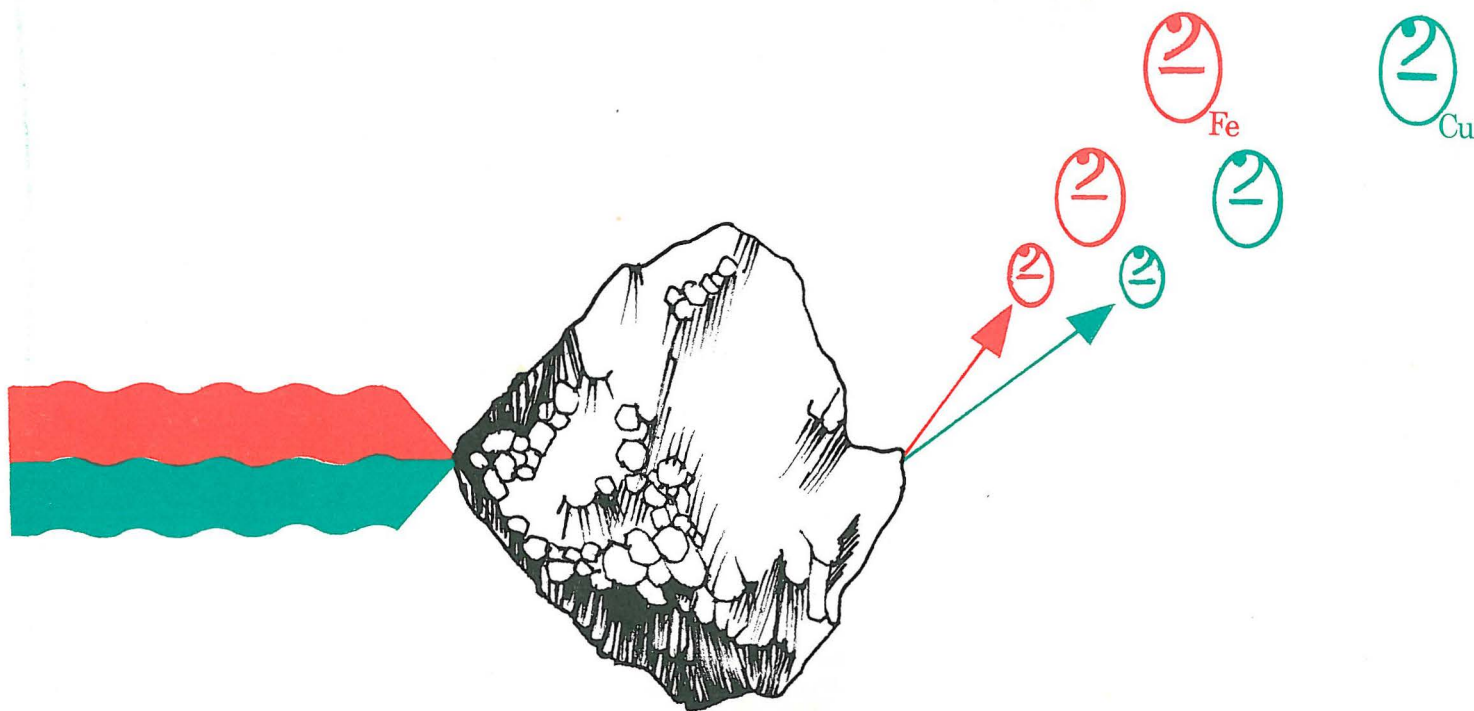


# Determinative Tables of $2\theta_{Cu}$ and $2\theta_{Fe}$ for Minerals of Southwestern United States



NEW MEXICO STATE BUREAU OF MINES AND MINERAL RESOURCES

Don H. Baker, Jr., *Director*

Full-time Staff

|   |  |
|---|--|
| JOYCE M. AGUILAR, <i>Stenographer</i>               | ROBERT W. KELLEY, <i>Editor &amp; Geologist</i>          |
| WILLIAM E. ARNOLD, <i>Scientific Illustrator</i>    | FRANK E. KOTTELOWSKI, <i>Ass't. Dir. &amp; Sr. Geol.</i> |
| BLAIR R. BENNER, <i>Junior Metallurgist</i>         | JACQUES R. RENAULT, <i>Geologist</i>                     |
| ROBERT A. BIEBERMAN, <i>Petroleum Geologist</i>     | RONALD ROMAN, <i>Chief Research Metallurgist</i>         |
| LYNN A. BRANDVOLD, <i>Chemist</i>                   | JOHN W. SHOMAKER, <i>Geologist</i>                       |
| CHARLES E. CHAPIN, <i>Geologist</i>                 | JACKIE H. SMITH, <i>Laboratory Assistant</i>             |
| RICHARD R. CHAVEZ, <i>Technician</i>                | KARL VONDER LINDEN, <i>Min. Eng., Env. Geol.</i>         |
| E. JACK COATS, <i>Bureau Info. Coordinator</i>      | CHARLES W. WALKER, <i>Geochemist-Mineralogist</i>        |
| JILL COLLIS, <i>Secretary</i>                       | ROBERT H. WEBER, <i>Senior Geologist</i>                 |
| LOIS M. DEVLIN, <i>Office Manager</i>               | SHIRLEY WHYTE, <i>Clerk-Typist</i>                       |
| JO DRAKE, <i>Administrative Ass't. &amp; Sec'y.</i> | MAX E. WILLARD, <i>Economic Geologist</i>                |
| ROUSSEAU H. FLOWER, <i>Senior Paleontologist</i>    | ROBERT WOOD, <i>Draftsman I</i>                          |
| ROY W. FOSTER, <i>Petroleum Geologist</i>           | JUARINE W. WOOLDRIDGE, <i>Editorial Clerk</i>            |
| WILLIAM L. HAWKS, <i>Materials Engineer</i>         | MICHAEL W. WOOLDRIDGE, <i>Draftsman</i>                  |

Part-time Staff

|   |  |
|---|--|
| CORALE BRIERLEY, <i>Ass't. Chemist, Biology</i> | RUFIE MONTOYA, <i>Dup. Mach. Oper.</i> |
| ROLAND F. DICKEY, <i>Public Relations</i>       | JOHN REICHE, <i>Instrument Manager</i> |

Graduate Students

|                                      |                                     |
|--------------------------------------|-------------------------------------|
| ROGER ALLMENDINGER, <i>Geologist</i> | JESÚS NÁJERA, <i>Hydrogeologist</i> |
| WILLIAM AVERILL, <i>Metallurgist</i> | CRAIG OLSON, <i>Metallurgist</i>    |
| N. BAKSHANI, <i>Metallurgist</i>     | RICHARD PAWLOWICZ, <i>Geologist</i> |
| JIM BRUNING, <i>Geologist</i>        | TERRY SEIMERS, <i>Geologist</i>     |
| MICHAEL JAWORSKI, <i>Geologist</i>   | DON SIMON, <i>Geologist</i>         |

Plus more than 28 undergraduate assistants

New Mexico Tech Staff Advisors

|  |                                     |
|--|-------------------------------------|
| GALE BILLINGS, <i>Geoscience</i>               | ALLAN R. SANFORD, <i>Geophysics</i> |
| PAIGE W. CHRISTIANSEN, <i>Historian-Mining</i> | FRANK B. TITUS, <i>Hydrology</i>    |

New Mexico State Bureau of Mines and Mineral Resources

Circular 127

DETERMINATIVE TABLES OF  $2\theta_{Cu}$  AND  $2\theta_{Fe}$  FOR MINERALS  
OF SOUTHWESTERN UNITED STATES

by Charles W. Walker and Jacques R. Renault

Socorro, 1972

Geotechnical  
Information Center

N. M. BUREAU OF MINES  
AND MINERAL RESOURCES  
SOCORRO, N. M. 87801

New Mexico State Bureau of Mines and Mineral Resources  
Don H. Baker, Jr., *Director*

a division of  
New Mexico Institute of Mining and Technology  
Stirling A. Colgate, *President*

BOARD OF REGENTS

Ex Officio

Bruce King, *Governor*

Leonard DeLayo, *Superintendent of Public Instruction*

Appointed

William G. Abbott, Chairman, 1967-1973, *Hobbs*

Henry S. Birdseye, 1969-1975, *Albuquerque*

Ben Shantz, 1971-1977, *Silver City*

Steve Torres, 1967-1973, *Socorro*

James R. Woods, 1971-1977, *Socorro*

Published by Authority of State of New Mexico, NMSA 1953 Sec. 63-1-4  
Printed by NMIMT Photo Laboratory, June 1972

Available from New Mexico State Bureau of Mines, Socorro, NM 87801  
Deposited in public libraries

Price \$3.00

INTRODUCTION

The conversion of Bragg angle or two-theta ( $2\Theta$ ) to interplanar spacing is a time-consuming step in the routine identification of minerals by X-ray diffraction methods. Furthermore, the derived "d-spacings" do not bear a linear relationship to the diffractometer record and introduce an additional error in the interpretation of diffraction spectra. The tables appearing in this publication alleviate these inconveniences in the X-ray identification of inorganic materials. This information is useful to persons working in the mineral industries and sciences.

Selection of minerals included in the tables was made primarily on the basis of species included in Stuart A. Northrop's *Minerals of New Mexico* (University of New Mexico Press, 1959). The names ankerite, endlichite, jenkinsite, martite, piedmontite, and rossite, however, do not appear in the tables due to inadequate X-ray data, or because they are synonymous with other mineral names. Several species, likely to occur in New Mexico or which are sufficiently important, have been included in the tables even though not reported in Northrop's compilation. Thus, these tables should not be used as an authority on the occurrence of minerals in New Mexico.

G. Y. Chao (Geological Paper 69-2, Carleton Univ., Ottawa, 1969) prepared a similar set of tables; however, the tables published herein are more applicable to mineral studies of materials from the southwestern United States. Tables for iron radiation are also included to facilitate studies of mixtures containing iron-bearing minerals.

An IBM 360 model 44 computer was used to generate the values presented in this publication. Interplanar spacings published by the Joint Committee on Powder Diffraction Standards were converted to two-theta angles

using the mean wavelengths for copper K-alpha and iron K-alpha radiation given by J. H. Fang and F. Donald Bloss in their "X-ray Diffraction Tables" published by Southern Illinois University Press in 1966:

$$\text{Cu } K_{\alpha} = 1.54178 \text{ \AA}$$

$$\text{Fe } K_{\alpha} = 1.93728 \text{ \AA},$$

to solve the Bragg equation,

$$n\lambda = 2d \sin \Theta .$$

The tables are divided into three parts: 1) determinative tables of copper radiation (green sheets), 2) an alphabetical listing (white sheets), and 3) determinative tables of iron radiation (pink sheets). The alphabetical listing is placed between the two determinative tables to minimize inadvertent misuse of iron tables for copper and vice versa.

In the alphabetical listing, the three most intense lines are given along with the file number of the Joint Committee on Powder Diffraction Standards. In the determinative tables, the six most intense lines are given, and the first three are permuted and listed in order of increasing two-theta; thus, each mineral appears three times. The determinative tables for iron are computed from the data for copper radiation; and a string of stars indicates either that an equivalent diffraction line for iron radiation is greater than 180 degrees two-theta, or, that data is nonexistent.

The Joint Committee on Powder Diffraction Standards granted permission to publish this data.

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 2.90               | 6.10  | 9.12  | 12.21 | 24.45 | 18.29 | 50                 | 100 | 20  | 20  | 20  | 15  | CHLORITE-MONT.           | 7-0027   |
| 2.98               | 6.01  | 18.07 | 61.58 | 12.09 | 27.02 | 50                 | 100 | 50  | 40  | 25  | 25  | CHLORITE AL-MONT.        | 7-0051   |
| 4.20               | 10.04 | 24.98 | 30.48 | 29.06 | 29.26 | 100                | 80  | 80  | 80  | 60  | 60  | OKENITE                  | 9-0469   |
| 4.70               | 60.25 | 34.36 | 9.72  | 19.51 | 24.66 | 100                | 70  | 60  | 50  | 50  | 50  | SAPONITE                 | 6-0002   |
| 5.20               | 26.45 | 60.29 | 10.41 | 19.38 | 15.57 | 100                | 80  | 70  | 50  | 50  | 40  | SAPONITE SYN             | 12-0168  |
| 5.32               | 60.95 | 19.68 | 34.77 | 72.10 | 24.05 | 100                | 90  | 80  | 50  | 50  | 40  | SAPONITE                 | 11-0056  |
| 5.67               | 60.38 | 19.47 | 34.09 |       |       | 100                | 50  | 40  | 30  |     |     | SAPONITE, FE RICH        | 12-0160  |
| 5.74               | 19.44 | 60.90 | 33.92 | 35.02 | 36.96 | 100                | 100 | 100 | 80  | 80  | 40  | NONTRONITE               | 2-0008   |
| 5.78               | 19.73 | 29.09 | 34.36 | 35.19 | 54.63 | 100                | 100 | 100 | 100 | 100 | 100 | MONTMORILLONITE          | 3-0009   |
| 5.84               | 19.92 | 29.56 | 34.46 | 36.04 | 55.66 | 100                | 100 | 100 | 100 | 100 | 100 | BEIDELLITE               | 3-0013   |
| 5.89               | 19.60 | 17.85 | 2.94  | 35.34 | 61.44 | 90                 | 100 | 75  | 60  | 50  | 50  | CHLORITE-MONT.           | 12-0231  |
| 5.89               | 19.73 | 17.70 | 29.58 | 61.85 | 62.17 | 100                | 80  | 60  | 60  | 50  | 50  | MONTMORILLONITE          | 13-0135  |
| 5.92               | 11.84 | 33.14 | 32.06 | 54.92 | 24.30 | 100                | 50  | 50  | 40  | 40  | 30  | SANTAFEITE               | 11-0169  |
| 6.01               | 2.98  | 18.07 | 61.58 | 12.09 | 27.02 | 100                | 50  | 50  | 40  | 25  | 25  | CHLORITE AL-MONT.        | 7-0051   |
| 6.10               | 2.90  | 9.12  | 12.21 | 24.45 | 18.29 | 100                | 50  | 20  | 20  | 20  | 15  | CHLORITE-MONT.           | 7-0027   |
| 6.22               | 31.50 | 18.80 | 25.16 | 12.48 | 36.53 | 100                | 90  | 60  | 60  | 40  | 30  | PENNINITE                | 10-0412  |
| 6.22               | 60.51 | 24.25 | 19.42 | 17.88 | 71.47 | 100                | 90  | 80  | 50  | 40  | 40  | SAPONITE                 | 13-0086  |
| 6.22               | 60.60 | 19.42 | 34.29 | 34.91 | 35.55 | 100                | 70  | 60  | 50  | 50  | 45  | VERMICULITE              | 16-0613  |
| 6.27               | 12.52 | 25.18 | 18.78 | 35.11 | 36.68 | 80                 | 100 | 50  | 30  | 30  | 30  | CHLORITE (RIPIDOLITE)    | 7-0076   |
| 6.27               | 12.56 | 25.30 | 18.92 | 35.77 | 59.27 | 50                 | 100 | 90  | 50  | 50  | 50  | CHLORITE (APHROSIDERITE) | 12-0243  |
| 6.31               | 12.47 | 25.23 | 18.88 | 59.44 | 31.61 | 90                 | 100 | 100 | 70  | 60  | 50  | CHAMOSITE (MG)           | 5-0146   |
| 6.31               | 12.50 | 25.15 | 34.45 | 36.56 | 35.08 | 80                 | 100 | 80  | 80  | 80  | 70  | CHLORITE (DIABANTITE)    | 7-0171   |
| 6.31               | 20.13 | 35.77 | 62.31 | 28.89 | 55.71 | 100                | 100 | 80  | 80  | 60  | 60  | MONTMORILLONITE SYN      | 3-0016   |
| 6.31               | 25.82 | 60.47 | 19.42 | 25.37 | 34.22 | 100                | 60  | 60  | 40  | 40  | 40  | VERMICULITE              | 10-0439  |
| 6.36               | 19.98 | 25.14 | 60.90 | 62.72 | 12.46 | 100                | 80  | 50  | 50  | 50  | 20  | NONTRONITE               | 2-0027   |
| 6.50               | 19.86 | 26.69 | 27.62 | 30.62 | 34.63 | 100                | 18  | 10  | 10  | 8   | 5   | MONTMORILLONITE          | 13-0259  |
| 6.64               | 19.66 | 25.50 | 50.96 |       |       | 100                | 60  | 50  | 40  |     |     | NONTRONITE               | 13-0508  |
| 6.64               | 19.80 | 20.20 | 20.54 | 22.38 | 22.78 | 60                 | 100 | 30  | 25  | 20  | 20  | ALUNOGEN                 | 16-0360  |
| 6.80               | 7.43  | 22.00 | 29.48 | 35.05 | 38.47 | 60                 | 100 | 50  | 40  | 40  | 30  | STILPNOMELANE            | 17-0505  |
| 7.19               | 33.56 | 36.07 | 19.73 | 20.66 | 32.61 | 100                | 60  | 60  | 35  | 35  | 35  | SEPIOLITE                | 14-0001  |
| 7.24               | 11.41 | 14.75 | 21.34 | 20.48 | 29.66 | 100                | 80  | 30  | 30  | 16  | 16  | ULEXITE                  | 12-0419  |
| 7.31               | 35.05 | 20.63 | 27.92 | 23.73 | 26.48 | 100                | 55  | 40  | 35  | 30  | 30  | SEPIOLITE                | 13-0595  |
| 7.43               | 6.80  | 22.00 | 29.48 | 35.05 | 38.47 | 100                | 60  | 50  | 40  | 40  | 30  | STILPNOMELANE            | 17-0505  |
| 7.43               | 19.95 | 35.05 | 62.31 | 30.09 | 54.28 | 100                | 90  | 80  | 80  | 60  | 60  | MONTMORILLONITE          | 2-0037   |
| 7.96               | 28.15 | 16.40 | 19.90 | 45.56 | 48.55 | 100                | 37  | 3   | 3   | 2   | 1   | MONTMORILLONITE (AL) SYN | 11-0303  |
| 8.04               | 27.02 | 41.02 | 66.82 | 79.94 |       | 100                | 80  | 60  | 40  | 20  |     | ALLOPHANE                | 2-0039   |
| 8.10               | 32.04 | 40.22 | 29.46 | 16.02 | 48.92 | 85                 | 100 | 25  | 14  | 10  | 8   | PLUMBOJAROSITE           | 15-0648  |
| 8.42               | 25.96 | 29.16 | 32.90 | 12.88 | 21.40 | 100                | 40  | 40  | 40  | 30  | 30  | COPIAPITE                | 11-0395  |
| 8.50               | 19.73 | 35.05 | 24.05 | 61.85 | 17.15 | 80                 | 100 | 80  | 60  | 60  | 40  | MUSCOVITE (AMMONIUM) SYN | 13-0573  |
| 8.58               | 17.86 | 24.78 | 25.50 | 26.74 | 19.80 | 100                | 80  | 70  | 70  | 70  | 60  | AUTUNITE                 | 8-0314   |
| 8.58               | 17.94 | 24.84 | 25.35 | 13.38 | 19.80 | 100                | 90  | 90  | 80  | 40  | 40  | TORBERNITE SYN           | 8-0360   |
| 8.66               | 12.70 | 26.82 | 18.20 | 33.14 | 21.86 | 100                | 50  | 50  | 40  | 40  | 30  | BISBEEITE                | 14-0685  |
| 8.66               | 17.64 | 27.86 | 44.36 | 13.36 | 26.40 | 100                | 90  | 50  | 40  | 30  | 30  | TYUYAMUNITE              | 6-0017   |
| 8.66               | 22.90 | 16.84 | 16.18 | 29.36 | 26.34 | 100                | 90  | 80  | 50  | 40  | 35  | CYANOTRICHITE            | 11-0131  |
| 8.66               | 24.84 | 17.50 | 26.58 | 13.00 | 50.96 | 100                | 90  | 80  | 50  | 40  | 30  | NOVACEKITE               | 8-0286   |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 8.67               | 26.39 | 34.24 | 36.93 | 60.60 | 19.42 | 100                | 100 | 60  | 30  | 30  | 25  | PHLOGOPITE (BORON SYN) | 14-0466  |
| 8.70               | 26.31 | 39.67 | 34.24 | 44.59 | 26.14 | 100                | 100 | 60  | 55  | 50  | 40  | PHLOGOPITE (3T SYN)    | 10-0481  |
| 8.73               | 26.51 | 34.17 | 44.94 | 60.16 | 41.42 | 100                | 100 | 100 | 65  | 50  | 45  | PHLOGOPITE             | 10-0493  |
| 8.73               | 26.58 | 45.13 | 35.76 | 26.15 | 54.88 | 100                | 100 | 100 | 50  | 45  | 35  | PHLOGOPITE (3T)        | 10-0492  |
| 8.75               | 26.45 | 33.69 | 36.68 | 41.42 | 45.34 | 100                | 100 | 80  | 80  | 80  | 80  | BIOTITE                | 2-0045   |
| 8.75               | 34.67 | 19.60 | 26.77 | 37.54 | 61.35 | 100                | 100 | 80  | 60  | 60  | 60  | GLAUCONITE             | 9-0439   |
| 8.77               | 26.53 | 19.77 | 34.98 | 24.32 | 29.09 | 100                | 100 | 90  | 90  | 60  | 50  | MUSCOVITE (SYN 1M)     | 7-0025   |
| 8.82               | 10.64 | 13.10 | 26.42 | 27.68 | 29.16 | 100                | 100 | 90  | 80  | 70  | 60  | FERRIMOLYBDITE SYN     | 15-0289  |
| 8.82               | 17.72 | 26.34 | 58.76 | 33.02 | 33.92 | 100                | 90  | 90  | 50  | 40  | 40  | SERPIERITE             | 14-0188  |
| 8.82               | 19.54 | 26.58 | 34.46 | 60.90 | 24.30 | 100                | 80  | 80  | 80  | 60  | 50  | ROSCOEELITE            | 10-0496  |
| 8.83               | 26.60 | 35.02 | 45.11 | 19.91 | 17.67 | 100                | 100 | 90  | 75  | 65  | 55  | MUSCOVITE (SYN 2M)     | 7-0032   |
| 8.84               | 19.82 | 26.77 | 34.36 | 60.51 | 37.15 | 100                | 90  | 90  | 60  | 60  | 40  | ILLITE (TRIOCT.)       | 9-0343   |
| 8.84               | 26.69 | 17.77 | 24.59 | 28.99 | 34.80 | 75                 | 100 | 75  | 75  | 75  | 75  | LEPIDOLITE (1M)        | 10-0485  |
| 8.84               | 26.85 | 34.83 | 17.81 | 19.86 | 23.10 | 50                 | 100 | 75  | 50  | 50  | 50  | LEPIDOLITE (3M)        | 10-0484  |
| 8.84               | 34.81 | 45.61 | 17.74 | 19.73 | 24.59 | 60                 | 100 | 80  | 50  | 50  | 50  | LEPIDOLITE (2M2)       | 14-0011  |
| 8.86               | 35.05 | 19.82 | 26.94 | 61.85 | 24.59 | 80                 | 100 | 80  | 80  | 80  | 60  | MUSCOVITE (BA)         | 10-0490  |
| 8.87               | 26.76 | 17.77 | 45.37 | 34.99 | 19.77 | 100                | 100 | 53  | 47  | 27  | 19  | MUSCOVITE (NAT.3T)     | 7-0042   |
| 8.88               | 19.86 | 26.85 | 35.05 | 17.85 | 23.73 | 100                | 100 | 100 | 100 | 80  | 80  | SERICITE               | 2-0056   |
| 8.88               | 26.77 | 45.44 | 26.37 | 28.52 | 30.80 | 100                | 65  | 16  | 10  | 10  | 8   | PHLOGOPITE SYN         | 16-0344  |
| 8.88               | 26.85 | 45.39 | 34.29 | 55.16 | 37.02 | 70                 | 100 | 30  | 20  | 20  | 18  | PHLOGOPITE SYN         | 16-0352  |
| 8.89               | 26.85 | 34.97 | 45.51 | 29.91 | 17.85 | 95                 | 100 | 54  | 46  | 34  | 31  | MUSCOVITE              | 6-0263   |
| 8.90               | 26.62 | 34.30 | 45.08 | 28.29 | 35.73 | 100                | 100 | 30  | 30  | 20  | 15  | PHLOGOPITE (1M)        | 10-0495  |
| 8.91               | 26.77 | 34.36 | 18.14 | 19.51 | 24.94 | 100                | 100 | 80  | 60  | 60  | 60  | LEPIDOLITE             | 10-0483  |
| 8.94               | 33.66 | 28.98 | 27.76 | 36.64 | 18.01 | 60                 | 100 | 80  | 60  | 60  | 40  | TRONA                  | 11-0643  |
| 8.95               | 10.52 | 13.14 | 28.96 | 25.42 | 17.16 | 100                | 55  | 20  | 20  | 6   | 4   | FERRIMOLYBDITE         | 13-0191  |
| 9.02               | 27.10 | 45.83 | 28.94 | 26.69 | 30.94 | 80                 | 100 | 55  | 40  | 35  | 30  | ZINNWALDITE            | 13-0227  |
| 9.02               | 60.95 | 33.82 | 37.47 | 54.63 | 72.10 | 100                | 80  | 60  | 60  | 50  | 50  | GARNIERITE             | 2-0060   |
| 9.12               | 6.10  | 2.90  | 12.21 | 24.45 | 18.29 | 20                 | 100 | 50  | 20  | 20  | 15  | CHLORITE-MONT.         | 7-0027   |
| 9.12               | 19.82 | 27.70 | 18.29 | 34.63 | 35.92 | 60                 | 100 | 80  | 60  | 60  | 60  | MONTMORILLONITE (ANHY) | 7-0304   |
| 9.12               | 20.00 | 35.39 | 36.99 | 62.50 | 30.61 | 80                 | 100 | 90  | 80  | 80  | 70  | PARAGONITE             | 12-0165  |
| 9.14               | 23.46 | 19.36 | 35.88 | 16.00 | 34.60 | 100                | 75  | 65  | 65  | 45  | 40  | THAUMASITE             | 13-0156  |
| 9.35               | 15.94 | 17.63 | 20.53 | 22.97 | 30.55 | 100                | 100 | 100 | 100 | 100 | 100 | CHABAZITE              | 15-0618  |
| 9.47               | 28.65 | 19.04 | 36.28 | 48.69 | 60.64 | 100                | 100 | 90  | 65  | 40  | 40  | TALC                   | 13-0558  |
| 9.60               | 28.99 | 19.38 | 20.18 | 21.31 | 36.84 | 60                 | 100 | 50  | 20  | 15  | 15  | PYROPHYLLITE           | 12-0203  |
| 9.68               | 29.38 | 19.42 | 37.47 | 49.83 | 67.92 | 40                 | 100 | 50  | 40  | 40  | 40  | PYROPHYLLITE           | 2-0613   |
| 9.70               | 21.76 | 18.94 | 29.46 | 26.10 | 27.86 | 90                 | 100 | 70  | 70  | 50  | 50  | STILBITE               | 10-0433  |
| 9.92               | 30.16 | 31.58 | 24.78 | 28.86 | 29.86 | 100                | 80  | 80  | 60  | 60  | 60  | OKENITE                | 3-0029   |
| 9.93               | 17.48 | 36.64 | 32.78 | 45.30 | 47.56 | 70                 | 100 | 70  | 50  | 35  | 20  | ZARATITE               | 16-0164  |
| 9.93               | 22.38 | 30.06 | 26.02 | 17.38 | 31.94 | 70                 | 100 | 70  | 50  | 40  | 40  | HEULANDITE             | 13-0196  |
| 10.04              | 4.20  | 24.98 | 30.48 | 29.06 | 29.26 | 80                 | 100 | 80  | 80  | 60  | 60  | OKENITE                | 9-0469   |
| 10.16              | 24.16 | 25.58 | 27.60 | 16.28 | 17.98 | 100                | 100 | 80  | 80  | 75  | 75  | METATORBERNITE         | 16-0404  |
| 10.29              | 18.12 | 25.72 | 40.98 | 20.94 | 21.92 | 60                 | 100 | 100 | 60  | 30  | 30  | BASSETITE              | 7-0288   |
| 10.30              | 25.88 | 27.34 | 34.88 | 43.02 | 45.54 | 80                 | 100 | 100 | 80  | 80  | 80  | WAVELLITE              | 17-0203  |
| 10.31              | 26.37 | 29.38 | 21.62 | 28.06 | 54.21 | 100                | 90  | 90  | 80  | 80  | 70  | CORDIERITE             | 9-0472   |
| 10.36              | 21.89 | 25.98 | 29.48 | 28.52 | 54.45 | 100                | 80  | 80  | 80  | 65  | 65  | CORDIERITE (FE)        | 9-0473   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME            | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|-------------------------|----------|
| 10.36              | 28.52 | 10.47 | 21.73 | 26.29 | 29.32 | 80                 | 100 | 80  | 75  | 70  | 65  | CORDIERITE              | 12-0303  |
| 10.38              | 21.02 | 27.34 | 29.26 | 17.06 | 23.58 | 100                | 80  | 60  | 60  | 40  | 40  | METATUYAMUNITE          | 8-0287   |
| 10.38              | 10.47 | 29.39 | 29.43 | 28.50 | 29.66 | 95                 | 100 | 65  | 65  | 55  | 55  | CORDIERITE (LOW) SYN    | 13-0294  |
| 10.39              | 28.23 | 32.78 | 26.03 | 34.44 | 41.32 | 70                 | 100 | 80  | 45  | 35  | 35  | ARFVEDSONITE            | 14-0633  |
| 10.42              | 12.18 | 18.46 | 31.02 | 6.17  | 21.28 | 70                 | 100 | 80  | 70  | 30  | 20  | SCHROECKINGERITE SYN    | 8-0397   |
| 10.43              | 29.51 | 28.44 | 26.38 | 21.71 | 18.14 | 100                | 85  | 65  | 55  | 50  | 30  | CORDIERITE (HIGH) SYN   | 13-0293  |
| 10.44              | 24.64 | 42.82 | 20.98 | 16.50 | 34.32 | 100                | 85  | 70  | 65  | 45  | 35  | META-AUTUNITE I         | 12-0423  |
| 10.47              | 10.38 | 29.39 | 29.43 | 28.50 | 29.66 | 100                | 95  | 65  | 65  | 55  | 55  | CORDIERITE (LOW) SYN    | 13-0294  |
| 10.47              | 28.52 | 10.36 | 21.73 | 26.29 | 29.32 | 80                 | 100 | 80  | 75  | 70  | 65  | CORDIERITE              | 12-0303  |
| 10.49              | 21.18 | 27.24 | 25.28 | 29.76 | 14.98 | 100                | 80  | 70  | 60  | 60  | 50  | SKLODOWSKITE            | 8-0447   |
| 10.51              | 32.94 | 28.89 | 25.98 | 35.48 | 19.64 | 100                | 100 | 80  | 60  | 60  | 50  | RIEBECKITE              | 14-0230  |
| 10.51              | 33.05 | 28.70 | 26.37 | 27.27 | 30.40 | 70                 | 100 | 80  | 70  | 60  | 60  | ACTINOLITE              | 7-0336   |
| 10.52              | 8.95  | 13.14 | 28.96 | 25.42 | 17.16 | 55                 | 100 | 20  | 20  | 6   | 4   | FERRIMOLYBDITE          | 13-0191  |
| 10.53              | 25.88 | 27.86 | 35.02 | 15.70 | 30.27 | 100                | 80  | 80  | 80  | 60  | 60  | WAVELLITE               | 2-0075   |
| 10.53              | 28.72 | 32.82 | 35.44 | 19.69 | 29.97 | 100                | 55  | 50  | 45  | 20  | 20  | RIEBECKITE SYN          | 15-0516  |
| 10.56              | 28.60 | 33.12 | 27.29 | 48.09 | 31.90 | 100                | 100 | 90  | 75  | 50  | 45  | TREMOLITE               | 13-0437  |
| 10.56              | 32.56 | 29.09 | 22.98 | 25.82 | 27.36 | 70                 | 100 | 80  | 60  | 60  | 60  | CUMINGTONITE            | 7-0382   |
| 10.57              | 28.74 | 32.06 | 22.21 | 27.34 | 55.89 | 100                | 85  | 21  | 20  | 18  | 15  | TREMOLITE (FLUOR) SYN   | 9-0330   |
| 10.61              | 32.33 | 29.06 | 35.73 | 25.64 | 9.59  | 100                | 90  | 80  | 60  | 55  | 50  | GRUNERITE               | 17-0725  |
| 10.62              | 29.18 | 27.62 | 19.77 | 61.85 | 19.00 | 70                 | 100 | 50  | 35  | 25  | 20  | ANTHOPHYLLITE MG SYN    | 16-0401  |
| 10.64              | 8.82  | 13.10 | 26.42 | 27.68 | 29.16 | 100                | 100 | 90  | 80  | 70  | 60  | FERRIMOLYBDITE SYN      | 15-0289  |
| 10.66              | 62.13 | 30.62 | 36.07 | 56.15 | 15.49 | 60                 | 100 | 80  | 45  | 45  | 30  | CHRYSOCOLLA             | 11-0322  |
| 10.71              | 29.28 | 27.53 | 31.50 | 35.34 | 24.39 | 55                 | 100 | 60  | 40  | 40  | 35  | ANTHOPHYLLITE           | 9-0455   |
| 10.72              | 29.18 | 32.80 | 35.77 | 66.55 | 41.62 | 80                 | 100 | 90  | 80  | 80  | 60  | CUMINGTONITE (MN)       | 13-0376  |
| 10.74              | 12.34 | 14.15 | 22.06 | 27.88 | 29.18 | 100                | 100 | 100 | 100 | 100 | 100 | HARMOTOME               | 9-0480   |
| 10.75              | 29.35 | 27.69 | 9.88  | 19.16 | 33.45 | 100                | 75  | 20  | 12  | 10  | 10  | ANTHOPHYLLITE AL-FE     | 11-0253  |
| 10.80              | 21.70 | 30.06 | 18.38 | 14.50 | 25.28 | 100                | 90  | 80  | 70  | 60  | 60  | CUPROSKLODOWSKITE       | 8-0290   |
| 10.95              | 21.08 | 33.41 | 56.02 | 22.10 | 31.48 | 100                | 100 | 90  | 90  | 60  | 50  | ZUNYITE                 | 14-0698  |
| 11.09              | 31.20 | 27.41 | 19.30 | 22.28 | 29.63 | 90                 | 100 | 95  | 50  | 45  | 35  | BERYL                   | 9-0430   |
| 11.10              | 22.90 | 21.82 | 25.80 | 15.20 | 20.58 | 90                 | 100 | 90  | 70  | 60  | 60  | FERRIMOLYBDITE          | 15-0371  |
| 11.18              | 24.70 | 28.86 | 19.16 | 27.60 | 33.54 | 100                | 80  | 60  | 50  | 50  | 50  | DUNDASITE               | 21-0936  |
| 11.22              | 22.54 | 29.84 | 30.70 | 46.03 | 18.62 | 100                | 90  | 80  | 80  | 70  | 50  | URANOPHANE              | 8-0442   |
| 11.28              | 22.84 | 25.36 | 27.94 | 34.60 | 13.28 | 100                | 90  | 60  | 50  | 50  | 40  | BETA URANOPHANE         | 8-0301   |
| 11.32              | 30.02 | 36.06 | 24.86 | 19.62 | 22.66 | 100                | 100 | 100 | 80  | 65  | 65  | APOPHYLLITE             | 7-0170   |
| 11.34              | 17.04 | 31.82 | 38.78 | 44.60 | 28.56 | 45                 | 100 | 40  | 40  | 40  | 35  | NITROCALCITE            | 1-0229   |
| 11.41              | 7.24  | 14.75 | 21.34 | 20.48 | 29.66 | 80                 | 100 | 30  | 30  | 16  | 16  | ULEXITE                 | 12-0419  |
| 11.71              | 29.15 | 20.80 | 33.45 | 31.20 | 23.47 | 100                | 57  | 51  | 28  | 27  | 21  | GYPSUM                  | 6-0046   |
| 11.84              | 5.92  | 33.14 | 32.06 | 54.92 | 24.30 | 50                 | 100 | 50  | 40  | 40  | 30  | SANTAFEITE              | 11-0169  |
| 11.95              | 39.32 | 26.74 | 33.02 | 10.64 | 13.06 | 100                | 60  | 50  | 40  | 30  | 30  | FERRIMOLYBDITE          | 15-0290  |
| 11.96              | 20.13 | 20.46 | 24.59 | 37.63 | 38.81 | 95                 | 100 | 70  | 65  | 35  | 35  | HALLOYSITE              | 13-0375  |
| 12.03              | 24.30 | 27.50 | 36.64 | 27.76 | 28.22 | 100                | 50  | 10  | 10  | 4   | 4   | SCHOEPITE               | 13-0241  |
| 12.07              | 24.32 | 35.89 | 60.29 | 38.56 | 46.25 | 100                | 100 | 100 | 80  | 70  | 70  | SERPENTINE              | 9-0444   |
| 12.12              | 24.52 | 35.63 | 37.15 | 12.74 | 25.37 | 400                | 300 | 70  | 38  | 24  | 24  | ANTIGORITE (SERPENTINE) | 7-0417   |
| 12.14              | 17.44 | 25.88 | 24.30 | 25.36 | 27.68 | 100                | 70  | 25  | 15  | 12  | 12  | SCHOEPITE               | 13-0407  |
| 12.14              | 33.02 | 31.48 | 33.54 | 36.80 | 41.58 | 70                 | 100 | 85  | 50  | 50  | 35  | ILVAITE                 |          |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 12.16              | 34.50 | 42.73 | 21.88 | 18.14 | 33.04 | 100                | 200 | 80  | 70  | 60  | 55  | DIOPTASE                 | 7-0172   |
| 12.16              | 35.77 | 24.73 | 41.62 | 59.48 | 60.38 | 90                 | 100 | 80  | 50  | 50  | 40  | ANTIGORITE               | 10-0402  |
| 12.18              | 18.46 | 10.42 | 31.02 | 6.17  | 21.28 | 100                | 80  | 70  | 70  | 30  | 20  | SCHROECKERITE SYN        | 8-0397   |
| 12.21              | 35.88 | 24.59 | 42.06 | 51.08 | 19.25 | 60                 | 100 | 60  | 35  | 25  | 20  | SERPENTINE SYN           | 11-0386  |
| 12.26              | 24.78 | 28.40 | 29.16 | 40.22 | 14.36 | 20                 | 100 | 25  | 15  | 15  | 13  | CLINOCLASITE             | 12-0297  |
| 12.31              | 15.44 | 31.16 | 20.46 | 29.88 | 13.66 | 100                | 80  | 80  | 70  | 70  | 60  | EUDIALYTE                | 8-0355   |
| 12.31              | 18.48 | 24.73 | 6.18  | 31.05 | 35.05 | 100                | 100 | 100 | 60  | 60  | 40  | PENNINITE                | 10-0183  |
| 12.33              | 24.87 | 62.41 | 38.45 | 19.82 | 34.98 | 100                | 100 | 100 | 90  | 80  | 80  | KAOLINITE (DISORDERED)   | 6-0221   |
| 12.34              | 10.74 | 14.15 | 22.06 | 27.88 | 29.18 | 100                | 100 | 100 | 100 | 100 | 100 | HARMOTOME                | 9-0480   |
| 12.34              | 24.94 | 60.25 | 19.34 | 35.92 | 33.96 | 80                 | 100 | 100 | 70  | 50  | 40  | SERPENTINE (AL) SYN      | 11-0096  |
| 12.34              | 62.36 | 24.88 | 56.83 | 20.34 | 58.16 | 100                | 90  | 80  | 70  | 60  | 60  | KAOLINITE                | 14-0164  |
| 12.36              | 25.01 | 35.63 | 19.21 | 33.43 | 59.57 | 100                | 100 | 60  | 40  | 20  | 20  | CHAMOSITE                | 10-0404  |
| 12.36              | 27.68 | 23.14 | 32.28 | 36.80 | 35.30 | 100                | 50  | 35  | 35  | 35  | 25  | EUCLASE                  | 14-0065  |
| 12.37              | 24.88 | 38.78 | 21.58 | 35.88 | 19.95 | 90                 | 100 | 90  | 80  | 80  | 70  | DICKITE                  | 10-0430  |
| 12.38              | 24.87 | 38.71 | 21.55 | 23.42 | 35.77 | 100                | 100 | 90  | 70  | 60  | 50  | DICKITE                  | 10-0446  |
| 12.38              | 27.88 | 21.57 | 27.53 | 28.42 | 30.51 | 100                | 100 | 80  | 80  | 80  | 80  | PHILLIPSITE              | 12-0455  |
| 12.43              | 25.08 | 35.48 | 42.02 | 59.10 | 51.36 | 100                | 100 | 100 | 70  | 70  | 60  | CHAMOSITE FE(II)         | 7-0339   |
| 12.43              | 37.82 | 25.01 | 60.42 | 34.08 | 45.32 | 100                | 90  | 80  | 55  | 40  | 40  | SERPENTINE (AL)          | 12-0583  |
| 12.45              | 24.78 | 35.30 | 50.66 | 45.78 | 38.10 | 100                | 80  | 70  | 70  | 60  | 50  | SPANGOLITE               | 5-0142   |
| 12.47              | 25.23 | 6.31  | 18.88 | 59.44 | 31.61 | 100                | 100 | 90  | 70  | 60  | 50  | CHAMOSITE (MG)           | 5-0146   |
| 12.48              | 25.68 | 37.85 | 60.34 | 34.02 | 34.83 | 100                | 100 | 80  | 65  | 55  | 40  | SERPENTINE               | 11-0388  |
| 12.48              | 36.04 | 25.05 | 60.38 | 46.88 | 19.30 | 100                | 80  | 70  | 50  | 45  | 40  | SERPENTINE (AL)          | 13-0004  |
| 12.50              | 6.31  | 25.15 | 34.45 | 36.56 | 35.08 | 100                | 80  | 80  | 80  | 80  | 70  | CHLORITE (DIABANTITE)    | 7-0171   |
| 12.52              | 6.27  | 25.18 | 18.78 | 35.11 | 36.68 | 100                | 80  | 50  | 30  | 30  | 30  | CHLORITE (RIPIDOLITE)    | 7-0076   |
| 12.54              | 25.23 | 36.53 | 34.09 | 61.08 | 19.55 | 100                | 100 | 80  | 70  | 70  | 60  | CHAMOSITE FE(III)        | 7-0329   |
| 12.56              | 25.23 | 35.63 | 6.27  | 18.84 | 42.02 | 100                | 80  | 50  | 40  | 40  | 40  | CHLORITE (THURINGITE)    | 13-0029  |
| 12.56              | 25.30 | 6.27  | 18.92 | 35.77 | 59.27 | 100                | 90  | 50  | 50  | 50  | 50  | CHLORITE (APHROSIDERITE) | 12-0243  |
| 12.56              | 25.30 | 35.63 | 59.44 | 42.23 | 33.43 | 100                | 100 | 90  | 70  | 60  | 40  | CHAMOSITE                | 7-0315   |
| 12.65              | 30.19 | 28.89 | 49.83 | 54.63 | 34.09 | 100                | 100 | 80  | 70  | 70  | 60  | NATROLITE (K) SYN        | 3-0062   |
| 12.70              | 8.66  | 26.82 | 18.20 | 33.14 | 21.86 | 50                 | 100 | 50  | 40  | 40  | 30  | BISBEEITE                | 14-0685  |
| 12.70              | 25.42 | 21.76 | 40.22 | 34.88 | 57.54 | 100                | 60  | 50  | 50  | 40  | 40  | CHALCOPHANITE            | 15-0807  |
| 12.80              | 34.20 | 38.96 | 58.34 | 34.60 | 25.80 | 100                | 80  | 80  | 80  | 70  | 60  | GERHARDTITE              | 14-0687  |
| 12.81              | 25.50 | 19.14 | 45.30 | 59.60 | 6.50  | 100                | 100 | 80  | 80  | 80  | 70  | THURINGITE               | 3-0067   |
| 12.83              | 25.52 | 19.17 | 45.34 | 59.65 | 6.50  | 100                | 100 | 80  | 80  | 80  | 70  | CHLORITE (THURINGITE)    | 3-0067   |
| 12.83              | 37.47 | 28.52 | 18.10 | 42.23 | 60.08 | 100                | 100 | 90  | 70  | 40  | 30  | CRYPTOMELANE             | 12-0706  |
| 13.02              | 30.09 | 33.05 | 27.88 | 18.07 | 23.16 | 100                | 67  | 67  | 53  | 40  | 40  | VIVIANITE SYN            | 3-0070   |
| 13.04              | 34.32 | 24.16 | 30.92 | 32.90 | 27.42 | 100                | 80  | 70  | 40  | 40  | 30  | AURICHALCITE             | 17-0743  |
| 13.10              | 8.82  | 10.64 | 26.42 | 27.68 | 29.16 | 90                 | 100 | 100 | 80  | 70  | 60  | FERRIMOLYBDITE SYN       | 15-0289  |
| 13.14              | 8.95  | 10.52 | 28.96 | 25.42 | 17.16 | 20                 | 100 | 55  | 20  | 6   | 4   | FERRIMOLYBDITE           | 13-0191  |
| 13.23              | 27.79 | 29.88 | 20.32 | 55.34 | 32.93 | 100                | 75  | 75  | 63  | 63  | 50  | ERYTHRITE                | 10-0480  |
| 13.31              | 54.73 | 27.70 | 26.69 | 33.18 | 38.81 | 100                | 14  | 12  | 8   | 8   | 8   | ERYTHRITE                | 11-0626  |
| 13.31              | 27.10 | 23.79 | 64.14 | 23.47 | 29.38 | 25                 | 100 | 20  | 18  | 14  | 12  | SULPHUR                  | 13-0141  |
| 13.40              | 28.76 | 27.08 | 27.00 | 16.52 | 37.44 | 86                 | 100 | 75  | 73  | 55  | 54  | HEMIMORPHITE             | 5-0555   |
| 13.46              | 29.98 | 28.06 | 11.31 | 20.51 | 33.05 | 100                | 30  | 26  | 25  | 20  | 18  | ANNABERGITE              | 11-0625  |
| 13.48              | 28.58 | 25.20 | 20.88 | 27.42 | 41.78 | 100                | 70  | 50  | 30  | 30  | 30  | CARNOTITE                | 8-0317   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 13.61              | 22.72 | 35.44 | 16.40 | 33.28 | 27.86 | 67                 | 100 | 67  | 58  | 50  | 42  | BROCHANTITE              | 3-0282   |
| 13.62              | 29.88 | 35.34 | 20.04 | 30.72 | 41.02 | 40                 | 100 | 60  | 40  | 40  | 20  | ACMITE (AEGIRINE)        | 3-0621   |
| 13.73              | 23.92 | 34.09 | 31.05 | 42.02 | 51.02 | 30                 | 100 | 50  | 30  | 30  | 30  | HAUYNITE                 | 2-0331   |
| 13.84              | 24.14 | 34.39 | 31.27 | 42.50 | 51.61 | 40                 | 100 | 75  | 40  | 40  | 20  | NOSEAN SYN               | 15-0470  |
| 13.86              | 27.92 | 23.54 | 24.16 | 22.06 | 24.30 | 20                 | 100 | 25  | 20  | 15  | 15  | ALBITE                   | 9-0466   |
| 13.90              | 30.84 | 29.95 | 20.18 | 36.56 | 35.28 | 90                 | 100 | 90  | 45  | 45  | 30  | ACMITE SYN               | 15-0787  |
| 14.06              | 24.52 | 43.51 | 37.96 | 35.05 | 59.23 | 17                 | 100 | 33  | 17  | 13  | 10  | SODALITE                 | 3-0338   |
| 14.06              | 31.82 | 25.75 | 28.42 | 30.04 | 41.98 | 70                 | 100 | 80  | 70  | 70  | 70  | AXINITE (TINZENITE)      | 6-0444   |
| 14.08              | 19.40 | 26.50 | 32.78 | 36.04 | 29.76 | 90                 | 100 | 90  | 80  | 80  | 70  | SODDYITE                 | 8-0195   |
| 14.14              | 27.08 | 36.34 | 46.78 | 52.88 | 92.08 | 100                | 90  | 80  | 70  | 40  | 40  | LEPIDOCROCITE            | 8-0098   |
| 14.15              | 10.74 | 12.34 | 22.06 | 27.88 | 29.18 | 100                | 100 | 100 | 100 | 100 | 100 | HARMOTOME                | 9-0480   |
| 14.22              | 28.48 | 33.66 | 31.94 | 36.34 | 38.60 | 80                 | 100 | 80  | 70  | 70  | 70  | GLAUBERITE               | 2-0556   |
| 14.32              | 32.16 | 40.08 | 40.22 | 37.28 | 47.84 | 100                | 65  | 30  | 25  | 16  | 16  | WEDDELLITE               | 17-0541  |
| 14.34              | 24.16 | 30.70 | 25.88 | 27.16 | 18.47 | 70                 | 100 | 80  | 70  | 70  | 60  | TURQUOIS                 | 6-0214   |
| 14.38              | 39.48 | 49.76 | 32.64 | 58.34 | 60.02 | 100                | 45  | 25  | 16  | 12  | 12  | MOLYBDENITE (2H) SYN     | 6-0097   |
| 14.40              | 29.07 | 28.46 | 40.37 | 27.91 | 35.25 | 75                 | 100 | 95  | 75  | 65  | 25  | LAZULITE                 | 14-0137  |
| 14.42              | 26.82 | 19.80 | 33.28 | 36.34 | 49.20 | 80                 | 100 | 90  | 70  | 60  | 50  | SODDYITE                 | 12-0180  |
| 14.52              | 33.02 | 58.34 | 60.44 | 34.06 | 38.44 | 100                | 70  | 70  | 70  | 60  | 60  | MOLYBDENITE (3R)         | 17-0744  |
| 14.72              | 29.76 | 31.94 | 25.72 | 49.48 | 42.40 | 95                 | 100 | 50  | 45  | 12  | 10  | BASSANITE                | 14-0453  |
| 14.75              | 7.24  | 11.41 | 21.34 | 20.48 | 29.66 | 30                 | 100 | 80  | 30  | 16  | 16  | ULEXITE                  | 12-0419  |
| 14.78              | 29.46 | 29.84 | 19.62 | 21.18 | 23.39 | 60                 | 100 | 100 | 60  | 60  | 60  | SCAWTITE                 | 12-0777  |
| 14.92              | 30.16 | 50.36 | 28.86 | 59.60 | 34.88 | 90                 | 100 | 80  | 70  | 60  | 40  | STIBICONITE              | 10-0388  |
| 14.99              | 29.98 | 18.41 | 36.37 | 37.63 | 21.20 | 70                 | 100 | 90  | 70  | 70  | 60  | OLIVENITE                | 4-0657   |
| 15.02              | 31.27 | 20.27 | 13.42 | 28.24 | 30.40 | 64                 | 100 | 64  | 48  | 48  | 48  | NATROLITE                | 3-0705   |
| 15.02              | 35.16 | 17.40 | 30.48 | 27.60 | 25.80 | 90                 | 100 | 90  | 90  | 85  | 75  | DUMORTIERITE             | 7-0071   |
| 15.08              | 37.94 | 46.52 | 26.02 | 29.36 | 25.50 | 100                | 50  | 45  | 35  | 30  | 20  | LEONITE SYN              | 17-0134  |
| 15.12              | 18.42 | 34.06 | 30.58 | 24.10 | 53.54 | 90                 | 100 | 100 | 90  | 70  | 70  | LIBETHENITE              | 8-0107   |
| 15.12              | 29.44 | 39.48 | 24.78 | 26.92 | 46.52 | 100                | 95  | 45  | 40  | 35  | 30  | BEAVERITE                | 17-0476  |
| 15.30              | 30.83 | 42.02 | 9.63  | 13.75 | 26.94 | 100                | 90  | 50  | 40  | 40  | 30  | HYDROMAGNESITE           | 8-0179   |
| 15.44              | 12.31 | 31.16 | 20.46 | 29.88 | 13.66 | 80                 | 100 | 80  | 70  | 70  | 60  | EUDIALYTE                | 8-0355   |
| 15.70              | 28.50 | 23.08 | 35.16 | 45.06 | 22.20 | 50                 | 100 | 50  | 50  | 50  | 35  | COLEMANITE               | 6-0331   |
| 15.80              | 25.98 | 30.56 | 53.39 | 33.27 | 35.85 | 80                 | 100 | 80  | 60  | 50  | 50  | ANALCIME (ZEOLITE)       | 7-0340   |
| 15.80              | 25.99 | 30.52 | 35.83 | 52.47 | 18.29 | 80                 | 100 | 70  | 50  | 50  | 40  | ANALCIME (ZEOLITE)       | 7-0363   |
| 15.83              | 30.51 | 19.91 | 10.79 | 11.64 | 19.04 | 60                 | 100 | 80  | 40  | 40  | 40  | NEPHELINE III SYN        | 12-0247  |
| 15.88              | 32.08 | 22.45 | 25.30 | 38.15 | 40.49 | 100                | 60  | 35  | 15  | 15  | 15  | ANDALUSITE X SYN         | 13-0231  |
| 15.90              | 25.14 | 26.10 | 29.36 | 9.15  | 13.02 | 70                 | 100 | 90  | 50  | 30  | 30  | VOLTAITE                 | 17-0539  |
| 15.92              | 19.98 | 28.22 | 34.74 | 29.26 | 17.90 | 100                | 100 | 100 | 90  | 80  | 60  | SCORODITE                | 5-0216   |
| 15.94              | 9.35  | 17.63 | 20.53 | 22.97 | 30.55 | 100                | 100 | 100 | 100 | 100 | 100 | CHABAZITE                | 15-0618  |
| 16.00              | 19.60 | 32.32 | 41.62 | 22.68 | 25.30 | 100                | 90  | 90  | 90  | 70  | 60  | ANDALUSITE               | 13-0122  |
| 16.04              | 30.70 | 32.78 | 25.50 | 27.42 | 17.62 | 80                 | 100 | 100 | 80  | 80  | 60  | MELANOTEKITE             | 15-0633  |
| 16.14              | 27.76 | 27.34 | 28.68 | 18.58 | 23.20 | 100                | 75  | 60  | 60  | 45  | 40  | MIRABILITE               | 11-0647  |
| 16.40              | 7.96  | 28.15 | 19.90 | 45.56 | 48.55 | 3                  | 100 | 37  | 3   | 2   | 1   | MONTMORILLONITE (AL) SYN | 11-0303  |
| 16.40              | 17.72 | 31.70 | 32.52 | 39.84 | 50.08 | 100                | 100 | 100 | 100 | 100 | 80  | ATACAMITE                | 2-0146   |
| 16.42              | 27.97 | 30.40 | 32.80 | 49.00 | 36.07 | 100                | 90  | 80  | 80  | 60  | 50  | REALGAR                  | 9-0441   |
| 16.45              | 27.31 | 25.92 | 30.64 | 31.48 | 38.03 | 80                 | 100 | 85  | 70  | 70  | 65  | LEUCITE                  |          |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME        | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|---------------------|----------|
| 16.52              | 21.08 | 21.23 | 16.74 | 31.14 | 33.80 | 80                 | 100 | 50  | 35  | 35  | 30  | GOSLARITE           | 9-0395   |
| 16.54              | 21.08 | 33.40 | 14.78 | 32.16 | 33.66 | 25                 | 100 | 25  | 20  | 20  | 20  | EPSOMITE            | 8-0467   |
| 16.72              | 33.66 | 56.40 | 39.12 | 42.82 | 27.42 | 100                | 100 | 100 | 90  | 90  | 80  | MURDOCHITE          | 7-0028   |
| 16.84              | 8.66  | 22.90 | 16.18 | 29.36 | 26.34 | 80                 | 100 | 90  | 50  | 40  | 35  | CYANOTRICHITE       | 11-0131  |
| 17.04              | 11.34 | 31.82 | 38.78 | 44.60 | 28.56 | 100                | 45  | 40  | 40  | 40  | 35  | NITROCALCITE        | 1-0229   |
| 17.22              | 25.25 | 35.68 | 24.30 | 38.54 | 39.40 | 70                 | 100 | 60  | 40  | 30  | 30  | AZURITE             | 11-0136  |
| 17.22              | 25.33 | 40.56 | 24.22 | 35.77 | 39.40 | 55                 | 100 | 70  | 50  | 35  | 35  | AZURITE             | 11-0682  |
| 17.30              | 27.58 | 30.80 | 55.66 | 20.88 | 39.12 | 80                 | 100 | 80  | 80  | 60  | 60  | DESCLOIZITE         | 12-0537  |
| 17.39              | 34.09 | 28.89 | 54.98 | 60.51 | 35.77 | 80                 | 100 | 20  | 20  | 18  | 15  | SPINEL (MN)         | 4-0732   |
| 17.40              | 35.16 | 15.02 | 30.48 | 27.60 | 25.80 | 90                 | 100 | 90  | 90  | 85  | 75  | DUMORTIERITE        | 7-0071   |
| 17.44              | 12.14 | 25.88 | 24.30 | 25.36 | 27.68 | 70                 | 100 | 25  | 15  | 12  | 12  | SCHOEPITE           | 13-0407  |
| 17.48              | 9.93  | 36.64 | 32.78 | 45.30 | 47.56 | 100                | 70  | 70  | 50  | 35  | 20  | ZARATITE            | 16-0164  |
| 17.48              | 27.50 | 31.14 | 33.40 | 33.66 | 34.60 | 80                 | 100 | 80  | 80  | 80  | 80  | MOTTRAMITE          | 12-0538  |
| 17.50              | 8.66  | 24.84 | 26.58 | 13.00 | 50.96 | 80                 | 100 | 90  | 50  | 40  | 30  | NOVACEKITE          | 8-0286   |
| 17.50              | 29.16 | 28.58 | 40.22 | 45.78 | 15.90 | 100                | 80  | 70  | 60  | 60  | 50  | NATROJAROSITE       | 11-0302  |
| 17.54              | 28.12 | 26.04 | 27.50 | 31.02 | 36.80 | 90                 | 100 | 90  | 80  | 50  | 50  | DUFRENITE           | 8-0155   |
| 17.54              | 31.31 | 24.10 | 14.78 | 35.63 | 32.22 | 75                 | 100 | 85  | 55  | 55  | 45  | MALACHITE SYN       | 10-0399  |
| 17.58              | 24.16 | 34.60 | 14.72 | 35.44 | 30.28 | 80                 | 100 | 100 | 70  | 60  | 50  | ROSASITE            | 17-0216  |
| 17.63              | 9.35  | 15.94 | 20.53 | 22.97 | 30.55 | 100                | 100 | 100 | 100 | 100 | 100 | CHABAZITE           | 15-0618  |
| 17.64              | 8.66  | 27.86 | 44.36 | 13.36 | 26.40 | 90                 | 100 | 50  | 40  | 30  | 30  | TYUYAMUNITE         | 6-0017   |
| 17.67              | 52.66 | 24.05 | 33.44 | 35.34 | 35.77 | 70                 | 100 | 70  | 70  | 70  | 70  | CLINOHUMITE         | 14-0692  |
| 17.70              | 5.89  | 19.73 | 29.58 | 61.85 | 62.17 | 60                 | 100 | 80  | 60  | 50  | 50  | MONTMORILLONITE     | 13-0135  |
| 17.72              | 8.82  | 26.34 | 58.76 | 33.02 | 33.92 | 90                 | 100 | 90  | 50  | 40  | 40  | SERPIERITE          | 14-0188  |
| 17.72              | 16.40 | 31.70 | 32.52 | 39.84 | 50.08 | 100                | 100 | 100 | 100 | 100 | 80  | ATACAMITE           | 2-0146   |
| 17.77              | 8.87  | 26.76 | 45.37 | 34.99 | 19.77 | 53                 | 100 | 100 | 47  | 27  | 19  | MUSCOVITE (NAT. 3T) | 7-0042   |
| 17.77              | 26.69 | 8.84  | 24.59 | 28.99 | 34.80 | 75                 | 100 | 75  | 75  | 75  | 75  | LEPIDOLITE (1M)     | 10-0485  |
| 17.82              | 28.30 | 24.78 | 29.26 | 27.68 | 36.18 | 100                | 80  | 60  | 60  | 40  | 40  | BUTLERITE           | 16-0819  |
| 17.85              | 19.60 | 5.89  | 2.94  | 35.34 | 61.44 | 75                 | 100 | 90  | 60  | 50  | 50  | CHLORITE-MONT.      | 12-0231  |
| 17.86              | 8.58  | 24.78 | 25.50 | 26.74 | 19.80 | 80                 | 100 | 70  | 70  | 70  | 60  | AUTUNITE            | 8-0314   |
| 17.90              | 20.02 | 26.92 | 25.42 | 50.96 | 56.78 | 70                 | 100 | 80  | 70  | 70  | 70  | SHATTUCKITE         | 13-0507  |
| 17.94              | 8.58  | 24.84 | 25.35 | 13.38 | 19.80 | 90                 | 100 | 90  | 80  | 40  | 40  | TORBERNITE SYN      | 8-0360   |
| 17.94              | 25.58 | 32.52 | 60.02 | 48.92 | 37.44 | 45                 | 100 | 80  | 35  | 30  | 25  | PSEUDOBROOKITE SYN  | 9-0182   |
| 18.07              | 6.01  | 2.98  | 61.58 | 12.09 | 27.02 | 50                 | 100 | 50  | 40  | 25  | 25  | CHLORITE AL-MONT.   | 7-0051   |
| 18.08              | 23.52 | 27.60 | 34.06 | 16.10 | 32.52 | 100                | 64  | 20  | 16  | 13  | 11  | MELANTERITE         | 1-0255   |
| 18.08              | 29.14 | 46.02 | 50.06 | 40.78 | 32.52 | 70                 | 100 | 70  | 70  | 60  | 50  | CARPHOSIDERITE      | 2-0597   |
| 18.12              | 25.72 | 10.29 | 40.98 | 20.94 | 21.92 | 100                | 100 | 60  | 60  | 30  | 30  | BASSETITE           | 7-0288   |
| 18.16              | 31.02 | 24.98 | 43.90 | 44.82 | 47.84 | 40                 | 100 | 70  | 40  | 40  | 40  | BASTNAESITE         | 11-0340  |
| 18.24              | 34.88 | 24.70 | 33.40 | 14.72 | 16.40 | 100                | 85  | 75  | 75  | 25  | 25  | ANTLERITE           | 7-0407   |
| 18.25              | 34.91 | 31.50 | 22.45 | 15.55 | 30.09 | 47                 | 100 | 53  | 40  | 20  | 20  | BORAX               | 1-1097   |
| 18.33              | 29.82 | 30.26 | 23.54 | 24.05 | 35.97 | 65                 | 100 | 95  | 60  | 55  | 55  | HUEBNERITE SYN      | 13-0434  |
| 18.38              | 25.34 | 20.54 | 21.54 | 23.46 | 14.56 | 100                | 90  | 35  | 30  | 30  | 20  | PICKERINGITE        | 12-0299  |
| 18.38              | 26.34 | 35.16 | 29.06 | 44.14 | 54.92 | 40                 | 100 | 40  | 20  | 17  | 17  | KIESERITE SYN       | 1-0638   |
| 18.38              | 33.14 | 22.20 | 18.38 | 31.36 | 36.64 | 100                | 53  | 47  | 47  | 47  | 47  | ORPIMENT            | 1-0273   |
| 18.41              | 20.46 | 20.66 | 37.96 | 36.84 | 44.64 | 100                | 40  | 20  | 20  | 16  | 12  | GIBBSITE SYN        | 12-0460  |
| 18.41              | 29.98 | 14.99 | 36.37 | 37.63 | 21.20 | 90                 | 100 | 70  | 70  | 70  | 60  | OLIVENITE           | 4-0657   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 18.42              | 34.06 | 15.12 | 30.58 | 24.10 | 53.54 | 100                | 100 | 90  | 90 | 70 | 70 | LIBETHENITE              | 8-0107   |
| 18.42              | 34.06 | 30.70 | 15.26 | 23.96 | 53.54 | 100                | 100 | 50  | 40 | 28 | 20 | LIBETHENITE SYN          | 1-0274   |
| 18.43              | 35.74 | 43.44 | 63.11 | 57.49 | 30.35 | 65                 | 100 | 55  | 55 | 40 | 13 | PICROCHROMITE SYN        | 10-0351  |
| 18.46              | 12.18 | 10.42 | 31.02 | 6.17  | 21.28 | 80                 | 100 | 70  | 70 | 30 | 20 | SCHROCKINGERITE SYN      | 8-0397   |
| 18.48              | 12.31 | 24.73 | 6.18  | 31.05 | 35.05 | 100                | 100 | 100 | 60 | 60 | 40 | PENNINITE                | 10-0183  |
| 18.56              | 30.11 | 30.34 | 23.66 | 24.32 | 36.10 | 60                 | 100 | 90  | 55 | 55 | 45 | WOLFRAMITE SYN           | 12-0727  |
| 18.58              | 25.56 | 20.68 | 21.72 | 23.70 | 22.48 | 100                | 100 | 55  | 45 | 40 | 35 | HALOTRICHITE             | 11-0506  |
| 18.60              | 38.05 | 50.90 | 58.69 | 62.13 | 68.32 | 90                 | 100 | 56  | 36 | 18 | 16 | BRUCITE SYN              | 7-0239   |
| 18.64              | 28.80 | 29.07 | 57.92 | 47.14 | 34.20 | 53                 | 100 | 31  | 30 | 28 | 23 | SCHÆFLITE                | 7-0210   |
| 18.64              | 28.80 | 47.11 | 58.08 | 34.36 | 54.14 | 28                 | 100 | 30  | 22 | 16 | 14 | POWELLITE                | 7-0212   |
| 18.64              | 30.27 | 36.18 | 23.79 | 24.40 | 53.39 | 50                 | 100 | 60  | 50 | 50 | 50 | WOLFRAMITE               | 11-0591  |
| 18.70              | 25.88 | 26.58 | 14.64 | 29.54 | 30.80 | 95                 | 100 | 100 | 35 | 35 | 35 | BRANNERITE SYN           | 12-0477  |
| 18.70              | 30.38 | 23.70 | 24.44 | 36.34 | 53.54 | 40                 | 100 | 35  | 35 | 30 | 30 | FERBERITE SYN            | 12-0729  |
| 18.74              | 23.96 | 22.26 | 27.00 | 16.16 | 32.52 | 100                | 85  | 60  | 60 | 55 | 50 | CHALCANTHITE             | 11-0646  |
| 18.80              | 6.22  | 31.50 | 25.16 | 12.48 | 36.53 | 60                 | 100 | 90  | 60 | 40 | 30 | PENNINITE                | 10-0412  |
| 18.80              | 25.08 | 33.49 | 49.71 | 31.48 | 35.68 | 85                 | 100 | 75  | 65 | 45 | 30 | THORITE SYN              | 11-0419  |
| 18.88              | 27.43 | 24.24 | 32.46 | 34.04 | 34.65 | 80                 | 100 | 80  | 35 | 30 | 30 | CANCRINITE SYN           | 15-0734  |
| 18.94              | 21.76 | 9.70  | 29.46 | 26.10 | 27.86 | 70                 | 100 | 90  | 70 | 50 | 50 | STILBITE                 | 10-0433  |
| 18.96              | 25.08 | 33.82 | 49.97 | 31.50 | 31.73 | 100                | 100 | 60  | 30 | 20 | 20 | THORITE                  | 11-0172  |
| 19.00              | 30.30 | 21.84 | 24.25 | 27.53 | 20.46 | 70                 | 100 | 90  | 70 | 70 | 60 | NEPHELINE HYDRATE II SYN | 10-0459  |
| 19.02              | 25.65 | 33.92 | 50.66 | 32.16 | 41.38 | 100                | 100 | 70  | 70 | 40 | 40 | COFFINITE                | 8-0304   |
| 19.02              | 32.16 | 28.74 | 33.80 | 29.06 | 48.92 | 73                 | 100 | 51  | 48 | 47 | 31 | THENARDITE               | 5-0631   |
| 19.04              | 9.47  | 28.65 | 36.28 | 48.69 | 60.64 | 90                 | 100 | 100 | 65 | 40 | 40 | TALC                     | 13-0558  |
| 19.04              | 30.59 | 27.29 | 14.06 | 19.64 | 27.95 | 100                | 80  | 40  | 30 | 30 | 30 | BREWSTERITE              | 15-0582  |
| 19.06              | 27.00 | 30.58 | 23.58 | 25.00 | 46.02 | 50                 | 100 | 70  | 50 | 50 | 45 | CARNALLITE               | 8-0075   |
| 19.10              | 25.58 | 33.92 | 50.66 | 32.06 | 49.20 | 95                 | 100 | 95  | 70 | 45 | 35 | COFFINITE SYN            | 11-0420  |
| 19.13              | 28.32 | 30.56 | 37.70 | 42.94 | 46.73 | 100                | 100 | 100 | 50 | 40 | 40 | AMBLYGONITE              | 8-0102   |
| 19.14              | 12.81 | 25.50 | 45.30 | 59.60 | 6.50  | 80                 | 100 | 100 | 80 | 80 | 70 | THURINGITE               | 3-0067   |
| 19.17              | 12.83 | 25.52 | 45.34 | 59.65 | 6.50  | 80                 | 100 | 100 | 80 | 80 | 70 | CHLORITE (THURINGITE)    | 3-0067   |
| 19.25              | 27.97 | 24.66 | 20.42 | 31.50 | 34.77 | 67                 | 100 | 40  | 27 | 20 | 15 | CANCRINITE               | 3-0503   |
| 19.28              | 49.20 | 28.86 | 55.30 | 39.84 | 40.78 | 80                 | 100 | 80  | 70 | 60 | 60 | CALEDONITE               | 8-0153   |
| 19.36              | 9.14  | 23.46 | 35.88 | 16.00 | 34.60 | 65                 | 100 | 75  | 65 | 45 | 40 | THAUMASITE               | 13-0156  |
| 19.38              | 28.99 | 9.60  | 20.18 | 21.31 | 36.84 | 50                 | 100 | 60  | 20 | 15 | 15 | PYROPHYLLITE             | 12-0203  |
| 19.38              | 36.07 | 60.51 | 9.51  | 28.52 | 34.22 | 64                 | 100 | 64  | 48 | 40 | 32 | TALC                     | 3-0881   |
| 19.40              | 14.08 | 26.50 | 32.78 | 36.04 | 29.76 | 100                | 90  | 90  | 80 | 80 | 70 | SODDYITE                 | 8-0195   |
| 19.42              | 6.22  | 60.60 | 34.29 | 34.91 | 35.55 | 60                 | 100 | 70  | 50 | 50 | 45 | VERMICULITE              | 16-0613  |
| 19.42              | 29.38 | 9.68  | 37.47 | 49.83 | 67.92 | 50                 | 100 | 40  | 40 | 40 | 40 | PYROPHYLLITE             | 2-0613   |
| 19.44              | 5.74  | 60.90 | 33.92 | 35.02 | 36.96 | 100                | 100 | 100 | 80 | 80 | 40 | NONPHONITE               | 2-0008   |
| 19.44              | 20.88 | 27.94 | 23.02 | 39.30 | 44.14 | 100                | 35  | 35  | 30 | 30 | 30 | RUTHERFORDINE SYN        | 9-0163   |
| 19.47              | 5.67  | 60.38 | 34.09 |       |       | 40                 | 100 | 50  | 30 |    |    | SAPONITE FE RICH         | 12-0160  |
| 19.54              | 8.82  | 26.58 | 34.46 | 60.90 | 24.30 | 80                 | 100 | 80  | 80 | 60 | 50 | ROSCOELEITE              | 10-0496  |
| 19.58              | 27.42 | 33.02 | 34.06 | 30.16 | 34.88 | 80                 | 100 | 40  | 40 | 30 | 30 | BLEDITE                  | 4-0549   |
| 19.58              | 34.74 | 24.44 | 28.86 | 33.40 | 26.82 | 85                 | 100 | 80  | 80 | 75 | 70 | CELEDONITE               | 17-0521  |
| 19.60              | 5.89  | 17.85 | 2.94  | 35.34 | 61.44 | 100                | 90  | 75  | 60 | 50 | 50 | CHLORITE-MONT.           | 12-0231  |
| 19.60              | 8.75  | 34.67 | 26.77 | 37.54 | 61.35 | 80                 | 100 | 100 | 60 | 60 | 60 | GLAUCONITE               | 9-0439   |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 19.60              | 16.00 | 32.32 | 41.62 | 22.68 | 25.30 | 90                 | 100 | 90  | 90  | 70  | 60  | ANDALUSITE               | 13-0122  |
| 19.62              | 34.32 | 35.16 | 61.80 | 5.80  | 53.88 | 100                | 100 | 100 | 100 | 60  | 60  | BEIDELLITE               | 3-0178   |
| 19.66              | 6.64  | 25.50 | 50.96 |       |       | 60                 | 100 | 50  | 40  |     |     | NONTRONITE               | 13-0508  |
| 19.68              | 5.32  | 60.95 | 34.77 | 72.10 | 24.05 | 80                 | 100 | 90  | 50  | 50  | 40  | SAPONITE                 | 11-0056  |
| 19.68              | 25.85 | 48.39 | 40.04 | 56.72 | 67.04 | 20                 | 100 | 30  | 15  | 15  | 12  | CORDIERITE MU SYN        | 14-0249  |
| 19.73              | 5.78  | 29.09 | 34.36 | 35.19 | 54.63 | 100                | 100 | 100 | 100 | 100 | 100 | MONTMORILLONITE          | 3-0009   |
| 19.73              | 5.89  | 17.70 | 29.58 | 61.85 | 62.17 | 80                 | 100 | 60  | 60  | 50  | 50  | MONTMORILLONITE          | 13-0135  |
| 19.73              | 8.50  | 35.05 | 24.05 | 61.85 | 17.15 | 100                | 80  | 80  | 60  | 60  | 40  | MUSCOVITE (AMMONIUM) SYN | 13-0573  |
| 19.74              | 19.97 | 30.16 | 58.37 | 38.01 | 39.06 | 100                | 100 | 90  | 80  | 70  | 70  | CHLORITOID               | 14-0062  |
| 19.77              | 8.77  | 26.53 | 34.98 | 24.32 | 29.09 | 90                 | 100 | 100 | 90  | 60  | 50  | MUSCOVITE (SYN 1M)       | 7-0025   |
| 19.80              | 6.64  | 20.20 | 20.54 | 22.38 | 22.78 | 100                | 60  | 30  | 25  | 20  | 20  | ALUNOGEN                 | 16-0360  |
| 19.80              | 26.82 | 14.42 | 33.28 | 36.34 | 49.20 | 90                 | 100 | 80  | 70  | 60  | 50  | SODDYITE                 | 12-0180  |
| 19.82              | 27.70 | 9.12  | 18.29 | 34.63 | 35.92 | 100                | 80  | 60  | 60  | 60  | 60  | MONTMORILLONITE (ANHY)   | 7-0304   |
| 19.82              | 35.05 | 8.86  | 26.94 | 61.85 | 24.59 | 80                 | 100 | 80  | 80  | 80  | 60  | MUSCOVITE (BA)           | 10-0490  |
| 19.82              | 8.84  | 26.77 | 34.36 | 60.51 | 37.15 | 90                 | 100 | 90  | 60  | 60  | 40  | ILLITE (TRIOI.)          | 9-0343   |
| 19.86              | 6.50  | 26.69 | 27.62 | 30.62 | 34.63 | 18                 | 100 | 10  | 10  | 8   | 5   | MONTMORILLONITE          | 13-0259  |
| 19.86              | 8.88  | 26.85 | 35.05 | 17.85 | 23.73 | 100                | 100 | 100 | 100 | 80  | 80  | SERICITE                 | 2-0056   |
| 19.91              | 26.53 | 34.91 | 8.93  | 61.85 | 18.10 | 100                | 100 | 100 | 80  | 80  | 60  | ILLITE                   | 9-0334   |
| 19.91              | 30.19 | 38.13 | 39.17 | 58.37 | 34.22 | 100                | 30  | 30  | 30  | 30  | 20  | CHLORITOID               | 6-0158   |
| 19.91              | 30.51 | 15.83 | 10.79 | 11.64 | 19.04 | 80                 | 100 | 60  | 40  | 40  | 40  | NEPHELINE III SYN        | 12-0247  |
| 19.92              | 5.84  | 29.56 | 34.46 | 36.04 | 55.66 | 100                | 100 | 100 | 100 | 100 | 100 | BEIDELLITE               | 3-0013   |
| 19.95              | 7.43  | 35.05 | 62.31 | 30.09 | 54.28 | 90                 | 100 | 80  | 80  | 60  | 60  | MONTMORILLONITE          | 2-0037   |
| 19.97              | 19.74 | 30.16 | 58.37 | 38.01 | 39.06 | 100                | 100 | 90  | 80  | 70  | 70  | CHLORITOID               | 14-0062  |
| 19.98              | 6.36  | 25.14 | 60.90 | 62.72 | 12.46 | 80                 | 100 | 50  | 50  | 50  | 20  | NONTRONITE               | 2-0027   |
| 19.98              | 15.92 | 28.22 | 34.74 | 29.26 | 17.90 | 100                | 100 | 100 | 90  | 80  | 60  | SCROODITE                | 5-0216   |
| 20.00              | 30.09 | 58.41 | 18.10 | 38.13 | 38.99 | 100                | 60  | 60  | 50  | 50  | 50  | CHLORITOID               | 7-0398   |
| 20.00              | 35.39 | 9.12  | 36.99 | 62.50 | 30.61 | 100                | 90  | 80  | 80  | 80  | 70  | PARAGONITE               | 12-0165  |
| 20.02              | 26.92 | 17.90 | 25.42 | 50.96 | 56.78 | 100                | 80  | 70  | 70  | 70  | 70  | SHATTUCKITE              | 13-0507  |
| 20.02              | 27.00 | 35.66 | 53.52 | 43.82 | 55.67 | 45                 | 100 | 45  | 40  | 20  | 14  | ZIRCON                   | 6-0266   |
| 20.04              | 29.09 | 37.15 | 35.05 | 9.31  | 62.31 | 86                 | 100 | 72  | 57  | 46  | 40  | PYROPHYLLITE             | 3-0574   |
| 20.13              | 6.31  | 35.77 | 62.31 | 28.89 | 55.71 | 100                | 100 | 80  | 80  | 60  | 60  | MONTMORILLONITE SYN      | 3-0016   |
| 20.13              | 11.96 | 20.46 | 24.59 | 37.63 | 38.81 | 100                | 95  | 70  | 65  | 35  | 35  | HALLOYSITE               | 13-0375  |
| 20.18              | 35.77 | 27.88 | 26.29 | 37.15 | 58.00 | 80                 | 100 | 90  | 80  | 80  | 80  | MARGARITE                | 12-0188  |
| 20.20              | 19.80 | 6.64  | 20.54 | 22.38 | 22.78 | 30                 | 100 | 60  | 25  | 20  | 20  | ALUNOGEN                 | 16-0360  |
| 20.23              | 26.21 | 30.30 | 34.50 | 36.99 | 10.66 | 90                 | 100 | 90  | 70  | 70  | 60  | NEPHELINE HYDRATE I SYN  | 10-0460  |
| 20.23              | 35.60 | 27.85 | 38.40 | 9.21  | 35.19 | 90                 | 100 | 80  | 80  | 70  | 70  | PARAGONITE               | 12-0187  |
| 20.27              | 31.27 | 15.02 | 13.42 | 28.24 | 30.40 | 64                 | 100 | 64  | 48  | 48  | 48  | NATROLITE                | 3-0705   |
| 20.42              | 35.60 | 62.59 | 27.79 | 9.20  | 37.50 | 100                | 90  | 90  | 80  | 70  | 60  | PARAGONITE               | 9-0428   |
| 20.42              | 62.78 | 26.53 | 30.62 | 31.85 | 36.53 | 100                | 80  | 50  | 20  | 20  | 20  | CHRYSOCOLLA              | 3-0219   |
| 20.46              | 18.41 | 20.66 | 37.96 | 36.84 | 44.64 | 40                 | 100 | 20  | 20  | 16  | 12  | GIBBSITE SYN             | 12-0460  |
| 20.46              | 20.13 | 11.96 | 24.59 | 37.63 | 38.81 | 70                 | 100 | 95  | 65  | 35  | 35  | HALLOYSITE               | 13-0375  |
| 20.46              | 26.21 | 49.63 | 41.62 | 45.11 | 58.98 | 20                 | 100 | 10  | 4   | 4   | 4   | QUARTZ (BETA)            | 11-0252  |
| 20.46              | 62.64 | 38.61 | 35.15 | 36.16 | 19.91 | 85                 | 100 | 95  | 85  | 85  | 75  | KAOLINITE                | 12-0447  |
| 20.50              | 21.76 | 27.24 | 12.50 | 16.16 | 24.02 | 100                | 80  | 75  | 55  | 55  | 35  | AMMONIA ALUM             | 7-0022   |
| 20.54              | 18.38 | 25.34 | 21.54 | 23.46 | 14.56 | 35                 | 100 | 90  | 30  | 30  | 20  | PICKERINGITE             | 12-0299  |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 20.61              | 21.68 | 23.35 | 30.11 | 27.44 | 36.15 | 65                 | 100 | 50  | 18 | 16 | 14 | TRIDYMITE                | 16-0152  |
| 20.63              | 7.31  | 35.05 | 27.92 | 23.73 | 26.48 | 40                 | 100 | 55  | 35 | 30 | 30 | SEPIOLITE                | 13-0595  |
| 20.65              | 27.42 | 21.91 | 16.28 | 32.06 | 29.46 | 100                | 55  | 45  | 40 | 35 | 25 | POTASH ALUM              | 7-0017   |
| 20.66              | 18.41 | 20.46 | 37.96 | 36.84 | 44.64 | 20                 | 100 | 40  | 20 | 16 | 12 | GIBBSITE SYN             | 12-0460  |
| 20.68              | 18.58 | 25.56 | 21.72 | 23.70 | 22.48 | 55                 | 100 | 100 | 45 | 40 | 35 | HALOTRICHITE             | 11-0506  |
| 20.68              | 32.04 | 27.68 | 50.96 | 34.06 | 46.78 | 100                | 70  | 50  | 50 | 40 | 30 | STERNBERGITE             | 11-0061  |
| 20.80              | 11.71 | 29.19 | 33.45 | 31.20 | 23.47 | 51                 | 100 | 57  | 28 | 27 | 21 | GYPSUM                   | 6-0466   |
| 20.81              | 21.81 | 23.41 | 30.24 | 36.03 | 36.22 | 100                | 90  | 90  | 60 | 60 | 60 | TRIDYMITE                | 14-0260  |
| 20.84              | 29.76 | 26.74 | 43.68 | 27.68 | 23.32 | 87                 | 100 | 86  | 76 | 71 | 57 | ANGLESITE                | 5-0577   |
| 20.85              | 26.66 | 50.21 | 36.56 | 39.49 | 68.20 | 35                 | 100 | 17  | 12 | 12 | 11 | QUARTZ (ALPHA)           | 5-0490   |
| 20.88              | 19.44 | 27.94 | 23.02 | 39.30 | 44.14 | 35                 | 100 | 35  | 30 | 30 | 30 | RUTHERFORDINE SYN        | 9-0163   |
| 20.90              | 27.36 | 41.82 | 50.72 | 21.95 | 23.16 | 40                 | 100 | 25  | 25 | 13 | 13 | MICROCLINE               | 12-0703  |
| 20.90              | 29.10 | 22.11 | 26.61 | 35.07 | 42.50 | 75                 | 100 | 70  | 60 | 60 | 50 | NAPHELINE (K)            | 12-0198  |
| 21.02              | 10.38 | 27.34 | 29.26 | 17.06 | 23.58 | 80                 | 100 | 60  | 60 | 40 | 40 | METATRYAMUNITE           | 8-0287   |
| 21.08              | 10.95 | 33.41 | 56.02 | 22.10 | 31.48 | 100                | 100 | 90  | 90 | 60 | 50 | ZUNYITE                  | 14-0698  |
| 21.08              | 16.52 | 21.23 | 16.74 | 31.14 | 33.80 | 100                | 80  | 50  | 35 | 35 | 30 | GOSLARITE                | 9-0395   |
| 21.08              | 16.54 | 33.40 | 14.78 | 32.16 | 33.66 | 100                | 25  | 25  | 20 | 20 | 20 | EPSOMITE                 | 8-0467   |
| 21.10              | 27.49 | 23.22 | 25.60 | 26.53 | 30.15 | 60                 | 100 | 50  | 50 | 50 | 50 | MICROCLINE               | 10-0479  |
| 21.10              | 33.31 | 36.84 | 53.29 | 41.42 | 59.10 | 100                | 80  | 70  | 50 | 40 | 30 | GOETHITE                 | 8-0097   |
| 21.18              | 10.49 | 27.24 | 25.28 | 29.76 | 14.98 | 80                 | 100 | 70  | 60 | 60 | 50 | SKLDOWSKITE              | 8-0447   |
| 21.23              | 21.08 | 16.52 | 16.74 | 31.14 | 33.80 | 50                 | 100 | 80  | 35 | 35 | 30 | GOSLARITE                | 9-0395   |
| 21.26              | 29.78 | 27.27 | 31.05 | 38.47 | 59.23 | 70                 | 100 | 70  | 70 | 60 | 60 | NEPHELINE                | 9-0458   |
| 21.26              | 36.84 | 33.31 | 53.26 | 17.85 | 26.53 | 100                | 80  | 70  | 70 | 60 | 60 | GOETHITE                 | 3-0249   |
| 21.28              | 25.14 | 33.80 | 34.20 | 36.64 | 24.56 | 80                 | 100 | 75  | 70 | 60 | 50 | ZINKOSITE SYN            | 8-0491   |
| 21.41              | 35.48 | 56.04 | 63.74 | 43.73 | 75.02 | 100                | 80  | 60  | 50 | 30 | 30 | CHRISTOBALITE BETA HIGH  | 4-0359   |
| 21.57              | 12.38 | 27.88 | 27.53 | 28.42 | 30.51 | 80                 | 100 | 100 | 80 | 80 | 80 | PHILLIPSITE              | 12-0455  |
| 21.64              | 27.78 | 27.50 | 41.78 | 13.64 | 23.61 | 15                 | 100 | 90  | 15 | 13 | 13 | ANORTHOCLASE             | 9-0478   |
| 21.68              | 20.61 | 23.35 | 30.11 | 27.44 | 36.15 | 100                | 65  | 50  | 18 | 16 | 14 | TRIDYMITE                | 16-0152  |
| 21.70              | 10.80 | 30.06 | 18.38 | 14.50 | 25.28 | 90                 | 100 | 80  | 70 | 60 | 60 | CUPROSKLDOWSKITE         | 8-0290   |
| 21.72              | 27.57 | 27.84 | 23.69 | 23.99 | 30.67 | 40                 | 100 | 70  | 30 | 15 | 15 | ANORTHOCLASE SYN         | 10-0361  |
| 21.76              | 9.70  | 18.94 | 29.46 | 26.10 | 27.86 | 100                | 90  | 70  | 70 | 50 | 50 | STILBITE                 | 10-0433  |
| 21.76              | 12.70 | 25.42 | 40.22 | 34.88 | 57.54 | 50                 | 100 | 60  | 50 | 40 | 40 | CHALCOPHANITE            | 15-0807  |
| 21.76              | 20.50 | 27.24 | 12.50 | 16.16 | 24.02 | 80                 | 100 | 75  | 55 | 55 | 35 | AMMONIA ALUM             | 7-0022   |
| 21.81              | 20.81 | 23.41 | 30.24 | 36.03 | 36.22 | 90                 | 100 | 90  | 60 | 60 | 60 | TRIDYMITE                | 14-0260  |
| 21.82              | 22.90 | 11.10 | 25.80 | 15.20 | 20.58 | 90                 | 100 | 90  | 70 | 60 | 60 | FERRIMOLYBDITE           | 15-0371  |
| 21.82              | 35.16 | 55.28 | 56.78 | 63.20 | 69.00 | 100                | 100 | 80  | 80 | 80 | 80 | RAMSDELLITE              | 7-0222   |
| 21.84              | 27.88 | 35.48 | 23.60 | 24.45 | 29.78 | 40                 | 100 | 27  | 13 | 11 | 11 | LABRADORITE              | 3-0499   |
| 21.84              | 30.30 | 19.00 | 24.25 | 27.53 | 20.46 | 90                 | 100 | 70  | 70 | 70 | 60 | NEPHELINE HYDRATE II SYN | 10-0459  |
| 21.86              | 38.78 | 35.16 | 19.10 | 43.90 | 26.78 | 100                | 65  | 60  | 50 | 13 | 11 | RAMSDELLITE              | 11-0055  |
| 21.89              | 10.36 | 25.98 | 29.48 | 28.52 | 54.45 | 80                 | 100 | 80  | 80 | 65 | 65 | CORDIERITE (FE)          | 9-0473   |
| 21.91              | 20.65 | 27.42 | 16.28 | 32.06 | 29.46 | 45                 | 100 | 55  | 40 | 35 | 25 | POTASH ALUM              | 7-0017   |
| 21.95              | 27.79 | 23.97 | 23.54 | 24.59 | 27.27 | 80                 | 100 | 90  | 80 | 80 | 80 | ANORTHOCLASE SYN         | 10-0379  |
| 21.95              | 27.88 | 24.32 | 30.19 | 49.83 | 23.41 | 35                 | 100 | 25  | 25 | 18 | 16 | ALBITE (LOW)             | 1-0739   |
| 21.95              | 36.15 | 31.49 | 28.47 | 48.69 | 36.45 | 100                | 20  | 13  | 11 | 7  | 5  | CHRISTOBALITE LOW SYN    | 11-0695  |
| 21.98              | 28.48 | 33.80 | 29.84 | 37.44 | 32.64 | 30                 | 100 | 30  | 16 | 16 | 14 | LANGBEINITE              | 17-0740  |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |    |    |    |    | MINERAL NAME         | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|----|----|----|----|----------------------|----------|
| 22.00              | 7.43  | 6.80  | 29.48 | 35.05 | 38.47 | 50                 | 100 | 60 | 40 | 40 | 30 | STILPNOE MELANE      | 17-0505  |
| 22.00              | 27.79 | 28.06 | 23.66 | 24.39 | 28.42 | 80                 | 100 | 90 | 70 | 70 | 70 | ANDESINE             | 10-0359  |
| 22.00              | 27.88 | 28.06 | 23.73 | 27.62 | 24.45 | 80                 | 100 | 90 | 80 | 80 | 70 | LABRADORITE          | 4-0465   |
| 22.00              | 27.88 | 28.06 | 27.36 | 28.61 | 27.79 | 60                 | 100 | 75 | 55 | 45 | 35 | ANORTHITE            | 12-0301  |
| 22.06              | 27.88 | 23.73 | 28.15 | 24.52 | 30.40 | 80                 | 100 | 80 | 80 | 70 | 70 | PLAGIOCLASE SYN      | 10-0360  |
| 22.06              | 27.88 | 23.93 | 28.15 | 24.59 | 30.40 | 80                 | 100 | 80 | 80 | 70 | 70 | BYTOWNITE            | 9-0467   |
| 22.06              | 28.06 | 27.88 | 23.66 | 30.51 | 13.88 | 80                 | 100 | 80 | 70 | 70 | 60 | OLIGOCLASE           | 9-0457   |
| 22.06              | 33.27 | 31.12 | 10.94 | 44.89 | 57.57 | 50                 | 100 | 65 | 40 | 35 | 35 | ZOISITE SYN          | 13-0562  |
| 22.10              | 28.50 | 28.40 | 20.44 | 41.78 | 35.74 | 40                 | 100 | 90 | 25 | 25 | 20 | BARYTOCALCITE        | 15-0285  |
| 22.11              | 27.88 | 23.79 | 28.15 | 24.52 | 28.61 | 80                 | 100 | 80 | 80 | 70 | 70 | PLAGIOCLASE          | 9-0456   |
| 22.11              | 28.06 | 23.41 | 64.23 | 26.77 | 29.78 | 90                 | 100 | 80 | 80 | 70 | 70 | ORTHOCLASE           | 9-0462   |
| 22.11              | 29.10 | 20.90 | 26.61 | 35.07 | 42.50 | 70                 | 100 | 75 | 60 | 60 | 50 | NEPHELINE (K)        | 12-0198  |
| 22.20              | 18.38 | 33.14 | 18.38 | 31.36 | 36.64 | 47                 | 100 | 53 | 47 | 47 | 47 | ORPIMENT             | 1-0273   |
| 22.26              | 18.74 | 23.96 | 27.00 | 16.16 | 32.52 | 60                 | 100 | 85 | 60 | 55 | 50 | CHALCANTHITE         | 11-0646  |
| 22.28              | 34.83 | 30.18 | 21.05 | 25.60 | 44.41 | 85                 | 100 | 85 | 65 | 60 | 45 | TOURMALINE           | 14-0076  |
| 22.28              | 38.87 | 42.42 | 43.57 | 56.34 | 35.08 | 100                | 56  | 52 | 49 | 43 | 30 | DIASPORE             | 5-0355   |
| 22.32              | 23.70 | 39.12 | 46.28 | 25.36 | 42.60 | 60                 | 100 | 85 | 50 | 40 | 30 | IODYRITE             | 9-0374   |
| 22.38              | 9.93  | 30.06 | 26.02 | 17.38 | 31.94 | 100                | 70  | 70 | 50 | 40 | 40 | HEULANDITE           | 13-0196  |
| 22.45              | 15.88 | 32.08 | 25.30 | 38.15 | 40.49 | 35                 | 100 | 60 | 15 | 15 | 15 | ANDALUSITE X SYN     | 13-0231  |
| 22.45              | 26.46 | 32.68 | 35.25 | 13.14 | 22.86 | 100                | 95  | 80 | 60 | 55 | 35 | EUCRYPTITE           | 14-0667  |
| 22.54              | 11.22 | 29.84 | 30.70 | 46.03 | 18.62 | 90                 | 100 | 80 | 80 | 70 | 50 | URANOPHANE           | 8-0442   |
| 22.68              | 25.54 | 48.36 | 48.61 | 19.25 | 28.18 | 60                 | 100 | 60 | 60 | 50 | 50 | SPODUMENE (BETA) SYN | 13-0251  |
| 22.72              | 13.61 | 35.44 | 16.40 | 33.28 | 27.86 | 100                | 67  | 67 | 58 | 50 | 42 | BROCHANTITE          | 3-0282   |
| 22.78              | 35.60 | 33.40 | 13.86 | 16.52 | 27.94 | 85                 | 100 | 50 | 40 | 40 | 40 | BROCHANTITE          | 13-0398  |
| 22.80              | 30.61 | 28.80 | 26.77 | 27.19 | 32.69 | 60                 | 100 | 80 | 60 | 60 | 60 | PECTOLITE            | 12-0238  |
| 22.84              | 11.28 | 25.36 | 27.94 | 34.60 | 13.28 | 90                 | 100 | 60 | 50 | 50 | 40 | BETA URANOPHANE      | 8-0301   |
| 22.85              | 32.31 | 35.70 | 36.51 | 17.35 | 52.24 | 60                 | 100 | 80 | 60 | 50 | 50 | FORSTERITE (OLIVINE) | 7-0075   |
| 22.90              | 8.66  | 16.84 | 16.18 | 29.36 | 26.34 | 90                 | 100 | 80 | 50 | 40 | 35 | CYANOTRICHITE        | 11-0131  |
| 22.90              | 11.10 | 21.82 | 25.80 | 15.20 | 20.58 | 100                | 90  | 90 | 70 | 60 | 60 | FERRIMOLYBDITE       | 15-0371  |
| 22.90              | 36.56 | 35.74 | 32.34 | 17.39 | 39.72 | 70                 | 100 | 70 | 60 | 50 | 40 | FORSTERITE (OLIVINE) | 7-0074   |
| 22.90              | 46.80 | 32.60 | 38.80 | 38.61 | 58.90 | 60                 | 100 | 95 | 50 | 45 | 45 | CRYOLITE             | 12-0257  |
| 22.92              | 36.56 | 35.73 | 52.34 | 39.74 | 32.34 | 69                 | 100 | 73 | 60 | 59 | 53 | FORSTERITE SYN       | 4-0768   |
| 22.98              | 29.51 | 27.07 | 21.10 | 30.78 | 38.15 | 60                 | 100 | 40 | 35 | 35 | 30 | NEPHELINE SYN        | 9-0338   |
| 23.08              | 28.50 | 15.70 | 35.16 | 45.06 | 22.20 | 50                 | 100 | 50 | 50 | 50 | 35 | COLEMANITE           | 6-0331   |
| 23.14              | 12.36 | 27.68 | 32.28 | 36.80 | 35.30 | 35                 | 100 | 50 | 35 | 35 | 25 | EUCLASE              | 14-0065  |
| 23.22              | 27.49 | 21.10 | 25.60 | 26.53 | 30.15 | 50                 | 100 | 60 | 50 | 50 | 50 | MICROCLINE           | 10-0479  |
| 23.22              | 30.09 | 25.30 | 26.94 | 36.37 | 41.42 | 80                 | 100 | 80 | 80 | 60 | 60 | WOLLASTONITE         | 10-0487  |
| 23.26              | 25.72 | 29.10 | 29.51 | 33.27 | 47.56 | 60                 | 100 | 70 | 55 | 30 | 30 | SCAPOLITE            | 14-0170  |
| 23.35              | 21.68 | 20.61 | 30.11 | 27.44 | 36.15 | 50                 | 100 | 65 | 18 | 16 | 14 | TRIDYMIT             | 16-0152  |
| 23.41              | 20.81 | 21.81 | 30.24 | 36.03 | 36.22 | 90                 | 100 | 90 | 60 | 60 | 60 | TRIDYMIT             | 14-0260  |
| 23.41              | 28.06 | 22.11 | 64.23 | 26.77 | 29.78 | 80                 | 100 | 90 | 80 | 70 | 70 | ORTHOCLASE           | 9-0462   |
| 23.45              | 30.80 | 32.60 | 36.64 | 33.92 | 40.80 | 50                 | 100 | 50 | 40 | 30 | 30 | PUMPELLYITE          | 10-0447  |
| 23.46              | 9.14  | 19.36 | 35.88 | 16.00 | 34.60 | 75                 | 100 | 65 | 65 | 45 | 40 | THAUMASITE           | 13-0156  |
| 23.48              | 26.79 | 27.68 | 27.13 | 20.95 | 25.76 | 80                 | 100 | 80 | 60 | 50 | 50 | SANIDINE (HIGH) SYN  | 10-0353  |
| 23.52              | 18.08 | 27.60 | 34.06 | 16.10 | 32.52 | 64                 | 100 | 20 | 16 | 13 | 11 | MELANTERITE          | 1-0255   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME          | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|-----------------------|----------|
| 23.54              | 23.86 | 29.45 | 33.86 | 33.67 | 41.18 | 100                | 56  | 55  | 55 | 41 | 41 | NITER SYN             | 5-0377   |
| 23.54              | 25.90 | 29.48 | 33.43 | 47.87 | 20.95 | 90                 | 100 | 100 | 90 | 90 | 70 | SCAPOLITE             | 2-0412   |
| 23.54              | 27.53 | 26.85 | 29.78 | 21.00 | 25.67 | 70                 | 100 | 70  | 50 | 40 | 30 | ORTHOCLASE (FE)       | 8-0048   |
| 23.54              | 27.92 | 13.86 | 24.16 | 22.06 | 24.30 | 25                 | 100 | 20  | 20 | 15 | 15 | ALBITE                | 9-0466   |
| 23.58              | 26.26 | 29.54 | 24.99 | 30.16 | 42.20 | 100                | 70  | 60  | 40 | 40 | 40 | CHALCOSIDERITE        | 8-0127   |
| 23.60              | 27.70 | 27.02 | 29.98 | 34.88 | 50.84 | 80                 | 100 | 90  | 80 | 80 | 80 | HYALOPHANE            | 11-0417  |
| 23.70              | 30.38 | 18.70 | 24.44 | 36.34 | 53.54 | 35                 | 100 | 40  | 35 | 30 | 30 | FERRITERITE SYN       | 12-0729  |
| 23.70              | 39.12 | 22.32 | 46.28 | 25.36 | 42.60 | 100                | 85  | 60  | 50 | 40 | 30 | IODYRITE              | 9-0374   |
| 23.71              | 28.10 | 27.78 | 22.00 | 22.91 | 24.46 | 30                 | 100 | 30  | 15 | 11 | 11 | ALBITE (HIGH)         | 10-0393  |
| 23.73              | 27.37 | 27.71 | 21.40 | 25.79 | 30.02 | 70                 | 100 | 90  | 45 | 40 | 35 | SANIDINE              | 13-0456  |
| 23.73              | 27.88 | 22.06 | 28.15 | 24.52 | 30.40 | 80                 | 100 | 80  | 80 | 70 | 70 | PLAGIOCLASE SYN       | 10-0360  |
| 23.75              | 27.49 | 27.77 | 21.58 | 13.66 | 41.80 | 35                 | 100 | 40  | 25 | 20 | 20 | SANIDINE (HIGH) SYN   | 10-0357  |
| 23.77              | 29.32 | 46.54 | 71.52 | 62.54 | 78.00 | 100                | 90  | 70  | 40 | 30 | 30 | COLORADOITE           | 8-0026   |
| 23.79              | 27.10 | 13.31 | 64.14 | 23.47 | 29.38 | 20                 | 100 | 25  | 18 | 14 | 12 | SULPHUR               | 13-0141  |
| 23.79              | 27.88 | 22.11 | 28.15 | 24.52 | 28.61 | 80                 | 100 | 80  | 80 | 70 | 70 | PLAGIOCLASE           | 9-0456   |
| 23.85              | 24.25 | 25.34 | 34.91 | 43.71 | 46.98 | 100                | 90  | 30  | 16 | 12 | 12 | PETALITE              | 12-0451  |
| 23.86              | 23.54 | 29.45 | 33.86 | 33.67 | 41.18 | 56                 | 100 | 55  | 55 | 41 | 41 | NITER SYN             | 5-0377   |
| 23.92              | 24.18 | 42.02 | 34.12 | 34.63 | 44.89 | 100                | 53  | 28  | 24 | 23 | 21 | WITHERITE SYN         | 5-0378   |
| 23.92              | 31.85 | 49.00 | 52.21 | 27.79 | 29.68 | 100                | 90  | 80  | 50 | 40 | 40 | BOULANGERITE          | 9-0470   |
| 23.92              | 34.09 | 13.73 | 31.05 | 42.02 | 51.02 | 100                | 50  | 30  | 30 | 30 | 30 | HAUYNITE              | 2-0331   |
| 23.93              | 27.88 | 22.06 | 28.15 | 24.59 | 30.40 | 80                 | 100 | 80  | 80 | 70 | 70 | BYTOWNITE             | 9-0467   |
| 23.96              | 18.74 | 22.26 | 27.00 | 16.16 | 32.52 | 85                 | 100 | 60  | 60 | 55 | 50 | CHALCANTHITE          | 11-0646  |
| 24.05              | 25.98 | 31.81 | 33.00 | 23.29 | 28.99 | 35                 | 100 | 35  | 35 | 30 | 30 | JAMESONITE            | 13-0461  |
| 24.05              | 52.66 | 17.67 | 32.44 | 35.34 | 35.77 | 70                 | 100 | 70  | 70 | 70 | 70 | CLINOHUMITE           | 14-0692  |
| 24.10              | 30.43 | 27.92 | 38.11 | 42.97 | 29.41 | 60                 | 100 | 65  | 45 | 45 | 35 | TOPAZ                 | 12-0765  |
| 24.10              | 31.31 | 17.54 | 14.78 | 35.63 | 32.22 | 85                 | 100 | 75  | 55 | 55 | 45 | MALACHITE SYN         | 10-0399  |
| 24.14              | 34.39 | 13.84 | 31.27 | 42.50 | 51.61 | 100                | 75  | 40  | 40 | 40 | 20 | NOSEAN SYN            | 15-0470  |
| 24.16              | 10.16 | 25.58 | 27.60 | 16.28 | 17.98 | 100                | 100 | 80  | 80 | 75 | 75 | METATORBERNITE        | 16-0404  |
| 24.16              | 13.04 | 34.32 | 30.92 | 32.90 | 27.42 | 70                 | 100 | 80  | 40 | 40 | 30 | AURICHALCITE          | 17-0743  |
| 24.16              | 30.70 | 14.34 | 25.88 | 27.16 | 18.47 | 100                | 80  | 70  | 70 | 70 | 60 | TURQUOIS              | 6-0214   |
| 24.16              | 34.60 | 17.58 | 14.72 | 35.44 | 30.28 | 100                | 100 | 80  | 70 | 60 | 50 | ROSASITE              | 17-0216  |
| 24.18              | 23.92 | 42.02 | 34.12 | 34.63 | 44.89 | 53                 | 100 | 28  | 24 | 23 | 21 | WITHERITE SYN         | 5-0378   |
| 24.24              | 27.43 | 18.88 | 32.46 | 34.04 | 34.65 | 80                 | 100 | 80  | 35 | 30 | 30 | CANCRINITE SYN        | 15-0734  |
| 24.25              | 6.22  | 60.51 | 19.42 | 17.88 | 71.47 | 80                 | 100 | 90  | 50 | 40 | 40 | SAPOINITE             | 13-0086  |
| 24.25              | 23.85 | 25.34 | 34.91 | 43.71 | 46.98 | 90                 | 100 | 30  | 16 | 12 | 12 | PETALITE              | 12-0451  |
| 24.30              | 12.03 | 27.50 | 36.64 | 27.76 | 28.22 | 50                 | 100 | 10  | 10 | 4  | 4  | SCHOEPIITE            | 13-0241  |
| 24.30              | 28.58 | 35.60 | 38.10 | 41.18 | 43.46 | 80                 | 100 | 75  | 70 | 60 | 50 | PHENAKITE             | 9-0431   |
| 24.32              | 12.07 | 35.89 | 60.29 | 38.56 | 46.25 | 100                | 100 | 100 | 80 | 70 | 70 | SERPENTINE            | 9-0444   |
| 24.32              | 27.88 | 21.95 | 30.19 | 49.83 | 23.41 | 25                 | 100 | 35  | 25 | 18 | 16 | ALBITE (LOW)          | 1-0739   |
| 24.32              | 29.88 | 30.30 | 34.50 | 49.83 | 53.02 | 40                 | 100 | 40  | 30 | 30 | 27 | EUXENITE              | 9-0442   |
| 24.32              | 30.19 | 53.22 | 51.58 | 63.50 | 12.41 | 50                 | 100 | 20  | 14 | 14 | 12 | COLUMBITE (TANTALITE) | 16-0337  |
| 24.32              | 31.50 | 51.86 | 51.64 | 41.58 | 45.34 | 35                 | 100 | 33  | 30 | 27 | 23 | RHODOCHROSITE SYN     | 7-0268   |
| 24.35              | 26.02 | 30.72 | 37.34 | 49.07 | 52.82 | 80                 | 100 | 100 | 80 | 80 | 80 | POLLUCITE             | 15-0317  |
| 24.44              | 34.74 | 19.58 | 28.86 | 33.40 | 26.82 | 80                 | 100 | 85  | 80 | 75 | 70 | CELADONITE            | 17-0521  |
| 24.45              | 33.49 | 34.52 | 27.95 | 30.41 | 21.20 | 80                 | 100 | 60  | 40 | 40 | 30 | MONTICELLITE SYN      | 11-0129  |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME            | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|-------------------------|----------|
| 24.47              | 33.62 | 34.69 | 21.20 | 30.46 | 35.29 | 40                 | 100 | 40  | 35 | 35 | 30 | MONTICELLITE            | 11-0353  |
| 24.52              | 12.12 | 35.63 | 37.15 | 12.74 | 25.37 | 300                | 400 | 70  | 38 | 24 | 24 | ANTIGORITE (SERPENTINE) | 7-0417   |
| 24.52              | 43.51 | 14.06 | 37.96 | 35.05 | 59.23 | 100                | 33  | 17  | 17 | 13 | 10 | SODALITE                | 3-0338   |
| 24.59              | 35.88 | 12.21 | 42.06 | 51.08 | 19.25 | 60                 | 100 | 60  | 35 | 25 | 20 | SERPENTINE SYN          | 11-0386  |
| 24.64              | 10.44 | 42.82 | 20.98 | 16.50 | 34.32 | 85                 | 100 | 70  | 65 | 45 | 35 | META-AUTUNITE I         | 12-0423  |
| 24.64              | 32.06 | 35.02 | 20.16 | 21.98 | 40.78 | 80                 | 100 | 80  | 60 | 50 | 40 | PHOSGENITE              | 12-0218  |
| 24.66              | 27.97 | 19.25 | 20.42 | 31.50 | 34.77 | 40                 | 100 | 67  | 27 | 20 | 15 | CANCRINITE              | 3-0503   |
| 24.70              | 11.18 | 28.86 | 19.16 | 27.60 | 33.54 | 180                | 100 | 60  | 50 | 50 | 50 | DUNDASITE               | 21-0936  |
| 24.70              | 18.24 | 34.88 | 33.40 | 14.72 | 16.40 | 75                 | 100 | 85  | 75 | 25 | 25 | ANTLERITE               | 7-0407   |
| 24.73              | 12.31 | 18.48 | 6.18  | 31.05 | 35.05 | 100                | 100 | 100 | 60 | 60 | 40 | PENNINITE               | 10-0183  |
| 24.73              | 35.77 | 12.16 | 41.62 | 59.48 | 60.38 | 80                 | 100 | 90  | 50 | 50 | 40 | ANTIGORITE              | 10-0402  |
| 24.78              | 8.58  | 17.86 | 25.50 | 26.74 | 19.80 | 70                 | 100 | 80  | 70 | 70 | 60 | AUTUNITE                | 8-0314   |
| 24.78              | 12.45 | 35.30 | 50.66 | 45.78 | 38.10 | 80                 | 100 | 70  | 70 | 60 | 50 | SPANGOLITE              | 5-0142   |
| 24.78              | 17.82 | 28.30 | 29.26 | 27.68 | 36.18 | 60                 | 100 | 80  | 60 | 40 | 40 | BUTLERITE               | 16-0819  |
| 24.78              | 25.42 | 36.04 | 43.46 | 29.06 | 48.92 | 100                | 43  | 32  | 27 | 24 | 21 | CERUSSITE               | 5-0417   |
| 24.78              | 28.40 | 12.26 | 29.16 | 40.22 | 14.36 | 100                | 25  | 20  | 15 | 15 | 13 | CLINOCLASITE            | 12-0297  |
| 24.78              | 43.24 | 45.06 | 27.50 | 50.66 | 35.16 | 70                 | 100 | 70  | 60 | 50 | 30 | WEISSITE                | 10-0421  |
| 24.84              | 8.58  | 17.94 | 25.35 | 13.38 | 19.80 | 90                 | 100 | 90  | 80 | 40 | 40 | TORBERNITE SYN          | 8-0360   |
| 24.84              | 8.66  | 17.50 | 26.58 | 13.00 | 50.96 | 90                 | 100 | 80  | 50 | 40 | 30 | NOVACEKITE              | 8-0286   |
| 24.84              | 28.22 | 26.50 | 43.68 | 51.90 | 47.84 | 75                 | 100 | 60  | 55 | 45 | 40 | GREENOCKITE             | 6-0314   |
| 24.87              | 12.33 | 62.41 | 38.45 | 19.82 | 34.98 | 100                | 100 | 100 | 90 | 80 | 80 | KAOLINITE (DISORDERED)  | 6-0221   |
| 24.87              | 12.38 | 38.71 | 21.55 | 23.42 | 35.77 | 100                | 100 | 90  | 70 | 60 | 50 | DICKITE                 | 10-0446  |
| 24.88              | 12.34 | 62.36 | 56.83 | 20.34 | 58.16 | 80                 | 100 | 90  | 70 | 60 | 60 | KAOLINITE               | 14-0164  |
| 24.88              | 12.37 | 38.78 | 21.58 | 35.88 | 19.95 | 100                | 90  | 90  | 80 | 80 | 70 | DICKITE                 | 10-0430  |
| 24.94              | 60.25 | 12.34 | 19.34 | 35.92 | 33.96 | 100                | 100 | 80  | 70 | 50 | 40 | SERPENTINE (AL) SYN     | 11-0096  |
| 24.98              | 4.20  | 10.04 | 30.48 | 29.06 | 29.26 | 80                 | 100 | 80  | 80 | 60 | 60 | OKENITE                 | 9-0469   |
| 24.98              | 31.02 | 18.16 | 43.90 | 44.82 | 47.84 | 70                 | 100 | 40  | 40 | 40 | 40 | BASTNAESITE             | 11-0340  |
| 25.00              | 32.40 | 29.26 | 24.92 | 17.54 | 33.40 | 70                 | 100 | 95  | 65 | 55 | 50 | STIBNITE SYN            | 6-0474   |
| 25.01              | 12.36 | 35.63 | 19.21 | 33.43 | 59.57 | 100                | 100 | 60  | 40 | 20 | 20 | CHAMOSITE               | 10-0404  |
| 25.01              | 12.43 | 37.82 | 60.42 | 34.08 | 45.32 | 80                 | 100 | 90  | 55 | 40 | 40 | SERPENTINE (AL)         | 12-0583  |
| 25.01              | 28.63 | 31.83 | 25.23 | 46.50 | 22.39 | 94                 | 100 | 63  | 60 | 55 | 38 | BISMUTHINITE SYN        | 6-0333   |
| 25.01              | 31.63 | 35.92 | 34.98 | 37.34 | 39.08 | 75                 | 100 | 80  | 60 | 35 | 35 | FAYALITE SYN            | 11-0262  |
| 25.05              | 12.48 | 36.04 | 60.38 | 46.88 | 19.30 | 70                 | 100 | 80  | 50 | 45 | 40 | SERPENTINE (AL)         | 13-0004  |
| 25.06              | 32.52 | 53.88 | 38.60 | 46.52 | 42.82 | 50                 | 100 | 45  | 25 | 25 | 18 | SMITHSONITE             | 8-0449   |
| 25.08              | 12.43 | 35.48 | 42.02 | 59.10 | 51.36 | 100                | 100 | 100 | 70 | 70 | 60 | CHAMOSITE FE(III)       | 7-0339   |
| 25.08              | 12.48 | 37.85 | 60.34 | 34.02 | 34.83 | 100                | 100 | 80  | 65 | 55 | 40 | SERPENTINE              | 11-0388  |
| 25.08              | 18.80 | 33.49 | 49.71 | 31.48 | 35.68 | 100                | 85  | 75  | 65 | 45 | 30 | THORITE SYN             | 11-0419  |
| 25.08              | 18.96 | 33.82 | 49.97 | 31.50 | 31.73 | 100                | 100 | 60  | 30 | 20 | 20 | THORITE                 | 11-0172  |
| 25.14              | 6.36  | 19.98 | 60.90 | 62.72 | 12.46 | 50                 | 100 | 80  | 50 | 50 | 20 | NONTRONITE              | 2-0027   |
| 25.14              | 21.28 | 33.80 | 34.20 | 36.64 | 24.56 | 100                | 80  | 75  | 70 | 60 | 50 | ZINKOSITE SYN           | 8-0491   |
| 25.14              | 26.10 | 15.90 | 29.36 | 9.15  | 13.02 | 100                | 90  | 70  | 50 | 30 | 30 | VOLTAITE                | 17-0539  |
| 25.15              | 12.50 | 6.31  | 34.45 | 36.56 | 35.08 | 80                 | 100 | 80  | 80 | 80 | 70 | CHLORITE (DIABANTITE)   | 7-0171   |
| 25.16              | 36.07 | 31.73 | 35.19 | 51.33 | 60.95 | 75                 | 100 | 95  | 70 | 70 | 70 | FAYALITE SYN            | 9-0307   |
| 25.18              | 12.52 | 6.27  | 18.78 | 35.11 | 36.68 | 50                 | 100 | 80  | 30 | 30 | 30 | CHLORITE (RIPIDOLITE)   | 7-0076   |
| 25.19              | 25.82 | 44.11 | 36.56 | 47.74 | 34.21 | 100                | 70  | 50  | 40 | 35 | 34 | STRONTIANITE SYN        | 05-0418  |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 25.20              | 13.48 | 28.58 | 20.88 | 27.42 | 41.78 | 50                 | 100 | 70  | 30 | 30 | 30 | CARNOTITE                | 8-0317   |
| 25.20              | 28.40 | 28.68 | 25.64 | 28.04 | 28.96 | 90                 | 100 | 100 | 90 | 90 | 90 | HOLLANDITE               | 4-0590   |
| 25.20              | 28.58 | 50.96 | 19.80 | 41.78 | 43.24 | 70                 | 100 | 60  | 40 | 40 | 40 | LINARITE                 | 4-0598   |
| 25.21              | 47.50 | 55.97 | 19.51 | 64.68 | 77.55 | 100                | 40  | 25  | 20 | 16 | 14 | EUCRYPTITE (BETA)        | 13-0378  |
| 25.23              | 12.47 | 6.31  | 18.88 | 59.44 | 31.61 | 100                | 100 | 90  | 70 | 60 | 50 | CHAMOSITE (MG)           | 5-0146   |
| 25.23              | 12.54 | 36.53 | 34.09 | 61.08 | 19.55 | 100                | 100 | 80  | 70 | 70 | 60 | CHAMOSITE FE(III)        | 7-0329   |
| 25.23              | 12.56 | 35.63 | 6.27  | 18.84 | 42.02 | 80                 | 100 | 50  | 40 | 40 | 40 | CHLORITE (THURINGITE)    | 13-0029  |
| 25.25              | 17.22 | 35.68 | 24.30 | 38.54 | 39.40 | 100                | 70  | 60  | 40 | 30 | 30 | AZURITE                  | 11-0136  |
| 25.28              | 32.28 | 48.36 | 44.14 | 59.18 | 51.60 | 26                 | 100 | 26  | 24 | 11 | 10 | ARSENIC                  | 5-0632   |
| 25.30              | 12.56 | 6.27  | 18.92 | 35.77 | 59.27 | 90                 | 100 | 50  | 50 | 50 | 50 | CHLORITE (APHROSIDERITE) | 12-0243  |
| 25.30              | 12.56 | 35.63 | 59.44 | 42.23 | 33.43 | 100                | 100 | 90  | 70 | 60 | 40 | CHAMOSITE                | 7-0315   |
| 25.30              | 30.09 | 23.22 | 26.94 | 36.37 | 41.42 | 80                 | 100 | 80  | 80 | 60 | 60 | WOLLASTONITE             | 10-0487  |
| 25.33              | 40.56 | 17.22 | 24.22 | 35.77 | 39.40 | 100                | 70  | 55  | 50 | 35 | 35 | AZURITE                  | 11-0682  |
| 25.34              | 18.38 | 20.54 | 21.54 | 23.46 | 14.56 | 90                 | 100 | 35  | 30 | 30 | 20 | PICKERINGITE             | 12-0299  |
| 25.34              | 23.85 | 24.25 | 34.91 | 43.71 | 46.98 | 30                 | 100 | 90  | 16 | 12 | 12 | PETALITE                 | 12-0451  |
| 25.36              | 11.28 | 22.84 | 27.94 | 34.60 | 13.28 | 60                 | 100 | 90  | 50 | 50 | 40 | BETA URANOPHANE          | 8-0301   |
| 25.37              | 30.83 | 25.67 | 48.06 | 55.27 | 36.28 | 100                | 90  | 80  | 30 | 30 | 25 | BROOKITE                 | 16-0617  |
| 25.37              | 48.12 | 37.82 | 53.97 | 55.16 | 62.78 | 100                | 33  | 22  | 21 | 19 | 13 | ANATASE SYN              | 4-0477   |
| 25.42              | 12.70 | 21.76 | 40.22 | 34.88 | 57.54 | 60                 | 100 | 50  | 50 | 40 | 40 | CHALCOPHANITE            | 15-0807  |
| 25.42              | 24.78 | 36.04 | 43.46 | 29.06 | 48.92 | 43                 | 100 | 32  | 27 | 24 | 21 | CERUSSITE                | 5-0417   |
| 25.42              | 31.92 | 48.92 | 36.18 | 60.46 | 62.26 | 100                | 100 | 100 | 70 | 70 | 70 | PLATTNERITE              | 8-0185   |
| 25.45              | 30.19 | 33.56 | 56.45 | 19.21 | 34.50 | 80                 | 100 | 80  | 60 | 50 | 40 | ALLANITE (METAMICT)      | 9-0474   |
| 25.46              | 31.40 | 28.68 | 40.87 | 48.72 | 55.78 | 100                | 33  | 22  | 20 | 15 | 14 | ANHYDRITE                | 6-0226   |
| 25.50              | 6.64  | 19.66 | 50.96 | 51.60 | 51.60 | 50                 | 100 | 60  | 40 | 40 | 40 | NONTRONITE               | 13-0508  |
| 25.50              | 12.81 | 19.14 | 45.30 | 59.60 | 6.50  | 100                | 100 | 80  | 80 | 80 | 70 | THURINGITE               | 3-0067   |
| 25.50              | 34.06 | 31.58 | 38.78 | 22.04 | 48.92 | 80                 | 100 | 95  | 45 | 35 | 35 | WILLEMITE                | 8-0492   |
| 25.52              | 12.83 | 19.17 | 45.34 | 59.65 | 6.50  | 100                | 100 | 80  | 80 | 80 | 70 | CHLORITE (THURINGITE)    | 3-0067   |
| 25.54              | 22.68 | 48.36 | 48.61 | 19.25 | 28.18 | 100                | 60  | 60  | 60 | 50 | 50 | SPODUMENE (BETA) SYN     | 13-0251  |
| 25.56              | 18.58 | 20.68 | 21.72 | 23.70 | 22.48 | 100                | 100 | 55  | 45 | 40 | 35 | HALOTRICHITE             | 11-0506  |
| 25.58              | 10.16 | 24.16 | 27.60 | 16.28 | 17.98 | 80                 | 100 | 100 | 80 | 75 | 75 | METATORBERNITE           | 16-0404  |
| 25.58              | 19.10 | 33.92 | 50.66 | 32.06 | 49.20 | 100                | 95  | 95  | 70 | 45 | 35 | COFFINITE SYN            | 11-0420  |
| 25.58              | 28.94 | 35.16 | 51.58 | 27.16 | 37.94 | 90                 | 100 | 100 | 70 | 60 | 40 | PREHNITE                 | 7-0333   |
| 25.58              | 32.52 | 17.94 | 60.02 | 48.92 | 37.44 | 100                | 80  | 45  | 35 | 30 | 25 | PSEUDOBROOKITE SYN       | 9-0182   |
| 25.58              | 37.28 | 41.18 | 12.70 | 37.92 | 31.02 | 60                 | 100 | 85  | 55 | 50 | 40 | PSILOMELANE              | 14-0627  |
| 25.64              | 28.78 | 60.02 | 37.44 | 40.98 | 41.98 | 60                 | 100 | 50  | 40 | 40 | 20 | CORONADITE               | 7-0361   |
| 25.64              | 35.44 | 29.66 | 52.22 | 20.84 | 61.34 | 80                 | 100 | 90  | 80 | 70 | 70 | LITHIOPHILITE            | 13-0336  |
| 25.65              | 19.02 | 33.92 | 50.66 | 32.16 | 41.38 | 100                | 100 | 70  | 70 | 40 | 40 | COFFINITE                | 8-0304   |
| 25.67              | 25.37 | 30.83 | 48.06 | 55.27 | 36.28 | 80                 | 100 | 90  | 30 | 30 | 25 | BROOKITE                 | 16-0617  |
| 25.67              | 28.99 | 43.73 | 32.80 | 47.61 | 68.49 | 100                | 100 | 100 | 80 | 80 | 80 | SCAPOLITE                | 2-0405   |
| 25.72              | 18.12 | 10.29 | 40.98 | 20.94 | 21.92 | 100                | 100 | 60  | 60 | 30 | 30 | BASSETITE                | 7-0288   |
| 25.72              | 29.10 | 23.26 | 29.51 | 33.27 | 47.56 | 100                | 70  | 60  | 55 | 30 | 30 | SCAPOLITE                | 14-0170  |
| 25.72              | 36.80 | 45.30 | 52.88 | 28.42 | 30.04 | 70                 | 100 | 85  | 50 | 70 | 70 | ARGENTITE                | 4-0774   |
| 25.75              | 31.82 | 14.06 | 28.42 | 30.04 | 41.98 | 80                 | 100 | 70  | 70 | 70 | 70 | AXINITE (TINZENITE)      | 6-0444   |
| 25.75              | 31.82 | 28.24 | 14.06 | 24.18 | 27.19 | 80                 | 100 | 90  | 70 | 60 | 60 | AXINITE                  | 6-0448   |
| 25.80              | 30.92 | 32.52 | 45.06 | 46.28 | 47.56 | 90                 | 100 | 80  | 40 | 40 | 30 | MIARGYRITE               | 4-0675   |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME                | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|-----------------------------|----------|
| 25.82              | 6.31  | 60.47 | 19.42 | 25.37 | 34.22 | 60                 | 100 | 60  | 40 | 40 | 40 | VERMICULITE                 | 10-0439  |
| 25.82              | 25.19 | 44.11 | 36.56 | 47.74 | 36.21 | 70                 | 100 | 50  | 40 | 35 | 34 | STRONTIANITE SYN            | 5-0418   |
| 25.82              | 31.71 | 32.90 | 39.69 | 48.50 | 53.19 | 70                 | 100 | 90  | 70 | 70 | 60 | DAHLITE (CARBONATE-APATITE) | 15-0100  |
| 25.82              | 35.05 | 51.70 | 19.51 | 53.09 | 36.84 | 100                | 50  | 50  | 25 | 18 | 13 | XENOTIME                    | 11-0254  |
| 25.85              | 31.83 | 32.80 | 28.84 | 39.71 | 46.65 | 30                 | 100 | 80  | 30 | 30 | 30 | DAHLITE (CARBONATE-APATITE) | 12-0529  |
| 25.85              | 48.89 | 19.68 | 40.04 | 56.72 | 67.04 | 100                | 30  | 20  | 15 | 15 | 12 | CORDIERITE MU SYN           | 14-0249  |
| 25.88              | 10.53 | 27.86 | 35.02 | 15.70 | 30.27 | 80                 | 100 | 80  | 80 | 60 | 60 | WAVELLITE                   | 2-0075   |
| 25.88              | 12.14 | 17.44 | 24.30 | 25.36 | 27.68 | 25                 | 100 | 70  | 15 | 12 | 12 | SCHOEPIE                    | 13-0407  |
| 25.88              | 26.58 | 18.70 | 14.64 | 29.54 | 30.80 | 100                | 100 | 95  | 35 | 35 | 35 | BRANNERITE SYN              | 12-0477  |
| 25.88              | 27.34 | 10.30 | 34.88 | 43.02 | 45.54 | 100                | 100 | 80  | 80 | 80 | 80 | WAVELLITE                   | 17-0203  |
| 25.88              | 28.79 | 42.65 | 42.99 | 26.88 | 22.80 | 100                | 97  | 80  | 76 | 67 | 57 | BARITE SYN                  | 5-0448   |
| 25.88              | 31.82 | 26.42 | 30.16 | 47.56 | 23.90 | 100                | 30  | 25  | 20 | 16 | 14 | COSALITE                    | 13-0502  |
| 25.90              | 29.48 | 23.54 | 33.43 | 47.87 | 20.95 | 100                | 100 | 90  | 90 | 90 | 70 | SCAPOLITE                   | 2-0412   |
| 25.90              | 33.05 | 51.95 | 47.61 | 37.31 | 38.81 | 40                 | 100 | 63  | 30 | 25 | 25 | MARCASITE                   | 3-0799   |
| 25.92              | 27.31 | 16.45 | 30.64 | 31.48 | 38.03 | 85                 | 100 | 80  | 70 | 70 | 65 | LEUCITE                     | 15-0047  |
| 25.96              | 8.42  | 29.16 | 32.90 | 12.88 | 21.40 | 40                 | 100 | 40  | 40 | 30 | 30 | COPIAPITE                   | 11-0395  |
| 25.98              | 10.36 | 21.89 | 29.48 | 28.52 | 54.45 | 80                 | 100 | 80  | 80 | 65 | 65 | CORDIERITE (FE)             | 9-0473   |
| 25.98              | 15.80 | 30.56 | 53.39 | 33.27 | 35.85 | 100                | 80  | 80  | 60 | 50 | 50 | ANALCIME (ZEOLITE)          | 7-0340   |
| 25.98              | 24.05 | 31.81 | 33.00 | 23.29 | 28.99 | 100                | 35  | 35  | 35 | 30 | 30 | JAMESONITE                  | 13-0461  |
| 25.98              | 30.10 | 43.09 | 51.02 | 71.03 | 53.46 | 84                 | 100 | 57  | 35 | 17 | 16 | GALENA SYN                  | 5-0592   |
| 25.99              | 15.80 | 30.52 | 35.83 | 52.47 | 18.29 | 100                | 80  | 70  | 50 | 50 | 40 | ANALCIME (ZEOLITE)          | 7-0363   |
| 25.99              | 26.29 | 40.91 | 16.45 | 35.31 | 33.26 | 95                 | 100 | 60  | 50 | 50 | 40 | MULLITE                     | 15-0776  |
| 26.02              | 30.72 | 24.35 | 37.34 | 49.07 | 52.82 | 100                | 100 | 80  | 80 | 80 | 80 | POLLUCITE                   | 15-0317  |
| 26.04              | 28.12 | 17.54 | 27.50 | 31.02 | 36.80 | 90                 | 100 | 90  | 80 | 50 | 50 | DUFRENITE                   | 8-0155   |
| 26.04              | 47.82 | 36.50 | 39.48 | 26.82 | 48.92 | 100                | 80  | 70  | 70 | 60 | 60 | BRANNERITE                  | 8-0002   |
| 26.05              | 49.25 | 58.82 | 65.71 | 67.20 | 20.04 | 100                | 90  | 80  | 80 | 80 | 60 | QUARTZ (BETA)               | 7-0346   |
| 26.10              | 25.14 | 15.90 | 29.36 | 9.15  | 13.02 | 90                 | 100 | 70  | 50 | 30 | 30 | VOLTAITE                    | 17-0539  |
| 26.13              | 26.53 | 41.02 | 35.48 | 61.13 | 33.56 | 90                 | 100 | 100 | 90 | 90 | 80 | SILLIMANITE                 | 10-0369  |
| 26.19              | 32.34 | 33.34 | 34.40 | 47.06 | 49.71 | 70                 | 100 | 70  | 70 | 70 | 70 | APATITE SYN (CARBONATE)     | 13-0001  |
| 26.21              | 20.23 | 30.30 | 34.50 | 36.99 | 10.66 | 100                | 90  | 90  | 70 | 70 | 60 | NEPHELINE HYDRATE I SYN     | 10-0460  |
| 26.21              | 20.46 | 49.63 | 41.62 | 45.11 | 58.98 | 100                | 20  | 10  | 4  | 4  | 4  | QUARTZ (BETA)               | 11-0252  |
| 26.21              | 33.96 | 39.52 | 53.66 | 56.23 | 85.19 | 100                | 65  | 50  | 40 | 40 | 40 | MANGANITE                   | 8-0099   |
| 26.21              | 37.31 | 54.63 | 34.09 | 51.64 | 35.48 | 100                | 70  | 70  | 60 | 50 | 40 | MANGANITE SYN               | 8-0016   |
| 26.24              | 45.90 | 27.25 | 33.18 | 37.93 | 36.21 | 100                | 65  | 52  | 46 | 38 | 33 | ARAGONITE SYN               | 5-0453   |
| 26.26              | 23.58 | 29.54 | 24.99 | 30.16 | 42.20 | 70                 | 100 | 60  | 40 | 40 | 40 | CHALCOSIDERITE              | 8-0127   |
| 26.26              | 27.94 | 57.92 | 24.84 | 37.28 | 29.54 | 50                 | 100 | 50  | 40 | 40 | 30 | ROCKBRIDGEITE               | 8-0159   |
| 26.29              | 25.99 | 40.91 | 16.45 | 35.31 | 33.26 | 100                | 95  | 60  | 50 | 50 | 40 | MULLITE                     | 15-0776  |
| 26.31              | 8.70  | 39.67 | 34.24 | 44.59 | 26.14 | 100                | 100 | 60  | 55 | 50 | 40 | PHLOGOPITE (3T SYN)         | 10-0481  |
| 26.34              | 8.82  | 17.72 | 58.76 | 33.02 | 33.92 | 90                 | 100 | 90  | 50 | 40 | 40 | SERPENTERITE                | 14-0188  |
| 26.34              | 18.38 | 35.16 | 29.06 | 44.14 | 54.92 | 100                | 40  | 40  | 20 | 17 | 17 | KIESERITE SYN               | 1-0638   |
| 26.34              | 29.84 | 29.06 | 21.04 | 45.78 | 47.56 | 60                 | 100 | 85  | 40 | 40 | 35 | VANADINITE                  | 13-0585  |
| 26.37              | 10.31 | 29.38 | 21.62 | 28.06 | 54.21 | 90                 | 100 | 90  | 80 | 80 | 70 | CORDIERITE                  | 9-0472   |
| 26.37              | 30.80 | 32.12 | 34.06 | 52.11 | 47.79 | 100                | 48  | 45  | 30 | 30 | 22 | MINIUM SYN                  | 8-0019   |
| 26.37              | 33.18 | 28.89 | 27.10 | 34.63 | 34.94 | 90                 | 100 | 95  | 70 | 70 | 70 | HORNBLende                  | 9-0434   |
| 26.39              | 8.67  | 34.24 | 36.93 | 60.60 | 19.42 | 100                | 100 | 60  | 30 | 30 | 25 | PHLOGOPITE (BORON SYN)      | 14-0466  |

| TWO-THETA (COPPER) |       |       |       |        |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME        | FILE NO. |
|--------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|-----|----|----|---------------------|----------|
| 26.42              | 25.88 | 31.82 | 30.16 | 47.56  | 23.90  | 25                 | 100 | 30  | 20  | 16 | 14 | COSALITE            | 13-0502  |
| 26.45              | 5.20  | 60.29 | 10.41 | 19.38  | 15.57  | 80                 | 100 | 70  | 50  | 50 | 40 | SAPONITE SYN        | 12-0168  |
| 26.45              | 8.75  | 33.69 | 36.68 | 41.42  | 45.34  | 100                | 100 | 80  | 80  | 80 | 80 | BIOTITE             | 2-0045   |
| 26.45              | 46.65 | 40.83 | 34.36 | 63.74  | 65.87  | 100                | 90  | 70  | 50  | 50 | 50 | HELVITE             | 15-0253  |
| 26.45              | 54.56 | 77.47 | 83.74 | 101.71 | 44.50  | 100                | 8   | 6   | 6   | 4  | 3  | GRAPHITE SYN        | 12-0212  |
| 26.46              | 22.45 | 32.68 | 35.25 | 13.14  | 22.86  | 95                 | 100 | 80  | 60  | 55 | 35 | EUCRYPTITE          | 14-0667  |
| 26.50              | 19.40 | 14.08 | 32.78 | 36.04  | 29.76  | 90                 | 100 | 90  | 80  | 80 | 70 | SODDYITE            | 8-0195   |
| 26.50              | 28.22 | 24.84 | 43.68 | 51.90  | 47.84  | 60                 | 100 | 75  | 55  | 45 | 40 | GREENOCKITE         | 6-0314   |
| 26.51              | 8.73  | 34.17 | 44.94 | 60.16  | 41.42  | 100                | 100 | 100 | 65  | 50 | 45 | PHLOGOPITE          | 10-0493  |
| 26.53              | 8.77  | 19.77 | 34.98 | 24.32  | 29.09  | 100                | 100 | 90  | 90  | 60 | 50 | MUSCOVITE (SYN 1M)  | 7-0025   |
| 26.53              | 19.91 | 34.91 | 8.93  | 61.85  | 18.10  | 100                | 100 | 100 | 80  | 80 | 60 | ILLITE              | 9-0334   |
| 26.53              | 20.42 | 62.78 | 30.62 | 31.85  | 36.53  | 50                 | 100 | 80  | 20  | 20 | 20 | CHRYSOCOLLA         | 3-0219   |
| 26.53              | 41.02 | 26.13 | 35.48 | 61.13  | 33.56  | 100                | 100 | 90  | 90  | 90 | 80 | SILLIMANITE         | 10-0369  |
| 26.54              | 31.24 | 45.83 | 28.19 | 52.76  | 43.64  | 100                | 94  | 29  | 28  | 27 | 26 | CINNABAR SYN        | 6-0256   |
| 26.58              | 8.73  | 45.13 | 35.76 | 26.15  | 54.88  | 100                | 100 | 100 | 50  | 45 | 35 | PHLOGOPITE (3T)     | 10-0492  |
| 26.58              | 8.82  | 19.54 | 34.46 | 60.90  | 24.30  | 80                 | 100 | 80  | 80  | 60 | 50 | ROSCOEITE           | 10-0496  |
| 26.58              | 25.88 | 18.70 | 14.64 | 29.54  | 30.80  | 100                | 100 | 95  | 35  | 35 | 35 | BRANNERITE SYN      | 12-0477  |
| 26.58              | 43.68 | 35.16 | 45.54 | 83.20  | 31.82  | 60                 | 100 | 40  | 40  | 30 | 20 | RICKARDITE          | 6-0661   |
| 26.58              | 47.04 | 41.18 | 86.90 | 95.56  | 24.16  | 100                | 70  | 50  | 50  | 50 | 40 | DANALITE            | 11-0491  |
| 26.60              | 8.83  | 35.02 | 45.11 | 19.91  | 17.67  | 100                | 100 | 90  | 75  | 65 | 55 | MUSCOVITE (SYN 2M)  | 7-0032   |
| 26.60              | 33.90 | 51.80 | 54.81 | 37.98  | 64.79  | 100                | 81  | 63  | 63  | 24 | 17 | CASSITERITE SYN     | 5-0467   |
| 26.61              | 28.06 | 68.09 | 46.27 | 46.96  | 47.09  | 65                 | 100 | 75  | 55  | 50 | 50 | KYANITE (DISTHENE)  | 11-0046  |
| 26.61              | 34.50 | 45.58 | 8.84  | 17.63  | 24.52  | 100                | 100 | 100 | 80  | 80 | 80 | HYDROMUSCOVITE      | 2-0462   |
| 26.61              | 54.81 | 44.41 | 83.83 | 77.62  | 102.14 | 100                | 80  | 50  | 40  | 30 | 30 | GRAPHITE            | 13-0148  |
| 26.62              | 8.90  | 34.30 | 45.08 | 26.29  | 35.73  | 100                | 100 | 30  | 30  | 20 | 15 | PHLOGOPITE (1M)     | 10-0495  |
| 26.66              | 20.85 | 50.21 | 36.56 | 39.49  | 68.20  | 100                | 35  | 17  | 12  | 12 | 11 | QUARTZ (ALPHA)      | 5-0490   |
| 26.68              | 43.74 | 51.77 | 30.52 | 70.03  | 54.26  | 100                | 55  | 45  | 35  | 12 | 10 | METACINNABAR        | 6-0261   |
| 26.69              | 6.50  | 19.86 | 27.62 | 30.62  | 34.63  | 10                 | 100 | 18  | 10  | 8  | 5  | MONTMORILLONITE     | 13-0259  |
| 26.69              | 8.84  | 17.77 | 24.59 | 28.99  | 34.80  | 100                | 75  | 75  | 75  | 75 | 75 | LEPIDOLITE (1M)     | 10-0485  |
| 26.74              | 11.95 | 39.32 | 33.02 | 10.64  | 13.06  | 50                 | 100 | 60  | 40  | 30 | 30 | FERRIMOLYBDITE      | 15-0290  |
| 26.74              | 29.76 | 20.84 | 43.68 | 27.68  | 23.32  | 86                 | 100 | 87  | 76  | 71 | 57 | ANGLESITE           | 5-0577   |
| 26.74              | 34.32 | 43.68 | 25.72 | 45.54  | 29.06  | 80                 | 100 | 80  | 70  | 70 | 60 | STROMEYERITE        | 9-0499   |
| 26.76              | 8.87  | 17.77 | 45.37 | 34.99  | 19.77  | 100                | 100 | 53  | 47  | 27 | 19 | MUSCOVITE (NAT. 3T) | 7-0042   |
| 26.77              | 8.84  | 19.82 | 34.36 | 60.51  | 37.15  | 90                 | 100 | 90  | 60  | 60 | 40 | ILLITE (TRIOCT.)    | 9-0343   |
| 26.77              | 8.88  | 45.44 | 26.37 | 28.52  | 30.80  | 65                 | 100 | 16  | 10  | 10 | 8  | PHLOGOPITE SYN      | 16-0344  |
| 26.77              | 8.91  | 34.36 | 18.14 | 19.51  | 24.94  | 100                | 100 | 80  | 60  | 60 | 60 | LEPIDOLITE          | 10-0483  |
| 26.77              | 31.39 | 34.77 | 8.82  | 17.64  | 19.66  | 80                 | 100 | 80  | 60  | 60 | 60 | MUSCOVITE (LI)      | 10-0482  |
| 26.79              | 23.48 | 27.68 | 27.13 | 20.95  | 25.76  | 100                | 80  | 80  | 60  | 50 | 50 | SANIDINE (HIGH) SYN | 10-0353  |
| 26.82              | 8.66  | 12.70 | 18.20 | 33.14  | 21.86  | 50                 | 100 | 50  | 40  | 40 | 30 | BISBEITE            | 14-0685  |
| 26.82              | 19.80 | 14.42 | 33.28 | 36.34  | 49.20  | 100                | 90  | 80  | 70  | 60 | 50 | SODDYITE            | 12-0180  |
| 26.85              | 8.88  | 19.86 | 35.05 | 17.85  | 23.73  | 100                | 100 | 100 | 100 | 80 | 80 | SERICITE            | 2-0056   |
| 26.85              | 8.88  | 45.39 | 34.29 | 55.16  | 37.02  | 100                | 70  | 30  | 20  | 20 | 18 | PHLOGOPITE SYN      | 16-0352  |
| 26.85              | 8.89  | 34.97 | 45.51 | 29.91  | 17.85  | 100                | 95  | 54  | 46  | 34 | 31 | MUSCOVITE           | 6-0263   |
| 26.85              | 27.53 | 23.54 | 29.78 | 21.00  | 25.67  | 70                 | 100 | 70  | 50  | 40 | 30 | ORTHOCLASE (FE)     | 8-0048   |
| 26.85              | 34.83 | 8.84  | 17.81 | 19.86  | 23.10  | 100                | 75  | 50  | 50  | 50 | 50 | LEPIDOLITE (3M)     | 10-0484  |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME        | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|---------------------|----------|
| 26.92              | 20.02 | 17.90 | 25.42 | 50.96 | 56.78 | 80                 | 100 | 70  | 70 | 70 | 70 | SHATTUCKITE         | 13-0507  |
| 26.94              | 34.63 | 45.78 | 8.90  | 17.81 | 28.24 | 100                | 100 | 100 | 80 | 80 | 80 | LEPIDOLITE (120)    | 15-0062  |
| 27.00              | 20.02 | 35.66 | 53.52 | 43.82 | 55.67 | 100                | 45  | 45  | 40 | 20 | 14 | ZIRCON              | 6-0266   |
| 27.00              | 28.86 | 31.14 | 21.28 | 25.36 | 41.98 | 50                 | 100 | 70  | 25 | 25 | 25 | MONAZITE            | 11-0556  |
| 27.00              | 30.58 | 19.06 | 23.58 | 25.00 | 46.02 | 100                | 70  | 50  | 50 | 50 | 45 | CARNALLITE          | 8-0075   |
| 27.02              | 8.04  | 41.02 | 66.82 | 79.94 |       | 80                 | 100 | 60  | 40 | 20 |    | ALLOPHANE           | 2-0039   |
| 27.02              | 27.70 | 23.60 | 29.98 | 34.88 | 50.84 | 90                 | 100 | 80  | 80 | 80 | 80 | HYALOPHANE          | 11-0417  |
| 27.06              | 30.07 | 32.79 | 28.09 | 44.38 | 44.29 | 98                 | 100 | 63  | 59 | 57 | 55 | CELESTINE SYN       | 5-0593   |
| 27.07              | 29.51 | 22.98 | 21.10 | 30.78 | 38.15 | 40                 | 100 | 60  | 35 | 35 | 30 | NEPHELINE SYN       | 9-0338   |
| 27.08              | 14.14 | 36.34 | 46.78 | 52.88 | 92.08 | 90                 | 100 | 80  | 70 | 40 | 40 | LEPIDOCROCITE       | 8-0098   |
| 27.08              | 28.76 | 13.40 | 27.00 | 16.52 | 37.44 | 75                 | 100 | 86  | 73 | 55 | 54 | HEMIMORPHITE        | 5-0555   |
| 27.10              | 9.02  | 45.83 | 28.94 | 26.69 | 30.94 | 100                | 80  | 55  | 40 | 35 | 30 | ZINNWALDITE         | 13-0227  |
| 27.10              | 13.31 | 23.79 | 64.14 | 23.47 | 29.38 | 100                | 25  | 20  | 18 | 14 | 12 | SULPHUR             | 13-0141  |
| 27.16              | 39.66 | 37.60 | 48.64 | 64.68 | 62.26 | 100                | 41  | 40  | 23 | 16 | 13 | BISMUTH             | 5-0519   |
| 27.24              | 10.49 | 21.18 | 25.28 | 29.76 | 14.98 | 70                 | 100 | 80  | 60 | 60 | 50 | SKLODOWSKITE        | 8-0447   |
| 27.24              | 20.50 | 21.76 | 12.50 | 16.16 | 24.02 | 75                 | 100 | 80  | 55 | 55 | 35 | AMMONIA ALUM.       | 7-0022   |
| 27.24              | 32.66 | 36.18 | 35.16 | 28.12 | 28.68 | 80                 | 100 | 90  | 80 | 70 | 70 | PROUSTITE SYN       | 11-0470  |
| 27.25              | 26.24 | 45.90 | 33.18 | 37.93 | 36.21 | 52                 | 100 | 65  | 46 | 38 | 33 | ARAGONITE SYN       | 5-0453   |
| 27.27              | 29.78 | 21.26 | 31.05 | 38.47 | 59.23 | 70                 | 100 | 70  | 70 | 60 | 60 | NEPHELINE           | 9-0458   |
| 27.29              | 19.04 | 30.59 | 14.06 | 19.64 | 27.95 | 40                 | 100 | 80  | 30 | 30 | 30 | BREWSTERITE         | 15-0582  |
| 27.31              | 25.92 | 16.45 | 30.64 | 31.48 | 38.03 | 100                | 85  | 80  | 70 | 70 | 65 | LEUCITE             | 15-0047  |
| 27.34              | 10.38 | 21.02 | 29.26 | 17.06 | 23.58 | 60                 | 100 | 80  | 60 | 40 | 40 | METATYUYAMUNITE     | 8-0287   |
| 27.34              | 16.14 | 27.76 | 28.68 | 18.58 | 23.20 | 60                 | 100 | 75  | 60 | 45 | 40 | MIRABILITE          | 11-0647  |
| 27.34              | 25.88 | 10.30 | 34.88 | 43.02 | 45.54 | 100                | 100 | 80  | 80 | 80 | 80 | WAVELLITE           | 17-0203  |
| 27.36              | 20.90 | 41.82 | 50.72 | 21.95 | 23.16 | 100                | 40  | 25  | 25 | 13 | 13 | MICROCLINE          | 12-0703  |
| 27.36              | 27.88 | 28.15 | 22.00 | 23.54 | 24.59 | 80                 | 100 | 80  | 70 | 70 | 70 | ANORTHITE           | 9-0464   |
| 27.37              | 27.71 | 23.73 | 21.40 | 25.79 | 30.02 | 100                | 90  | 70  | 45 | 40 | 35 | SANIDINE            | 13-0456  |
| 27.41              | 31.20 | 11.09 | 19.30 | 22.28 | 29.63 | 95                 | 100 | 90  | 50 | 45 | 35 | BERYL               | 9-0430   |
| 27.42              | 19.58 | 33.02 | 34.06 | 30.16 | 34.88 | 100                | 80  | 40  | 40 | 30 | 30 | BLOEDITE            | 4-0549   |
| 27.42              | 20.65 | 21.91 | 16.28 | 32.06 | 29.46 | 55                 | 100 | 45  | 40 | 35 | 25 | POTASH ALUM         | 7-0017   |
| 27.42              | 29.06 | 32.78 | 24.42 | 46.28 | 53.20 | 40                 | 100 | 60  | 30 | 30 | 30 | CUPROBISMUTITE      | 8-0086   |
| 27.42              | 33.28 | 33.02 | 26.92 | 28.04 | 46.28 | 100                | 45  | 40  | 35 | 25 | 25 | BISMITE             | 14-0699  |
| 27.42              | 44.82 | 55.30 | 32.78 | 29.66 | 51.28 | 100                | 35  | 35  | 30 | 20 | 20 | STOLZITE SYN        | 8-0476   |
| 27.43              | 18.88 | 24.24 | 32.46 | 34.04 | 34.65 | 100                | 80  | 80  | 35 | 30 | 30 | CANCRINITE SYN      | 15-0734  |
| 27.49              | 21.10 | 23.22 | 25.60 | 26.53 | 30.15 | 100                | 60  | 50  | 50 | 50 | 50 | MICROCLINE          | 10-0479  |
| 27.49              | 27.77 | 23.75 | 21.58 | 13.66 | 41.80 | 100                | 40  | 35  | 25 | 20 | 20 | SANIDINE (HIGH) SYN | 10-0357  |
| 27.49              | 54.38 | 36.09 | 41.26 | 56.68 | 69.06 | 100                | 50  | 41  | 22 | 16 | 16 | RUTILE              | 4-0051   |
| 27.50              | 12.03 | 24.30 | 36.64 | 27.76 | 28.22 | 10                 | 100 | 50  | 10 | 4  | 4  | SCHOEPIE            | 13-0241  |
| 27.50              | 17.48 | 31.14 | 33.40 | 33.66 | 34.60 | 100                | 80  | 80  | 80 | 80 | 80 | MOTTRAMITE          | 12-0538  |
| 27.50              | 27.78 | 21.64 | 41.78 | 13.64 | 23.61 | 90                 | 100 | 15  | 15 | 13 | 13 | ANORTHOCLASE        | 9-0478   |
| 27.50              | 55.30 | 44.82 | 32.90 | 51.28 | 56.78 | 100                | 90  | 80  | 60 | 60 | 60 | STOLZITE            | 8-0108   |
| 27.53              | 23.54 | 26.85 | 29.78 | 21.00 | 25.67 | 100                | 70  | 70  | 50 | 40 | 30 | ORTHOCLASE (FE)     | 8-0048   |
| 27.53              | 29.28 | 10.71 | 31.50 | 35.34 | 24.39 | 60                 | 100 | 55  | 40 | 40 | 35 | ANTHOPHYLLITE       | 9-0455   |
| 27.53              | 43.27 | 56.87 | 22.17 | 35.01 | 39.80 | 100                | 90  | 80  | 50 | 50 | 45 | CHRYSOBERYL         | 11-0448  |
| 27.57              | 27.84 | 21.72 | 23.69 | 23.99 | 30.67 | 100                | 70  | 40  | 30 | 15 | 15 | ANORTHOCLASE SYN    | 10-0361  |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME           | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|------------------------|----------|
| 27.58              | 17.30 | 30.80 | 55.66 | 20.88 | 39.12 | 100                | 80  | 80  | 80 | 60 | 60 | DESCLOIZITE            | 12-0537  |
| 27.58              | 39.48 | 64.68 | 72.02 | 48.92 | 92.08 | 100                | 80  | 50  | 40 | 30 | 20 | ALTAITE                | 8-0028   |
| 27.59              | 29.89 | 34.56 | 44.00 | 55.97 | 62.13 | 100                | 90  | 90  | 40 | 40 | 40 | SPHENE                 | 11-0142  |
| 27.60              | 18.08 | 23.52 | 34.06 | 16.10 | 32.52 | 20                 | 100 | 64  | 16 | 13 | 11 | MELANITERITE           | 1-0255   |
| 27.60              | 29.26 | 28.50 | 11.98 | 41.58 | 48.92 | 90                 | 100 | 70  | 50 | 40 | 30 | EMPLECTITE             | 10-0474  |
| 27.60              | 38.26 | 40.22 | 23.02 | 49.78 | 62.72 | 100                | 37  | 31  | 20 | 20 | 13 | TELLURIUM              | 4-0554   |
| 27.60              | 43.36 | 56.95 | 57.10 | 43.55 | 22.17 | 85                 | 100 | 90  | 75 | 60 | 50 | CHRYSOBERYL SYN        | 10-0082  |
| 27.62              | 29.18 | 10.62 | 19.77 | 61.85 | 19.00 | 50                 | 100 | 70  | 35 | 25 | 20 | ANTHOPHYLLITE MG SYN   | 16-0401  |
| 27.68              | 12.36 | 23.14 | 32.28 | 36.80 | 35.30 | 50                 | 100 | 35  | 35 | 35 | 25 | EUCLASE                | 14-0065  |
| 27.68              | 20.68 | 32.04 | 50.96 | 34.06 | 46.78 | 50                 | 100 | 70  | 50 | 40 | 30 | STERNBERGITE           | 11-0061  |
| 27.68              | 26.79 | 23.48 | 27.13 | 20.95 | 25.76 | 80                 | 100 | 80  | 60 | 50 | 50 | SANIDINE (HIGH) SYN    | 10-0353  |
| 27.68              | 29.36 | 28.68 | 38.44 | 41.78 | 50.66 | 100                | 100 | 90  | 90 | 80 | 80 | EMPLECTITE             | 2-0516   |
| 27.68              | 32.17 | 34.88 | 35.44 | 26.66 | 28.04 | 90                 | 100 | 95  | 90 | 80 | 70 | PYRARGYRITE SYN        | 14-0280  |
| 27.68              | 37.76 | 41.18 | 17.44 | 50.36 | 62.26 | 100                | 25  | 25  | 8  | 8  | 8  | TELLUROBISMUTHITE      | 15-0863  |
| 27.68              | 48.64 | 52.22 | 83.20 | 94.36 | 25.50 | 100                | 80  | 70  | 50 | 50 | 40 | CUBANITE               | 9-0324   |
| 27.69              | 10.75 | 29.35 | 9.88  | 19.16 | 33.45 | 20                 | 100 | 75  | 12 | 10 | 10 | ANTHOPHYLLITE AL-FE    | 11-0253  |
| 27.70              | 13.31 | 54.73 | 26.69 | 33.18 | 38.81 | 12                 | 100 | 14  | 8  | 8  | 8  | ERYTHRITE              | 11-0626  |
| 27.70              | 19.82 | 9.12  | 18.29 | 34.63 | 35.92 | 80                 | 100 | 60  | 60 | 60 | 60 | MONTMORILLONITE (ANHY) | 7-0304   |
| 27.70              | 27.02 | 23.60 | 29.98 | 34.88 | 50.84 | 100                | 90  | 80  | 80 | 80 | 80 | HYALOPHANE             | 11-0417  |
| 27.70              | 49.00 | 31.16 | 52.89 | 58.00 | 91.63 | 100                | 90  | 80  | 60 | 50 | 50 | ENARGITE               | 10-0436  |
| 27.71              | 27.37 | 23.73 | 21.40 | 25.79 | 30.02 | 90                 | 100 | 70  | 45 | 40 | 35 | SANIDINE               | 13-0456  |
| 27.76              | 16.14 | 27.34 | 28.68 | 18.58 | 23.20 | 75                 | 100 | 60  | 60 | 45 | 40 | MIRABILITE             | 11-0647  |
| 27.76              | 46.02 | 32.06 | 54.22 | 85.00 | 41.58 | 40                 | 100 | 40  | 30 | 20 | 10 | DIGENITE               | 9-0064   |
| 27.77              | 27.49 | 23.75 | 21.58 | 13.66 | 41.80 | 40                 | 100 | 35  | 25 | 20 | 20 | SANIDINE (HIGH) SYN    | 10-0357  |
| 27.78              | 27.50 | 21.64 | 41.78 | 13.64 | 23.61 | 100                | 90  | 15  | 15 | 13 | 13 | ANORTHOCLASE           | 9-0478   |
| 27.78              | 28.10 | 23.71 | 22.00 | 22.91 | 24.46 | 30                 | 100 | 30  | 15 | 11 | 11 | ALBITE (HIGH)          | 10-0393  |
| 27.79              | 13.23 | 29.88 | 20.32 | 55.34 | 32.93 | 75                 | 100 | 75  | 63 | 63 | 50 | ERYTHRITE              | 10-0480  |
| 27.79              | 27.97 | 21.95 | 23.54 | 24.59 | 27.27 | 100                | 90  | 80  | 80 | 80 | 80 | ANORTHITE SYN          | 10-0379  |
| 27.79              | 28.06 | 22.00 | 23.66 | 24.39 | 28.42 | 100                | 90  | 80  | 70 | 70 | 70 | ANDESINE               | 10-0359  |
| 27.79              | 29.57 | 30.79 | 30.75 | 34.80 | 56.56 | 80                 | 100 | 100 | 80 | 60 | 60 | PIGEONITE              | 13-0421  |
| 27.84              | 27.57 | 21.72 | 23.69 | 23.99 | 30.67 | 70                 | 100 | 40  | 30 | 15 | 15 | ANORTHOCLASE SYN       | 10-0361  |
| 27.85              | 35.60 | 20.23 | 38.40 | 9.21  | 35.19 | 80                 | 100 | 90  | 80 | 70 | 70 | PARAGONITE             | 12-0187  |
| 27.86              | 8.66  | 17.64 | 44.36 | 13.36 | 26.40 | 50                 | 100 | 90  | 40 | 30 | 30 | TYUYAMUNITE            | 6-0017   |
| 27.86              | 10.53 | 25.88 | 35.02 | 15.70 | 30.27 | 80                 | 100 | 80  | 80 | 60 | 60 | WAVELLITE              | 2-0075   |
| 27.86              | 28.76 | 29.54 | 38.26 | 41.78 | 48.92 | 90                 | 100 | 100 | 40 | 40 | 30 | EMPLECTITE             | 3-0581   |
| 27.86              | 32.28 | 46.28 | 54.92 | 57.54 | 76.80 | 50                 | 100 | 50  | 16 | 16 | 12 | CERARGYRITE            | 6-0480   |
| 27.88              | 12.38 | 21.57 | 27.53 | 28.42 | 30.51 | 100                | 100 | 80  | 80 | 80 | 80 | PHILLIPSITE            | 12-0455  |
| 27.88              | 21.84 | 35.48 | 23.60 | 24.45 | 29.78 | 100                | 40  | 27  | 13 | 11 | 11 | LABRADORITE            | 3-0499   |
| 27.88              | 21.95 | 24.32 | 30.19 | 49.83 | 23.41 | 100                | 35  | 25  | 25 | 18 | 16 | ALBITE (LOW)           | 1-0739   |
| 27.88              | 22.06 | 23.73 | 28.15 | 24.52 | 30.40 | 100                | 80  | 80  | 80 | 70 | 70 | PLAGIOCLASE SYN        | 10-0360  |
| 27.88              | 22.06 | 23.93 | 28.15 | 24.59 | 30.40 | 100                | 80  | 80  | 80 | 70 | 70 | BYTOWNITE              | 9-0467   |
| 27.88              | 22.11 | 23.79 | 28.15 | 24.52 | 28.61 | 100                | 80  | 80  | 80 | 70 | 70 | PLAGIOCLASE            | 9-0456   |
| 27.88              | 27.36 | 28.15 | 22.00 | 23.54 | 24.59 | 100                | 80  | 80  | 70 | 70 | 70 | ANORTHITE              | 9-0464   |
| 27.88              | 28.06 | 22.00 | 27.36 | 28.61 | 27.79 | 100                | 75  | 60  | 55 | 45 | 35 | ANORTHITE              | 12-0301  |
| 27.88              | 28.06 | 22.00 | 23.73 | 27.62 | 24.45 | 100                | 90  | 80  | 80 | 80 | 70 | LABRADORITE            | 9-0465   |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 27.88              | 28.06 | 22.06 | 23.66 | 30.51 | 13.88 | 80                 | 100 | 80  | 70 | 70 | 60 | OLIGOCLASE               | 9-0457   |
| 27.88              | 30.94 | 62.31 | 57.61 | 67.37 | 35.14 | 100                | 80  | 80  | 60 | 60 | 50 | HYPERSTHENE              | 2-0520   |
| 27.88              | 35.77 | 20.18 | 26.29 | 37.15 | 58.00 | 90                 | 100 | 80  | 80 | 80 | 80 | MARGARITE                | 12-0188  |
| 27.92              | 23.54 | 13.86 | 24.16 | 22.06 | 24.30 | 100                | 25  | 20  | 20 | 15 | 15 | ALBITE                   | 9-0466   |
| 27.92              | 30.43 | 24.10 | 38.11 | 42.97 | 29.41 | 165                | 100 | 60  | 45 | 45 | 35 | TOPAZ                    | 12-0765  |
| 27.94              | 19.44 | 20.88 | 23.02 | 39.30 | 44.14 | 35                 | 100 | 35  | 30 | 30 | 30 | RUTHERFORDINE SYN        | 9-0163   |
| 27.94              | 26.26 | 57.92 | 24.84 | 37.28 | 29.54 | 100                | 50  | 50  | 40 | 40 | 30 | ROCKBRIDGEITE            | 8-0159   |
| 27.94              | 29.74 | 31.02 | 35.44 | 48.10 | 33.14 | 90                 | 100 | 80  | 60 | 60 | 50 | POLYBASITE               | 8-0123   |
| 27.97              | 16.42 | 30.40 | 32.80 | 49.00 | 36.07 | 90                 | 100 | 80  | 80 | 60 | 50 | REALGAR                  | 9-0441   |
| 27.97              | 19.25 | 24.66 | 20.42 | 31.50 | 34.77 | 100                | 67  | 40  | 27 | 20 | 15 | CANCRINITE               | 3-0503   |
| 27.97              | 27.79 | 21.95 | 23.54 | 24.59 | 27.27 | 90                 | 100 | 80  | 80 | 80 | 80 | ANORTHITE SYN            | 10-0379  |
| 28.06              | 13.46 | 29.98 | 11.31 | 20.51 | 33.05 | 26                 | 100 | 30  | 25 | 20 | 18 | ANNABERGITE              | 11-0625  |
| 28.06              | 22.06 | 27.88 | 23.66 | 30.51 | 13.88 | 100                | 80  | 80  | 70 | 70 | 60 | OLIGOCLASE               | 9-0457   |
| 28.06              | 22.11 | 23.41 | 64.23 | 26.77 | 29.78 | 100                | 90  | 80  | 80 | 70 | 70 | ORTHOCLASE               | 9-0462   |
| 28.06              | 27.79 | 22.00 | 23.66 | 24.39 | 28.42 | 90                 | 100 | 80  | 70 | 70 | 70 | ANDESINE                 | 10-0359  |
| 28.06              | 27.88 | 22.00 | 23.73 | 27.62 | 24.45 | 90                 | 100 | 80  | 80 | 80 | 70 | LABRADORITE              | 9-0465   |
| 28.06              | 27.88 | 22.00 | 27.36 | 28.61 | 27.79 | 75                 | 100 | 60  | 55 | 45 | 35 | ANORTHITE                | 12-0301  |
| 28.06              | 46.90 | 32.68 | 75.58 | 87.09 | 26.94 | 60                 | 100 | 50  | 50 | 50 | 40 | BORNITE                  | 14-0323  |
| 28.06              | 62.78 | 35.77 | 20.23 | 9.31  | 37.31 | 70                 | 100 | 90  | 60 | 50 | 50 | PARAGONITE SYN           | 10-0420  |
| 28.06              | 68.09 | 26.61 | 46.27 | 46.96 | 47.09 | 100                | 75  | 65  | 55 | 50 | 50 | KYANITE (DISTHENE)       | 11-0046  |
| 28.06              | 68.49 | 47.09 | 35.63 | 38.30 | 46.32 | 100                | 75  | 50  | 40 | 40 | 40 | KYANITE                  | 3-0513   |
| 28.10              | 23.71 | 27.78 | 22.00 | 22.91 | 24.46 | 100                | 30  | 30  | 15 | 11 | 11 | ALBITE (HIGH)            | 10-0393  |
| 28.10              | 30.70 | 30.94 | 31.43 | 14.76 | 26.16 | 70                 | 100 | 100 | 16 | 12 | 12 | POLYHALITE               | 13-0526  |
| 28.11              | 31.07 | 29.98 | 36.53 | 27.13 | 42.67 | 60                 | 100 | 95  | 60 | 50 | 45 | CLINGENSTATITE SYN       | 13-0415  |
| 28.12              | 17.54 | 26.04 | 27.50 | 31.02 | 36.80 | 100                | 90  | 90  | 80 | 50 | 50 | DUFRENITE                | 8-0155   |
| 28.15              | 7.96  | 16.40 | 19.90 | 45.56 | 48.55 | 37                 | 100 | 3   | 3  | 2  | 1  | MONTMORILLONITE (AL) SYN | 11-0303  |
| 28.15              | 27.88 | 27.36 | 22.00 | 23.54 | 24.59 | 80                 | 100 | 80  | 70 | 70 | 70 | ANORTHITE                | 9-0464   |
| 28.18              | 31.14 | 36.01 | 30.39 | 35.42 | 26.99 | 100                | 87  | 51  | 44 | 43 | 35 | ENSTATITE                | 7-0216   |
| 28.22              | 15.92 | 19.98 | 34.74 | 29.26 | 17.90 | 100                | 100 | 100 | 90 | 80 | 60 | SCORODITE                | 5-0216   |
| 28.22              | 24.84 | 26.50 | 43.68 | 51.90 | 47.84 | 100                | 75  | 60  | 55 | 45 | 40 | GREENOCKITE              | 6-0314   |
| 28.22              | 29.54 | 32.78 | 43.24 | 59.60 | 41.38 | 100                | 70  | 30  | 30 | 30 | 20 | KAINITE                  | 14-0591  |
| 28.22              | 47.04 | 32.64 | 55.66 | 76.08 | 78.30 | 100                | 49  | 48  | 47 | 18 | 15 | URANINITE SYN            | 5-0550   |
| 28.23              | 32.78 | 10.39 | 26.03 | 34.44 | 41.32 | 100                | 80  | 70  | 45 | 35 | 35 | ARFVEDSONITE             | 14-0633  |
| 28.24              | 31.82 | 25.75 | 14.06 | 24.18 | 27.19 | 90                 | 100 | 80  | 70 | 60 | 60 | AXINITE                  | 6-0448   |
| 28.30              | 17.82 | 24.78 | 29.26 | 27.68 | 36.18 | 80                 | 100 | 60  | 60 | 40 | 40 | BUTLERITE                | 16-0819  |
| 28.30              | 28.58 | 41.38 | 37.28 | 41.78 | 59.60 | 100                | 100 | 70  | 60 | 60 | 60 | HOLLANDITE               | 12-0514  |
| 28.30              | 47.06 | 55.82 | 87.48 | 68.71 | 75.94 | 94                 | 100 | 35  | 16 | 12 | 10 | FLUORITE SYN             | 4-0864   |
| 28.32              | 19.13 | 30.56 | 37.70 | 42.94 | 46.73 | 100                | 100 | 100 | 50 | 40 | 40 | AMBYGONITE               | 8-0102   |
| 28.37              | 40.56 | 50.24 | 66.45 | 73.80 | 58.69 | 100                | 59  | 23  | 20 | 13 | 8  | SYLVITE                  | 4-0587   |
| 28.40              | 24.78 | 12.26 | 29.16 | 40.22 | 14.36 | 25                 | 100 | 20  | 15 | 15 | 13 | CLINOCLASITE             | 12-0297  |
| 28.40              | 28.50 | 22.10 | 20.44 | 41.78 | 35.74 | 90                 | 100 | 40  | 25 | 25 | 20 | BARYTOCALCITE            | 15-0285  |
| 28.40              | 28.68 | 25.20 | 25.64 | 28.04 | 28.96 | 100                | 100 | 90  | 90 | 90 | 90 | HOLLANDITE               | 4-0590   |
| 28.40              | 29.76 | 31.70 | 42.40 | 16.10 | 22.10 | 30                 | 100 | 60  | 30 | 20 | 20 | XANTHOCONITE             | 8-0134   |
| 28.42              | 37.31 | 56.45 | 42.44 | 59.23 | 72.10 | 100                | 50  | 50  | 25 | 25 | 20 | PYROLUSITE               | 12-0716  |
| 28.44              | 10.43 | 29.51 | 26.38 | 21.71 | 18.14 | 65                 | 100 | 85  | 55 | 50 | 30 | CORDIERITE (HIGH) SYN    | 13-0293  |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME          | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|-----------------------|----------|
| 28.46              | 29.07 | 14.40 | 40.37 | 27.91 | 35.25 | 95                 | 100 | 75  | 75 | 65 | 25 | LAZULITE              | 14-0137  |
| 28.48              | 14.22 | 33.66 | 31.94 | 36.34 | 38.60 | 100                | 80  | 80  | 70 | 70 | 70 | GLAUBERITE            | 2-0556   |
| 28.48              | 21.98 | 33.80 | 29.84 | 37.44 | 32.64 | 100                | 30  | 30  | 16 | 16 | 14 | LANGBEINITE           | 17-0740  |
| 28.50              | 15.70 | 33.08 | 35.16 | 45.06 | 22.20 | 100                | 50  | 50  | 50 | 50 | 35 | COLEMANITE            | 6-0331   |
| 28.50              | 28.40 | 22.10 | 20.44 | 41.78 | 35.74 | 100                | 90  | 40  | 25 | 25 | 20 | BARYTOCALCITE         | 15-0285  |
| 28.50              | 29.26 | 27.60 | 11.98 | 41.58 | 48.92 | 70                 | 100 | 90  | 50 | 40 | 30 | EMPLECTITE            | 10-0474  |
| 28.50              | 29.76 | 51.90 | 38.96 | 42.61 | 47.96 | 100                | 90  | 50  | 40 | 30 | 30 | CHALCOSTILBITE        | 9-0143   |
| 28.50              | 31.24 | 35.74 | 24.10 | 33.54 | 50.66 | 100                | 90  | 90  | 80 | 80 | 80 | EMMONSITE             | 7-0404   |
| 28.50              | 40.98 | 28.68 | 37.44 | 41.58 | 41.98 | 90                 | 100 | 90  | 90 | 90 | 90 | HOLLANDITE            | 4-0813   |
| 28.50              | 56.02 | 31.24 | 34.74 | 17.86 | 33.66 | 80                 | 100 | 80  | 80 | 60 | 60 | CUPRODESCLOIZITE      | 13-0240  |
| 28.52              | 10.36 | 10.47 | 21.73 | 26.29 | 29.32 | 100                | 80  | 80  | 75 | 70 | 65 | CORDIERITE            | 12-0303  |
| 28.52              | 12.83 | 37.47 | 18.10 | 42.23 | 60.08 | 90                 | 100 | 100 | 70 | 40 | 30 | CRYPTOMELANE          | 12-0706  |
| 28.58              | 13.48 | 25.20 | 20.88 | 27.42 | 41.78 | 70                 | 100 | 50  | 30 | 30 | 30 | CARNOTITE             | 8-0317   |
| 28.58              | 17.50 | 29.16 | 40.22 | 45.78 | 15.90 | 70                 | 100 | 80  | 60 | 60 | 50 | NATROJAROSITE         | 11-0302  |
| 28.58              | 24.30 | 35.60 | 38.10 | 41.18 | 43.46 | 100                | 80  | 75  | 70 | 60 | 50 | PHENAKITE             | 9-0431   |
| 28.58              | 25.20 | 50.96 | 19.80 | 41.78 | 43.24 | 100                | 70  | 60  | 40 | 40 | 40 | LANARITE              | 4-0598   |
| 28.58              | 28.30 | 41.38 | 37.28 | 41.78 | 59.60 | 100                | 100 | 70  | 60 | 60 | 60 | HOLLANDITE            | 12-0514  |
| 28.58              | 30.16 | 47.82 | 32.64 | 49.20 | 33.92 | 100                | 90  | 50  | 40 | 30 | 20 | FERGUSONITE           | 9-0443   |
| 28.58              | 47.56 | 56.34 | 33.12 | 76.88 | 88.68 | 100                | 51  | 30  | 10 | 9  | 9  | SPHALERITE SYN        | 5-0566   |
| 28.60              | 10.56 | 33.12 | 27.29 | 48.09 | 31.90 | 100                | 100 | 90  | 75 | 50 | 45 | TREMOLITE             | 13-0437  |
| 28.61              | 33.18 | 33.56 | 10.98 | 13.97 | 21.84 | 100                | 100 | 100 | 80 | 80 | 80 | HARMOTOME             | 13-0494  |
| 28.61              | 47.29 | 56.00 | 33.05 | 56.60 | 76.52 | 100                | 70  | 40  | 30 | 30 | 30 | STANNITE              | 11-0062  |
| 28.61              | 47.77 | 56.60 | 27.36 | 30.51 | 88.68 | 100                | 50  | 35  | 6  | 6  | 6  | WURZITE               | 12-0688  |
| 28.63              | 25.01 | 31.83 | 25.23 | 46.50 | 22.39 | 100                | 94  | 63  | 60 | 55 | 38 | BISMUTHINITE SYN      | 6-0333   |
| 28.65              | 9.47  | 19.04 | 36.28 | 48.69 | 60.64 | 100                | 100 | 90  | 65 | 40 | 40 | TALC                  | 13-0558  |
| 28.67              | 31.33 | 41.24 | 23.64 | 48.55 | 55.93 | 100                | 65  | 60  | 45 | 40 | 40 | DATOLITE              | 11-0070  |
| 28.68              | 25.46 | 31.40 | 40.87 | 48.72 | 55.78 | 22                 | 100 | 33  | 20 | 15 | 14 | ANHYDRITE             | 6-0226   |
| 28.68              | 27.68 | 29.36 | 38.44 | 41.78 | 50.66 | 90                 | 100 | 100 | 90 | 90 | 80 | EMPLECTITE            | 2-0516   |
| 28.68              | 28.40 | 25.20 | 25.64 | 28.04 | 28.96 | 100                | 100 | 90  | 90 | 90 | 90 | HOLLANDITE            | 4-0590   |
| 28.68              | 28.96 | 39.30 | 45.78 | 50.06 | 17.40 | 60                 | 100 | 50  | 50 | 50 | 40 | JAROSITE              | 10-0443  |
| 28.68              | 29.74 | 31.48 | 38.78 | 49.20 | 36.04 | 50                 | 100 | 90  | 50 | 50 | 40 | PEARCEITE             | 8-0132   |
| 28.68              | 29.98 | 29.54 | 33.14 | 16.16 | 20.02 | 35                 | 100 | 80  | 30 | 25 | 25 | ESCHYNITE             | 15-0864  |
| 28.68              | 39.32 | 55.66 | 72.66 | 79.07 | 42.82 | 100                | 40  | 40  | 40 | 40 | 30 | TETRADYMIT            | 9-0447   |
| 28.68              | 40.42 | 68.25 | 65.90 | 41.94 | 75.30 | 100                | 70  | 67  | 63 | 56 | 40 | ANTIDOMY              | 5-0562   |
| 28.68              | 40.98 | 28.50 | 37.44 | 41.58 | 41.98 | 90                 | 100 | 90  | 90 | 90 | 90 | HOLLANDITE            | 4-0813   |
| 28.70              | 33.05 | 10.51 | 26.37 | 27.27 | 30.40 | 80                 | 100 | 70  | 70 | 60 | 60 | ACTINOLITE            | 7-0336   |
| 28.70              | 37.47 | 49.54 | 60.08 | 69.65 | 17.79 | 60                 | 100 | 60  | 60 | 60 | 20 | CRYPTOMELANE          | 6-0547   |
| 28.70              | 37.49 | 55.56 | 56.96 | 18.33 | 50.12 | 80                 | 100 | 80  | 70 | 50 | 50 | CRYPTOMELANE          | 4-0778   |
| 28.70              | 57.77 | 46.83 | 76.08 | 18.60 | 54.24 | 100                | 90  | 80  | 80 | 70 | 70 | SCHEELITE             | 8-0145   |
| 28.72              | 10.53 | 32.82 | 35.44 | 19.69 | 29.97 | 55                 | 100 | 50  | 45 | 20 | 20 | RIEBECKITE SYN        | 15-0516  |
| 28.74              | 10.57 | 32.06 | 22.21 | 27.34 | 55.89 | 85                 | 100 | 21  | 20 | 18 | 15 | TREMOLITE (FLOUR) SYN | 9-0330   |
| 28.74              | 32.16 | 19.02 | 33.80 | 29.06 | 48.92 | 51                 | 100 | 73  | 48 | 47 | 31 | THENARDITE            | 5-0631   |
| 28.76              | 13.40 | 27.08 | 27.00 | 16.52 | 37.44 | 100                | 86  | 75  | 73 | 55 | 54 | HEMIMORPHITE          | 5-0555   |
| 28.76              | 29.54 | 27.86 | 38.26 | 41.78 | 48.92 | 100                | 100 | 90  | 40 | 40 | 30 | EMPLECTITE            | 3-0581   |
| 28.76              | 29.66 | 47.84 | 29.96 | 31.94 | 27.94 | 60                 | 100 | 45  | 40 | 40 | 30 | TILLEYITE             | 13-0416  |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME         | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|----------------------|----------|
| 28.76              | 32.04 | 35.30 | 38.44 | 18.82 | 25.64 | 100                | 100 | 100 | 70  | 50  | 50  | GADOLINITE           | 8-0190   |
| 28.78              | 25.64 | 60.02 | 37.44 | 40.98 | 41.98 | 100                | 60  | 50  | 40  | 40  | 20  | CORONADITE           | 7-0361   |
| 28.79              | 25.88 | 42.65 | 42.99 | 26.88 | 22.80 | 97                 | 100 | 80  | 76  | 67  | 57  | BARITE SYN           | 5-0448   |
| 28.80              | 18.64 | 29.07 | 57.92 | 47.14 | 34.20 | 100                | 53  | 31  | 30  | 28  | 23  | SCHEELITE            | 7-0210   |
| 28.80              | 30.61 | 22.80 | 26.77 | 27.19 | 32.69 | 80                 | 100 | 60  | 60  | 60  | 60  | PECTOLITE            | 12-0238  |
| 28.80              | 47.11 | 18.64 | 58.08 | 34.36 | 54.14 | 100                | 30  | 28  | 22  | 16  | 14  | POWELLITE            | 7-0212   |
| 28.86              | 11.18 | 24.70 | 19.16 | 27.60 | 33.54 | 160                | 100 | 80  | 50  | 50  | 50  | DUNDASITE            | 21-0936  |
| 28.86              | 31.14 | 27.00 | 21.28 | 25.36 | 41.98 | 100                | 70  | 50  | 25  | 25  | 25  | MONAZITE             | 11-0556  |
| 28.86              | 33.28 | 47.84 | 56.78 | 60.02 | 70.78 | 100                | 50  | 50  | 40  | 20  | 20  | URANINITE            | 13-0225  |
| 28.86              | 49.20 | 19.28 | 55.30 | 39.84 | 40.78 | 80                 | 100 | 80  | 70  | 60  | 60  | CALEDONITE           | 8-0153   |
| 28.89              | 10.51 | 32.94 | 25.98 | 35.48 | 19.64 | 80                 | 100 | 100 | 60  | 60  | 50  | RIEBECKITE           | 14-0230  |
| 28.89              | 12.65 | 30.19 | 49.83 | 54.63 | 34.09 | 80                 | 100 | 100 | 70  | 70  | 60  | NATROLITE (K) SYN    | 3-0062   |
| 28.89              | 31.16 | 51.83 | 44.43 | 36.10 | 23.86 | 30                 | 100 | 30  | 20  | 17  | 13  | AKERMANITE           | 10-0391  |
| 28.89              | 33.18 | 26.37 | 27.10 | 34.63 | 34.94 | 95                 | 100 | 90  | 70  | 70  | 70  | HORNBLende           | 9-0434   |
| 28.89              | 34.09 | 17.39 | 54.98 | 60.51 | 35.77 | 20                 | 100 | 80  | 20  | 18  | 15  | SPINEL (MN)          | 4-0732   |
| 28.89              | 34.59 | 42.42 | 20.85 | 23.66 | 29.58 | 100                | 30  | 25  | 15  | 12  | 12  | KALIOPHILITE         | 11-0313  |
| 28.94              | 35.16 | 25.58 | 51.58 | 27.16 | 37.94 | 100                | 100 | 90  | 70  | 60  | 40  | PREHNITE             | 7-0333   |
| 28.96              | 28.68 | 39.30 | 45.78 | 50.06 | 17.40 | 100                | 60  | 50  | 50  | 50  | 40  | JAROSITE             | 10-0443  |
| 28.96              | 34.74 | 30.92 | 42.40 | 41.18 | 49.78 | 100                | 90  | 60  | 50  | 40  | 40  | STEPHANITE           | 11-0108  |
| 28.98              | 33.66 | 8.94  | 27.76 | 36.64 | 18.01 | 80                 | 100 | 60  | 60  | 60  | 40  | TRONA                | 11-0643  |
| 28.99              | 9.60  | 19.38 | 20.18 | 21.31 | 36.84 | 100                | 60  | 50  | 20  | 15  | 15  | PYROPHYLLITE         | 12-0203  |
| 28.99              | 25.67 | 43.73 | 32.80 | 47.61 | 68.49 | 100                | 100 | 100 | 80  | 80  | 80  | SCAPOLITE            | 2-0405   |
| 29.06              | 10.61 | 32.33 | 35.78 | 25.64 | 9.59  | 80                 | 100 | 90  | 60  | 55  | 50  | GRUNERITE            | 17-0725  |
| 29.06              | 29.84 | 26.34 | 21.04 | 45.78 | 47.56 | 85                 | 100 | 60  | 40  | 40  | 35  | VANADINITE           | 13-0585  |
| 29.06              | 32.78 | 27.42 | 24.42 | 46.28 | 53.20 | 100                | 60  | 40  | 30  | 30  | 30  | CUPROBISMUTITE       | 8-0086   |
| 29.07              | 28.46 | 14.40 | 40.37 | 27.91 | 35.25 | 100                | 95  | 75  | 75  | 65  | 25  | LAZULITE             | 14-0137  |
| 29.07              | 28.80 | 18.64 | 57.92 | 47.14 | 34.20 | 31                 | 100 | 53  | 30  | 28  | 23  | SCHEELITE            | 7-0210   |
| 29.09              | 5.78  | 19.73 | 34.36 | 35.19 | 54.63 | 100                | 100 | 100 | 100 | 100 | 100 | MONTMORILLONITE      | 3-0009   |
| 29.09              | 20.04 | 37.15 | 35.05 | 9.31  | 62.31 | 100                | 86  | 72  | 57  | 46  | 40  | PYROPHYLLITE         | 3-0574   |
| 29.09              | 31.39 | 52.15 | 37.41 | 24.25 | 36.91 | 25                 | 100 | 35  | 22  | 20  | 20  | GEHLENITE SYN        | 9-0216   |
| 29.09              | 32.56 | 10.56 | 22.98 | 25.82 | 27.36 | 80                 | 100 | 70  | 60  | 60  | 60  | CUMMINGTONITE        | 7-0382   |
| 29.09              | 48.42 | 57.73 | 90.77 | 78.15 | 56.30 | 100                | 90  | 70  | 70  | 60  | 55  | CHALCOPYRITE (GAMMA) | 11-0570  |
| 29.10              | 20.90 | 22.11 | 26.61 | 35.07 | 42.50 | 100                | 75  | 70  | 60  | 60  | 50  | NEPHELINE (K)        | 12-0198  |
| 29.10              | 25.72 | 23.26 | 29.51 | 33.27 | 47.56 | 70                 | 100 | 60  | 55  | 30  | 30  | SCAPOLITE            | 14-0170  |
| 29.12              | 30.34 | 32.63 | 37.85 | 53.12 | 49.25 | 100                | 31  | 28  | 20  | 15  | 14  | MASSICOT SYN         | 5-0570   |
| 29.14              | 18.08 | 46.02 | 50.06 | 40.78 | 32.52 | 100                | 70  | 70  | 70  | 60  | 50  | CARPHOSIDERITE       | 2-0597   |
| 29.16              | 8.42  | 25.96 | 32.90 | 12.88 | 21.40 | 40                 | 100 | 40  | 40  | 30  | 30  | COPIAPITE            | 11-0395  |
| 29.16              | 17.50 | 28.58 | 40.22 | 45.78 | 15.90 | 80                 | 100 | 70  | 60  | 60  | 50  | NATROJAROSITE        | 11-0302  |
| 29.18              | 10.62 | 27.62 | 19.77 | 61.85 | 19.00 | 100                | 70  | 50  | 35  | 25  | 20  | ANTHOPHYLLITE MG SYN | 16-0401  |
| 29.18              | 32.80 | 10.72 | 35.77 | 66.55 | 41.62 | 100                | 90  | 80  | 80  | 80  | 60  | CUMMINGTONITE (MN)   | 13-0376  |
| 29.18              | 48.58 | 90.87 | 57.61 | 78.65 | 98.19 | 100                | 97  | 75  | 70  | 60  | 60  | CHALCOPYRITE (BETA)  | 11-0515  |
| 29.19              | 11.71 | 20.80 | 33.45 | 31.20 | 23.47 | 57                 | 100 | 51  | 28  | 27  | 21  | GYPSUM               | 6-0046   |
| 29.26              | 27.60 | 28.50 | 11.98 | 41.58 | 48.92 | 100                | 90  | 70  | 50  | 40  | 30  | EMPLECTITE           | 10-0474  |
| 29.26              | 29.74 | 43.24 | 59.18 | 60.02 | 47.84 | 100                | 100 | 100 | 90  | 90  | 80  | NIMETITE             | 13-0056  |
| 29.26              | 31.82 | 47.82 | 32.90 | 52.88 | 59.18 | 65                 | 100 | 75  | 55  | 35  | 35  | COVELLITE            | 6-0464   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME          | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|-----------------------|----------|
| 29.26              | 32.40 | 25.00 | 24.92 | 17.54 | 33.40 | 95                 | 100 | 70  | 65  | 55  | 50  | STIBNITE SYN          | 6-0474   |
| 29.26              | 42.20 | 40.04 | 45.54 | 29.96 | 50.66 | 100                | 50  | 30  | 30  | 20  | 20  | SYLVANITE             | 9-0477   |
| 29.28              | 27.53 | 10.71 | 31.50 | 35.34 | 24.39 | 100                | 60  | 55  | 40  | 40  | 35  | ANTHOPHYLLITE         | 9-0455   |
| 29.32              | 23.77 | 46.54 | 71.52 | 62.54 | 78.00 | 90                 | 100 | 70  | 40  | 30  | 30  | COLORADOITE           | 8-0026   |
| 29.35              | 10.75 | 27.69 | 9.88  | 19.16 | 33.45 | 75                 | 100 | 20  | 12  | 10  | 10  | ANTHOPHYLLITE AL-FE   | 11-0253  |
| 29.36              | 27.68 | 28.68 | 38.44 | 41.78 | 50.66 | 100                | 100 | 90  | 90  | 90  | 80  | EMPLECTITE            | 2-0516   |
| 29.36              | 43.90 | 32.90 | 76.95 | 51.81 | 42.10 | 70                 | 100 | 50  | 50  | 45  | 40  | BORACITE              | 5-0710   |
| 29.36              | 47.88 | 29.58 | 35.96 | 40.22 | 19.45 | 100                | 60  | 50  | 50  | 50  | 40  | SCAWTITE              | 10-0400  |
| 29.38              | 10.31 | 26.37 | 21.62 | 28.06 | 54.21 | 90                 | 100 | 90  | 80  | 80  | 70  | CORDIERITE            | 9-0472   |
| 29.38              | 19.42 | 9.68  | 37.47 | 49.83 | 67.92 | 100                | 50  | 40  | 40  | 40  | 40  | PYROPHYLLITE          | 2-0613   |
| 29.39              | 10.47 | 10.38 | 29.43 | 28.50 | 29.66 | 65                 | 100 | 95  | 65  | 55  | 55  | CORDIERITE (LOW) SYN  | 13-0294  |
| 29.43              | 39.43 | 43.18 | 47.53 | 48.55 | 36.00 | 100                | 18  | 18  | 17  | 17  | 14  | CALCITE SYN           | 5-0586   |
| 29.44              | 15.12 | 39.48 | 24.78 | 26.92 | 46.52 | 95                 | 100 | 45  | 40  | 35  | 30  | BEAVERITE             | 17-0476  |
| 29.45              | 23.54 | 23.86 | 33.86 | 33.67 | 41.18 | 55                 | 100 | 56  | 55  | 41  | 41  | NITER SYN             | 5-0377   |
| 29.46              | 29.84 | 14.78 | 19.62 | 21.18 | 23.39 | 100                | 100 | 60  | 60  | 60  | 60  | SCAWTITE              | 12-0777  |
| 29.46              | 38.96 | 47.84 | 31.82 | 35.44 | 41.98 | 100                | 25  | 16  | 16  | 10  | 10  | SODA-NITER SYN        | 7-0271   |
| 29.48              | 25.90 | 23.54 | 33.43 | 47.87 | 20.95 | 100                | 100 | 90  | 90  | 90  | 70  | SCAPOLITE             | 2-0412   |
| 29.48              | 38.97 | 47.93 | 31.85 | 35.48 | 42.54 | 100                | 24  | 16  | 9   | 9   | 9   | NITER (NA) SYN        | 7-0271   |
| 29.48              | 49.14 | 57.96 | 91.42 | 48.83 | 92.30 | 100                | 80  | 60  | 60  | 40  | 30  | CHALCOPYRITE          | 9-0423   |
| 29.48              | 51.48 | 47.06 | 30.83 | 15.33 | 39.17 | 80                 | 100 | 50  | 40  | 30  | 30  | PENTLANDITE           | 8-0090   |
| 29.51              | 10.43 | 28.44 | 26.38 | 21.71 | 18.14 | 85                 | 100 | 65  | 55  | 50  | 30  | CORDIERITE (HIGH) SYN | 13-0293  |
| 29.51              | 22.98 | 27.07 | 21.10 | 30.78 | 38.15 | 100                | 60  | 40  | 35  | 35  | 30  | NEPHELINE SYN         | 9-0338   |
| 29.54              | 23.58 | 26.26 | 24.99 | 30.16 | 42.20 | 60                 | 100 | 70  | 40  | 40  | 40  | CHALCOSIDERITE        | 8-0127   |
| 29.54              | 28.22 | 32.78 | 43.24 | 59.60 | 41.38 | 70                 | 100 | 30  | 30  | 30  | 20  | KAINITE               | 14-0591  |
| 29.54              | 28.76 | 27.86 | 38.26 | 41.78 | 48.92 | 100                | 100 | 90  | 40  | 40  | 30  | EMPLECTITE            | 3-0581   |
| 29.54              | 29.98 | 28.68 | 33.14 | 16.16 | 20.02 | 80                 | 100 | 35  | 30  | 25  | 25  | ESCHYNITE             | 15-0864  |
| 29.54              | 31.82 | 61.34 | 36.96 | 43.46 | 50.06 | 100                | 60  | 60  | 40  | 30  | 30  | NAGYAGITE             | 8-0003   |
| 29.54              | 34.32 | 48.92 | 58.34 | 79.86 | 82.34 | 100                | 70  | 70  | 70  | 50  | 40  | STETEFELDITE          | 8-0012   |
| 29.56              | 5.84  | 19.92 | 34.46 | 36.04 | 55.66 | 100                | 100 | 100 | 100 | 100 | 100 | BEIDELLITE            | 3-0013   |
| 29.57              | 30.79 | 27.79 | 30.75 | 34.80 | 56.56 | 100                | 100 | 80  | 80  | 60  | 60  | PIGEONITE             | 13-0421  |
| 29.58              | 29.36 | 47.88 | 35.96 | 40.22 | 19.45 | 50                 | 100 | 60  | 50  | 50  | 40  | SCAWTITE              | 10-0400  |
| 29.59              | 33.17 | 34.02 | 33.65 | 41.62 | 23.35 | 65                 | 100 | 70  | 50  | 40  | 30  | SPURRITE              | 13-0496  |
| 29.63              | 33.23 | 57.18 | 36.49 | 46.42 | 54.88 | 60                 | 100 | 60  | 45  | 25  | 25  | ANDRADITE SYN         | 10-0288  |
| 29.64              | 50.66 | 39.48 | 66.22 | 31.70 | 33.66 | 50                 | 100 | 70  | 30  | 20  | 20  | CORVUSITE             | 15-0247  |
| 29.66              | 28.76 | 47.84 | 29.96 | 31.94 | 27.94 | 100                | 60  | 45  | 40  | 40  | 30  | TILLUSITE             | 13-0416  |
| 29.66              | 33.27 | 37.93 | 25.02 | 37.47 | 61.17 | 100                | 100 | 80  | 60  | 60  | 60  | STAUROLITE            | 15-0397  |
| 29.66              | 35.44 | 25.64 | 52.22 | 20.84 | 61.34 | 90                 | 100 | 80  | 80  | 70  | 70  | LITHIOPHILITE         | 13-0336  |
| 29.74              | 27.94 | 31.02 | 35.44 | 48.10 | 33.14 | 100                | 90  | 80  | 60  | 60  | 50  | POLYBASITE            | 8-0123   |
| 29.74              | 29.26 | 43.24 | 59.18 | 60.02 | 47.84 | 100                | 100 | 100 | 90  | 90  | 80  | MIMETITE              | 13-0056  |
| 29.74              | 31.48 | 28.68 | 38.78 | 49.20 | 36.04 | 100                | 90  | 50  | 50  | 50  | 40  | PEARCEITE             | 8-0132   |
| 29.74              | 33.40 | 57.56 | 36.64 | 38.26 | 55.30 | 70                 | 100 | 60  | 55  | 25  | 25  | UVAROVITE             | 11-0696  |
| 29.74              | 58.74 | 49.48 | 80.66 | 69.00 | 83.20 | 68                 | 100 | 84  | 68  | 63  | 63  | MICROLITE             | 3-1139   |
| 29.76              | 14.72 | 31.94 | 25.72 | 49.48 | 42.40 | 100                | 95  | 50  | 45  | 12  | 10  | BASSANITE             | 14-0453  |
| 29.76              | 20.84 | 26.74 | 43.68 | 27.68 | 23.32 | 100                | 87  | 86  | 76  | 71  | 57  | ANGLESITE             | 5-0577   |
| 29.76              | 28.50 | 51.90 | 38.96 | 42.61 | 47.96 | 50                 | 100 | 90  | 40  | 30  | 30  | CHALCOSTILBITE        | 9-0143   |



| TWO-THETA (COPPER) |       |       |       |       |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|--------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 29.76              | 31.70 | 28.40 | 42.40 | 16.10 | 22.10  | 100                | 60  | 30  | 30  | 20  | 20  | XANTHOCONITE           | 8-0134   |
| 29.78              | 21.26 | 27.27 | 31.05 | 38.47 | 59.23  | 100                | 70  | 70  | 70  | 60  | 60  | NEPHELINE              | 9-0458   |
| 29.78              | 35.48 | 56.83 | 30.83 | 65.76 | 27.62  | 80                 | 100 | 60  | 40  | 40  | 20  | DIOPSIDE SYN           | 3-0860   |
| 29.78              | 35.63 | 56.83 | 92.19 | 65.76 | 71.47  | 100                | 100 | 100 | 100 | 90  | 80  | DIOPSIDE               | 2-0656   |
| 29.78              | 49.60 | 58.90 | 14.81 | 28.52 | 34.50  | 100                | 60  | 50  | 25  | 20  | 20  | PYROCHLORE             | 13-0254  |
| 29.78              | 49.80 | 59.10 | 34.36 | 93.78 | 24.12  | 100                | 60  | 30  | 20  | 20  | 10  | TETRAHEDRITE           | 11-0107  |
| 29.82              | 30.26 | 18.33 | 23.54 | 24.05 | 35.97  | 100                | 95  | 65  | 60  | 55  | 55  | HUEBNERITE SYN         | 13-0434  |
| 29.84              | 11.22 | 22.54 | 30.70 | 46.03 | 18.62  | 80                 | 100 | 90  | 80  | 70  | 50  | URANOPHANE             | 8-0442   |
| 29.84              | 29.06 | 26.34 | 21.04 | 45.78 | 47.56  | 100                | 85  | 60  | 40  | 40  | 35  | VANADINITE             | 13-0585  |
| 29.84              | 29.46 | 14.78 | 19.62 | 21.18 | 23.39  | 100                | 100 | 60  | 60  | 60  | 60  | SCAWTITE               | 12-0777  |
| 29.84              | 43.24 | 30.70 | 43.90 | 41.18 | 61.80  | 100                | 90  | 70  | 60  | 50  | 50  | CALAVERITE             | 7-0344   |
| 29.86              | 30.16 | 43.68 | 30.80 | 21.14 | 27.16  | 80                 | 100 | 70  | 60  | 40  | 35  | PYROMORPHITE           | 12-0704  |
| 29.86              | 35.16 | 61.80 | 56.40 | 88.88 | 103.62 | 70                 | 100 | 80  | 70  | 50  | 50  | FRANKLINITE            | 10-0467  |
| 29.87              | 35.51 | 30.91 | 35.66 | 27.62 | 30.28  | 100                | 40  | 30  | 30  | 25  | 25  | DIOPSIDE               | 11-0654  |
| 29.88              | 13.23 | 27.79 | 20.32 | 55.34 | 32.93  | 75                 | 100 | 75  | 63  | 63  | 50  | ERYTHRITE              | 10-0480  |
| 29.88              | 24.32 | 30.30 | 34.50 | 49.83 | 53.02  | 100                | 40  | 40  | 30  | 30  | 27  | EUXENITE               | 9-0442   |
| 29.88              | 30.94 | 39.29 | 47.19 | 17.88 | 61.72  | 100                | 100 | 80  | 70  | 55  | 35  | ALUNITE                | 14-0136  |
| 29.88              | 35.34 | 13.62 | 20.04 | 30.72 | 41.02  | 100                | 60  | 40  | 40  | 40  | 20  | ACMITE (AEGIRINE)      | 3-0621   |
| 29.88              | 56.83 | 65.24 | 91.09 | 92.19 | 92.19  | 100                | 100 | 100 | 100 | 100 | 100 | AUGITE                 | 3-0623   |
| 29.89              | 27.59 | 34.56 | 44.00 | 55.97 | 62.13  | 90                 | 100 | 90  | 40  | 40  | 40  | SPHENE                 | 11-0142  |
| 29.95              | 30.84 | 13.90 | 20.18 | 36.56 | 35.28  | 90                 | 100 | 90  | 45  | 45  | 30  | ACMITE SYN             | 15-0787  |
| 29.96              | 50.66 | 84.10 | 42.82 | 29.95 | 70.78  | 60                 | 100 | 70  | 50  | 40  | 40  | SPERRYLITE             | 9-0452   |
| 29.98              | 13.46 | 28.06 | 11.31 | 20.51 | 33.05  | 30                 | 100 | 26  | 25  | 20  | 18  | ANNABERGITE            | 11-0625  |
| 29.98              | 18.41 | 14.99 | 36.37 | 37.63 | 31.20  | 100                | 90  | 70  | 70  | 70  | 60  | OLIVENITE              | 4-0657   |
| 29.98              | 29.54 | 28.68 | 33.14 | 16.16 | 20.02  | 100                | 80  | 35  | 30  | 25  | 25  | ESCHYNITE              | 15-0864  |
| 29.98              | 31.07 | 28.11 | 36.53 | 27.13 | 42.67  | 95                 | 100 | 60  | 60  | 50  | 45  | CLINDENSTATITE SYN     | 13-0415  |
| 29.98              | 32.29 | 30.57 | 28.42 | 26.69 | 28.80  | 65                 | 100 | 65  | 30  | 25  | 25  | RHODONITE              | 13-0138  |
| 29.98              | 43.29 | 33.56 | 53.26 | 70.85 | 47.35  | 90                 | 100 | 90  | 90  | 80  | 60  | TROILITE (PYRRHO.) SYN | 4-0832   |
| 30.02              | 11.32 | 36.06 | 24.86 | 19.62 | 22.66  | 100                | 100 | 100 | 80  | 65  | 65  | APOPHYLLITE            | 7-0170   |
| 30.06              | 10.80 | 21.70 | 18.38 | 14.50 | 25.28  | 80                 | 100 | 90  | 70  | 60  | 60  | CUPROSKLODOWSKITE      | 8-0290   |
| 30.06              | 22.38 | 9.93  | 26.02 | 17.38 | 31.94  | 70                 | 100 | 70  | 50  | 40  | 40  | HEULANDITE             | 13-0196  |
| 30.06              | 31.36 | 43.24 | 21.66 | 36.50 | 24.10  | 90                 | 100 | 90  | 60  | 60  | 50  | APHTHALITE             | 6-0429   |
| 30.06              | 31.94 | 36.34 | 39.12 | 49.78 | 38.40  | 100                | 90  | 60  | 60  | 60  | 50  | PEARCEITE              | 8-0130   |
| 30.06              | 35.44 | 35.02 | 42.40 | 51.90 | 56.40  | 100                | 50  | 30  | 30  | 30  | 30  | HEDENBERGITE           | 16-0701  |
| 30.07              | 27.06 | 32.79 | 28.09 | 44.38 | 44.29  | 100                | 98  | 63  | 59  | 57  | 55  | CELESTITE SYN          | 5-0593   |
| 30.09              | 13.02 | 33.05 | 27.88 | 18.07 | 23.16  | 67                 | 100 | 67  | 53  | 40  | 40  | VIVIANITE SYN          | 3-0070   |
| 30.09              | 20.00 | 58.41 | 18.10 | 38.13 | 38.99  | 60                 | 100 | 60  | 50  | 50  | 50  | CHLORITOID             | 7-0398   |
| 30.09              | 23.22 | 25.30 | 26.94 | 36.37 | 41.42  | 100                | 80  | 80  | 80  | 60  | 60  | WOLLASTONITE           | 10-0487  |
| 30.09              | 43.95 | 33.82 | 53.59 | 71.47 | 87.98  | 33                 | 100 | 33  | 33  | 13  | 13  | PYRRHOTITE SYN         | 1-1247   |
| 30.09              | 43.95 | 33.82 | 53.59 | 71.47 | 87.98  | 33                 | 100 | 33  | 33  | 13  | 13  | TROILITE (PYRRHO.) SYN | 1-1247   |
| 30.10              | 25.98 | 43.09 | 51.02 | 71.03 | 53.46  | 100                | 84  | 57  | 35  | 17  | 16  | GALENA SYN             | 5-0592   |
| 30.11              | 30.34 | 18.56 | 23.66 | 24.32 | 36.10  | 100                | 90  | 60  | 55  | 55  | 45  | WOLFRAMITE SYN         | 12-0727  |
| 30.16              | 9.92  | 31.58 | 24.78 | 28.86 | 29.86  | 80                 | 100 | 80  | 60  | 60  | 60  | OKENITE                | 3-0029   |
| 30.16              | 14.92 | 50.36 | 28.86 | 59.60 | 34.88  | 100                | 90  | 80  | 70  | 60  | 40  | STIBICONITE            | 10-0388  |
| 30.16              | 19.74 | 19.97 | 58.37 | 38.01 | 39.06  | 90                 | 100 | 100 | 80  | 70  | 70  | CHLORITOID             | 14-0062  |

| TWO-THETA (COPPER) |       |       |       |       |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 30.16              | 28.58 | 47.82 | 32.64 | 49.20 | 33.92  | 90                 | 100 | 50  | 40  | 30  | 20  | FERGUSONITE              | 9-0443   |
| 30.16              | 29.86 | 43.68 | 30.80 | 21.14 | 27.16  | 100                | 80  | 70  | 60  | 40  | 35  | PYROMORPHITE             | 12-0704  |
| 30.16              | 33.80 | 58.34 | 55.66 | 47.30 | 41.78  | 80                 | 100 | 90  | 80  | 70  | 60  | GROSSULARITE             | 3-0826   |
| 30.16              | 35.52 | 62.68 | 57.09 | 43.16 | 89.92  | 40                 | 100 | 35  | 30  | 25  | 12  | MAGNESIOFERRITE          | 17-0464  |
| 30.18              | 34.83 | 22.28 | 21.05 | 25.60 | 44.41  | 85                 | 100 | 85  | 65  | 60  | 45  | TOURMALINE               | 14-0076  |
| 30.19              | 12.65 | 28.89 | 49.83 | 54.63 | 34.09  | 100                | 100 | 80  | 70  | 70  | 60  | NATROLITE (K) SYN        | 3-0062   |
| 30.19              | 19.91 | 38.13 | 39.17 | 58.37 | 34.22  | 30                 | 100 | 30  | 30  | 30  | 20  | CHLORITOID               | 6-0158   |
| 30.19              | 24.32 | 53.22 | 51.58 | 63.50 | 12.41  | 100                | 50  | 20  | 14  | 14  | 12  | COLUMBITE (TANTALITE)    | 16-0337  |
| 30.19              | 25.45 | 33.56 | 56.45 | 19.21 | 34.50  | 100                | 80  | 80  | 60  | 50  | 40  | ALLANITE (METAMICT)      | 9-0474   |
| 30.19              | 31.27 | 33.43 | 13.42 | 15.02 | 19.17  | 80                 | 100 | 80  | 70  | 70  | 70  | THOMSONITE               | 9-0490   |
| 30.19              | 31.61 | 36.22 | 14.19 | 19.51 | 20.75  | 100                | 100 | 70  | 60  | 60  | 60  | SPODUMENE (ALPHA) SYN    | 9-0029   |
| 30.19              | 50.30 | 59.82 | 35.05 | 81.67 | 62.69  | 100                | 45  | 40  | 20  | 20  | 15  | BETAFITE                 | 13-0197  |
| 30.26              | 29.82 | 18.33 | 23.54 | 24.05 | 35.97  | 95                 | 100 | 65  | 60  | 55  | 55  | HUEBNERITE SYN           | 13-0434  |
| 30.26              | 35.60 | 57.14 | 23.70 | 43.24 | 53.88  | 100                | 100 | 100 | 100 | 100 | 100 | MAGHEMITE SYN            | 15-0615  |
| 30.26              | 42.18 | 56.78 | 47.04 | 52.22 | 23.90  | 100                | 100 | 100 | 80  | 80  | 70  | BISMUTITE                | 4-0666   |
| 30.26              | 50.36 | 59.60 | 35.02 | 81.50 | 84.10  | 100                | 90  | 90  | 60  | 60  | 60  | YTTROTANTALITE           | 11-0116  |
| 30.27              | 36.18 | 18.64 | 23.79 | 24.40 | 53.39  | 100                | 60  | 50  | 50  | 50  | 50  | WOLFRAMITE               | 11-0591  |
| 30.30              | 21.84 | 19.00 | 24.25 | 27.53 | 20.46  | 100                | 90  | 70  | 70  | 70  | 60  | NEPHELINE HYDRATE II SYN | 10-0459  |
| 30.30              | 26.21 | 20.23 | 34.50 | 36.99 | 10.66  | 90                 | 100 | 90  | 70  | 70  | 60  | NEPHELINE HYDRATE I SYN  | 10-0460  |
| 30.30              | 29.88 | 24.32 | 34.50 | 49.83 | 53.02  | 40                 | 100 | 40  | 30  | 30  | 27  | EUXENITE                 | 9-0442   |
| 30.30              | 49.25 | 50.42 | 40.26 | 99.51 | 40.26  | 100                | 80  | 70  | 50  | 50  | 40  | CALCITE (MANGANDAN)      | 2-0714   |
| 30.34              | 29.12 | 32.63 | 37.85 | 53.12 | 49.25  | 31                 | 100 | 28  | 20  | 15  | 14  | MASSICOT SYN             | 5-0570   |
| 30.34              | 30.11 | 18.56 | 23.66 | 24.32 | 36.10  | 90                 | 100 | 60  | 55  | 55  | 45  | WOLFRAMITE SYN           | 12-0727  |
| 30.35              | 35.74 | 63.11 | 43.42 | 57.88 | 53.93  | 50                 | 100 | 50  | 30  | 30  | 16  | SPINEL (LI) SYN          | 13-0207  |
| 30.38              | 18.70 | 23.70 | 24.44 | 36.34 | 53.54  | 100                | 40  | 35  | 35  | 30  | 30  | FERBERITE SYN            | 12-0729  |
| 30.38              | 53.54 | 36.34 | 18.78 | 23.76 | 41.18  | 100                | 80  | 70  | 60  | 60  | 60  | FERBERITE                | 10-0449  |
| 30.38              | 53.54 | 40.22 | 62.72 | 15.00 | 19.28  | 100                | 90  | 80  | 70  | 60  | 40  | UVANITE                  | 8-0322   |
| 30.40              | 16.42 | 27.97 | 32.80 | 49.00 | 36.07  | 80                 | 100 | 90  | 80  | 60  | 50  | REALGAR                  | 9-0441   |
| 30.40              | 50.69 | 60.29 | 35.19 | 82.52 | 95.55  | 100                | 80  | 50  | 30  | 30  | 30  | TENNANTITE               | 11-0102  |
| 30.43              | 27.92 | 24.10 | 38.11 | 42.97 | 29.41  | 100                | 65  | 60  | 45  | 45  | 35  | TOPAZ                    | 12-0765  |
| 30.51              | 19.91 | 15.83 | 10.79 | 11.64 | 19.04  | 100                | 80  | 60  | 40  | 40  | 40  | NEPHELINE III SYN        | 12-0247  |
| 30.51              | 31.96 | 58.90 | 21.10 | 36.68 | 57.37  | 100                | 80  | 70  | 60  | 60  | 60  | SPODUMENE (ALPHA)        | 9-0468   |
| 30.52              | 25.99 | 15.80 | 35.83 | 52.47 | 18.29  | 70                 | 100 | 80  | 50  | 50  | 40  | ANALCIME (ZEOLITE)       | 7-0363   |
| 30.56              | 19.13 | 28.32 | 37.70 | 42.94 | 46.73  | 100                | 100 | 100 | 50  | 40  | 40  | AMBLYGONITE              | 8-0102   |
| 30.56              | 25.98 | 15.80 | 53.39 | 33.27 | 25.85  | 80                 | 100 | 80  | 60  | 50  | 50  | ANALCIME (ZEOLITE)       | 7-0340   |
| 30.57              | 32.29 | 29.98 | 28.42 | 26.69 | 28.80  | 65                 | 100 | 65  | 30  | 25  | 25  | RHODONITE                | 13-0138  |
| 30.58              | 27.00 | 19.06 | 23.58 | 25.00 | 46.02  | 70                 | 100 | 50  | 50  | 50  | 45  | CARNALLITE               | 8-0075   |
| 30.59              | 19.04 | 27.29 | 14.06 | 19.64 | 27.95  | 80                 | 100 | 40  | 30  | 30  | 30  | BREWSTERITE              | 15-0582  |
| 30.61              | 28.80 | 22.80 | 26.77 | 27.19 | 32.69  | 100                | 80  | 60  | 60  | 60  | 60  | PECTOLITE                | 12-0238  |
| 30.62              | 30.72 | 31.27 | 35.30 | 33.43 | 34.22  | 90                 | 100 | 50  | 40  | 40  | 40  | ALLANITE (NON-METAMICT)  | 10-0366  |
| 30.62              | 31.61 | 37.15 | 58.82 | 20.80 | 28.80  | 80                 | 100 | 90  | 40  | 30  | 30  | JADEITE                  | 9-0463   |
| 30.62              | 34.22 | 58.65 | 37.63 | 56.38 | 105.57 | 90                 | 100 | 100 | 90  | 90  | 90  | GARNET (FE,MN)           | 10-0367  |
| 30.62              | 62.13 | 10.66 | 36.07 | 56.15 | 15.49  | 80                 | 100 | 60  | 45  | 45  | 30  | CHRYSOCOLLA              | 11-0322  |
| 30.64              | 32.01 | 44.90 | 43.78 | 62.54 | 79.47  | 100                | 90  | 74  | 34  | 23  | 20  | TIN (BETA)               | 4-0673   |
| 30.70              | 18.42 | 34.06 | 15.26 | 23.96 | 53.54  | 50                 | 100 | 100 | 40  | 28  | 20  | LIBETHENITE SYN          | 1-0274   |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME            | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|-------------------------|----------|
| 30.70              | 24.16 | 14.34 | 25.88 | 27.16 | 18.47 | 80                 | 100 | 70  | 70 | 70 | 60 | TURQUOIS                | 6-0214   |
| 30.70              | 29.84 | 43.24 | 43.90 | 41.18 | 61.80 | 70                 | 100 | 90  | 60 | 50 | 50 | CALAVERITE              | 7-0344   |
| 30.70              | 30.94 | 28.10 | 31.43 | 14.76 | 26.16 | 100                | 100 | 70  | 16 | 12 | 12 | POLYHALITE              | 13-0526  |
| 30.70              | 32.78 | 16.04 | 25.50 | 27.42 | 17.62 | 100                | 100 | 80  | 80 | 80 | 60 | MELANOTEKITE            | 15-0633  |
| 30.72              | 26.02 | 24.35 | 37.34 | 49.07 | 52.82 | 100                | 100 | 80  | 80 | 80 | 80 | POLLUCITE               | 15-0317  |
| 30.72              | 30.62 | 31.27 | 35.30 | 33.43 | 34.22 | 100                | 90  | 50  | 40 | 40 | 40 | ALLANITE (NON-METAMICT) | 10-0366  |
| 30.79              | 29.57 | 27.79 | 30.75 | 34.80 | 56.56 | 100                | 100 | 80  | 80 | 60 | 60 | PIGEONITE               | 13-0421  |
| 30.80              | 23.45 | 32.60 | 36.64 | 33.92 | 40.80 | 100                | 50  | 50  | 40 | 30 | 30 | PUMPELLYITE             | 10-0447  |
| 30.80              | 26.37 | 32.12 | 34.06 | 52.11 | 47.79 | 48                 | 100 | 45  | 30 | 30 | 22 | MINIUM SYN              | 8-0019   |
| 30.80              | 27.58 | 17.30 | 55.66 | 20.88 | 39.12 | 80                 | 100 | 80  | 80 | 60 | 60 | DESCLOIZITE             | 12-0537  |
| 30.83              | 15.30 | 42.02 | 9.63  | 13.75 | 26.94 | 90                 | 100 | 50  | 40 | 40 | 30 | HYDROMAGNESITE          | 8-0179   |
| 30.83              | 25.37 | 25.67 | 48.06 | 55.27 | 36.28 | 90                 | 100 | 80  | 30 | 30 | 25 | BROOKITE                | 16-0617  |
| 30.83              | 36.37 | 58.41 | 64.23 | 44.18 | 54.98 | 60                 | 100 | 60  | 60 | 30 | 10 | GALAXITE                | 12-0431  |
| 30.83              | 37.54 | 56.26 | 33.47 | 48.72 | 34.59 | 100                | 70  | 65  | 60 | 60 | 55 | EPIDOTE                 | 7-0438   |
| 30.84              | 13.90 | 29.95 | 20.18 | 36.56 | 35.28 | 100                | 90  | 90  | 45 | 45 | 30 | ACMITE SYN              | 15-0787  |
| 30.84              | 41.04 | 50.36 | 50.96 | 24.05 | 33.37 | 100                | 6   | 6   | 6  | 3  | 3  | DOLOMITE (FERROAN)      | 12-0088  |
| 30.91              | 29.87 | 35.51 | 35.66 | 27.62 | 30.28 | 30                 | 100 | 40  | 30 | 25 | 25 | DIOPSIDE                | 11-0654  |
| 30.92              | 25.80 | 32.52 | 45.06 | 46.28 | 47.56 | 100                | 90  | 80  | 40 | 40 | 30 | MIARGYRITE              | 4-0675   |
| 30.92              | 28.96 | 34.74 | 42.40 | 41.18 | 49.78 | 60                 | 100 | 90  | 50 | 40 | 40 | STEPHANITE              | 11-0108  |
| 30.92              | 44.36 | 54.92 | 73.32 | 81.50 | 26.74 | 100                | 55  | 16  | 14 | 10 | 8  | BROMYRITE               | 6-0438   |
| 30.94              | 27.88 | 62.31 | 57.61 | 67.37 | 35.19 | 80                 | 100 | 80  | 60 | 60 | 50 | HYPERSTHENE             | 2-0520   |
| 30.94              | 29.88 | 39.29 | 47.19 | 17.88 | 61.72 | 100                | 100 | 80  | 70 | 55 | 35 | ALUNITE                 | 14-0136  |
| 30.94              | 30.70 | 28.10 | 31.43 | 14.76 | 26.16 | 100                | 100 | 70  | 16 | 12 | 12 | POLYHALITE              | 13-0526  |
| 30.99              | 41.18 | 51.14 | 51.30 | 50.60 | 44.99 | 100                | 30  | 30  | 30 | 20 | 15 | DOLOMITE                | 11-0078  |
| 31.02              | 24.98 | 18.16 | 43.90 | 44.82 | 47.84 | 100                | 70  | 40  | 40 | 40 | 40 | BASTNAESITE             | 11-0340  |
| 31.02              | 29.74 | 27.94 | 35.44 | 48.10 | 33.14 | 80                 | 100 | 90  | 60 | 60 | 50 | POLYBASITE              | 8-0123   |
| 31.07              | 29.98 | 28.11 | 36.53 | 27.13 | 42.67 | 100                | 95  | 60  | 60 | 50 | 45 | CLINOENSTATITE SYN      | 13-0415  |
| 31.12              | 33.27 | 22.06 | 10.94 | 44.89 | 57.57 | 65                 | 100 | 50  | 40 | 35 | 35 | ZOISITE SYN             | 13-0562  |
| 31.13              | 34.92 | 60.08 | 57.65 | 22.00 | 48.80 | 40                 | 100 | 50  | 40 | 30 | 30 | ALMANDITE               | 9-0427   |
| 31.14              | 27.50 | 17.48 | 33.40 | 33.66 | 34.60 | 80                 | 100 | 80  | 80 | 80 | 80 | MOTTRAMITE              | 12-0538  |
| 31.14              | 28.18 | 36.01 | 30.39 | 35.42 | 26.99 | 87                 | 100 | 51  | 44 | 43 | 35 | ENSTATITE               | 7-0216   |
| 31.14              | 28.86 | 27.00 | 21.28 | 25.36 | 41.98 | 70                 | 100 | 50  | 25 | 25 | 25 | MONAZITE                | 11-0556  |
| 31.14              | 38.96 | 40.04 | 26.99 | 42.20 | 67.30 | 80                 | 100 | 70  | 60 | 60 | 40 | HESSITE                 | 12-0695  |
| 31.16              | 12.31 | 15.44 | 20.46 | 29.88 | 13.66 | 80                 | 100 | 80  | 70 | 70 | 60 | EUDIALYTE               | 8-0355   |
| 31.16              | 27.70 | 49.00 | 52.89 | 58.00 | 91.63 | 80                 | 100 | 90  | 60 | 50 | 50 | ENARGITE                | 10-0436  |
| 31.16              | 28.89 | 51.83 | 44.43 | 36.10 | 23.86 | 100                | 30  | 30  | 20 | 17 | 13 | AKERMANITE              | 10-0391  |
| 31.16              | 32.32 | 48.97 | 56.83 | 25.82 | 28.06 | 100                | 50  | 50  | 50 | 40 | 40 | CLINOZOISITE            | 16-0705  |
| 31.16              | 36.84 | 65.24 | 44.64 | 59.23 | 55.71 | 80                 | 100 | 100 | 80 | 80 | 60 | SPINEL SYN              | 2-0175   |
| 31.17              | 33.14 | 57.02 | 43.86 | 24.63 | 38.56 | 100                | 100 | 75  | 65 | 60 | 60 | ZOISITE                 | 11-0665  |
| 31.20              | 27.41 | 11.09 | 19.30 | 22.28 | 29.63 | 100                | 95  | 90  | 50 | 45 | 35 | BERYL                   | 9-0430   |
| 31.22              | 35.02 | 60.47 | 36.79 | 58.04 | 40.13 | 60                 | 100 | 50  | 40 | 30 | 25 | PYROPE SYN              | 15-0742  |
| 31.24              | 26.54 | 45.83 | 28.19 | 52.76 | 43.64 | 94                 | 100 | 29  | 28 | 27 | 26 | CINNABAR SYN            | 6-0256   |
| 31.24              | 28.50 | 35.74 | 24.10 | 33.54 | 50.66 | 90                 | 100 | 90  | 80 | 80 | 80 | EMMONSITE               | 7-0404   |
| 31.24              | 36.80 | 65.19 | 59.44 | 55.74 | 77.25 | 90                 | 100 | 50  | 40 | 30 | 30 | GAHNITE (Fe)            | 12-0267  |
| 31.24              | 44.14 | 46.02 | 56.78 | 72.02 | 65.70 | 100                | 40  | 40  | 20 | 20 | 20 | BREITHAUPHITE           | 2-0783   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |    | MINERAL NAME                | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|----|-----------------------------|----------|
| 31.24              | 56.02 | 28.50 | 34.74 | 17.86 | 33.66 | 80                 | 100 | 80  | 80  | 60  | 60 | CUPRODESCLOIZITE            | 13-0240  |
| 31.26              | 32.21 | 49.65 | 46.25 | 26.29 | 10.63 | 60                 | 100 | 20  | 18  | 14  | 10 | CHLORAPATITE SYN            | 12-0263  |
| 31.26              | 36.87 | 65.29 | 59.40 | 55.71 | 94.13 | 84                 | 100 | 43  | 40  | 24  | 12 | GAHNITE SYN                 | 5-0669   |
| 31.27              | 15.02 | 20.27 | 13.42 | 28.24 | 30.40 | 100                | 64  | 64  | 48  | 48  | 48 | NATROLITE                   | 3-0705   |
| 31.27              | 30.19 | 33.43 | 13.42 | 15.02 | 19.17 | 100                | 80  | 80  | 70  | 70  | 70 | THOMSONITE                  | 9-0490   |
| 31.27              | 30.72 | 30.62 | 35.30 | 33.43 | 34.22 | 50                 | 100 | 90  | 40  | 40  | 40 | ALLANITE (NON-METAMICT)     | 10-0366  |
| 31.31              | 24.10 | 17.54 | 14.78 | 35.63 | 32.22 | 100                | 85  | 75  | 55  | 55  | 45 | MALACHITE SYN               | 10-0399  |
| 31.33              | 28.67 | 41.24 | 23.64 | 48.55 | 55.93 | 65                 | 100 | 60  | 45  | 40  | 40 | DATOLITE                    | 11-0070  |
| 31.33              | 36.30 | 62.17 | 52.27 | 85.47 | 65.29 | 100                | 50  | 32  | 31  | 10  | 9  | LEAD SYN                    | 4-0686   |
| 31.36              | 30.06 | 43.24 | 21.66 | 36.50 | 24.10 | 100                | 90  | 90  | 60  | 60  | 50 | APHTHALITE                  | 6-0429   |
| 31.36              | 33.54 | 36.96 | 40.60 | 59.60 | 64.68 | 35                 | 100 | 95  | 30  | 30  | 30 | CREDNERITE                  | 14-0623  |
| 31.36              | 33.80 | 37.12 | 48.10 | 27.60 | 28.58 | 100                | 50  | 50  | 50  | 40  | 20 | PYROSTILPNITE               | 8-0129   |
| 31.39              | 26.77 | 34.77 | 8.82  | 17.64 | 19.66 | 100                | 80  | 80  | 60  | 60  | 60 | MUSCOVITE (LI)              | 10-0482  |
| 31.39              | 32.32 | 46.57 | 49.54 | 38.99 | 25.98 | 90                 | 100 | 50  | 50  | 30  | 20 | CHLORAPATITE                | 2-0851   |
| 31.39              | 51.95 | 52.27 | 36.99 | 37.31 | 37.47 | 100                | 100 | 100 | 70  | 70  | 70 | GEHLLENITE SYN              | 4-0690   |
| 31.39              | 52.15 | 29.09 | 37.41 | 24.25 | 36.91 | 100                | 35  | 25  | 22  | 20  | 20 | GEHLLENITE SYN              | 9-0216   |
| 31.40              | 25.46 | 28.68 | 40.87 | 48.72 | 55.78 | 33                 | 100 | 22  | 20  | 15  | 14 | ANHYDRITE                   | 6-0226   |
| 31.48              | 29.74 | 28.68 | 38.78 | 49.20 | 36.04 | 90                 | 100 | 50  | 50  | 50  | 40 | PEARCEITE                   | 8-0132   |
| 31.48              | 33.02 | 12.14 | 33.54 | 36.80 | 41.58 | 85                 | 100 | 70  | 50  | 50  | 35 | ILVAITE                     | 14-0067  |
| 31.48              | 35.16 | 36.20 | 48.64 | 53.88 | 51.58 | 65                 | 100 | 90  | 55  | 30  | 25 | RAMMELSBURGITE SYN          | 11-0014  |
| 31.48              | 42.18 | 52.22 | 54.58 | 24.56 | 26.66 | 100                | 80  | 80  | 80  | 70  | 70 | BEYERITE                    | 4-0693   |
| 31.49              | 21.95 | 36.15 | 28.47 | 48.69 | 36.45 | 13                 | 100 | 20  | 11  | 7   | 5  | CRISTOBALITE LOW SYN        | 11-0695  |
| 31.50              | 6.22  | 18.80 | 25.16 | 12.48 | 36.53 | 90                 | 100 | 60  | 60  | 40  | 30 | PENNINITE                   | 10-0412  |
| 31.50              | 24.32 | 51.86 | 51.64 | 41.58 | 45.34 | 100                | 35  | 33  | 30  | 27  | 23 | RHODOCHROSITE SYN           | 7-0268   |
| 31.50              | 34.91 | 18.25 | 22.45 | 15.55 | 30.09 | 53                 | 100 | 47  | 40  | 20  | 20 | BORAX                       | 1-1097   |
| 31.58              | 9.92  | 30.16 | 24.78 | 28.86 | 29.86 | 80                 | 100 | 80  | 60  | 60  | 60 | OKENITE                     | 3-0029   |
| 31.58              | 34.06 | 25.50 | 38.78 | 22.04 | 48.92 | 95                 | 100 | 80  | 45  | 35  | 35 | WILLEMITE                   | 8-0492   |
| 31.60              | 35.90 | 34.97 | 25.03 | 39.11 | 51.39 | 100                | 70  | 50  | 30  | 30  | 30 | FAYALITE                    | 7-0164   |
| 31.61              | 30.19 | 36.22 | 14.19 | 19.91 | 20.75 | 100                | 100 | 70  | 60  | 60  | 60 | SPODUMENE (ALPHA) SYN       | 9-0029   |
| 31.61              | 37.15 | 30.62 | 58.82 | 20.80 | 28.80 | 100                | 90  | 80  | 40  | 30  | 30 | JADEITE                     | 9-0463   |
| 31.63              | 35.92 | 25.01 | 34.98 | 37.34 | 39.08 | 100                | 80  | 75  | 60  | 35  | 35 | FAYALITE SYN                | 11-0262  |
| 31.70              | 16.40 | 17.72 | 32.52 | 39.84 | 50.08 | 100                | 100 | 100 | 100 | 100 | 80 | ATACAMITE                   | 2-0146   |
| 31.70              | 29.76 | 28.40 | 42.40 | 16.10 | 22.10 | 60                 | 100 | 30  | 30  | 20  | 20 | XANTHOCONITE                | 8-0134   |
| 31.70              | 36.18 | 34.46 | 56.40 | 62.72 | 47.56 | 71                 | 100 | 56  | 40  | 35  | 29 | ZINCITE SYN                 | 5-0664   |
| 31.71              | 32.90 | 25.82 | 39.69 | 48.50 | 53.19 | 100                | 90  | 70  | 70  | 70  | 60 | DAHLITE (CARBONATE-APATITE) | 15-0100  |
| 31.72              | 45.49 | 56.53 | 27.37 | 75.37 | 84.01 | 100                | 55  | 15  | 13  | 11  | 7  | HALITE SYN                  | 5-0628   |
| 31.73              | 35.92 | 51.45 | 25.08 | 34.91 | 61.04 | 100                | 100 | 100 | 80  | 80  | 60 | FAYALITE                    | 9-0484   |
| 31.73              | 36.07 | 25.16 | 35.19 | 51.33 | 60.95 | 95                 | 100 | 75  | 70  | 70  | 70 | FAYALITE SYN                | 9-0307   |
| 31.80              | 32.22 | 32.93 | 25.90 | 49.51 | 46.75 | 100                | 60  | 60  | 40  | 40  | 30 | HYDROXYLAPATITE SYN         | 9-0432   |
| 31.81              | 25.98 | 24.05 | 33.00 | 23.29 | 28.99 | 35                 | 100 | 35  | 35  | 30  | 30 | JAMESONITE                  | 13-0461  |
| 31.82              | 17.04 | 11.34 | 38.78 | 44.60 | 28.56 | 40                 | 100 | 45  | 40  | 40  | 35 | NITROCALCITE                | 1-0229   |
| 31.82              | 25.75 | 14.06 | 28.42 | 30.04 | 41.98 | 100                | 80  | 70  | 70  | 70  | 70 | AXINITE (TINZENITE)         | 6-3444   |
| 31.82              | 25.88 | 26.42 | 30.16 | 47.56 | 23.90 | 30                 | 100 | 25  | 20  | 16  | 14 | COSALITE                    | 13-0502  |
| 31.82              | 28.24 | 25.75 | 14.06 | 24.18 | 27.19 | 100                | 90  | 80  | 70  | 60  | 60 | AXINITE                     | 6-0448   |
| 31.82              | 29.54 | 61.34 | 36.96 | 43.46 | 50.06 | 60                 | 100 | 60  | 40  | 30  | 30 | NAGYAGITE                   | 8-0003   |



| TWO-THETA (COPPER) |       |        |       |       |        | RELATIVE INTENSITY |     |     |    |    | MINERAL NAME | FILE NO.                    |         |
|--------------------|-------|--------|-------|-------|--------|--------------------|-----|-----|----|----|--------------|-----------------------------|---------|
| 31.82              | 47.82 | 29.26  | 32.90 | 52.88 | 59.18  | 100                | 75  | 65  | 55 | 35 | 35           | COVELLITE                   | 6-0464  |
| 31.83              | 28.63 | 25.01  | 25.23 | 46.50 | 22.39  | 63                 | 100 | 94  | 60 | 55 | 38           | BISMUTHINITE SYN            | 6-0333  |
| 31.83              | 32.80 | 25.85  | 28.84 | 39.71 | 46.65  | 100                | 80  | 30  | 30 | 30 | 30           | DAHLITE (CARBONATE-APATITE) | 12-0529 |
| 31.85              | 23.92 | 49.00  | 52.21 | 27.79 | 29.68  | 90                 | 100 | 80  | 50 | 40 | 40           | BOULANGERITE                | 9-0470  |
| 31.92              | 25.42 | 48.92  | 36.18 | 60.46 | 62.26  | 100                | 100 | 100 | 70 | 70 | 70           | PLATTNERITE                 | 8-0185  |
| 31.94              | 29.76 | 14.72  | 25.72 | 49.48 | 42.40  | 50                 | 100 | 95  | 45 | 12 | 10           | BASSANITE                   | 14-0453 |
| 31.94              | 30.06 | 36.34  | 39.12 | 49.78 | 38.40  | 90                 | 100 | 60  | 60 | 60 | 50           | PEARCEITE                   | 8-0130  |
| 31.94              | 45.54 | 75.36  | 56.78 | 84.10 | 27.50  | 100                | 60  | 40  | 30 | 30 | 20           | EMBOLITE                    | 14-0255 |
| 31.96              | 30.51 | 58.90  | 21.10 | 36.68 | 57.37  | 80                 | 100 | 70  | 60 | 60 | 60           | SPODUMENE (ALPHA)           | 9-0468  |
| 31.96              | 33.15 | 32.29  | 36.80 | 34.17 | 49.63  | 100                | 60  | 55  | 40 | 30 | 30           | FLUORAPATITE SYN            | 15-0876 |
| 32.01              | 30.64 | 44.90  | 43.78 | 62.54 | 79.47  | 90                 | 100 | 74  | 34 | 23 | 20           | TIN (BETA)                  | 4-0673  |
| 32.02              | 32.63 | 32.20  | 34.39 | 41.26 | 32.79  | 100                | 95  | 90  | 65 | 65 | 40           | LARNITE                     | 9-0351  |
| 32.04              | 8.10  | 40.22  | 29.46 | 16.02 | 48.92  | 100                | 85  | 25  | 14 | 10 | 8            | PLUMBOJAROSITE              | 15-0648 |
| 32.04              | 20.68 | 27.68  | 50.96 | 34.06 | 46.78  | 70                 | 100 | 50  | 50 | 40 | 30           | STERNBERGITE                | 11-0061 |
| 32.04              | 28.76 | 35.30  | 38.44 | 18.82 | 25.64  | 100                | 100 | 100 | 70 | 50 | 50           | GADOLINITE                  | 8-0190  |
| 32.06              | 10.57 | 28.74  | 22.21 | 27.34 | 55.89  | 21                 | 100 | 85  | 20 | 18 | 15           | TREMOLITE (FLUOR) SYN       | 9-0330  |
| 32.06              | 24.64 | 35.02  | 20.16 | 21.98 | 40.78  | 100                | 80  | 80  | 60 | 50 | 40           | PHOSGENITE                  | 12-0218 |
| 32.06              | 46.02 | 27.76  | 54.22 | 85.00 | 41.58  | 40                 | 100 | 40  | 30 | 20 | 10           | DIGENITE                    | 9-0064  |
| 32.06              | 46.02 | 54.58  | 27.68 | 85.00 | 109.70 | 80                 | 100 | 90  | 70 | 70 | 70           | DIGENITE SYN                | 4-0861  |
| 32.08              | 15.88 | 22.45  | 25.30 | 38.15 | 40.49  | 60                 | 100 | 35  | 15 | 15 | 15           | ANDALUSITE X SYN            | 13-0231 |
| 32.08              | 52.79 | 111.79 | 24.80 | 42.44 | 46.25  | 100                | 80  | 70  | 60 | 60 | 60           | SIDERITE                    | 8-0133  |
| 32.09              | 52.92 | 52.76  | 46.27 | 24.80 | 42.42  | 100                | 45  | 35  | 30 | 25 | 25           | SIDERITE SYN                | 12-0531 |
| 32.12              | 26.37 | 30.80  | 34.06 | 52.11 | 47.79  | 45                 | 100 | 48  | 30 | 30 | 22           | MINIUM SYN                  | 8-0019  |
| 32.16              | 14.32 | 40.08  | 40.22 | 37.28 | 47.84  | 65                 | 100 | 30  | 25 | 16 | 16           | WEDDELLITE                  | 17-0541 |
| 32.16              | 19.02 | 28.74  | 33.80 | 29.06 | 48.92  | 100                | 73  | 51  | 48 | 47 | 31           | THENARDITE                  | 5-0631  |
| 32.16              | 54.58 | 36.04  | 39.67 | 46.02 | 27.68  | 100                | 75  | 50  | 25 | 25 | 10           | BRAVOITE                    | 2-0850  |
| 32.17              | 34.88 | 27.68  | 35.44 | 26.66 | 28.04  | 100                | 95  | 90  | 90 | 80 | 70           | PYRARGYRITE SYN             | 14-0280 |
| 32.20              | 32.02 | 32.63  | 34.39 | 41.26 | 32.79  | 95                 | 100 | 90  | 65 | 65 | 40           | LARNITE                     | 9-0351  |
| 32.21              | 31.26 | 49.65  | 46.25 | 26.29 | 10.63  | 100                | 60  | 20  | 18 | 14 | 10           | CHLORAPATITE SYN            | 12-0263 |
| 32.22              | 31.80 | 32.93  | 25.90 | 49.51 | 46.75  | 60                 | 100 | 60  | 40 | 40 | 30           | HYDROXYLAPATITE SYN         | 9-0432  |
| 32.23              | 48.89 | 35.73  | 18.45 | 40.49 | 50.18  | 100                | 95  | 65  | 60 | 55 | 45           | MILLERITE                   | 12-0041 |
| 32.28              | 25.28 | 48.36  | 44.14 | 59.18 | 51.60  | 100                | 26  | 26  | 24 | 11 | 10           | ARSENIC                     | 5-0632  |
| 32.28              | 42.60 | 44.60  | 36.80 | 38.78 | 12.10  | 100                | 80  | 70  | 60 | 60 | 50           | PETZITE                     | 12-0424 |
| 32.28              | 46.28 | 27.86  | 54.92 | 57.54 | 76.80  | 100                | 50  | 50  | 16 | 16 | 12           | CERARGYRITE                 | 6-0480  |
| 32.29              | 29.98 | 30.57  | 28.42 | 26.69 | 28.80  | 100                | 65  | 65  | 30 | 25 | 25           | RHODONITE                   | 13-0138 |
| 32.29              | 31.96 | 33.15  | 36.80 | 34.17 | 49.63  | 55                 | 100 | 60  | 40 | 30 | 30           | FLUORAPATITE SYN            | 15-0876 |
| 32.31              | 35.70 | 22.85  | 36.51 | 17.35 | 52.24  | 100                | 80  | 60  | 60 | 50 | 50           | FORSTERITE (OLIVINE)        | 7-0075  |
| 32.31              | 35.70 | 36.51  | 52.24 | 17.29 | 22.87  | 100                | 60  | 60  | 50 | 40 | 40           | CHRYSOLITE (OLIVINE)        | 7-0156  |
| 32.32              | 16.00 | 19.60  | 41.62 | 22.68 | 25.30  | 90                 | 100 | 90  | 90 | 70 | 60           | ANDALUSITE                  | 13-0122 |
| 32.32              | 31.16 | 48.97  | 56.83 | 25.82 | 28.06  | 50                 | 100 | 50  | 50 | 40 | 40           | CLINOZOISITE                | 16-0705 |
| 32.32              | 31.39 | 46.57  | 49.54 | 38.99 | 25.98  | 100                | 90  | 50  | 50 | 30 | 20           | CHLORAPATITE                | 2-0851  |
| 32.32              | 35.71 | 36.53  | 22.90 | 17.39 | 36.69  | 100                | 100 | 80  | 60 | 50 | 40           | FORSTERITE (OLIVINE)        | 7-0079  |
| 32.33              | 10.61 | 29.06  | 35.78 | 25.64 | 9.59   | 90                 | 100 | 80  | 60 | 55 | 50           | GRUNERITE                   | 17-0725 |
| 32.34              | 26.19 | 33.34  | 34.40 | 47.06 | 49.71  | 100                | 70  | 70  | 70 | 70 | 70           | APATITE SYN (CARBONATE)     | 13-0001 |
| 32.34              | 39.94 | 52.56  | 35.37 | 35.74 | 24.08  | 60                 | 100 | 80  | 60 | 60 | 45           | CLINOHUMITE SYN             | 14-0009 |

| TWO-THETA (COPPER) |       |       |       |        |        | RELATIVE INTENSITY |     |    |    |    | MINERAL NAME | FILE NO.                    |         |
|--------------------|-------|-------|-------|--------|--------|--------------------|-----|----|----|----|--------------|-----------------------------|---------|
| 32.40              | 29.26 | 25.00 | 24.92 | 17.54  | 33.40  | 100                | 95  | 70 | 65 | 55 | 50           | STIBNITE SYN                | 6-0474  |
| 32.50              | 34.56 | 56.74 | 36.62 | 30.31  | 42.60  | 100                | 80  | 60 | 50 | 40 | 30           | VESUVIANITE                 | 11-0145 |
| 32.52              | 25.06 | 53.88 | 38.60 | 46.52  | 42.82  | 100                | 50  | 45 | 25 | 25 | 18           | SMITHSONITE                 | 8-0449  |
| 32.52              | 25.58 | 17.94 | 60.02 | 48.92  | 37.44  | 80                 | 100 | 45 | 35 | 30 | 25           | PSEUDOBROOKITE SYN          | 9-0182  |
| 32.52              | 30.92 | 25.80 | 45.06 | 46.28  | 47.56  | 80                 | 100 | 90 | 40 | 40 | 30           | MIARGYRITE                  | 4-0675  |
| 32.52              | 46.78 | 58.76 | 38.60 | 19.67  | 22.90  | 67                 | 100 | 53 | 40 | 20 | 20           | CRYOLITE                    | 1-1273  |
| 32.54              | 34.59 | 56.79 | 36.65 | 30.34  | 42.60  | 100                | 80  | 60 | 50 | 40 | 30           | IDOCRASE                    | 11-0145 |
| 32.56              | 29.09 | 10.56 | 22.98 | 25.82  | 27.36  | 100                | 80  | 70 | 60 | 60 | 60           | CUMMINGTONITE               | 7-0382  |
| 32.56              | 36.22 | 58.82 | 60.08 | 28.99  | 18.03  | 63                 | 100 | 50 | 50 | 31 | 20           | HAUSMANNITE                 | 1-1127  |
| 32.60              | 30.80 | 23.45 | 36.64 | 33.92  | 40.80  | 50                 | 100 | 50 | 40 | 30 | 30           | PUMPELLYITE                 | 10-0447 |
| 32.60              | 46.80 | 22.90 | 38.80 | 38.61  | 58.90  | 95                 | 100 | 60 | 50 | 45 | 45           | CRYOLITE                    | 12-0257 |
| 32.63              | 29.12 | 30.34 | 37.85 | 53.12  | 49.25  | 28                 | 100 | 31 | 20 | 15 | 14           | MASSICOT SYN                | 5-0570  |
| 32.63              | 32.02 | 32.20 | 34.39 | 41.26  | 32.79  | 95                 | 100 | 90 | 65 | 65 | 40           | LARNITE                     | 9-0351  |
| 32.64              | 28.22 | 47.04 | 55.66 | 76.08  | 78.30  | 48                 | 100 | 49 | 47 | 18 | 15           | URANINITE SYN               | 5-0550  |
| 32.66              | 36.18 | 27.24 | 35.16 | 28.12  | 28.68  | 100                | 90  | 80 | 80 | 70 | 70           | PROUSTITE SYN               | 11-0470 |
| 32.66              | 40.42 | 63.68 | 68.42 | 110.04 | 127.18 | 100                | 80  | 60 | 60 | 60 | 60           | MERCURY                     | 9-0253  |
| 32.66              | 43.03 | 53.93 | 35.88 | 46.85  | 70.36  | 100                | 43  | 34 | 17 | 12 | 8            | MAGNESITE SYN               | 8-0479  |
| 32.68              | 22.45 | 26.46 | 35.25 | 13.14  | 22.86  | 80                 | 100 | 95 | 60 | 55 | 35           | EUCRYPTITE                  | 14-0667 |
| 32.68              | 46.90 | 28.06 | 75.58 | 87.09  | 26.94  | 50                 | 100 | 60 | 50 | 50 | 40           | BORNITE                     | 14-0323 |
| 32.68              | 51.70 | 33.37 | 23.16 | 22.77  | 48.68  | 100                | 50  | 45 | 35 | 30 | 30           | BOURNONITE                  | 12-0094 |
| 32.68              | 53.26 | 35.34 | 48.97 | 61.85  | 63.26  | 100                | 100 | 85 | 85 | 85 | 85           | ILMENITE                    | 3-0781  |
| 32.78              | 28.22 | 29.54 | 43.24 | 59.60  | 41.38  | 30                 | 100 | 70 | 30 | 30 | 20           | KAINITE                     | 14-0591 |
| 32.78              | 28.23 | 10.39 | 26.03 | 34.44  | 41.32  | 80                 | 100 | 70 | 45 | 35 | 35           | ARFVEDSONITE                | 14-0633 |
| 32.78              | 29.06 | 27.42 | 24.42 | 46.28  | 53.20  | 60                 | 100 | 40 | 30 | 30 | 30           | CUPROBISMUTITE              | 8-0086  |
| 32.78              | 30.70 | 16.04 | 25.50 | 27.42  | 17.62  | 100                | 100 | 80 | 80 | 80 | 60           | MELANOTEKITE                | 15-0633 |
| 32.79              | 30.07 | 27.06 | 28.09 | 44.38  | 44.29  | 63                 | 100 | 98 | 59 | 57 | 55           | CELESTITE SYN               | 5-0593  |
| 32.80              | 29.18 | 10.72 | 35.77 | 66.55  | 41.62  | 90                 | 100 | 80 | 80 | 80 | 60           | CUMMINGTONITE (MN)          | 13-0376 |
| 32.80              | 31.83 | 25.85 | 28.84 | 39.71  | 46.65  | 80                 | 100 | 30 | 30 | 30 | 30           | DAHLITE (CARBONATE-APATITE) | 12-0529 |
| 32.82              | 10.53 | 28.72 | 35.44 | 19.69  | 29.97  | 50                 | 100 | 55 | 45 | 20 | 20           | RIEBECKITE SYN              | 15-0516 |
| 32.82              | 34.14 | 59.60 | 18.31 | 24.30  | 36.76  | 70                 | 100 | 80 | 60 | 60 | 60           | LAWSONITE                   | 13-0533 |
| 32.90              | 31.71 | 25.82 | 39.69 | 48.50  | 53.19  | 90                 | 100 | 70 | 70 | 70 | 60           | DAHLITE (CARBONATE-APATITE) | 15-0100 |
| 32.90              | 43.90 | 29.36 | 76.95 | 51.81  | 42.10  | 50                 | 100 | 70 | 50 | 45 | 40           | BORACITE                    | 5-0710  |
| 32.90              | 50.66 | 36.50 | 86.80 | 37.76  | 92.87  | 100                | 100 | 90 | 90 | 80 | 80           | COBALTITE                   | 16-0624 |
| 32.93              | 31.80 | 32.22 | 25.90 | 49.51  | 46.75  | 60                 | 100 | 60 | 40 | 40 | 30           | HYDROXYLAPATITE SYN         | 9-0432  |
| 32.93              | 55.45 | 65.71 | 91.20 | 23.22  | 94.24  | 100                | 90  | 80 | 70 | 60 | 60           | BIXBYITE                    | 8-0010  |
| 32.93              | 55.49 | 42.23 | 94.13 | 38.30  | 65.76  | 100                | 70  | 50 | 50 | 40 | 40           | BRAUNITE                    | 8-0078  |
| 32.94              | 10.51 | 28.89 | 25.98 | 35.48  | 19.64  | 100                | 100 | 80 | 60 | 60 | 50           | RIEBECKITE                  | 14-0230 |
| 33.02              | 14.52 | 58.34 | 60.44 | 34.06  | 38.44  | 70                 | 100 | 70 | 70 | 60 | 60           | MOLYBDENITE (3R)            | 17-0744 |
| 33.02              | 27.42 | 19.58 | 34.06 | 30.16  | 34.88  | 40                 | 100 | 80 | 40 | 30 | 30           | BLOEDITE                    | 4-0549  |
| 33.02              | 27.42 | 33.28 | 26.92 | 28.04  | 46.28  | 40                 | 100 | 45 | 35 | 25 | 25           | BISMITE                     | 14-0699 |
| 33.02              | 31.48 | 12.14 | 33.54 | 36.80  | 41.58  | 100                | 85  | 70 | 50 | 50 | 35           | ILVAITE                     | 14-0067 |
| 33.05              | 13.02 | 30.09 | 27.88 | 18.07  | 23.16  | 67                 | 100 | 67 | 53 | 40 | 40           | VIVIANITE SYN               | 3-0070  |
| 33.05              | 28.70 | 10.51 | 26.37 | 27.27  | 30.40  | 100                | 80  | 70 | 70 | 60 | 60           | ACTINOLITE                  | 7-0336  |
| 33.05              | 51.95 | 25.90 | 47.61 | 37.31  | 38.81  | 100                | 63  | 40 | 30 | 25 | 25           | MARCASITE                   | 3-0799  |
| 33.07              | 56.34 | 37.10 | 40.79 | 47.45  | 28.54  | 84                 | 100 | 66 | 52 | 40 | 36           | PYRITE SYN                  | 6-0710  |



| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME            | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|----|----|-------------------------|----------|
| 33.12              | 10.56 | 28.60 | 27.29 | 48.09 | 31.90 | 90                 | 100 | 100 | 75  | 50 | 45 | TREMOLITE               | 13-0437  |
| 33.14              | 5.92  | 11.34 | 32.06 | 54.92 | 24.30 | 50                 | 100 | 50  | 40  | 40 | 30 | SANTAFEITE              | 11-0169  |
| 33.14              | 18.33 | 22.20 | 18.38 | 31.36 | 36.64 | 53                 | 100 | 47  | 47  | 47 | 47 | ORPIMENT                | 1-0273   |
| 33.14              | 31.17 | 57.02 | 43.86 | 24.63 | 38.56 | 100                | 100 | 75  | 65  | 60 | 60 | ZOISITE                 | 11-0665  |
| 33.15              | 31.96 | 32.29 | 36.80 | 34.17 | 49.63 | 60                 | 100 | 55  | 40  | 30 | 30 | FLUORAPATITE SYN        | 15-0876  |
| 33.17              | 34.02 | 29.59 | 33.65 | 41.62 | 23.35 | 100                | 70  | 65  | 50  | 40 | 30 | SPURRITE                | 13-0496  |
| 33.18              | 28.61 | 33.56 | 10.98 | 13.97 | 21.84 | 100                | 100 | 100 | 80  | 80 | 80 | HARMOTOME               | 13-0494  |
| 33.18              | 28.89 | 26.37 | 27.10 | 34.63 | 34.94 | 100                | 95  | 90  | 70  | 70 | 70 | HORNBLende              | 9-0434   |
| 33.18              | 47.61 | 59.23 | 59.65 | 69.70 | 79.15 | 100                | 90  | 70  | 70  | 60 | 50 | PEROVSKITE              | 8-0091   |
| 33.18              | 47.63 | 59.10 | 59.48 | 32.93 | 33.31 | 100                | 100 | 100 | 100 | 80 | 80 | PEROVSKITE SYN          | 9-0365   |
| 33.23              | 29.63 | 57.18 | 36.49 | 46.42 | 54.88 | 100                | 60  | 60  | 45  | 25 | 25 | ANDRADITE SYN           | 10-0288  |
| 33.27              | 29.66 | 37.93 | 25.02 | 37.47 | 61.17 | 100                | 100 | 80  | 60  | 60 | 60 | STAUROLITE              | 15-0397  |
| 33.27              | 31.12 | 22.06 | 10.94 | 44.89 | 57.57 | 100                | 65  | 50  | 40  | 35 | 35 | ZOISITE SYN             | 13-0562  |
| 33.28              | 27.42 | 33.02 | 26.92 | 28.04 | 46.28 | 45                 | 100 | 40  | 35  | 25 | 25 | BISMITE                 | 14-0699  |
| 33.28              | 28.86 | 47.84 | 56.78 | 60.02 | 70.78 | 50                 | 100 | 50  | 40  | 20 | 20 | URANINITE               | 13-0225  |
| 33.31              | 21.10 | 36.84 | 53.29 | 41.42 | 59.10 | 80                 | 100 | 70  | 50  | 40 | 30 | GOETHITE                | 8-0097   |
| 33.31              | 21.26 | 36.84 | 53.26 | 17.85 | 26.53 | 70                 | 100 | 80  | 70  | 60 | 60 | GOETHITE                | 3-0249   |
| 33.31              | 54.28 | 35.77 | 49.60 | 62.59 | 64.14 | 100                | 60  | 50  | 40  | 35 | 35 | HEMATITE                | 13-0534  |
| 33.34              | 32.34 | 26.19 | 34.40 | 47.06 | 49.71 | 70                 | 100 | 70  | 70  | 70 | 70 | APATITE SYN (CARBONATE) | 13-0001  |
| 33.37              | 32.68 | 51.70 | 23.16 | 22.77 | 48.68 | 45                 | 100 | 50  | 35  | 30 | 30 | BOURNONITE              | 12-0094  |
| 33.40              | 21.08 | 16.54 | 14.78 | 32.16 | 33.66 | 25                 | 100 | 25  | 20  | 20 | 20 | EPSOMITE                | 8-0467   |
| 33.40              | 29.74 | 57.56 | 36.64 | 38.26 | 55.30 | 100                | 70  | 60  | 55  | 25 | 25 | UVAROVITE               | 11-0696  |
| 33.40              | 35.60 | 22.78 | 13.86 | 16.52 | 27.94 | 50                 | 100 | 85  | 40  | 40 | 40 | BROCHANTITE             | 13-0398  |
| 33.41              | 10.95 | 21.08 | 56.02 | 22.10 | 31.48 | 90                 | 100 | 100 | 90  | 60 | 50 | ZUNYITE                 | 14-0698  |
| 33.43              | 31.27 | 30.19 | 13.42 | 15.02 | 19.17 | 80                 | 100 | 80  | 70  | 70 | 70 | THOMSONITE              | 9-0490   |
| 33.43              | 35.19 | 64.73 | 28.80 | 56.11 | 32.08 | 90                 | 100 | 100 | 80  | 80 | 70 | HORNBLende              | 11-0493  |
| 33.49              | 24.45 | 34.52 | 27.95 | 30.41 | 21.20 | 100                | 80  | 60  | 40  | 40 | 30 | MONTICELLITE SYN        | 11-0129  |
| 33.49              | 25.08 | 18.80 | 49.71 | 31.48 | 35.68 | 75                 | 100 | 85  | 65  | 45 | 30 | THORITE SYN             | 11-0419  |
| 33.54              | 36.96 | 31.36 | 40.60 | 59.60 | 64.68 | 100                | 95  | 35  | 30  | 30 | 30 | CREDNERITE              | 14-0623  |
| 33.56              | 7.19  | 36.07 | 19.73 | 20.66 | 32.61 | 60                 | 100 | 60  | 35  | 35 | 35 | SEPIOLITE               | 14-0001  |
| 33.56              | 28.61 | 33.18 | 10.98 | 13.97 | 21.84 | 100                | 100 | 100 | 80  | 80 | 80 | HARMOTOME               | 13-0494  |
| 33.56              | 30.19 | 25.45 | 56.45 | 19.21 | 34.50 | 80                 | 100 | 80  | 60  | 50 | 40 | ALLANITE (METAMICT)     | 9-0474   |
| 33.56              | 43.25 | 29.98 | 53.26 | 70.85 | 47.35 | 90                 | 100 | 90  | 90  | 80 | 60 | TROILITE (PYRRHO.) SYN  | 4-0832   |
| 33.62              | 24.47 | 34.69 | 21.20 | 30.46 | 35.29 | 100                | 40  | 40  | 35  | 35 | 30 | MONTICELLITE            | 11-0353  |
| 33.66              | 16.72 | 56.40 | 39.12 | 42.82 | 27.42 | 100                | 100 | 100 | 90  | 90 | 80 | MURDOCHITE              | 7-0028   |
| 33.66              | 28.48 | 14.22 | 31.94 | 36.34 | 38.60 | 80                 | 100 | 80  | 70  | 70 | 70 | GLAUBERITE              | 2-0556   |
| 33.66              | 28.98 | 8.94  | 27.76 | 36.64 | 18.01 | 100                | 80  | 60  | 60  | 60 | 40 | TRONA                   | 11-0643  |
| 33.66              | 47.84 | 60.44 | 48.64 | 31.48 | 32.64 | 100                | 70  | 70  | 60  | 50 | 50 | MERWINITE               | 4-0728   |
| 33.69              | 8.75  | 26.45 | 36.68 | 41.42 | 45.34 | 80                 | 100 | 100 | 80  | 80 | 80 | BIOTITE                 | 2-0045   |
| 33.69              | 36.99 | 50.12 | 56.30 | 69.76 | 24.39 | 90                 | 100 | 80  | 40  | 40 | 30 | ARSENOPYRITE            | 11-0154  |
| 33.69              | 43.29 | 53.29 | 29.98 | 70.79 | 87.09 | 60                 | 100 | 50  | 40  | 40 | 40 | TROILITE                | 11-0151  |
| 33.69              | 46.30 | 50.39 | 92.08 | 70.97 | 96.54 | 100                | 90  | 80  | 40  | 30 | 30 | NICCOLITE               | 9-0001   |
| 33.80              | 25.14 | 21.28 | 34.20 | 36.64 | 24.56 | 75                 | 100 | 80  | 70  | 60 | 50 | ZINKOSITE SYN           | 8-0491   |
| 33.80              | 28.48 | 21.98 | 29.84 | 37.44 | 32.64 | 30                 | 100 | 30  | 16  | 16 | 14 | LANGBEINITE             | 17-0740  |
| 33.80              | 31.36 | 37.12 | 48.10 | 27.60 | 28.58 | 50                 | 100 | 50  | 50  | 40 | 20 | PYROSTILPNITE           | 8-0129   |

| TWO-THETA (COPPER) |       |       |       |       |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME           | FILE NO. |
|--------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|-----|----|----|------------------------|----------|
| 33.80              | 58.34 | 30.16 | 55.66 | 47.30 | 41.78  | 100                | 90  | 80  | 80  | 70 | 60 | GROSSULARITE           | 3-0826   |
| 33.82              | 9.02  | 60.95 | 37.47 | 54.63 | 72.10  | 60                 | 100 | 80  | 60  | 50 | 50 | GARNIERITE             | 2-0060   |
| 33.82              | 18.96 | 25.08 | 49.97 | 31.50 | 31.73  | 60                 | 100 | 100 | 30  | 20 | 20 | THORITE                | 11-0172  |
| 33.82              | 43.95 | 30.09 | 53.59 | 71.47 | 87.98  | 33                 | 100 | 33  | 33  | 13 | 13 | TROILITE (PYRRHO.) SYN | 1-1247   |
| 33.82              | 43.95 | 30.09 | 53.59 | 71.47 | 87.98  | 33                 | 100 | 33  | 33  | 13 | 13 | PYRRHOTITE SYN         | 1-1247   |
| 33.90              | 26.60 | 51.80 | 54.81 | 37.98 | 64.79  | 81                 | 100 | 63  | 63  | 24 | 17 | CASSITERITE SYN        | 5-0467   |
| 33.92              | 19.02 | 25.65 | 50.66 | 32.16 | 41.38  | 70                 | 100 | 100 | 70  | 40 | 40 | COFFINITE              | 8-0304   |
| 33.92              | 25.58 | 19.10 | 50.66 | 32.06 | 49.20  | 95                 | 100 | 95  | 70  | 45 | 35 | COFFINITE SYN          | 11-0420  |
| 33.96              | 26.21 | 39.52 | 53.66 | 56.23 | 85.19  | 65                 | 100 | 50  | 40  | 40 | 40 | MANGANITE              | 8-0099   |
| 34.02              | 33.17 | 29.59 | 33.65 | 41.62 | 23.35  | 70                 | 100 | 65  | 50  | 40 | 30 | SPURRITE               | 13-0496  |
| 34.06              | 18.42 | 15.12 | 30.58 | 24.10 | 53.54  | 100                | 100 | 90  | 90  | 70 | 70 | LIBETHENITE            | 8-0107   |
| 34.06              | 18.42 | 30.70 | 15.26 | 23.96 | 53.54  | 100                | 100 | 50  | 40  | 28 | 20 | LIBETHENITE SYN        | 1-0274   |
| 34.06              | 31.58 | 25.50 | 38.78 | 22.04 | 48.92  | 100                | 95  | 80  | 45  | 35 | 35 | WILLEMITE              | 8-0492   |
| 34.09              | 17.39 | 28.89 | 54.98 | 60.51 | 35.77  | 100                | 80  | 20  | 20  | 18 | 15 | SPINEL (MN)            | 4-0732   |
| 34.09              | 23.92 | 13.73 | 31.05 | 42.02 | 51.02  | 50                 | 100 | 30  | 30  | 30 | 30 | HAUYNITE               | 2-0331   |
| 34.14              | 59.60 | 32.82 | 18.31 | 24.30 | 36.76  | 100                | 80  | 70  | 60  | 60 | 60 | LAWSONITE              | 13-0533  |
| 34.17              | 8.73  | 26.51 | 44.94 | 60.16 | 41.42  | 100                | 100 | 100 | 65  | 50 | 45 | PHLOGOPITE             | 10-0493  |
| 34.20              | 12.80 | 38.96 | 58.34 | 34.60 | 25.80  | 80                 | 100 | 80  | 80  | 70 | 60 | GERHARDTITE            | 14-0687  |
| 34.22              | 58.65 | 30.62 | 37.63 | 56.38 | 105.57 | 100                | 100 | 90  | 90  | 90 | 90 | GARNET (FE,MN)         | 10-0367  |
| 34.24              | 8.67  | 26.39 | 36.93 | 60.60 | 19.42  | 60                 | 100 | 100 | 30  | 30 | 25 | PHLOGOPITE (BORON SYN) | 14-0466  |
| 34.30              | 8.90  | 26.62 | 45.08 | 26.29 | 35.73  | 30                 | 100 | 100 | 30  | 20 | 15 | PHLOGOPITE (1M)        | 10-0495  |
| 34.32              | 13.04 | 24.16 | 30.92 | 32.90 | 27.42  | 80                 | 100 | 70  | 40  | 40 | 30 | AURICHALCITE           | 17-0743  |
| 34.32              | 19.62 | 35.16 | 61.80 | 5.80  | 53.88  | 100                | 100 | 100 | 100 | 60 | 60 | BEIDELLITE             | 3-0178   |
| 34.32              | 26.74 | 43.68 | 25.72 | 45.54 | 29.06  | 100                | 80  | 80  | 70  | 70 | 60 | STROMEYERITE           | 9-0499   |
| 34.32              | 29.54 | 48.92 | 58.34 | 79.86 | 82.34  | 70                 | 100 | 70  | 70  | 50 | 40 | STETEFELDITE           | 8-0012   |
| 34.32              | 38.60 | 34.46 | 35.44 | 56.50 | 49.20  | 100                | 65  | 60  | 60  | 35 | 30 | LOELLINGITE SYN        | 11-0699  |
| 34.32              | 49.20 | 61.34 | 82.34 | 92.08 | 72.02  | 100                | 50  | 20  | 20  | 16 | 8  | ALABANDITE             | 6-0518   |
| 34.32              | 49.48 | 61.80 | 82.50 | 92.51 | 29.60  | 100                | 50  | 20  | 20  | 16 | 14 | ALABANDITE             | 6-0518   |
| 34.36              | 4.70  | 60.25 | 9.72  | 19.51 | 24.66  | 60                 | 100 | 70  | 50  | 50 | 50 | SAPONITE               | 6-0002   |
| 34.36              | 8.91  | 26.77 | 18.14 | 19.51 | 24.94  | 80                 | 100 | 100 | 60  | 60 | 60 | LEPIDOLITE             | 10-0483  |
| 34.36              | 49.51 | 56.98 | 41.02 | 54.59 | 66.29  | 100                | 90  | 90  | 80  | 70 | 70 | SKUTTERUDITE           | 10-0497  |
| 34.38              | 36.80 | 37.72 | 34.70 | 36.56 | 28.96  | 100                | 80  | 75  | 70  | 70 | 60 | ACANTHITE              | 14-0072  |
| 34.39              | 24.14 | 13.84 | 31.27 | 42.50 | 51.61  | 75                 | 100 | 40  | 40  | 40 | 20 | NOSEAN SYN             | 15-0470  |
| 34.46              | 34.32 | 38.60 | 35.44 | 56.50 | 49.20  | 60                 | 100 | 65  | 60  | 35 | 30 | LOELLINGITE SYN        | 11-0699  |
| 34.46              | 36.18 | 31.70 | 56.40 | 62.72 | 47.56  | 56                 | 100 | 71  | 40  | 35 | 29 | ZINCITE SYN            | 5-0664   |
| 34.50              | 12.16 | 42.73 | 21.88 | 18.14 | 33.04  | 200                | 100 | 80  | 70  | 60 | 55 | DIOPTASE               | 7-0172   |
| 34.50              | 26.61 | 45.58 | 8.84  | 17.63 | 24.52  | 100                | 100 | 100 | 80  | 80 | 80 | HYDRUMSCOVITE          | 2-0462   |
| 34.50              | 59.36 | 57.06 | 30.72 | 48.25 | 54.59  | 100                | 40  | 30  | 25  | 20 | 20 | SPESSARTITE SYN        | 10-0354  |
| 34.50              | 59.65 | 91.09 | 57.22 | 74.75 | 93.32  | 100                | 80  | 70  | 60  | 60 | 60 | SPESSARTITE            | 2-0992   |
| 34.52              | 33.49 | 24.45 | 27.95 | 30.41 | 21.20  | 60                 | 100 | 80  | 40  | 40 | 30 | MONTICELLITE SYN       | 11-0129  |
| 34.56              | 27.59 | 29.89 | 44.00 | 55.97 | 62.13  | 90                 | 100 | 90  | 40  | 40 | 40 | SPHENE                 | 11-0142  |
| 34.56              | 32.50 | 56.74 | 30.62 | 30.31 | 42.60  | 80                 | 100 | 60  | 50  | 40 | 30 | VESUVIANITE            | 11-0145  |
| 34.59              | 28.89 | 42.42 | 20.85 | 23.66 | 29.58  | 30                 | 100 | 25  | 15  | 12 | 12 | KALIOPHILITE           | 11-0313  |
| 34.59              | 32.54 | 56.79 | 36.65 | 30.34 | 42.60  | 80                 | 100 | 60  | 50  | 40 | 30 | IDOCRASE               | 11-0145  |
| 34.60              | 24.16 | 17.58 | 14.72 | 35.44 | 30.28  | 100                | 100 | 80  | 70  | 60 | 50 | ROSASITE               | 17-0216  |



| TWO-THETA (COPPER) |       |       |       |        |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|-----|----|----|--------------------------|----------|
| 34.60              | 41.16 | 49.68 | 57.26 | 54.81  | 107.82 | 100                | 35  | 35  | 30  | 20 | 20 | SKUTTERUDITE SYN         | 10-0328  |
| 34.63              | 26.94 | 45.78 | 8.90  | 17.81  | 28.24  | 100                | 100 | 100 | 80  | 80 | 80 | LEPIDOLITE (120)         | 15-0062  |
| 34.67              | 8.75  | 19.60 | 26.77 | 37.54  | 61.35  | 100                | 100 | 80  | 60  | 60 | 60 | GLAUCONITE               | 9-0439   |
| 34.69              | 33.62 | 24.47 | 21.20 | 30.46  | 35.29  | 40                 | 100 | 40  | 35  | 35 | 30 | MONTICELLITE             | 11-0353  |
| 34.70              | 34.88 | 38.10 | 48.89 | 37.54  | 49.06  | 100                | 95  | 90  | 50  | 40 | 40 | SAFFLORITE               | 11-0140  |
| 34.74              | 19.58 | 24.44 | 28.86 | 33.40  | 26.82  | 100                | 85  | 80  | 80  | 75 | 70 | CELADONITE               | 17-0521  |
| 34.74              | 28.96 | 30.92 | 42.40 | 41.18  | 49.78  | 90                 | 100 | 60  | 50  | 40 | 40 | STEPHANITE               | 11-0108  |
| 34.77              | 31.39 | 26.77 | 8.82  | 17.64  | 19.66  | 80                 | 100 | 80  | 60  | 60 | 60 | MUSCOVITE (L1)           | 10-0482  |
| 34.77              | 60.08 | 92.19 | 31.05 | 57.61  | 75.44  | 100                | 100 | 70  | 60  | 60 | 60 | PYROPE                   | 2-1008   |
| 34.81              | 45.61 | 8.84  | 17.74 | 19.73  | 24.59  | 100                | 80  | 60  | 50  | 50 | 50 | LEPIDOLITE (2M2)         | 14-0011  |
| 34.83              | 22.28 | 30.18 | 21.05 | 25.60  | 44.41  | 100                | 85  | 85  | 65  | 60 | 45 | TOURMALINE               | 14-0076  |
| 34.83              | 26.85 | 8.84  | 17.81 | 19.86  | 23.10  | 75                 | 100 | 50  | 50  | 50 | 50 | LEPIDOLITE (3M)          | 10-0484  |
| 34.88              | 18.24 | 24.70 | 33.40 | 14.72  | 16.40  | 85                 | 100 | 75  | 75  | 25 | 25 | ANTLERITE                | 7-0407   |
| 34.88              | 32.17 | 27.68 | 35.44 | 26.66  | 28.04  | 95                 | 100 | 90  | 90  | 80 | 70 | PYRRARGYRITE SYN         | 14-0280  |
| 34.88              | 34.70 | 38.10 | 48.89 | 37.54  | 49.06  | 95                 | 100 | 90  | 50  | 40 | 40 | SAFFLORITE               | 11-0140  |
| 34.88              | 40.60 | 58.74 | 70.16 | 102.16 | 115.66 | 60                 | 100 | 60  | 20  | 18 | 16 | MANGANOSITE SYN          | 7-0230   |
| 34.91              | 19.91 | 26.53 | 8.93  | 61.85  | 18.10  | 100                | 100 | 100 | 80  | 80 | 60 | ILLITE                   | 9-0334   |
| 34.91              | 31.50 | 18.25 | 22.45 | 15.55  | 30.09  | 100                | 53  | 47  | 40  | 20 | 20 | BORAX                    | 1-1097   |
| 34.92              | 60.08 | 31.13 | 57.65 | 22.00  | 48.80  | 100                | 50  | 40  | 40  | 30 | 30 | ALMANDITE                | 9-0427   |
| 34.97              | 26.85 | 8.89  | 45.51 | 29.91  | 17.85  | 54                 | 100 | 95  | 46  | 34 | 31 | MUSCOVITE                | 6-0263   |
| 34.97              | 31.60 | 35.90 | 25.03 | 39.11  | 51.39  | 50                 | 100 | 70  | 30  | 30 | 30 | FAYALITE                 | 7-0164   |
| 35.02              | 8.83  | 26.60 | 45.11 | 19.91  | 17.67  | 90                 | 100 | 100 | 75  | 65 | 55 | MUSCOVITE (SYN 2M)       | 7-0032   |
| 35.02              | 30.06 | 35.44 | 42.40 | 51.90  | 56.40  | 30                 | 100 | 50  | 30  | 30 | 30 | HEDENBERGITE             | 16-0701  |
| 35.02              | 31.22 | 60.47 | 36.79 | 58.04  | 40.13  | 100                | 60  | 50  | 40  | 30 | 25 | PYROPE SYN               | 15-0742  |
| 35.02              | 32.06 | 24.64 | 20.16 | 21.58  | 40.78  | 80                 | 100 | 80  | 60  | 50 | 40 | PHOSGENITE               | 12-0218  |
| 35.05              | 7.31  | 20.63 | 27.92 | 23.73  | 26.48  | 55                 | 100 | 40  | 35  | 30 | 30 | SEPIOLITE                | 13-0595  |
| 35.05              | 7.43  | 19.95 | 62.31 | 30.09  | 54.28  | 80                 | 100 | 90  | 80  | 60 | 60 | MONTMORILLONITE          | 2-0037   |
| 35.05              | 8.86  | 19.82 | 26.94 | 61.85  | 24.59  | 100                | 80  | 80  | 80  | 80 | 60 | MUSCOVITE (BA)           | 10-0490  |
| 35.05              | 19.73 | 8.50  | 24.05 | 61.85  | 17.15  | 80                 | 100 | 80  | 60  | 60 | 40 | MUSCOVITE (AMMONIUM) SYN | 13-0573  |
| 35.05              | 25.82 | 51.70 | 19.51 | 53.09  | 36.84  | 50                 | 100 | 50  | 25  | 18 | 13 | XENOTIME                 | 11-0254  |
| 35.16              | 15.02 | 17.40 | 30.48 | 27.60  | 25.80  | 100                | 90  | 90  | 90  | 85 | 75 | DUMORTIERITE             | 7-0071   |
| 35.16              | 19.62 | 34.32 | 61.80 | 5.80   | 53.88  | 100                | 100 | 100 | 100 | 60 | 60 | BEIDELLITE               | 3-0178   |
| 35.16              | 21.82 | 55.28 | 56.78 | 63.20  | 69.00  | 100                | 100 | 80  | 80  | 80 | 80 | RAMSDELLITE              | 7-0222   |
| 35.16              | 21.86 | 38.78 | 19.10 | 43.90  | 56.78  | 60                 | 100 | 65  | 50  | 13 | 11 | RAMSDELLITE              | 11-0055  |
| 35.16              | 26.34 | 18.38 | 29.06 | 44.14  | 54.92  | 40                 | 100 | 40  | 20  | 17 | 17 | KIESERITE SYN            | 1-0638   |
| 35.16              | 28.94 | 25.58 | 51.58 | 27.16  | 37.94  | 100                | 100 | 90  | 70  | 60 | 40 | PREHNITE                 | 7-0333   |
| 35.16              | 36.20 | 31.48 | 48.64 | 53.88  | 51.58  | 100                | 90  | 65  | 55  | 30 | 25 | RAMMELSBERGITE SYN       | 11-0014  |
| 35.16              | 43.40 | 57.57 | 25.60 | 68.26  | 52.60  | 90                 | 100 | 80  | 75  | 50 | 45 | CORUNDUM (ALPHA ALUMINA) | 10-0173  |
| 35.16              | 43.68 | 26.58 | 45.54 | 83.20  | 31.82  | 40                 | 100 | 60  | 40  | 30 | 20 | RICKARDITE               | 6-0661   |
| 35.16              | 61.80 | 29.86 | 56.40 | 88.88  | 103.62 | 100                | 80  | 70  | 70  | 50 | 50 | FRANKLINITE              | 10-0467  |
| 35.19              | 64.73 | 33.43 | 28.80 | 56.11  | 32.08  | 100                | 100 | 90  | 80  | 80 | 70 | HORNBLende               | 11-0493  |
| 35.30              | 12.45 | 24.78 | 50.66 | 45.78  | 38.10  | 70                 | 100 | 80  | 70  | 60 | 50 | SPANGOLITE               | 5-0142   |
| 35.30              | 28.76 | 32.04 | 38.44 | 18.82  | 25.64  | 100                | 100 | 100 | 70  | 50 | 50 | GADOLINITE               | 8-0190   |
| 35.34              | 29.88 | 13.62 | 20.04 | 30.72  | 41.02  | 60                 | 100 | 40  | 40  | 40 | 20 | ACMITE (AEGIRINE)        | 3-0621   |
| 35.34              | 32.68 | 53.26 | 48.97 | 61.85  | 63.26  | 85                 | 100 | 100 | 85  | 85 | 85 | ILMENITE                 | 3-0781   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME            | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|-------------------------|----------|
| 35.39              | 20.00 | 9.12  | 36.99 | 62.50 | 30.61 | 90                 | 100 | 80  | 80  | 80  | 70  | PARAGONITE              | 12-0165  |
| 35.44              | 22.72 | 13.61 | 16.40 | 33.28 | 27.86 | 67                 | 100 | 67  | 58  | 50  | 42  | BROCHANTITE             | 3-0282   |
| 35.44              | 29.66 | 25.64 | 22.22 | 20.84 | 61.34 | 100                | 90  | 80  | 80  | 70  | 70  | LITHIOPHILITE           | 13-0336  |
| 35.44              | 30.06 | 35.02 | 42.40 | 51.90 | 56.40 | 50                 | 100 | 30  | 30  | 30  | 30  | HEDENBERGITE            | 16-0701  |
| 35.44              | 35.60 | 38.78 | 38.96 | 48.64 | 61.80 | 49                 | 100 | 96  | 30  | 25  | 20  | TENORITE                | 5-0661   |
| 35.48              | 12.43 | 25.08 | 42.02 | 59.10 | 51.36 | 100                | 100 | 100 | 70  | 70  | 60  | CHAMOSITE FE(II)        | 7-0339   |
| 35.48              | 21.41 | 56.04 | 63.74 | 43.73 | 75.02 | 80                 | 100 | 60  | 50  | 30  | 30  | CRISTOBALITE BETA HIGH  | 4-0359   |
| 35.48              | 27.88 | 21.84 | 23.60 | 24.45 | 29.78 | 27                 | 100 | 40  | 13  | 11  | 11  | LABRADORITE             | 3-0499   |
| 35.48              | 29.78 | 56.83 | 30.83 | 65.76 | 27.62 | 100                | 80  | 60  | 40  | 40  | 20  | DIOPSIDE SYN            | 3-0860   |
| 35.48              | 57.06 | 62.64 | 30.13 | 43.16 | 53.52 | 100                | 85  | 85  | 70  | 70  | 60  | MAGNETITE               | 11-0614  |
| 35.48              | 62.78 | 43.29 | 57.22 | 30.09 | 37.31 | 100                | 60  | 50  | 40  | 30  | 25  | SPINEL (MN,NI)          | 1-1110   |
| 35.51              | 29.87 | 30.91 | 35.66 | 27.62 | 30.28 | 40                 | 100 | 30  | 30  | 25  | 25  | DIOPSIDE                | 11-0654  |
| 35.52              | 30.16 | 62.68 | 57.09 | 43.16 | 89.92 | 100                | 40  | 35  | 30  | 25  | 12  | MAGNESIOFERRITE         | 17-0464  |
| 35.60              | 20.23 | 27.85 | 38.40 | 9.21  | 35.19 | 100                | 90  | 80  | 80  | 70  | 70  | PARAGONITE              | 12-0187  |
| 35.60              | 20.42 | 62.59 | 27.79 | 9.20  | 37.50 | 90                 | 100 | 90  | 80  | 70  | 60  | PARAGONITE              | 9-0428   |
| 35.60              | 22.78 | 33.40 | 13.86 | 16.52 | 27.94 | 100                | 85  | 50  | 40  | 40  | 40  | BROCHANTITE             | 13-0398  |
| 35.60              | 28.58 | 24.30 | 38.10 | 41.18 | 43.46 | 75                 | 100 | 80  | 70  | 60  | 50  | PHENAKITE               | 9-0431   |
| 35.60              | 30.26 | 57.14 | 23.70 | 43.24 | 53.88 | 100                | 100 | 100 | 100 | 100 | 100 | MAGHEMITE SYN           | 15-0615  |
| 35.60              | 38.78 | 35.44 | 38.96 | 48.64 | 61.80 | 100                | 96  | 49  | 30  | 25  | 20  | TENORITE                | 5-0661   |
| 35.63              | 12.12 | 24.52 | 37.15 | 12.74 | 25.37 | 70                 | 400 | 300 | 38  | 24  | 24  | ANTIGORITE (SERPENTINE) | 7-0417   |
| 35.63              | 12.36 | 25.01 | 19.21 | 33.43 | 59.57 | 60                 | 100 | 100 | 40  | 20  | 20  | CHAMOSITE               | 10-0404  |
| 35.63              | 12.56 | 25.23 | 6.27  | 18.84 | 42.02 | 50                 | 100 | 80  | 40  | 40  | 40  | CHLORITE (THURINGITE)   | 13-0029  |
| 35.63              | 12.56 | 25.30 | 59.44 | 42.23 | 33.43 | 90                 | 100 | 100 | 70  | 60  | 40  | CHAMOSITE               | 7-0315   |
| 35.63              | 29.78 | 56.83 | 92.19 | 65.76 | 71.47 | 100                | 100 | 100 | 100 | 90  | 80  | DIOPSIDE                | 2-0656   |
| 35.63              | 57.61 | 63.74 | 43.73 | 30.30 | 88.99 | 100                | 90  | 90  | 70  | 60  | 60  | CHROMITE                | 3-0873   |
| 35.66              | 27.00 | 20.02 | 53.52 | 43.82 | 55.67 | 45                 | 100 | 45  | 40  | 20  | 14  | ZIRCON                  | 6-0266   |
| 35.68              | 25.25 | 17.22 | 24.30 | 38.54 | 39.40 | 60                 | 100 | 70  | 40  | 30  | 30  | AZURITE                 | 11-0136  |
| 35.70              | 32.31 | 22.85 | 36.51 | 17.35 | 52.24 | 80                 | 100 | 60  | 60  | 50  | 50  | FORSTERITE (OLIVINE)    | 7-0075   |
| 35.70              | 32.31 | 36.51 | 52.24 | 17.29 | 22.87 | 60                 | 100 | 60  | 50  | 40  | 40  | CHRYSOLITE (OLIVINE)    | 7-0156   |
| 35.71              | 32.32 | 36.53 | 22.90 | 17.59 | 36.69 | 100                | 100 | 80  | 60  | 50  | 40  | FORSTERITE (OLIVINE)    | 7-0079   |
| 35.73              | 32.23 | 48.89 | 18.45 | 40.49 | 50.18 | 65                 | 100 | 95  | 60  | 55  | 45  | MILLERITE               | 12-0041  |
| 35.73              | 36.56 | 22.92 | 52.34 | 39.74 | 32.34 | 73                 | 100 | 69  | 60  | 59  | 53  | FORSTERITE SYN          | 4-0768   |
| 35.74              | 18.43 | 43.44 | 63.11 | 57.49 | 30.35 | 100                | 65  | 55  | 55  | 40  | 13  | PICROCHROMITE SYN       | 10-0351  |
| 35.74              | 28.50 | 31.24 | 24.10 | 33.54 | 50.66 | 90                 | 100 | 90  | 80  | 80  | 80  | EMMONSITE               | 7-0404   |
| 35.74              | 30.35 | 63.11 | 43.42 | 57.88 | 53.93 | 100                | 50  | 50  | 30  | 30  | 16  | SPINEL (LI) SYN         | 13-0207  |
| 35.74              | 36.56 | 22.90 | 32.34 | 17.39 | 39.72 | 70                 | 100 | 70  | 60  | 50  | 40  | FORSTERITE (OLIVINE)    | 7-0074   |
| 35.77              | 6.31  | 20.13 | 62.31 | 28.89 | 55.71 | 80                 | 100 | 100 | 80  | 60  | 60  | MONTMORILLONITE SYN     | 3-0016   |
| 35.77              | 12.16 | 24.73 | 41.62 | 59.48 | 60.38 | 100                | 90  | 80  | 50  | 50  | 40  | ANTIGORITE              | 10-0402  |
| 35.77              | 27.88 | 20.18 | 26.29 | 37.15 | 58.00 | 100                | 90  | 80  | 80  | 80  | 80  | MARGARITE               | 12-0188  |
| 35.77              | 33.31 | 54.28 | 49.60 | 62.59 | 64.14 | 50                 | 100 | 60  | 40  | 35  | 35  | HEMATITE                | 13-0534  |
| 35.77              | 47.61 | 57.22 | 62.31 | 18.37 | 30.30 | 100                | 75  | 75  | 75  | 50  | 50  | CHROMITE SYN            | 4-0759   |
| 35.77              | 62.78 | 28.06 | 20.23 | 9.31  | 37.31 | 90                 | 100 | 70  | 60  | 50  | 50  | PARAGONITE SYN          | 10-0420  |
| 35.88              | 12.21 | 24.59 | 42.06 | 51.08 | 19.25 | 100                | 60  | 60  | 35  | 25  | 20  | SERPENTINE SYN          | 11-0386  |
| 35.89              | 12.07 | 24.32 | 60.29 | 38.56 | 46.25 | 100                | 100 | 100 | 80  | 70  | 70  | SERPENTINE              | 9-0444   |
| 35.90              | 31.60 | 34.97 | 25.03 | 39.11 | 51.39 | 70                 | 100 | 50  | 30  | 30  | 30  | FAYALITE                | 7-0164   |



| TWO-THETA (COPPER) |       |       |       |       |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME          | FILE NO. |
|--------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|----|----|----|-----------------------|----------|
| 35.92              | 31.63 | 25.01 | 34.98 | 37.34 | 39.08  | 80                 | 100 | 75  | 60 | 35 | 35 | FAYALITE SYN          | 11-0262  |
| 35.92              | 31.73 | 51.45 | 25.08 | 34.91 | 61.04  | 100                | 100 | 100 | 80 | 80 | 60 | FAYALITE              | 9-0484   |
| 36.01              | 28.18 | 31.14 | 30.39 | 35.42 | 26.99  | 51                 | 100 | 87  | 44 | 43 | 35 | ENSTATITE             | 7-0216   |
| 36.04              | 12.48 | 25.05 | 60.38 | 46.88 | 19.30  | 80                 | 100 | 70  | 50 | 45 | 40 | SERPENTINE (AL)       | 13-0004  |
| 36.04              | 24.78 | 25.42 | 43.46 | 29.06 | 48.92  | 32                 | 100 | 43  | 27 | 24 | 21 | CERUSSITE             | 5-0417   |
| 36.04              | 32.16 | 54.58 | 39.67 | 46.02 | 27.68  | 50                 | 100 | 75  | 25 | 25 | 10 | BRAVOITE              | 2-0850   |
| 36.06              | 11.32 | 30.02 | 24.86 | 19.62 | 22.66  | 100                | 100 | 100 | 80 | 65 | 65 | APOPHYLLITE           | 7-0170   |
| 36.07              | 7.19  | 33.56 | 19.73 | 20.66 | 32.61  | 60                 | 100 | 60  | 35 | 35 | 35 | SEPIOLITE             | 14-0001  |
| 36.07              | 19.38 | 60.51 | 9.51  | 28.52 | 34.22  | 100                | 64  | 64  | 48 | 40 | 32 | TALC                  | 3-0881   |
| 36.07              | 31.73 | 25.16 | 35.19 | 51.33 | 60.95  | 100                | 95  | 75  | 70 | 70 | 70 | FAYALITE SYN          | 9-0307   |
| 36.09              | 27.49 | 54.38 | 41.26 | 56.68 | 69.06  | 41                 | 100 | 50  | 22 | 16 | 16 | RUTILE                | 4-0551   |
| 36.15              | 21.95 | 31.49 | 28.47 | 48.69 | 36.45  | 20                 | 100 | 13  | 11 | 7  | 5  | CRISTOBALITE LOW SYN  | 11-0695  |
| 36.18              | 30.27 | 18.64 | 23.79 | 24.40 | 53.39  | 60                 | 100 | 50  | 50 | 50 | 50 | WOLFRAMITE            | 11-0591  |
| 36.18              | 31.70 | 34.46 | 56.40 | 62.72 | 47.56  | 100                | 71  | 56  | 40 | 35 | 29 | ZINCITE SYN           | 5-0664   |
| 36.18              | 32.66 | 27.24 | 35.16 | 28.12 | 28.68  | 90                 | 100 | 80  | 80 | 70 | 70 | PROUSTITE SYN         | 11-0470  |
| 36.20              | 35.16 | 31.48 | 48.64 | 53.88 | 51.58  | 90                 | 100 | 65  | 55 | 30 | 25 | RAMMELSBERGITE SYN    | 11-0014  |
| 36.22              | 30.19 | 31.61 | 14.19 | 19.91 | 20.75  | 70                 | 100 | 100 | 60 | 60 | 60 | SPODUMENE (ALPHA) SYN | 9-0029   |
| 36.22              | 32.56 | 58.82 | 60.08 | 28.99 | 18.03  | 100                | 63  | 50  | 50 | 31 | 20 | HAUSMANNITE           | 1-1127   |
| 36.29              | 43.23 | 38.99 | 54.34 | 70.06 | 82.10  | 53                 | 100 | 40  | 28 | 25 | 23 | ZINC                  | 4-0831   |
| 36.30              | 31.33 | 62.17 | 52.27 | 85.47 | 65.29  | 50                 | 100 | 32  | 31 | 10 | 9  | LEAD SYN              | 4-0686   |
| 36.34              | 14.14 | 27.08 | 46.78 | 52.88 | 92.08  | 80                 | 100 | 90  | 70 | 40 | 40 | LEPIDOCROCITE         | 8-0098   |
| 36.34              | 30.06 | 31.94 | 39.12 | 49.78 | 38.40  | 60                 | 100 | 90  | 60 | 60 | 50 | PEARCEITE             | 8-0130   |
| 36.34              | 30.38 | 53.54 | 18.78 | 23.76 | 41.18  | 70                 | 100 | 80  | 60 | 60 | 60 | FERBERITE             | 10-0449  |
| 36.37              | 30.83 | 58.41 | 64.23 | 44.18 | 54.98  | 100                | 60  | 60  | 60 | 30 | 10 | GALAXITE              | 12-0431  |
| 36.45              | 42.33 | 61.40 | 73.60 | 29.58 | 77.40  | 100                | 37  | 27  | 17 | 9  | 4  | CUPRITE SYN           | 5-0667   |
| 36.50              | 26.04 | 47.82 | 39.48 | 26.82 | 48.92  | 70                 | 100 | 80  | 70 | 60 | 60 | BRANNERITE            | 8-0002   |
| 36.50              | 32.90 | 50.66 | 86.80 | 37.76 | 92.87  | 90                 | 100 | 100 | 90 | 80 | 80 | COBALTITE             | 16-0624  |
| 36.51              | 32.31 | 35.70 | 52.24 | 17.29 | 22.87  | 60                 | 100 | 60  | 50 | 40 | 40 | CHRYSLITE (OLIVINE)   | 7-0156   |
| 36.53              | 12.54 | 25.23 | 34.09 | 61.08 | 19.55  | 80                 | 100 | 100 | 70 | 70 | 60 | CHAMOSITE FE(III)     | 7-0329   |
| 36.53              | 32.32 | 35.71 | 22.90 | 17.39 | 36.69  | 80                 | 100 | 100 | 60 | 50 | 40 | FORSTERITE (OLIVINE)  | 7-0079   |
| 36.56              | 22.90 | 35.74 | 32.34 | 17.39 | 39.72  | 100                | 70  | 70  | 60 | 50 | 40 | FORSTERITE (OLIVINE)  | 7-0074   |
| 36.56              | 35.73 | 22.92 | 52.34 | 39.74 | 32.34  | 100                | 73  | 69  | 60 | 59 | 53 | FORSTERITE SYN        | 4-0768   |
| 36.64              | 17.48 | 9.93  | 32.78 | 45.30 | 47.56  | 70                 | 100 | 70  | 50 | 35 | 20 | ZARATITE              | 16-0164  |
| 36.68              | 59.15 | 65.04 | 31.16 | 44.64 | 18.88  | 100                | 90  | 90  | 70 | 70 | 50 | HERCYNITE             | 7-0068   |
| 36.80              | 31.24 | 65.19 | 59.44 | 55.74 | 77.25  | 100                | 90  | 50  | 40 | 30 | 30 | GAHNITE (FE)          | 12-0267  |
| 36.80              | 34.38 | 37.72 | 34.70 | 36.56 | 28.96  | 80                 | 100 | 75  | 70 | 70 | 60 | ACANTHITE             | 14-0072  |
| 36.80              | 45.30 | 25.72 | 52.88 |       |        | 100                | 85  | 70  | 50 | 70 | 60 | ARGENTITE             | 4-0774   |
| 36.84              | 21.10 | 33.31 | 53.29 | 41.42 | 59.10  | 70                 | 100 | 80  | 50 | 40 | 30 | GOETHITE              | 8-0097   |
| 36.84              | 21.26 | 33.31 | 53.26 | 17.85 | 26.53  | 80                 | 100 | 70  | 70 | 60 | 60 | GOETHITE              | 3-0249   |
| 36.84              | 65.24 | 31.16 | 44.64 | 59.23 | 55.71  | 100                | 100 | 80  | 80 | 80 | 60 | SPINEL SYN            | 2-0175   |
| 36.87              | 31.26 | 65.29 | 59.40 | 55.71 | 94.13  | 100                | 84  | 43  | 40 | 24 | 12 | GAHNITE SYN           | 5-0669   |
| 36.87              | 39.96 | 62.83 | 52.63 | 24.45 | 33.29  | 70                 | 100 | 70  | 65 | 50 | 50 | HUMITE                | 12-0755  |
| 36.90              | 44.85 | 65.29 | 59.44 | 31.30 | 138.27 | 100                | 58  | 58  | 45 | 40 | 20 | SPINEL SYN            | 5-0672   |
| 36.96              | 33.54 | 31.36 | 40.60 | 59.60 | 64.68  | 95                 | 100 | 35  | 30 | 30 | 30 | CREDNERITE            | 14-0623  |
| 36.99              | 33.69 | 50.12 | 56.30 | 69.76 | 24.39  | 100                | 90  | 80  | 40 | 40 | 30 | ARSENOPYRITE          | 11-0154  |

| TWO-THETA (COPPER) |       |        |       |        |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME         | FILE NO. |
|--------------------|-------|--------|-------|--------|--------|--------------------|-----|-----|-----|----|----|----------------------|----------|
| 37.10              | 56.34 | 33.07  | 40.79 | 47.45  | 28.54  | 66                 | 100 | 84  | 52  | 40 | 36 | PYRITE SYN           |          |
| 37.12              | 31.36 | 33.80  | 48.10 | 27.60  | 28.58  | 50                 | 100 | 50  | 50  | 40 | 20 | PYROSTILPnite        | 6-0710   |
| 37.12              | 39.30 | 68.42  | 34.32 | 51.58  | 61.34  | 40                 | 100 | 40  | 30  | 30 | 30 | DYSCRASITE           | 8-0129   |
| 37.15              | 29.09 | 20.04  | 35.05 | 9.31   | 62.31  | 72                 | 100 | 86  | 57  | 46 | 40 | PYROPHYLLITE         | 10-0452  |
| 37.15              | 31.61 | 30.62  | 58.82 | 20.80  | 28.80  | 90                 | 100 | 80  | 40  | 30 | 30 | JADEITE              | 3-0574   |
| 37.28              | 41.18 | 25.58  | 12.70 | 37.92  | 31.02  | 100                | 85  | 60  | 55  | 50 | 40 | PSILOMELANE          | 9-0463   |
| 37.31              | 26.21 | 54.63  | 34.09 | 51.64  | 35.48  | 70                 | 100 | 70  | 60  | 50 | 40 | MANGANITE SYN        | 14-0627  |
| 37.31              | 28.42 | 56.45  | 42.44 | 59.23  | 72.10  | 50                 | 100 | 50  | 25  | 25 | 20 | PYROLUSITE           | 8-0016   |
| 37.46              | 37.50 | 46.02  | 48.44 | 23.86  | 24.79  | 100                | 100 | 100 | 100 | 75 | 75 | CHALCOCITE SYN       | 12-0716  |
| 37.47              | 12.83 | 28.52  | 18.10 | 42.23  | 60.08  | 100                | 100 | 90  | 70  | 40 | 30 | CRYPTOMELANE         | 12-0227  |
| 37.47              | 28.70 | 49.54  | 60.08 | 69.65  | 17.79  | 100                | 60  | 60  | 60  | 60 | 20 | CRYPTOMELANE         | 12-0706  |
| 37.47              | 48.69 | 46.10  | 54.11 | 26.29  | 74.20  | 70                 | 100 | 60  | 60  | 60 | 20 | CRYPTOMELANE         |          |
| 37.49              | 28.70 | 55.56  | 56.95 | 18.33  | 50.12  | 100                | 80  | 80  | 40  | 30 | 30 | CHALCOCITE ALPHA LOW | 6-0547   |
| 37.50              | 37.46 | 46.02  | 48.44 | 23.86  | 24.79  | 100                | 100 | 100 | 100 | 75 | 75 | CRYPTOMELANE         | 9-0328   |
| 37.54              | 30.83 | 56.26  | 33.47 | 48.72  | 34.59  | 100                | 100 | 100 | 100 | 75 | 75 | CHALCOCITE SYN       | 4-0778   |
| 37.60              | 27.16 | 39.66  | 48.64 | 64.68  | 62.26  | 40                 | 100 | 41  | 23  | 16 | 13 | EPIDOTE              | 12-0227  |
| 37.63              | 66.82 | 45.83  | 60.51 | 31.85  | 56.83  | 100                | 100 | 70  | 70  | 60 | 55 | EPIDOTE              | 9-0438   |
| 37.72              | 34.38 | 36.80  | 34.70 | 36.56  | 28.96  | 75                 | 100 | 80  | 70  | 70 | 60 | BISMUTH              | 5-0519   |
| 37.76              | 27.68 | 41.18  | 17.44 | 50.36  | 62.26  | 25                 | 100 | 25  | 8   | 8  | 8  | SPINEL (LI)          | 3-0911   |
| 37.82              | 12.43 | 25.01  | 60.42 | 34.08  | 45.32  | 90                 | 100 | 80  | 55  | 40 | 40 | ACANTHITE            | 14-0072  |
| 37.82              | 25.37 | 48.12  | 53.97 | 55.16  | 62.78  | 22                 | 100 | 33  | 21  | 19 | 13 | TELLUROBISMUTHITE    | 15-0863  |
| 37.85              | 12.48 | 25.08  | 60.34 | 34.02  | 34.83  | 80                 | 100 | 100 | 65  | 55 | 40 | SERPENTINE (AL)      | 12-0583  |
| 37.93              | 29.66 | 33.27  | 25.02 | 37.47  | 61.17  | 80                 | 100 | 100 | 60  | 60 | 60 | ANATASE SYN          | 4-0477   |
| 37.94              | 15.08 | 46.52  | 26.02 | 29.36  | 25.50  | 80                 | 100 | 100 | 60  | 60 | 60 | SERPENTINE           | 11-0388  |
| 38.05              | 18.60 | 50.90  | 58.69 | 62.13  | 68.32  | 50                 | 100 | 45  | 35  | 30 | 20 | STAUROLITE           | 15-0397  |
| 38.10              | 34.70 | 34.88  | 48.89 | 37.54  | 49.06  | 100                | 90  | 56  | 36  | 18 | 16 | LEONITE SYN          | 17-0134  |
| 38.13              | 19.91 | 30.19  | 39.17 | 58.37  | 34.22  | 90                 | 100 | 95  | 50  | 40 | 40 | BRUCITE SYN          | 7-0239   |
| 38.15              | 44.31 | 77.55  | 64.48 | 110.54 | 135.14 | 30                 | 100 | 30  | 30  | 30 | 20 | SAFFLORITE           | 11-0140  |
| 38.22              | 44.43 | 77.62  | 64.63 | 110.90 | 135.47 | 100                | 40  | 26  | 25  | 15 | 13 | CHLORITOID           | 6-0158   |
| 38.26              | 27.60 | 40.22  | 23.02 | 49.78  | 62.72  | 100                | 52  | 36  | 32  | 23 | 23 | SILVER               | 4-0783   |
| 38.44              | 44.14 | 45.30  | 24.36 | 45.54  | 50.96  | 37                 | 100 | 31  | 20  | 20 | 13 | GOLD                 | 4-0784   |
| 38.60              | 34.32 | 34.46  | 35.44 | 45.54  | 50.96  | 80                 | 100 | 100 | 60  | 60 | 60 | TELLURIUM            | 4-0554   |
| 38.60              | 69.58 | 121.34 | 55.54 | 94.93  | 82.46  | 65                 | 100 | 60  | 60  | 35 | 30 | BETA DOMEYKITE SYN   |          |
| 38.61              | 62.64 | 20.46  | 35.15 | 36.16  | 19.91  | 100                | 38  | 29  | 21  | 19 | 13 | LOELLINGITE SYN      | 2-1251   |
| 38.71              | 12.38 | 24.87  | 21.55 | 23.42  | 35.77  | 95                 | 100 | 85  | 85  | 85 | 75 | TANTALUM             | 11-0699  |
| 38.78              | 21.86 | 35.16  | 19.10 | 43.90  | 56.78  | 90                 | 100 | 70  | 60  | 60 | 50 | KAOLINITE            | 4-0788   |
| 38.78              | 24.88 | 12.37  | 21.58 | 35.88  | 19.95  | 65                 | 100 | 60  | 50  | 13 | 11 | DICKITE              | 12-0447  |
| 38.78              | 35.60 | 35.44  | 38.96 | 48.64  | 61.80  | 90                 | 100 | 90  | 80  | 80 | 70 | DICKITE              | 11-0055  |
| 38.87              | 22.28 | 42.42  | 43.57 | 56.34  | 35.08  | 96                 | 100 | 49  | 30  | 25 | 20 | TENORITE             | 10-0430  |
| 38.96              | 12.80 | 34.20  | 58.34 | 34.60  | 25.80  | 56                 | 100 | 52  | 49  | 43 | 30 | DIASPORE             | 5-0661   |
| 38.96              | 29.46 | 47.84  | 31.82 | 35.44  | 41.98  | 80                 | 100 | 80  | 80  | 70 | 60 | GERHARDTITE          | 5-0355   |
| 38.96              | 31.14 | 40.04  | 26.99 | 42.20  | 67.30  | 25                 | 100 | 16  | 16  | 10 | 10 | GERHARDTITE          | 14-0687  |
| 38.97              | 29.48 | 47.93  | 31.85 | 35.48  | 42.54  | 100                | 80  | 70  | 60  | 60 | 40 | SODA-NITER SYN       | 7-0271   |
| 38.99              | 43.23 | 36.29  | 54.34 | 70.06  | 82.10  | 24                 | 100 | 16  | 9   | 9  | 9  | HESSITE              | 12-0695  |
| 39.12              | 23.70 | 22.32  | 46.28 | 25.36  | 42.60  | 40                 | 100 | 53  | 28  | 25 | 23 | NITER (NA) SYN       | 7-0271   |
|                    |       |        |       |        |        | 85                 | 100 | 60  | 50  | 40 | 30 | ZINC                 | 4-0831   |



| TWO-THETA (COPPER) |       |       |       |        |        | RELATIVE INTENSITY |     |     |    |    |            | MINERAL NAME         | FILE NO. |
|--------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|----|----|------------|----------------------|----------|
| 39.29              | 29.88 | 30.94 | 47.19 | 17.88  | 61.72  | 80                 | 100 | 100 | 70 | 55 | 35         | ALUNITE              | 14-0136  |
| 39.30              | 28.96 | 28.68 | 45.78 | 50.06  | 17.40  | 50                 | 100 | 60  | 50 | 50 | 40         | JAROSITE             | 10-0443  |
| 39.30              | 37.12 | 68.42 | 34.32 | 51.58  | 61.34  | 100                | 40  | 40  | 30 | 30 | 30         | DYSCRASITE           | 10-0452  |
| 39.32              | 11.95 | 26.74 | 33.02 | 10.64  | 13.06  | 60                 | 100 | 50  | 40 | 30 | 30         | FERRIMOLYBDITE       | 15-0290  |
| 39.32              | 28.68 | 55.66 | 72.66 | 79.07  | 42.82  | 40                 | 100 | 40  | 40 | 40 | 30         | TETRADYMITTE         | 9-0447   |
| 39.43              | 29.43 | 43.18 | 47.53 | 48.55  | 36.00  | 18                 | 100 | 18  | 17 | 17 | 14         | CALCITE SYN          | 5-0586   |
| 39.48              | 14.38 | 49.76 | 32.64 | 58.34  | 60.02  | 45                 | 100 | 25  | 16 | 12 | 12         | MOLYBDENITE (2H) SYN | 6-0097   |
| 39.48              | 15.12 | 29.44 | 24.78 | 26.92  | 46.52  | 45                 | 100 | 95  | 40 | 35 | 30         | BEAVERITE            | 17-0476  |
| 39.48              | 27.58 | 64.68 | 72.02 | 48.92  | 92.08  | 80                 | 100 | 50  | 40 | 30 | 20         | ALTAITE              | 8-0028   |
| 39.48              | 50.66 | 29.64 | 66.22 | 31.70  | 33.66  | 70                 | 100 | 50  | 30 | 20 | 20         | CORVUSITE            | 15-0247  |
| 39.52              | 26.21 | 33.96 | 53.66 | 56.23  | 85.19  | 50                 | 100 | 65  | 40 | 40 | 40         | MANGANITE            | 8-0099   |
| 39.66              | 27.16 | 37.60 | 48.64 | 64.68  | 62.26  | 41                 | 100 | 40  | 23 | 16 | 13         | BISMUTH              | 5-0519   |
| 39.67              | 8.70  | 26.31 | 34.24 | 44.59  | 26.14  | 60                 | 100 | 100 | 55 | 50 | 40         | PHLOGOPITE (3T SYN)  | 10-0481  |
| 39.67              | 40.04 | 52.69 | 34.43 | 29.71  | 33.54  | 100                | 100 | 95  | 55 | 45 | 45         | CHONDROTITE          | 14-0010  |
| 39.80              | 46.27 | 81.33 | 67.53 | 148.49 | 117.86 | 100                | 53  | 33  | 31 | 29 | 22         | PLATINUM             | 4-0802   |
| 39.94              | 52.56 | 32.34 | 35.37 | 35.74  | 24.08  | 100                | 80  | 60  | 60 | 60 | 45         | CLINOHUMITE SYN      | 14-0009  |
| 39.96              | 36.87 | 62.83 | 52.63 | 24.45  | 33.29  | 100                | 70  | 70  | 65 | 50 | 50         | HUMITE               | 12-0755  |
| 40.04              | 29.26 | 42.20 | 45.54 | 29.96  | 50.66  | 30                 | 100 | 50  | 30 | 20 | 20         | SYLVANITE            | 9-0477   |
| 40.04              | 38.96 | 31.14 | 26.99 | 42.20  | 67.30  | 70                 | 100 | 80  | 60 | 60 | 40         | HESSITE              | 12-0695  |
| 40.04              | 39.67 | 52.69 | 34.43 | 29.71  | 33.54  | 100                | 100 | 95  | 55 | 45 | 45         | CHONDROTITE          | 14-0010  |
| 40.08              | 14.32 | 32.16 | 40.22 | 37.28  | 47.84  | 30                 | 100 | 65  | 25 | 16 | 16         | WEDDELLITE           | 17-0541  |
| 40.22              | 27.60 | 38.26 | 23.02 | 49.78  | 62.72  | 31                 | 100 | 37  | 20 | 20 | 13         | TELLURIUM            | 4-0554   |
| 40.22              | 30.38 | 53.54 | 62.72 | 15.00  | 19.28  | 80                 | 100 | 90  | 70 | 60 | 40         | UVANITE              | 8-0322   |
| 40.22              | 32.04 | 8.10  | 29.46 | 16.02  | 48.92  | 25                 | 100 | 85  | 14 | 10 | 8          | PLUMBOJAROSITE       | 15-0648  |
| 40.22              | 46.66 | 68.08 | 82.09 | 119.34 | 124.66 | 100                | 42  | 25  | 24 | 13 | 11         | PALLADIUM            | 5-0681   |
| 40.40              | 82.34 | 47.04 | 68.42 | 86.90  | 100    | 70                 | 50  | 40  | 20 |    | IRIDOSMINE | 17-0213              |          |
| 40.42              | 28.68 | 68.25 | 65.90 | 41.94  | 75.30  | 70                 | 100 | 67  | 63 | 56 | 40         | ANTIMONY             | 5-0562   |
| 40.42              | 32.66 | 63.68 | 68.42 | 110.04 | 127.18 | 80                 | 100 | 60  | 60 | 60 | 60         | MERCURY              | 9-0253   |
| 40.56              | 25.33 | 17.22 | 24.22 | 35.77  | 39.40  | 70                 | 100 | 55  | 50 | 35 | 35         | AZURITE              | 11-0682  |
| 40.56              | 28.37 | 50.24 | 66.45 | 73.80  | 58.69  | 59                 | 100 | 23  | 20 | 13 | 8          | SYLVITE              | 4-0587   |
| 40.60              | 34.88 | 58.74 | 70.16 | 102.16 | 115.66 | 100                | 60  | 60  | 20 | 18 | 16         | MANGANOSITE SYN      | 7-0230   |
| 40.83              | 26.45 | 46.65 | 34.36 | 63.74  | 65.87  | 70                 | 100 | 90  | 50 | 50 | 50         | HELVITE              | 15-0253  |
| 40.91              | 26.25 | 25.99 | 16.45 | 35.31  | 33.26  | 60                 | 100 | 95  | 50 | 50 | 40         | MULLITE              | 15-0776  |
| 40.98              | 28.50 | 28.68 | 37.44 | 41.58  | 41.98  | 100                | 90  | 90  | 90 | 90 | 90         | HOLLANDITE           | 4-0813   |
| 41.02              | 8.04  | 27.02 | 66.82 | 79.94  | 60     | 100                | 80  | 40  | 20 |    | ALLOPHANE  | 2-0039               |          |
| 41.02              | 26.53 | 26.13 | 35.48 | 61.13  | 33.56  | 100                | 100 | 90  | 90 | 90 | 80         | SILLIMANITE          | 10-0369  |
| 41.04              | 30.84 | 50.36 | 50.96 | 24.05  | 33.37  | 6                  | 100 | 6   | 6  | 3  | 3          | DOLOMITE (FERROAN)   | 12-0088  |
| 41.16              | 34.60 | 49.68 | 57.26 | 54.81  | 107.82 | 35                 | 100 | 35  | 30 | 20 | 20         | SKUTTERUDITE SYN     | 10-0328  |
| 41.18              | 26.58 | 47.04 | 86.90 | 95.56  | 24.16  | 50                 | 100 | 70  | 50 | 50 | 40         | DANALITE             | 11-0491  |
| 41.18              | 27.68 | 37.76 | 17.44 | 50.36  | 62.26  | 25                 | 100 | 25  | 8  | 8  | 8          | TELLUROBISMUTHITE    | 15-0863  |
| 41.18              | 30.99 | 51.14 | 51.30 | 50.60  | 44.99  | 30                 | 100 | 30  | 30 | 20 | 15         | DOLOMITE             | 11-0078  |
| 41.18              | 37.28 | 25.58 | 12.70 | 37.92  | 31.02  | 85                 | 100 | 60  | 55 | 50 | 40         | PSILOMELANE          | 14-0627  |
| 41.18              | 42.82 | 46.02 | 42.40 | 49.78  | 51.90  | 100                | 70  | 70  | 50 | 35 | 35         | SCHREIBERSITE        | 16-0707  |
| 41.24              | 28.67 | 31.33 | 23.64 | 48.55  | 55.93  | 60                 | 100 | 65  | 45 | 40 | 40         | DATOLITE             | 11-0070  |
| 41.38              | 28.30 | 28.58 | 37.28 | 41.78  | 59.60  | 70                 | 100 | 100 | 60 | 60 | 60         | HOLLANDITE           | 12-0514  |

| TWO-THETA (COPPER) |       |        |        |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|--------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 41.82              | 27.36 | 20.90  | 50.72  | 21.95  | 23.16  | 25                 | 100 | 40  | 25 | 13 | 13 | MICROCLINE               | 12-0703  |
| 42.02              | 15.30 | 30.83  | 9.63   | 13.75  | 26.94  | 50                 | 100 | 90  | 40 | 40 | 30 | HYDROMAGNESITE           | 8-0179   |
| 42.02              | 23.92 | 24.18  | 34.12  | 34.63  | 44.89  | 28                 | 100 | 53  | 24 | 23 | 21 | WITHERITE SYN            | 5-0378   |
| 42.18              | 30.26 | 56.78  | 47.04  | 52.22  | 23.90  | 100                | 100 | 100 | 80 | 80 | 70 | BISMUTHITE               | 4-0666   |
| 42.18              | 31.48 | 52.22  | 54.58  | 24.56  | 26.66  | 80                 | 100 | 80  | 80 | 70 | 70 | BEYERITE                 | 4-0693   |
| 42.20              | 29.26 | 40.04  | 45.54  | 29.96  | 50.66  | 50                 | 100 | 30  | 30 | 20 | 20 | SYLVANITE                | 9-0477   |
| 42.23              | 32.93 | 55.49  | 94.13  | 38.30  | 65.76  | 50                 | 100 | 70  | 50 | 40 | 40 | BRAUNITE                 | 8-0078   |
| 42.33              | 36.45 | 61.40  | 73.60  | 29.58  | 77.40  | 37                 | 100 | 27  | 17 | 9  | 4  | CUPRITE SYN              | 5-0667   |
| 42.42              | 22.28 | 38.87  | 43.57  | 56.34  | 35.08  | 52                 | 100 | 56  | 49 | 43 | 30 | DIASPORE                 | 5-0355   |
| 42.42              | 28.89 | 34.59  | 20.85  | 23.66  | 29.58  | 25                 | 100 | 30  | 15 | 12 | 12 | KALIOPHILITE             | 11-0313  |
| 42.60              | 32.28 | 44.60  | 36.80  | 38.78  | 12.10  | 80                 | 100 | 70  | 60 | 60 | 50 | PETZITE                  | 12-0424  |
| 42.65              | 25.88 | 28.79  | 42.99  | 26.88  | 22.80  | 80                 | 100 | 97  | 76 | 67 | 57 | BARITE SYN               | 5-0448   |
| 42.73              | 34.50 | 12.16  | 21.88  | 18.14  | 33.04  | 80                 | 200 | 100 | 70 | 60 | 55 | DIOPHASE                 | 7-0172   |
| 42.82              | 10.44 | 24.64  | 20.98  | 16.50  | 34.32  | 70                 | 100 | 85  | 65 | 45 | 35 | META-AUTUNITE I          | 12-0423  |
| 42.82              | 41.18 | 46.02  | 42.40  | 49.78  | 51.90  | 70                 | 100 | 70  | 50 | 35 | 35 | SCHREIBERSITE            | 16-0707  |
| 42.94              | 62.36 | 109.84 | 127.38 | 78.69  | 36.98  | 100                | 52  | 17  | 15 | 12 | 10 | PERICLASE                | 4-0829   |
| 43.03              | 32.66 | 53.93  | 35.88  | 46.85  | 70.36  | 43                 | 100 | 34  | 17 | 12 | 8  | MAGNESITE SYN            | 8-0479   |
| 43.09              | 30.10 | 25.98  | 51.02  | 71.03  | 53.46  | 57                 | 100 | 84  | 35 | 17 | 16 | GALENA SYN               | 5-0592   |
| 43.18              | 29.43 | 39.43  | 47.53  | 48.55  | 36.00  | 18                 | 100 | 18  | 17 | 17 | 14 | CALCITE SYN              | 5-0586   |
| 43.23              | 36.29 | 38.99  | 54.34  | 70.06  | 82.10  | 100                | 53  | 40  | 28 | 25 | 23 | ZINC                     | 4-0831   |
| 43.24              | 24.78 | 45.06  | 27.50  | 50.66  | 35.16  | 100                | 70  | 70  | 60 | 50 | 30 | WEISSITE                 | 10-0421  |
| 43.24              | 29.26 | 29.74  | 59.18  | 60.02  | 47.84  | 100                | 100 | 100 | 90 | 90 | 80 | MIMETITE                 | 13-0056  |
| 43.24              | 29.84 | 30.70  | 43.90  | 41.18  | 61.80  | 90                 | 100 | 70  | 60 | 50 | 50 | CALAVERITE               | 7-0344   |
| 43.24              | 31.36 | 30.06  | 21.66  | 36.50  | 24.10  | 90                 | 100 | 90  | 60 | 60 | 50 | APHTHALITE               | 6-0429   |
| 43.27              | 27.53 | 56.87  | 22.17  | 35.01  | 39.80  | 90                 | 100 | 80  | 50 | 50 | 45 | CHRYSOBERYL              | 11-0448  |
| 43.29              | 29.98 | 33.56  | 53.26  | 70.85  | 47.35  | 100                | 90  | 90  | 90 | 80 | 60 | TROILITE (PYRRHO.) SYN   | 4-0832   |
| 43.29              | 33.69 | 53.29  | 29.98  | 70.79  | 87.09  | 100                | 60  | 50  | 40 | 40 | 40 | TROILITE                 | 11-0151  |
| 43.29              | 35.48 | 62.78  | 57.22  | 30.09  | 37.31  | 50                 | 100 | 60  | 40 | 30 | 25 | SPINEL (MN,NI)           | 1-1110   |
| 43.33              | 50.48 | 74.20  | 90.02  | 136.50 | 145.14 | 100                | 46  | 20  | 17 | 9  | 8  | COPPER                   | 4-0836   |
| 43.36              | 56.95 | 27.60  | 57.10  | 43.55  | 22.17  | 100                | 90  | 85  | 75 | 60 | 50 | CHRYSOBERYL SYN          | 10-0082  |
| 43.40              | 35.16 | 57.57  | 25.60  | 68.26  | 52.60  | 100                | 90  | 80  | 75 | 50 | 45 | CORUNDUM (ALPHA ALUMINA) | 10-0173  |
| 43.44              | 35.74 | 18.43  | 63.11  | 57.49  | 30.35  | 55                 | 100 | 65  | 55 | 40 | 13 | PICROCHROMITE SYN        | 10-0351  |
| 43.46              | 44.82 | 64.18  | 64.68  | 24.50  | 70.78  | 100                | 100 | 50  | 50 | 40 | 40 | BETA DOMEYKITE           | 14-0454  |
| 43.51              | 24.52 | 14.06  | 37.96  | 35.05  | 59.23  | 33                 | 100 | 17  | 17 | 13 | 10 | SODALITE                 | 3-0338   |
| 43.68              | 26.58 | 35.16  | 45.54  | 83.20  | 31.82  | 100                | 60  | 40  | 40 | 30 | 20 | RICKARDITE               | 6-0661   |
| 43.68              | 30.16 | 29.86  | 30.80  | 21.14  | 27.16  | 70                 | 100 | 80  | 60 | 40 | 35 | PYROMORPHITE             | 12-0704  |
| 43.68              | 34.32 | 26.74  | 25.72  | 45.54  | 29.06  | 80                 | 100 | 80  | 70 | 70 | 60 | STROMEYERITE             | 9-0499   |
| 43.73              | 25.67 | 28.99  | 32.80  | 47.61  | 68.49  | 100                | 100 | 100 | 80 | 80 | 80 | SCAPOLITE                | 2-0405   |
| 43.74              | 26.68 | 51.77  | 30.52  | 70.03  | 54.26  | 55                 | 100 | 45  | 35 | 12 | 10 | METACINNABAR             | 6-0261   |
| 43.90              | 29.36 | 32.90  | 76.95  | 51.81  | 42.10  | 100                | 70  | 50  | 50 | 45 | 40 | BORACITE                 | 5-0710   |
| 43.95              | 30.09 | 33.82  | 53.59  | 71.47  | 87.98  | 100                | 33  | 33  | 33 | 13 | 13 | TROILITE (PYRRHO.) SYN   | 1-1247   |
| 43.95              | 30.09 | 33.82  | 53.59  | 71.47  | 87.98  | 100                | 33  | 33  | 33 | 13 | 13 | PYRRHOTITE SYN           | 1-1247   |
| 43.95              | 75.37 | 91.63  | 140.92 | 119.59 |        | 100                | 27  | 16  | 15 | 7  |    | DIAMOND                  | 6-0675   |
| 44.11              | 25.19 | 25.82  | 36.56  | 47.74  | 36.21  | 50                 | 100 | 70  | 40 | 35 | 34 | STRONTIANITE SYN         | 5-0418   |
| 44.14              | 31.24 | 46.02  | 56.78  | 72.02  | 65.70  | 40                 | 100 | 40  | 20 | 20 | 20 | BREITHAUPTE              | 2-0783   |



| TWO-THETA (COPPER) |       |       |        |        |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME         | FILE NO. |
|--------------------|-------|-------|--------|--------|--------|--------------------|-----|-----|-----|----|----|----------------------|----------|
| 44.14              | 45.30 | 38.44 | 24.36  | 45.54  | 50.96  | 100                | 100 | 80  | 60  | 60 | 60 | BETA DOMEYKITE SYN   | 2-1251   |
| 44.14              | 48.10 | 46.02 | 72.02  | 22.48  | 29.26  | 100                | 70  | 50  | 50  | 40 | 40 | DOMEYKITE            | 9-0333   |
| 44.31              | 38.15 | 77.55 | 64.48  | 110.54 | 135.14 | 40                 | 100 | 26  | 25  | 15 | 13 | SILVER               | 4-0783   |
| 44.36              | 30.92 | 54.92 | 73.32  | 81.50  | 26.74  | 55                 | 100 | 16  | 14  | 10 | 8  | BROMYRITE            | 6-0438   |
| 44.41              | 26.61 | 54.81 | 83.83  | 77.62  | 102.14 | 50                 | 100 | 80  | 40  | 30 | 30 | GRAPHITE             | 13-0148  |
| 44.43              | 38.22 | 77.62 | 64.63  | 110.90 | 135.47 | 52                 | 100 | 36  | 32  | 23 | 23 | GOLD                 | 4-0784   |
| 44.60              | 32.28 | 42.60 | 36.80  | 38.78  | 12.10  | 70                 | 100 | 80  | 60  | 60 | 50 | PEIZITE              | 12-0424  |
| 44.71              | 82.43 | 65.09 | 116.62 | 99.11  | 137.19 | 100                | 30  | 19  | 12  | 9  | 6  | IRON (ALPHA)         | 6-0696   |
| 44.82              | 27.42 | 55.30 | 32.78  | 29.66  | 51.28  | 35                 | 100 | 35  | 30  | 20 | 20 | STOLZITE SYN         | 8-0476   |
| 44.82              | 27.50 | 55.30 | 32.90  | 51.28  | 56.78  | 80                 | 100 | 90  | 60  | 60 | 60 | STOLZITE             | 8-0108   |
| 44.82              | 43.46 | 64.18 | 64.68  | 24.50  | 70.78  | 100                | 100 | 50  | 50  | 40 | 40 | BETA DOMEYKITE       | 14-0454  |
| 44.85              | 36.90 | 65.29 | 59.44  | 31.30  | 138.27 | 58                 | 100 | 58  | 45  | 40 | 20 | SPINEL SYN           | 5-0672   |
| 44.90              | 30.64 | 32.01 | 43.78  | 62.54  | 79.47  | 74                 | 100 | 90  | 34  | 23 | 20 | TIN (BETA)           | 4-0673   |
| 45.06              | 43.24 | 24.78 | 27.50  | 50.66  | 35.16  | 70                 | 100 | 70  | 60  | 50 | 30 | WEISSITE             | 10-0421  |
| 45.13              | 8.73  | 26.58 | 35.76  | 26.15  | 54.88  | 100                | 100 | 100 | 50  | 45 | 35 | PHLOGOPITE (3T)      | 10-0492  |
| 45.30              | 36.80 | 25.72 | 52.88  |        |        | 85                 | 100 | 70  | 50  |    |    | ARGENTITE            | 4-0774   |
| 45.30              | 44.14 | 38.44 | 24.36  | 45.54  | 50.96  | 100                | 100 | 80  | 60  | 60 | 60 | BETA DOMEYKITE SYN   | 2-1251   |
| 45.39              | 26.85 | 8.88  | 34.29  | 55.16  | 37.02  | 30                 | 100 | 70  | 20  | 20 | 18 | PHLOGOPITE SYN       | 16-0352  |
| 45.44              | 8.88  | 26.77 | 26.37  | 28.52  | 30.80  | 16                 | 100 | 65  | 10  | 10 | 8  | PHLOGOPITE SYN       | 16-0344  |
| 45.49              | 31.72 | 56.53 | 27.37  | 75.37  | 84.01  | 55                 | 100 | 15  | 13  | 11 | 7  | HALITE SYN           | 5-0628   |
| 45.54              | 31.94 | 75.36 | 56.78  | 84.10  | 27.50  | 60                 | 100 | 40  | 30  | 30 | 20 | EMBOLITE             | 14-0255  |
| 45.58              | 26.61 | 34.50 | 8.84   | 17.63  | 24.52  | 100                | 100 | 100 | 80  | 80 | 80 | HYDROMUSCOVITE       | 2-0462   |
| 45.61              | 34.81 | 8.84  | 17.74  | 19.73  | 24.59  | 80                 | 100 | 60  | 50  | 50 | 50 | LEPIDOLITE (2M2)     | 14-0011  |
| 45.78              | 26.94 | 34.63 | 8.90   | 17.81  | 28.24  | 100                | 100 | 100 | 80  | 80 | 80 | LEPIDOLITE (120)     | 15-0062  |
| 45.83              | 26.54 | 31.24 | 28.19  | 52.76  | 43.64  | 29                 | 100 | 94  | 28  | 27 | 26 | CINNABAR SYN         | 6-0256   |
| 45.83              | 27.10 | 9.02  | 28.94  | 26.69  | 30.94  | 55                 | 100 | 80  | 40  | 35 | 30 | ZINNWALDITE          | 13-0227  |
| 45.83              | 37.63 | 66.82 | 60.51  | 31.85  | 56.83  | 70                 | 100 | 100 | 60  | 50 | 40 | SPINEL (LI)          | 3-0911   |
| 45.90              | 26.24 | 27.25 | 33.18  | 37.93  | 36.21  | 65                 | 100 | 52  | 46  | 38 | 33 | ARAGONITE SYN        | 5-0453   |
| 46.02              | 27.76 | 32.06 | 54.22  | 85.00  | 41.58  | 100                | 40  | 40  | 30  | 20 | 10 | DIGENITE             | 9-0064   |
| 46.02              | 29.14 | 18.08 | 50.06  | 40.78  | 32.52  | 70                 | 100 | 70  | 70  | 60 | 50 | CARPHOSIDERITE       | 2-0597   |
| 46.02              | 31.24 | 44.14 | 56.78  | 72.02  | 65.70  | 40                 | 100 | 40  | 20  | 20 | 20 | BREITHAAPTITE        | 2-0783   |
| 46.02              | 37.46 | 37.50 | 48.44  | 23.86  | 24.79  | 100                | 100 | 100 | 100 | 75 | 75 | CHALCOCITE SYN       | 12-0227  |
| 46.02              | 41.18 | 42.82 | 42.40  | 49.78  | 51.90  | 70                 | 100 | 70  | 50  | 35 | 35 | SCHREIBERSITE        | 16-0707  |
| 46.02              | 44.14 | 48.10 | 72.02  | 22.48  | 29.26  | 50                 | 100 | 70  | 50  | 40 | 40 | DOMEYKITE            | 9-0333   |
| 46.02              | 54.58 | 32.06 | 27.68  | 85.00  | 109.70 | 100                | 90  | 80  | 70  | 70 | 70 | DIGENITE SYN         | 4-0861   |
| 46.10              | 48.69 | 37.47 | 54.11  | 26.29  | 74.20  | 80                 | 100 | 70  | 40  | 30 | 30 | CHALCOCITE ALPHA LOW | 9-0328   |
| 46.27              | 39.80 | 81.33 | 67.53  | 148.49 | 117.86 | 53                 | 100 | 33  | 31  | 29 | 22 | PLATINUM             | 4-0802   |
| 46.28              | 32.28 | 27.86 | 54.92  | 57.54  | 76.80  | 50                 | 100 | 50  | 16  | 16 | 12 | CERARGYRITE          | 6-0480   |
| 46.30              | 33.69 | 50.39 | 92.08  | 70.97  | 96.54  | 90                 | 100 | 80  | 40  | 30 | 30 | NICCOLITE            | 9-0001   |
| 46.52              | 15.08 | 37.94 | 26.02  | 29.36  | 25.50  | 45                 | 100 | 50  | 35  | 30 | 20 | LEONITE SYN          | 17-0134  |
| 46.54              | 23.77 | 29.32 | 71.52  | 62.54  | 78.00  | 70                 | 100 | 90  | 40  | 30 | 30 | COLORADOITE          | 8-0026   |
| 46.57              | 32.32 | 31.39 | 49.54  | 38.99  | 25.98  | 50                 | 100 | 90  | 50  | 30 | 20 | CHLORAPATITE         | 2-0851   |
| 46.65              | 26.45 | 40.83 | 34.36  | 63.74  | 65.87  | 90                 | 100 | 70  | 50  | 50 | 50 | HELVITE              | 15-0253  |
| 46.66              | 40.22 | 68.08 | 82.09  | 119.34 | 124.66 | 100                | 100 | 25  | 24  | 13 | 11 | PALLADIUM            | 5-0681   |
| 46.78              | 32.52 | 58.76 | 38.60  | 19.67  | 22.90  | 100                | 67  | 53  | 40  | 20 | 20 | CRYOLITE             | 1-1273   |

| TWO-THETA (COPPER) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME         | FILE NO. |
|--------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|----|----|----------------------|----------|
| 46.80              | 32.60 | 22.90 | 38.80 | 38.61 | 58.90 | 100                | 95  | 60  | 50  | 45 | 45 | CRYOLITE             | 12-0257  |
| 46.83              | 28.70 | 57.77 | 76.08 | 18.60 | 54.24 | 80                 | 100 | 90  | 80  | 70 | 70 | SCHHEELITE           | 8-0145   |
| 46.90              | 28.06 | 32.68 | 75.58 | 87.09 | 26.94 | 100                | 60  | 50  | 50  | 50 | 40 | BORNITE              | 14-0323  |
| 47.04              | 26.58 | 41.18 | 86.90 | 95.56 | 24.16 | 70                 | 100 | 50  | 50  | 50 | 40 | DANALITE             | 11-0491  |
| 47.04              | 28.22 | 32.64 | 55.66 | 76.08 | 78.30 | 49                 | 100 | 48  | 47  | 18 | 15 | URANINITE SYN        | 5-0550   |
| 47.04              | 40.40 | 82.34 | 68.42 | 86.90 |       | 50                 | 100 | 70  | 40  | 20 |    | IRIDOSMINE           | 17-0213  |
| 47.06              | 28.30 | 55.82 | 87.48 | 68.71 | 75.94 | 100                | 94  | 35  | 16  | 12 | 10 | FLUORITE SYN         | 4-0864   |
| 47.09              | 51.48 | 29.48 | 30.83 | 15.33 | 39.17 | 50                 | 100 | 80  | 40  | 30 | 30 | PENTLANDITE          | 8-0090   |
| 47.09              | 28.06 | 68.49 | 35.63 | 38.30 | 46.32 | 50                 | 100 | 75  | 40  | 40 | 40 | KYANITE              | 3-0513   |
| 47.11              | 28.80 | 18.64 | 58.08 | 34.36 | 54.14 | 30                 | 100 | 28  | 22  | 16 | 14 | POWELLITE            | 7-0212   |
| 47.29              | 28.61 | 56.00 | 33.05 | 56.60 | 76.52 | 70                 | 100 | 40  | 30  | 30 | 30 | STANNITE             | 11-0062  |
| 47.50              | 25.21 | 55.97 | 19.51 | 64.68 | 77.55 | 40                 | 100 | 25  | 20  | 16 | 14 | EUCRYPTITE (BETA)    | 13-0378  |
| 47.56              | 28.58 | 56.34 | 33.12 | 76.88 | 88.68 | 51                 | 100 | 30  | 10  | 9  | 9  | SPHALERITE SYN       | 5-0566   |
| 47.61              | 33.18 | 59.23 | 59.65 | 69.70 | 79.15 | 90                 | 100 | 70  | 70  | 60 | 50 | PEROVSKITE           | 8-0091   |
| 47.61              | 35.77 | 57.22 | 62.31 | 18.37 | 30.30 | 75                 | 100 | 75  | 75  | 50 | 50 | CHROMITE SYN         | 4-0759   |
| 47.63              | 33.18 | 59.10 | 59.48 | 32.93 | 33.31 | 100                | 100 | 100 | 100 | 80 | 80 | PEROVSKITE SYN       | 9-0365   |
| 47.77              | 28.61 | 56.60 | 27.36 | 30.51 | 88.68 | 50                 | 100 | 35  | 6   | 6  | 6  | WURTZITE             | 12-0688  |
| 47.82              | 26.04 | 36.50 | 39.48 | 26.82 | 48.92 | 80                 | 100 | 70  | 70  | 60 | 60 | BRANNERITE           | 8-0002   |
| 47.82              | 28.58 | 30.16 | 32.64 | 49.20 | 33.92 | 50                 | 100 | 90  | 40  | 30 | 20 | FERGUSONITE          | 9-0443   |
| 47.82              | 31.82 | 29.26 | 32.90 | 52.88 | 59.18 | 75                 | 100 | 65  | 55  | 35 | 35 | COVELLITE            | 6-0464   |
| 47.84              | 28.86 | 33.28 | 56.78 | 60.02 | 70.78 | 50                 | 100 | 50  | 40  | 20 | 20 | URANINITE            | 13-0225  |
| 47.84              | 29.46 | 38.96 | 31.82 | 35.44 | 41.98 | 16                 | 100 | 25  | 16  | 10 | 10 | SODA-NITER SYN       | 7-0271   |
| 47.84              | 29.66 | 28.76 | 29.96 | 31.94 | 27.94 | 45                 | 100 | 60  | 40  | 40 | 30 | TILLEYITE            | 13-0416  |
| 47.84              | 33.66 | 60.44 | 48.64 | 31.48 | 32.64 | 70                 | 100 | 70  | 60  | 50 | 50 | MERWINITE            | 4-0728   |
| 47.88              | 29.36 | 29.58 | 35.96 | 40.22 | 19.45 | 60                 | 100 | 50  | 50  | 50 | 40 | SCAWTITE             | 10-0400  |
| 47.93              | 29.48 | 38.97 | 31.85 | 35.48 | 42.54 | 16                 | 100 | 24  | 9   | 9  | 9  | NITER (NA) SYN       | 7-0271   |
| 48.10              | 44.14 | 46.02 | 72.02 | 22.48 | 29.26 | 70                 | 100 | 50  | 50  | 40 | 40 | DOMEYKITE            | 9-0333   |
| 48.12              | 25.37 | 37.82 | 53.97 | 55.16 | 62.78 | 33                 | 100 | 22  | 21  | 19 | 13 | ANATASE SYN          | 4-0477   |
| 48.36              | 25.54 | 22.68 | 48.61 | 19.25 | 28.18 | 60                 | 100 | 60  | 60  | 50 | 50 | SPODUMENE (BETA) SYN | 13-0251  |
| 48.36              | 32.28 | 25.28 | 44.14 | 59.18 | 51.60 | 26                 | 100 | 26  | 24  | 11 | 10 | ARSENIC              | 5-0632   |
| 48.42              | 29.09 | 57.73 | 90.77 | 78.15 | 56.30 | 90                 | 100 | 70  | 70  | 60 | 55 | CHALCOPYRITE (GAMMA) | 11-0570  |
| 48.58              | 29.18 | 90.87 | 57.61 | 78.65 | 98.19 | 97                 | 100 | 75  | 70  | 60 | 60 | CHALCOPYRITE (BETA)  | 11-0515  |
| 48.64              | 27.68 | 52.22 | 83.20 | 94.36 | 25.50 | 80                 | 100 | 70  | 50  | 50 | 40 | CUBANITE             | 9-0324   |
| 48.65              | 46.10 | 37.47 | 54.11 | 26.29 | 74.20 | 100                | 80  | 70  | 40  | 30 | 30 | CHALCOCITE ALPHA LOW | 9-0328   |
| 48.89              | 25.85 | 19.68 | 40.04 | 56.72 | 67.04 | 30                 | 100 | 20  | 15  | 15 | 12 | CORDIERITE MU SYN    | 14-0249  |
| 48.89              | 32.23 | 35.73 | 18.45 | 40.49 | 50.18 | 95                 | 100 | 65  | 60  | 55 | 45 | MILLERITE            | 12-0041  |
| 48.92              | 25.42 | 31.92 | 36.18 | 60.46 | 62.26 | 100                | 100 | 100 | 70  | 70 | 70 | PLATTNERITE          | 8-0185   |
| 48.92              | 29.54 | 34.32 | 58.34 | 79.86 | 82.34 | 70                 | 100 | 70  | 70  | 50 | 40 | STETEFELDITE         | 8-0012   |
| 48.97              | 31.16 | 32.32 | 56.83 | 25.82 | 28.06 | 50                 | 100 | 50  | 50  | 40 | 40 | CLINOZOISITE         | 16-0705  |
| 49.00              | 23.92 | 31.85 | 52.21 | 27.79 | 29.68 | 80                 | 100 | 90  | 50  | 40 | 40 | BOULANGERITE         | 9-0470   |
| 49.00              | 27.70 | 31.16 | 52.89 | 58.00 | 91.63 | 90                 | 100 | 80  | 60  | 50 | 50 | ENARGITE             | 10-0436  |
| 49.14              | 29.48 | 57.96 | 91.42 | 48.83 | 92.30 | 80                 | 100 | 60  | 60  | 40 | 30 | CHALCOPYRITE         | 9-0423   |
| 49.20              | 19.28 | 28.86 | 55.30 | 39.84 | 40.78 | 100                | 80  | 80  | 70  | 60 | 60 | CALEDONITE           | 8-0153   |
| 49.20              | 34.32 | 61.34 | 82.34 | 92.08 | 72.02 | 50                 | 100 | 20  | 20  | 16 | 8  | ALABANDITE           | 6-0518   |
| 49.25              | 26.05 | 58.82 | 65.71 | 67.20 | 20.04 | 90                 | 100 | 80  | 80  | 80 | 60 | QUARTZ (BETA)        | 7-0346   |



| TWO-THETA (COPPER) |       |       |       |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME         | FILE NO. |
|--------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|----|----|----|----------------------|----------|
| 49.25              | 30.30 | 50.42 | 40.26 | 99.51  | 40.26  | 80                 | 100 | 70  | 50 | 50 | 40 | CALCITE (MANGANOAN)  | 2-0714   |
| 49.48              | 34.32 | 61.80 | 82.50 | 92.51  | 29.60  | 50                 | 100 | 20  | 20 | 16 | 14 | ALABANDITE           | 6-0518   |
| 49.48              | 58.74 | 29.74 | 80.66 | 69.00  | 83.20  | 84                 | 100 | 68  | 68 | 63 | 63 | MICROLITE            | 3-1139   |
| 49.51              | 34.36 | 56.98 | 41.02 | 54.59  | 66.29  | 90                 | 100 | 90  | 80 | 70 | 70 | SKUTTERUDITE         | 10-0497  |
| 49.54              | 37.47 | 28.70 | 60.08 | 69.65  | 17.79  | 60                 | 100 | 60  | 60 | 60 | 20 | CRYPTOMELANE         | 6-0547   |
| 49.60              | 29.78 | 58.90 | 14.81 | 28.52  | 34.50  | 60                 | 100 | 50  | 25 | 20 | 20 | PYROCHLORE           | 13-0254  |
| 49.63              | 26.21 | 20.46 | 41.62 | 45.11  | 58.98  | 10                 | 100 | 20  | 4  | 4  | 4  | QUARTZ (BETA)        | 11-0252  |
| 49.65              | 32.21 | 31.26 | 46.25 | 26.29  | 10.63  | 20                 | 100 | 60  | 18 | 14 | 10 | CHLORAPATITE SYN     | 12-0263  |
| 49.68              | 34.60 | 41.16 | 57.26 | 54.81  | 107.82 | 35                 | 100 | 35  | 30 | 20 | 20 | SKUTTERUDITE SYN     | 10-0328  |
| 49.76              | 14.38 | 39.48 | 32.64 | 58.34  | 60.02  | 25                 | 100 | 45  | 16 | 12 | 12 | MOLYBDENITE (2H) SYN | 6-0097   |
| 49.80              | 29.78 | 59.10 | 34.36 | 93.78  | 24.12  | 60                 | 100 | 30  | 20 | 20 | 10 | TETRAHEDRITE         | 11-0107  |
| 50.12              | 36.99 | 33.69 | 56.30 | 69.76  | 24.39  | 80                 | 100 | 90  | 40 | 40 | 30 | ARSENOPYRITE         | 11-0154  |
| 50.21              | 26.66 | 20.85 | 36.56 | 39.49  | 68.20  | 17                 | 100 | 35  | 12 | 12 | 11 | QUARTZ (ALPHA)       | 5-0490   |
| 50.24              | 28.37 | 40.56 | 66.45 | 73.80  | 58.69  | 23                 | 100 | 59  | 20 | 13 | 8  | SYLVITE              | 4-0587   |
| 50.30              | 30.19 | 59.82 | 35.05 | 81.67  | 62.69  | 45                 | 100 | 40  | 20 | 20 | 15 | BETAFITE             | 13-0197  |
| 50.36              | 30.16 | 14.92 | 28.86 | 59.60  | 34.88  | 80                 | 100 | 90  | 70 | 60 | 40 | STIBICONITE          | 10-0388  |
| 50.36              | 30.26 | 59.60 | 35.02 | 81.50  | 84.10  | 90                 | 100 | 90  | 60 | 60 | 60 | YTROTANTALITE        | 11-0116  |
| 50.36              | 30.84 | 41.04 | 50.96 | 24.05  | 33.37  | 6                  | 100 | 6   | 6  | 3  | 3  | DOLOMITE (FERROAN)   | 12-0088  |
| 50.39              | 33.69 | 46.30 | 92.08 | 70.97  | 96.54  | 80                 | 100 | 90  | 40 | 30 | 30 | NICALCITE            | 9-0001   |
| 50.42              | 30.30 | 49.25 | 40.26 | 99.51  | 40.26  | 70                 | 100 | 80  | 50 | 50 | 40 | CALCITE (MANGANOAN)  | 2-0714   |
| 50.48              | 43.33 | 74.20 | 90.02 | 136.50 | 145.14 | 46                 | 100 | 20  | 17 | 9  | 8  | COPPER               | 4-0836   |
| 50.66              | 32.90 | 36.50 | 86.80 | 37.76  | 92.87  | 100                | 100 | 90  | 90 | 80 | 80 | COBALTITE            | 16-0624  |
| 50.66              | 39.48 | 29.64 | 66.22 | 31.70  | 33.66  | 100                | 70  | 50  | 30 | 20 | 20 | CORVUSITE            | 15-0247  |
| 50.66              | 84.10 | 29.96 | 42.82 | 29.95  | 70.78  | 100                | 70  | 60  | 50 | 40 | 40 | SPERRYLITE           | 9-0452   |
| 50.69              | 30.40 | 60.29 | 35.19 | 82.52  | 95.55  | 80                 | 100 | 50  | 30 | 30 | 30 | TENNANTITE           | 11-0102  |
| 50.90              | 38.05 | 18.60 | 58.69 | 62.13  | 68.32  | 56                 | 100 | 90  | 36 | 18 | 16 | BRUCITE SYN          | 7-0239   |
| 50.96              | 28.58 | 25.20 | 19.80 | 41.78  | 43.24  | 60                 | 100 | 70  | 40 | 40 | 40 | LINARITE             | 4-0598   |
| 51.14              | 30.99 | 41.18 | 51.30 | 50.60  | 44.99  | 30                 | 100 | 30  | 30 | 20 | 15 | DOLOMITE             | 11-0078  |
| 51.45              | 31.73 | 35.92 | 25.08 | 34.91  | 61.04  | 100                | 100 | 100 | 80 | 80 | 60 | FAYALITE             | 9-0484   |
| 51.48              | 29.48 | 47.06 | 30.83 | 15.33  | 39.17  | 100                | 80  | 50  | 40 | 30 | 30 | PENTLANDITE          | 8-0090   |
| 51.70              | 25.82 | 35.05 | 19.51 | 53.09  | 36.84  | 50                 | 100 | 50  | 25 | 18 | 13 | XENOTIME             | 11-0254  |
| 51.70              | 32.68 | 33.37 | 23.16 | 22.77  | 48.68  | 50                 | 100 | 45  | 35 | 30 | 30 | BOURNONITE           | 12-0094  |
| 51.77              | 26.68 | 43.74 | 30.52 | 70.03  | 54.26  | 45                 | 100 | 55  | 35 | 12 | 10 | METACINNABAR         | 6-0261   |
| 51.80              | 26.60 | 33.90 | 54.81 | 37.98  | 64.79  | 63                 | 100 | 81  | 63 | 24 | 17 | CASSITERITE SYN      | 5-0467   |
| 51.83              | 31.16 | 28.89 | 44.43 | 36.10  | 23.86  | 30                 | 100 | 30  | 20 | 17 | 13 | AKERMANITE           | 10-0391  |
| 51.86              | 31.50 | 24.32 | 51.64 | 41.58  | 45.34  | 33                 | 100 | 35  | 30 | 27 | 23 | RHODOCHROSITE SYN    | 7-0268   |
| 51.90              | 28.50 | 29.76 | 38.96 | 42.61  | 47.96  | 50                 | 100 | 90  | 40 | 30 | 30 | CHALCOSTILBITE       | 9-0143   |
| 51.95              | 31.39 | 52.27 | 36.99 | 37.31  | 37.47  | 100                | 100 | 100 | 70 | 70 | 70 | GEHLENITE SYN        | 4-0690   |
| 51.95              | 33.05 | 25.90 | 47.61 | 37.31  | 38.81  | 63                 | 100 | 40  | 30 | 25 | 25 | MARCASITE            | 3-0799   |
| 52.15              | 31.39 | 29.09 | 37.41 | 24.25  | 36.91  | 35                 | 100 | 25  | 22 | 20 | 20 | GEHLENITE SYN        | 9-0216   |
| 52.22              | 27.68 | 48.64 | 83.20 | 94.36  | 25.50  | 70                 | 100 | 80  | 50 | 50 | 40 | CUBANITE             | 9-0324   |
| 52.22              | 31.48 | 42.18 | 54.58 | 24.56  | 26.66  | 80                 | 100 | 80  | 80 | 70 | 70 | BEYERITE             | 4-0693   |
| 52.27              | 31.39 | 51.95 | 36.99 | 37.31  | 37.47  | 100                | 100 | 100 | 70 | 70 | 70 | GEHLENITE SYN        | 4-0690   |
| 52.56              | 39.94 | 32.34 | 35.37 | 35.74  | 24.08  | 80                 | 100 | 60  | 60 | 60 | 45 | CLINOHUMITE SYN      | 14-0009  |
| 52.66              | 17.67 | 24.05 | 32.44 | 35.34  | 35.77  | 100                | 70  | 70  | 70 | 70 | 70 | CLINOHUMITE          | 14-0692  |

| TWO-THETA (COPPER) |       |        |       |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|--------------------|-------|--------|-------|--------|--------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 52.69              | 39.67 | 40.04  | 34.43 | 29.71  | 33.54  | 95                 | 100 | 100 | 55  | 45  | 45  | CHONDROITE             | 14-0010  |
| 52.76              | 32.09 | 52.92  | 46.27 | 24.80  | 42.42  | 35                 | 100 | 45  | 30  | 25  | 25  | SIDERITE SYN           | 12-0531  |
| 52.79              | 32.08 | 111.79 | 24.80 | 42.44  | 46.25  | 80                 | 100 | 70  | 60  | 60  | 60  | SIDERITE               | 8-0133   |
| 52.92              | 32.09 | 52.76  | 46.27 | 24.80  | 42.42  | 45                 | 100 | 35  | 30  | 25  | 25  | SIDERITE SYN           | 12-0531  |
| 53.22              | 30.19 | 24.32  | 51.58 | 63.50  | 12.41  | 20                 | 100 | 50  | 14  | 14  | 12  | COLUMBITE (TANTALITE)  | 16-0337  |
| 53.26              | 32.68 | 35.34  | 48.97 | 61.85  | 63.26  | 100                | 100 | 85  | 85  | 85  | 85  | ILMENITE               | 3-0781   |
| 53.29              | 43.29 | 33.69  | 29.98 | 70.79  | 87.09  | 50                 | 100 | 60  | 40  | 40  | 40  | TROILITE               | 11-0151  |
| 53.54              | 30.38 | 36.34  | 18.78 | 23.76  | 41.18  | 80                 | 100 | 70  | 60  | 60  | 60  | FERBERITE              | 10-0449  |
| 53.54              | 30.38 | 40.22  | 62.72 | 15.00  | 19.28  | 90                 | 100 | 80  | 70  | 60  | 40  | UVANITE                | 8-0322   |
| 53.88              | 32.52 | 25.06  | 38.60 | 46.52  | 42.82  | 45                 | 100 | 50  | 25  | 25  | 18  | SMITHSONITE            | 8-0449   |
| 53.93              | 32.66 | 43.03  | 35.88 | 46.85  | 70.36  | 34                 | 100 | 43  | 17  | 12  | 8   | MAGNESITE SYN          | 8-0479   |
| 54.28              | 33.31 | 35.77  | 49.60 | 62.59  | 64.14  | 60                 | 100 | 50  | 40  | 35  | 35  | HEMATITE               | 13-0534  |
| 54.38              | 27.49 | 36.09  | 41.26 | 56.68  | 69.06  | 50                 | 100 | 41  | 22  | 16  | 16  | RUTILE                 | 4-0551   |
| 54.56              | 26.45 | 77.47  | 83.74 | 101.71 | 44.50  | 8                  | 100 | 6   | 6   | 4   | 3   | GRAPHITE SYN           | 12-0212  |
| 54.58              | 32.16 | 36.04  | 39.67 | 46.02  | 27.68  | 75                 | 100 | 50  | 25  | 25  | 10  | BRAVOITE               | 2-0850   |
| 54.58              | 46.02 | 32.06  | 27.68 | 85.00  | 109.70 | 90                 | 100 | 80  | 70  | 70  | 70  | DIGENITE SYN           | 4-0861   |
| 54.63              | 26.21 | 37.31  | 34.09 | 51.64  | 35.48  | 70                 | 100 | 70  | 60  | 50  | 40  | MANGANITE SYN          | 8-0016   |
| 54.73              | 13.31 | 27.70  | 26.69 | 33.18  | 38.81  | 14                 | 100 | 12  | 8   | 8   | 8   | ERYTHRITE              | 11-0626  |
| 54.81              | 26.61 | 44.41  | 83.83 | 77.62  | 102.14 | 80                 | 100 | 50  | 40  | 30  | 30  | GRAPHITE               | 13-0148  |
| 54.92              | 30.92 | 44.36  | 73.32 | 81.50  | 26.74  | 16                 | 100 | 55  | 14  | 10  | 8   | BROMYRITE              | 6-0438   |
| 55.28              | 21.82 | 35.16  | 56.78 | 63.20  | 69.00  | 80                 | 100 | 100 | 80  | 80  | 80  | RAMSDELLITE            | 7-0222   |
| 55.30              | 27.42 | 44.82  | 32.78 | 29.66  | 51.28  | 35                 | 100 | 35  | 30  | 20  | 20  | STOLZITE SYN           | 8-0476   |
| 55.30              | 27.50 | 44.82  | 32.90 | 51.28  | 56.78  | 90                 | 100 | 80  | 60  | 60  | 60  | STOLZITE               | 8-0108   |
| 55.45              | 32.93 | 65.71  | 91.20 | 23.22  | 94.24  | 90                 | 100 | 80  | 70  | 60  | 60  | BIXBYITE               | 8-0010   |
| 55.49              | 32.93 | 42.23  | 94.13 | 38.30  | 65.76  | 70                 | 100 | 50  | 50  | 40  | 40  | BRAUNITE               | 8-0078   |
| 55.56              | 37.49 | 28.70  | 56.95 | 18.33  | 50.12  | 80                 | 100 | 80  | 70  | 50  | 50  | CRYPTOMELANE           | 4-0778   |
| 55.66              | 28.68 | 39.32  | 72.66 | 79.07  | 42.82  | 40                 | 100 | 40  | 40  | 40  | 30  | TETRADYMIT             | 9-0447   |
| 55.82              | 47.06 | 28.30  | 87.48 | 68.71  | 75.94  | 35                 | 100 | 94  | 16  | 12  | 10  | FLUORITE SYN           | 4-0864   |
| 55.97              | 25.21 | 47.50  | 19.51 | 64.68  | 77.55  | 25                 | 100 | 40  | 20  | 16  | 14  | EUCRYPTITE (BETA)      | 13-0378  |
| 56.00              | 28.61 | 47.29  | 33.05 | 56.60  | 76.52  | 40                 | 100 | 70  | 30  | 30  | 30  | STANNITE               | 11-0062  |
| 56.02              | 28.50 | 31.24  | 34.74 | 17.86  | 33.66  | 100                | 80  | 80  | 80  | 60  | 60  | CUPRODESCLOIZITE       | 13-0240  |
| 56.04              | 21.41 | 35.48  | 63.74 | 43.73  | 75.02  | 60                 | 100 | 80  | 50  | 30  | 30  | CRISTOBALITE BETA HIGH | 4-0359   |
| 56.26              | 30.83 | 37.54  | 33.47 | 48.72  | 34.59  | 65                 | 100 | 70  | 60  | 60  | 55  | EPIDOTE                | 9-0438   |
| 56.34              | 28.58 | 47.56  | 33.12 | 76.88  | 88.68  | 30                 | 100 | 51  | 10  | 9   | 9   | SPHALERITE SYN         | 5-0566   |
| 56.34              | 33.07 | 37.10  | 40.79 | 47.45  | 28.54  | 100                | 84  | 66  | 52  | 40  | 36  | PYRITE SYN             | 6-0710   |
| 56.40              | 16.72 | 33.66  | 39.12 | 42.82  | 27.42  | 100                | 100 | 100 | 90  | 90  | 80  | MURDOCHITE             | 7-0028   |
| 56.45              | 28.42 | 37.31  | 42.44 | 59.23  | 72.10  | 50                 | 100 | 50  | 25  | 25  | 20  | PYROLUSITE             | 12-0716  |
| 56.53              | 31.72 | 45.49  | 27.37 | 75.37  | 84.01  | 15                 | 100 | 55  | 13  | 11  | 7   | HALITE SYN             | 5-0628   |
| 56.60              | 28.61 | 47.77  | 27.36 | 30.51  | 88.68  | 35                 | 100 | 50  | 6   | 6   | 6   | WURTZITE               | 12-0688  |
| 56.74              | 32.50 | 34.56  | 36.62 | 30.31  | 42.60  | 60                 | 100 | 80  | 50  | 40  | 30  | VESUVIANITE            | 11-0145  |
| 56.78              | 30.26 | 42.18  | 47.04 | 52.22  | 23.90  | 100                | 100 | 100 | 80  | 80  | 70  | BISMUTITE              | 4-0666   |
| 56.79              | 32.54 | 34.59  | 36.65 | 30.34  | 42.60  | 60                 | 100 | 80  | 50  | 40  | 30  | IDOCRASE               | 11-0145  |
| 56.83              | 29.78 | 35.63  | 92.19 | 65.76  | 71.47  | 100                | 100 | 100 | 100 | 90  | 80  | DIOPSIDE               | 2-0656   |
| 56.83              | 29.88 | 65.24  | 91.09 | 92.19  | 92.19  | 100                | 100 | 100 | 100 | 100 | 100 | AUGITE                 | 3-0623   |
| 56.83              | 35.48 | 29.78  | 30.83 | 65.76  | 27.62  | 60                 | 100 | 80  | 40  | 40  | 20  | DIOPSIDE SYN           | 3-0860   |



| TWO-THETA (COPPER) |       |       |       |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|--------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 56.87              | 27.53 | 43.27 | 22.17 | 35.01  | 39.80  | 80                 | 100 | 90  | 50  | 50  | 45  | CHRYSOBERYL              | 11-0448  |
| 56.95              | 43.36 | 27.60 | 57.10 | 43.55  | 22.17  | 90                 | 100 | 85  | 75  | 60  | 50  | CHRYSOBERYL SYN          | 10-0082  |
| 56.98              | 34.36 | 49.51 | 41.02 | 54.59  | 66.29  | 90                 | 100 | 90  | 80  | 70  | 70  | SKUTTERUDITE             | 10-0497  |
| 57.02              | 31.17 | 33.14 | 43.86 | 24.63  | 38.56  | 75                 | 100 | 100 | 65  | 60  | 60  | ZOISITE                  | 11-0665  |
| 57.06              | 34.50 | 59.36 | 30.72 | 48.25  | 54.59  | 30                 | 100 | 40  | 25  | 20  | 20  | SPESSARTITE SYN          | 10-0354  |
| 57.06              | 35.48 | 62.64 | 30.13 | 43.16  | 53.52  | 85                 | 100 | 85  | 70  | 70  | 60  | MAGNETITE                | 11-0614  |
| 57.14              | 35.60 | 30.26 | 23.70 | 43.24  | 53.88  | 100                | 100 | 100 | 100 | 100 | 100 | MAGHEMITE SYN            | 15-0615  |
| 57.18              | 33.23 | 29.63 | 36.49 | 46.42  | 54.88  | 60                 | 100 | 60  | 45  | 25  | 25  | ANDRADITE SYN            | 10-0288  |
| 57.22              | 35.77 | 47.61 | 62.31 | 18.37  | 30.30  | 75                 | 100 | 75  | 75  | 50  | 50  | CHROMITE SYN             | 4-0759   |
| 57.56              | 33.40 | 29.74 | 36.64 | 38.26  | 55.30  | 60                 | 100 | 70  | 55  | 25  | 25  | UVAROVITE                | 11-0696  |
| 57.57              | 43.40 | 35.16 | 25.60 | 68.26  | 52.60  | 80                 | 100 | 90  | 75  | 50  | 45  | CORUNDUM (ALPHA ALUMINA) | 10-0173  |
| 57.61              | 35.63 | 63.74 | 43.73 | 30.30  | 88.99  | 90                 | 100 | 90  | 70  | 60  | 60  | CHROMITE                 | 3-0873   |
| 57.73              | 29.09 | 48.42 | 90.77 | 78.15  | 56.30  | 70                 | 100 | 90  | 70  | 60  | 55  | CHALCOPYRITE (GAMMA)     | 11-0570  |
| 57.77              | 28.70 | 46.83 | 76.08 | 18.60  | 54.24  | 90                 | 100 | 80  | 80  | 70  | 70  | SCHHEELITE               | 8-0145   |
| 57.92              | 27.94 | 26.26 | 24.84 | 37.28  | 29.54  | 50                 | 100 | 50  | 40  | 40  | 30  | ROCKBRIDGEITE            | 8-0159   |
| 57.96              | 29.48 | 49.14 | 91.42 | 48.83  | 92.30  | 60                 | 100 | 80  | 60  | 40  | 30  | CHALCOPYRITE             | 9-0423   |
| 58.34              | 14.52 | 33.02 | 60.44 | 34.06  | 38.44  | 70                 | 100 | 70  | 70  | 60  | 60  | MOLYBDENITE (3R)         | 17-0744  |
| 58.34              | 33.80 | 30.16 | 55.66 | 47.30  | 41.78  | 90                 | 100 | 80  | 80  | 70  | 60  | GROSSULARITE             | 3-0826   |
| 58.41              | 20.00 | 30.09 | 18.10 | 38.13  | 38.99  | 60                 | 100 | 60  | 50  | 50  | 50  | CHLORITOID               | 7-0398   |
| 58.41              | 36.37 | 30.83 | 64.23 | 44.18  | 54.98  | 60                 | 100 | 60  | 60  | 30  | 10  | GALAXITE                 | 12-0431  |
| 58.65              | 34.22 | 30.62 | 37.63 | 56.38  | 105.57 | 100                | 100 | 90  | 90  | 90  | 90  | GARNET (FE,MN)           | 10-0367  |
| 58.74              | 40.60 | 34.88 | 70.16 | 102.16 | 115.66 | 60                 | 100 | 60  | 20  | 18  | 16  | MANGANOSITE SYN          | 7-0230   |
| 58.74              | 49.48 | 29.74 | 80.66 | 69.00  | 83.20  | 100                | 84  | 68  | 68  | 63  | 63  | MICROLITE                | 3-1139   |
| 58.76              | 46.78 | 32.52 | 38.60 | 19.67  | 22.90  | 53                 | 100 | 67  | 40  | 20  | 20  | CRYOLITE                 | 1-1273   |
| 58.82              | 26.05 | 49.25 | 65.71 | 67.20  | 20.04  | 80                 | 100 | 90  | 80  | 80  | 60  | QUARTZ (BETA)            | 7-0346   |
| 58.82              | 36.22 | 32.56 | 60.08 | 28.99  | 18.03  | 50                 | 100 | 63  | 50  | 31  | 20  | HAUSMANNITE              | 1-1127   |
| 58.90              | 29.78 | 49.60 | 14.81 | 28.52  | 34.50  | 50                 | 100 | 60  | 25  | 20  | 20  | PYROCHLORE               | 13-0254  |
| 58.90              | 30.51 | 31.96 | 21.10 | 36.68  | 57.37  | 70                 | 100 | 80  | 60  | 60  | 60  | SPODUMENE (ALPHA)        | 9-0468   |
| 59.10              | 29.78 | 49.80 | 34.36 | 93.78  | 24.12  | 30                 | 100 | 60  | 20  | 20  | 10  | TETRAHEDRITE             | 11-0107  |
| 59.10              | 33.18 | 47.63 | 59.48 | 32.93  | 33.31  | 100                | 100 | 100 | 100 | 80  | 80  | PEROVSKITE SYN           | 9-0365   |
| 59.15              | 36.68 | 65.04 | 31.16 | 44.64  | 18.88  | 90                 | 100 | 90  | 70  | 70  | 50  | HERCYNITE                | 7-0068   |
| 59.23              | 33.18 | 47.61 | 59.65 | 69.70  | 79.15  | 70                 | 100 | 90  | 70  | 60  | 50  | PEROVSKITE               | 8-0091   |
| 59.36              | 34.50 | 57.06 | 30.72 | 48.25  | 54.59  | 40                 | 100 | 30  | 25  | 20  | 20  | SPESSARTITE SYN          | 10-0354  |
| 59.60              | 30.26 | 50.36 | 35.02 | 81.50  | 84.10  | 90                 | 100 | 90  | 60  | 60  | 60  | YTTROTANTALITE           | 11-0116  |
| 59.60              | 34.14 | 32.82 | 18.31 | 24.30  | 36.76  | 80                 | 100 | 70  | 60  | 60  | 60  | LAWSONITE                | 13-0533  |
| 59.65              | 34.50 | 91.09 | 57.22 | 74.75  | 93.32  | 80                 | 100 | 70  | 60  | 60  | 60  | SPESSARTITE              | 2-0992   |
| 59.82              | 30.19 | 50.30 | 35.05 | 81.67  | 62.69  | 40                 | 100 | 45  | 20  | 20  | 15  | BETAFITE                 | 13-0197  |
| 60.02              | 28.78 | 25.64 | 37.44 | 40.98  | 41.98  | 50                 | 100 | 60  | 40  | 40  | 20  | CORONADITE               | 7-0361   |
| 60.08              | 34.77 | 92.19 | 31.05 | 57.61  | 75.44  | 100                | 100 | 70  | 60  | 60  | 60  | PYROPE                   | 2-1008   |
| 60.08              | 34.92 | 31.13 | 57.65 | 22.00  | 48.80  | 50                 | 100 | 40  | 40  | 30  | 30  | ALMANDITE                | 9-0427   |
| 60.25              | 4.70  | 34.36 | 9.72  | 19.51  | 24.66  | 70                 | 100 | 60  | 50  | 50  | 50  | SAPONITE                 | 6-0002   |
| 60.25              | 24.94 | 12.34 | 19.34 | 35.92  | 33.96  | 100                | 100 | 80  | 70  | 50  | 40  | SERPENTINE (AL) SYN      | 11-0096  |
| 60.29              | 5.20  | 26.45 | 10.41 | 19.38  | 15.57  | 70                 | 100 | 80  | 50  | 50  | 40  | SAPONITE SYN             | 12-0168  |
| 60.29              | 30.40 | 50.69 | 35.19 | 82.52  | 95.55  | 50                 | 100 | 80  | 30  | 30  | 30  | TENNANTITE               | 11-0102  |
| 60.38              | 5.67  | 19.47 | 34.09 |        |        | 50                 | 100 | 40  | 30  |     |     | SAPONITE FE RICH         | 12-0160  |

| TWO-THETA (COPPER) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|--------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 60.44              | 33.66 | 47.84  | 48.64  | 31.48  | 32.64  | 70                 | 100 | 70  | 60  | 50  | 50  | MERWINITE              | 4-0728   |
| 60.47              | 6.31  | 25.82  | 19.42  | 25.37  | 34.22  | 60                 | 100 | 60  | 40  | 40  | 40  | VERMICULITE            | 10-0439  |
| 60.47              | 35.02 | 31.22  | 36.79  | 58.04  | 40.13  | 50                 | 100 | 60  | 40  | 30  | 25  | PYROPE SYN             | 15-0742  |
| 60.51              | 6.22  | 24.25  | 19.42  | 17.88  | 71.47  | 90                 | 100 | 80  | 50  | 40  | 40  | SAPONITE               | 13-0086  |
| 60.51              | 36.07 | 19.38  | 9.51   | 28.52  | 34.22  | 64                 | 100 | 64  | 48  | 40  | 32  | TALC                   | 3-0881   |
| 60.60              | 6.22  | 19.42  | 34.29  | 34.91  | 35.55  | 70                 | 100 | 60  | 50  | 50  | 45  | VERMICULITE            | 16-0613  |
| 60.90              | 5.74  | 19.44  | 33.92  | 35.02  | 36.96  | 100                | 100 | 100 | 80  | 80  | 40  | NONTRONITE             | 2-0008   |
| 60.95              | 5.32  | 19.68  | 34.77  | 72.10  | 24.05  | 90                 | 100 | 80  | 50  | 50  | 40  | SAPONITE               | 11-0056  |
| 60.95              | 9.02  | 33.82  | 37.47  | 54.63  | 72.10  | 80                 | 100 | 60  | 60  | 50  | 50  | GARNIERITE             | 2-0060   |
| 61.34              | 29.54 | 31.82  | 36.96  | 43.46  | 50.06  | 60                 | 100 | 60  | 40  | 30  | 30  | NAGYAGITE              | 8-0003   |
| 61.34              | 34.32 | 49.20  | 82.34  | 92.08  | 72.02  | 20                 | 100 | 50  | 20  | 16  | 8   | ALABANDITE             | 6-0518   |
| 61.40              | 36.45 | 42.33  | 73.60  | 29.58  | 77.40  | 27                 | 100 | 37  | 17  | 9   | 4   | CUPRITE SYN            | 5-0667   |
| 61.80              | 34.32 | 49.48  | 82.50  | 92.51  | 29.60  | 20                 | 100 | 50  | 20  | 16  | 14  | ALABANDITE             | 6-0518   |
| 61.80              | 35.16 | 29.86  | 56.40  | 88.88  | 103.62 | 80                 | 100 | 70  | 70  | 50  | 50  | FRANKLINITE            | 10-0467  |
| 62.13              | 30.62 | 10.66  | 36.07  | 56.15  | 15.49  | 100                | 80  | 60  | 45  | 45  | 30  | CHRYSOCOLLA            | 11-0322  |
| 62.17              | 31.33 | 36.30  | 52.27  | 85.47  | 65.29  | 32                 | 100 | 50  | 31  | 10  | 9   | LEAD SYN               | 4-0686   |
| 62.31              | 27.88 | 30.94  | 57.61  | 67.37  | 35.19  | 80                 | 100 | 80  | 60  | 60  | 50  | HYPERSTHENE            | 2-0520   |
| 62.36              | 12.34 | 24.88  | 56.83  | 20.34  | 58.16  | 90                 | 100 | 80  | 70  | 60  | 60  | KAOLINITE              | 14-0164  |
| 62.36              | 42.94 | 109.84 | 127.38 | 78.69  | 36.98  | 52                 | 100 | 17  | 15  | 12  | 10  | PERICLASE              | 4-0829   |
| 62.41              | 24.87 | 12.33  | 38.45  | 19.82  | 34.98  | 100                | 100 | 100 | 90  | 80  | 80  | KAOLINITE (DISORDERED) | 6-0221   |
| 62.59              | 20.42 | 35.60  | 27.79  | 9.20   | 37.50  | 90                 | 100 | 90  | 80  | 70  | 60  | PARAGONITE             | 9-0428   |
| 62.64              | 35.48 | 57.06  | 30.13  | 43.16  | 53.52  | 85                 | 100 | 85  | 70  | 70  | 60  | MAGNETITE              | 11-0614  |
| 62.64              | 38.61 | 20.46  | 35.15  | 36.16  | 19.91  | 100                | 95  | 85  | 85  | 85  | 75  | KAOLINITE              | 12-0447  |
| 62.68              | 35.52 | 30.16  | 57.09  | 43.16  | 89.92  | 35                 | 100 | 40  | 30  | 25  | 12  | MAGNESIOFERRITE        | 17-0464  |
| 62.78              | 20.42 | 26.53  | 30.62  | 31.85  | 36.53  | 80                 | 100 | 50  | 20  | 20  | 20  | CHRYSOCOLLA            | 3-0219   |
| 62.78              | 35.48 | 43.29  | 57.22  | 30.09  | 37.31  | 60                 | 100 | 50  | 40  | 30  | 25  | SPINEL (MN,NI)         | 1-1110   |
| 62.78              | 35.77 | 28.06  | 20.23  | 9.31   | 37.31  | 100                | 90  | 70  | 60  | 50  | 50  | PARAGONITE SYN         | 10-0420  |
| 62.83              | 39.96 | 36.87  | 52.63  | 24.45  | 33.29  | 70                 | 100 | 70  | 65  | 50  | 50  | HUMITE                 | 12-0755  |
| 63.11              | 35.74 | 30.35  | 43.42  | 57.88  | 53.93  | 50                 | 100 | 50  | 30  | 30  | 16  | SPINEL (LI) SYN        | 13-0207  |
| 63.68              | 32.66 | 40.42  | 68.42  | 110.04 | 127.18 | 60                 | 100 | 80  | 60  | 60  | 60  | MERCURY                | 9-0253   |
| 63.74              | 35.63 | 57.61  | 43.73  | 30.30  | 88.99  | 90                 | 100 | 90  | 70  | 60  | 60  | CHROMITE               | 3-0873   |
| 64.18              | 43.46 | 44.82  | 64.68  | 24.50  | 70.78  | 50                 | 100 | 100 | 50  | 40  | 40  | BETA DOMEYKITE         | 14-0454  |
| 64.68              | 27.58 | 39.48  | 72.02  | 48.92  | 92.08  | 50                 | 100 | 80  | 40  | 30  | 20  | ALTAITE                | 8-0028   |
| 64.73              | 35.19 | 33.43  | 28.80  | 56.11  | 32.08  | 100                | 100 | 90  | 80  | 80  | 70  | HORNBLende             | 11-0493  |
| 65.04              | 36.68 | 59.15  | 31.16  | 44.64  | 18.88  | 90                 | 100 | 90  | 70  | 70  | 50  | HERCYNITE              | 7-0068   |
| 65.09              | 44.71 | 82.43  | 116.62 | 99.11  | 137.19 | 19                 | 100 | 30  | 12  | 9   | 6   | IRON (ALPHA)           | 6-0696   |
| 65.19              | 36.80 | 31.24  | 59.44  | 55.74  | 77.25  | 50                 | 100 | 90  | 40  | 30  | 30  | GAHNITE (FE)           | 12-0267  |
| 65.24              | 29.88 | 56.83  | 91.09  | 92.19  | 92.19  | 100                | 100 | 100 | 100 | 100 | 100 | AUGITE                 | 3-0623   |
| 65.24              | 36.84 | 31.16  | 44.64  | 59.23  | 55.71  | 100                | 100 | 80  | 80  | 80  | 60  | SPINEL SYN             | 2-0175   |
| 65.29              | 36.87 | 31.26  | 59.40  | 55.71  | 94.13  | 43                 | 100 | 84  | 40  | 24  | 12  | GAHNITE SYN            | 5-0669   |
| 65.29              | 36.90 | 44.85  | 59.44  | 31.30  | 138.27 | 58                 | 100 | 58  | 45  | 40  | 20  | SPINEL SYN             | 5-0672   |
| 65.71              | 32.93 | 55.45  | 91.20  | 23.22  | 94.24  | 80                 | 100 | 90  | 70  | 60  | 60  | BIXBYITE               | 8-0010   |
| 66.82              | 37.63 | 45.83  | 60.51  | 31.85  | 56.83  | 100                | 100 | 70  | 60  | 50  | 40  | SPINEL (LI)            | 3-0911   |
| 68.08              | 40.22 | 46.66  | 82.09  | 119.34 | 124.66 | 25                 | 100 | 42  | 24  | 13  | 11  | PALLADIUM              | 5-0681   |
| 68.09              | 28.06 | 26.61  | 46.27  | 46.96  | 47.09  | 75                 | 100 | 65  | 55  | 50  | 50  | KYANITE (DISTHENE)     | 11-0046  |

| TWO-THETA (COPPER) |       |        |        |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME  | FILE NO.   |
|--------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|----|----|----|---|--|
| 68.25              | 28.68 | 40.42  | 65.90  | 41.94  | 75.30  | 67                 | 100 | 70  | 63 | 56 | 40 | ANTIMONY<br>DYSCRASITE<br>KYANITE<br>TANTALUM<br>COPPER                     | 5-0562<br>10-0452<br>3-0513<br>4-0788<br>4-0836  |
| 68.42              | 39.30 | 37.12  | 34.32  | 51.58  | 61.34  | 40                 | 100 | 40  | 30 | 30 | 30 |   |  |
| 68.49              | 28.06 | 47.09  | 35.63  | 38.30  | 46.32  | 75                 | 100 | 50  | 40 | 40 | 40 |   |  |
| 69.58              | 38.60 | 121.34 | 55.54  | 94.93  | 82.46  | 38                 | 100 | 29  | 21 | 19 | 13 |   |  |
| 74.20              | 43.33 | 50.48  | 90.02  | 136.50 | 145.14 | 20                 | 100 | 46  | 17 | 9  | 8  |   |  |
| 75.36              | 31.94 | 45.54  | 56.78  | 84.10  | 27.50  | 40                 | 100 | 60  | 30 | 30 | 20 | EMBOLITE<br>DIAMOND<br>GRAPHITE SYN<br>SILVER<br>GOLD                       | 14-0255<br>6-0675<br>12-0212<br>4-0783<br>4-0784 |
| 75.37              | 43.95 | 91.63  | 140.92 | 119.59 |        | 27                 | 100 | 16  | 15 | 7  |    |   |  |
| 77.47              | 26.45 | 54.56  | 83.74  | 101.71 | 44.50  | 6                  | 100 | 8   | 6  | 4  | 3  |   |  |
| 77.55              | 38.15 | 44.31  | 64.48  | 110.54 | 135.14 | 26                 | 100 | 40  | 25 | 15 | 13 |   |  |
| 77.62              | 38.22 | 44.43  | 64.63  | 110.90 | 135.47 | 36                 | 100 | 52  | 32 | 23 | 23 |   |  |
| 81.33              | 39.80 | 46.27  | 67.53  | 148.49 | 117.86 | 33                 | 100 | 53  | 31 | 29 | 22 | PLATINUM<br>IRIDOSMINE<br>IRON (ALPHA)<br>SPERRYLITE<br>CHALCOPYRITE (BETA) | 4-0802<br>17-0213<br>6-0696<br>9-0452<br>11-0515 |
| 82.34              | 40.40 | 47.04  | 68.42  | 86.90  |        | 70                 | 100 | 50  | 40 | 20 |    |   |  |
| 82.43              | 44.71 | 65.09  | 116.62 | 99.11  | 137.19 | 30                 | 100 | 19  | 12 | 9  | 6  |   |  |
| 84.10              | 50.66 | 29.96  | 42.82  | 29.95  | 70.78  | 70                 | 100 | 60  | 50 | 40 | 40 |   |  |
| 90.87              | 29.18 | 48.58  | 57.61  | 78.69  | 98.19  | 75                 | 100 | 97  | 70 | 60 | 60 |   |  |
| 91.09              | 34.50 | 59.65  | 57.22  | 74.75  | 93.32  | 70                 | 100 | 80  | 60 | 60 | 60 | SPESSARTITE<br>DIAMOND<br>PYROPE<br>PERICLAISE<br>SIDERITE                  | 2-0992<br>6-0675<br>2-1008<br>4-0829<br>8-0133   |
| 91.63              | 43.95 | 75.37  | 140.92 | 119.59 |        | 16                 | 100 | 27  | 15 | 7  |    |   |  |
| 92.19              | 34.77 | 60.08  | 31.05  | 57.61  | 75.44  | 70                 | 100 | 100 | 60 | 60 | 60 |   |  |
| 109.84             | 42.94 | 62.36  | 127.38 | 78.69  | 36.98  | 17                 | 100 | 52  | 15 | 12 | 10 |   |  |
| 111.79             | 32.08 | 52.79  | 24.80  | 42.44  | 46.25  | 70                 | 100 | 80  | 60 | 60 | 60 |   |  |
| 121.34             | 38.60 | 69.58  | 55.54  | 94.93  | 82.46  | 29                 | 100 | 38  | 21 | 19 | 13 | TANTALUM  | 4-0788   |

| MINERAL                 | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |       | FILE NO. |
|-------------------------|--------------------|-------|-------|------------------|-------|-------|----------|
| ACANTHITE               | 34.38              | 36.80 | 37.72 | 43.60            | 46.73 | 47.93 | 14-0072  |
| ACMITE (AEGIRINE)       | 29.88              | 35.34 | 13.62 | 37.80            | 44.84 | 17.14 | 3-0621   |
| ACMITE SYN              | 30.84              | 13.90 | 29.95 | 39.04            | 17.49 | 37.89 | 15-0787  |
| ACTINOLITE              | 33.05              | 28.70 | 10.51 | 41.88            | 36.29 | 13.22 | 7-0336   |
| AEGIRITE                | 29.86              | 35.30 | 13.60 | 37.78            | 44.79 | 17.11 | 3-0621   |
| AKERMANITE              | 31.16              | 28.89 | 51.83 | 39.45            | 36.53 | 66.62 | 10-0391  |
| ALABANDITE              | 34.32              | 49.20 | 61.34 | 43.52            | 63.08 | 79.72 | 6-0518   |
| ALBITE                  | 27.92              | 23.54 | 13.86 | 35.29            | 29.70 | 17.44 | 9-0466   |
| ALBITE (HIGH)           | 28.10              | 23.71 | 27.78 | 35.52            | 29.92 | 35.11 | 10-0393  |
| ALBITE (LOW)            | 27.88              | 21.95 | 24.32 | 35.24            | 27.68 | 30.70 | 1-0739   |
| ALLANITE (METAMICT)     | 30.19              | 25.45 | 33.56 | 38.20            | 32.14 | 42.54 | 9-0474   |
| ALLANITE (NON-METAMICT) | 30.72              | 30.62 | 31.27 | 38.88            | 38.75 | 39.59 | 10-0366  |
| ALLOPHANE               | 8.04               | 27.02 | 41.02 | 10.11            | 34.14 | 52.24 | 2-0039   |
| ALMANDITE               | 34.92              | 60.08 | 31.13 | 44.30            | 77.96 | 39.41 | 9-0427   |
| ALTAITE                 | 27.58              | 39.48 | 64.68 | 34.86            | 50.22 | 84.47 | 8-0028   |
| ALUNITE                 | 29.88              | 30.94 | 39.29 | 37.80            | 39.16 | 49.98 | 14-0136  |
| ALUNOGEN                | 19.80              | 6.64  | 20.20 | 24.95            | 8.35  | 25.46 | 16-0360  |
| AMBLYGONITE             | 19.13              | 28.32 | 30.56 | 24.10            | 35.80 | 38.68 | 8-0102   |
| AMMONIA ALUM            | 20.50              | 21.76 | 27.24 | 25.84            | 27.44 | 34.42 | 7-0022   |
| ANALCIME (ZEOLITE)      | 25.99              | 15.80 | 30.52 | 32.82            | 19.89 | 38.62 | 7-0363   |
| ANALCIME (ZEOLITE)      | 25.98              | 15.80 | 30.56 | 32.81            | 19.89 | 38.68 | 7-0340   |
| ANATASE SYN             | 25.37              | 48.12 | 37.82 | 32.03            | 61.63 | 48.06 | 4-0477   |
| ANDALUSITE              | 16.00              | 19.60 | 32.32 | 20.14            | 24.70 | 40.94 | 13-0122  |
| ANDALUSITE X SYN        | 15.88              | 32.08 | 22.45 | 19.99            | 40.63 | 28.32 | 13-0231  |
| ANDESINE                | 27.79              | 28.06 | 22.00 | 35.12            | 35.47 | 27.74 | 10-0359  |
| ANDRADITE SYN           | 33.23              | 29.63 | 57.18 | 42.11            | 37.48 | 73.93 | 10-0288  |
| ANGLESITE               | 29.76              | 20.84 | 26.74 | 37.65            | 26.27 | 33.78 | 5-0577   |
| ANHYDRITE               | 25.46              | 31.40 | 28.68 | 32.15            | 39.76 | 36.26 | 6-0226   |
| ANNABERAITTE            | 13.46              | 29.98 | 28.06 | 16.94            | 37.93 | 35.47 | 11-0625  |
| ANORTHITE               | 27.88              | 28.06 | 22.00 | 35.24            | 35.47 | 27.74 | 13-0301  |
| ANORTHITE               | 27.88              | 27.36 | 28.15 | 35.24            | 34.57 | 35.59 | 9-0464   |
| ANORTHITE SYN           | 27.79              | 27.97 | 21.95 | 35.12            | 35.36 | 27.68 | 10-0379  |
| ANORTHOCLEASE           | 27.78              | 27.50 | 21.64 | 35.11            | 34.75 | 27.29 | 9-0478   |
| ANORTHOCLEASE SYN       | 27.57              | 27.84 | 21.72 | 34.84            | 35.19 | 27.39 | 10-0361  |
| ANTHOPHYLLITE           | 29.28              | 27.53 | 10.71 | 37.03            | 34.79 | 13.47 | 9-0455   |
| ANTHOPHYLLITE AL-FE     | 10.75              | 29.35 | 27.69 | 13.52            | 37.12 | 35.00 | 11-0253  |
| ANTHOPHYLLITE MG SYN    | 29.18              | 10.62 | 27.62 | 36.90            | 13.36 | 34.91 | 16-0401  |
| ANTIGORITE              | 35.77              | 12.16 | 24.73 | 45.40            | 15.30 | 31.22 | 10-0402  |
| ANTIGORITE (SERPENTINE) | 12.12              | 24.52 | 35.63 | 15.25            | 30.95 | 45.22 | 7-0417   |
| ANTIMONY                | 28.68              | 40.42 | 68.25 | 36.26            | 51.45 | 89.64 | 5-0562   |
| ANTLERITE               | 18.24              | 34.88 | 24.70 | 22.98            | 44.24 | 31.18 | 7-0407   |
| APATITE SYN (CARBONATE) | 32.34              | 26.19 | 33.34 | 40.97            | 33.08 | 42.25 | 13-0001  |
| APHTHALITE              | 31.36              | 30.06 | 43.24 | 39.70            | 38.03 | 55.16 | 6-0429   |
| APOPHYLLITE             | 11.32              | 30.02 | 36.06 | 14.24            | 37.98 | 45.77 | 7-0170   |
| ARAGONITE SYN           | 26.24              | 45.90 | 27.25 | 33.14            | 58.67 | 34.43 | 5-0453   |
| ARFVEDSONITE            | 28.23              | 32.78 | 10.39 | 35.69            | 41.53 | 13.07 | 14-0633  |
| ARGENTITE               | 36.80              | 45.30 | 25.72 | 46.73            | 57.88 | 32.48 | 4-0774   |
| ARSENIC                 | 32.28              | 25.28 | 48.36 | 40.89            | 31.92 | 61.95 | 5-0632   |
| ARSENOPYRITE            | 36.99              | 33.69 | 50.12 | 46.98            | 42.71 | 64.31 | 11-0154  |
| ATACAMITE               | 16.40              | 17.72 | 31.70 | 20.65            | 22.32 | 40.14 | 2-0146   |
| AUGITE                  | 29.88              | 56.83 | 65.24 | 37.80            | 73.44 | 85.27 | 3-0623   |



| MINERAL             | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |       | FILE NO. |
|---------------------|--------------------|-------|-------|------------------|-------|-------|----------|
| AURICHALCITE        | 13.04              | 34.32 | 24.16 | 16.41            | 43.52 | 30.49 | 17-0743  |
| AUTUNITE            | 8.58               | 17.86 | 24.78 | 10.79            | 22.49 | 31.28 | 8-0314   |
| AXINITE             | 31.82              | 28.24 | 25.75 | 40.30            | 35.70 | 32.52 | 6-0448   |
| AXINITE (TINZENITE) | 31.82              | 25.75 | 14.06 | 40.30            | 32.52 | 17.69 | 06-0444  |
| AZURITE             | 25.33              | 40.56 | 17.22 | 31.98            | 51.64 | 21.69 | 11-0682  |
| AZURITE             | 25.25              | 17.22 | 35.68 | 31.88            | 21.69 | 45.28 | 11-0136  |
| BARITE SYN          | 25.88              | 28.79 | 42.65 | 32.68            | 36.41 | 54.38 | 5-0448   |
| BARYTOCALCITE       | 28.50              | 28.40 | 22.10 | 36.03            | 35.91 | 27.87 | 15-0285  |
| BASSANITE           | 29.76              | 14.72 | 31.94 | 37.65            | 18.53 | 40.45 | 14-0453  |
| BASSETITE           | 18.12              | 25.72 | 10.29 | 22.82            | 32.48 | 12.94 | 7-0288   |
| BASTNAESITE         | 31.02              | 24.98 | 18.16 | 39.27            | 31.54 | 22.87 | 11-0340  |
| BEAVERITE           | 15.12              | 29.44 | 39.48 | 19.03            | 37.24 | 50.22 | 17-0476  |
| BEIDELLITE          | 19.62              | 34.32 | 35.16 | 24.72            | 43.52 | 44.61 | 3-0178   |
| BEIDELLITE          | 5.84               | 19.92 | 29.56 | 7.34             | 25.10 | 37.39 | 3-0013   |
| BERYL               | 31.20              | 27.41 | 11.09 | 39.50            | 34.64 | 13.95 | 9-0430   |
| BETA DOMEYKITE      | 43.46              | 44.82 | 64.18 | 55.45            | 57.24 | 83.75 | 14-0454  |
| BETA DOMEYKITE SYN  | 44.14              | 45.30 | 38.44 | 56.34            | 57.88 | 48.87 | 2-1251   |
| BETAFITE            | 30.19              | 50.30 | 59.82 | 38.20            | 64.55 | 77.59 | 13-0197  |
| BETA URANOPHANE     | 11.28              | 22.84 | 25.36 | 14.19            | 28.81 | 32.02 | 8-0301   |
| BEYERITE            | 31.48              | 42.18 | 52.22 | 39.86            | 53.76 | 67.14 | 4-0693   |
| BIOTITE             | 8.75               | 26.45 | 33.69 | 11.00            | 33.41 | 42.71 | 2-0045   |
| BISBEEITE           | 8.66               | 12.70 | 26.82 | 10.89            | 15.98 | 33.88 | 14-0685  |
| BISMITE             | 27.42              | 33.28 | 33.02 | 34.65            | 42.18 | 41.84 | 14-0699  |
| BISMUTH             | 27.16              | 39.66 | 37.60 | 34.32            | 50.46 | 47.77 | 5-0519   |
| BISMUTHINITE SYN    | 28.63              | 25.01 | 31.83 | 36.20            | 31.57 | 40.31 | 6-0333   |
| BISMUTITE           | 30.26              | 42.18 | 56.78 | 38.29            | 53.76 | 73.37 | 4-0666   |
| BIXBYITE            | 32.93              | 55.45 | 65.71 | 41.73            | 71.55 | 85.95 | 8-0010   |
| BLOEDITE            | 27.42              | 19.58 | 33.02 | 34.65            | 24.67 | 41.84 | 4-0549   |
| BORACITE            | 43.90              | 29.36 | 32.90 | 56.03            | 37.14 | 41.69 | 5-0710   |
| BORAX               | 34.91              | 31.50 | 18.25 | 44.28            | 39.88 | 22.99 | 1-1097   |
| BORNITE             | 46.90              | 28.06 | 32.68 | 60.00            | 35.47 | 41.40 | 14-0323  |
| BOULANGERITE        | 23.92              | 31.85 | 49.00 | 30.19            | 40.33 | 62.81 | 9-0470   |
| BOURNONITE          | 32.68              | 51.70 | 33.37 | 41.40            | 66.44 | 42.29 | 12-0094  |
| BRANNERITE          | 26.04              | 47.82 | 36.50 | 32.89            | 61.23 | 46.34 | 8-0002   |
| BRANNERITE SYN      | 25.88              | 26.58 | 18.70 | 32.68            | 33.58 | 23.56 | 12-0477  |
| BRAUNITE            | 32.93              | 55.49 | 42.23 | 41.73            | 71.60 | 53.83 | 8-0078   |
| BRAVOITE            | 32.16              | 54.58 | 36.04 | 40.73            | 70.35 | 45.75 | 2-0850   |
| BREITHAUPHITE       | 31.24              | 44.14 | 46.02 | 39.55            | 56.34 | 58.83 | 2-0783   |
| BREWSTERITE         | 19.04              | 30.59 | 27.29 | 23.99            | 38.71 | 34.49 | 15-0582  |
| BROCHANITITE        | 35.60              | 22.78 | 33.40 | 45.18            | 28.74 | 42.33 | 13-0398  |
| BROCHANTITE         | 22.72              | 13.61 | 35.44 | 28.66            | 17.12 | 44.97 | 3-0282   |
| BROMYRITE           | 30.92              | 44.36 | 54.92 | 39.14            | 56.64 | 70.82 | 6-0438   |
| BROOKITE            | 25.37              | 30.83 | 25.67 | 32.03            | 39.02 | 32.42 | 16-0617  |
| BRUCITE SYN         | 38.03              | 18.60 | 50.90 | 48.33            | 23.43 | 65.36 | 7-0239   |
| BUTLERITE           | 17.82              | 28.30 | 24.78 | 22.44            | 35.78 | 31.28 | 16-0819  |
| BYTOWNITE           | 27.88              | 22.06 | 23.93 | 35.24            | 27.82 | 30.20 | 9-0467   |
| CALAVERITE          | 29.84              | 43.24 | 30.70 | 37.75            | 55.16 | 38.86 | 7-0344   |
| CALCITE (MANGANOAN) | 30.30              | 49.25 | 50.42 | 38.34            | 63.14 | 64.71 | 2-0714   |

| MINERAL                  | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |        | FILE NO. |
|--------------------------|--------------------|-------|-------|------------------|-------|--------|----------|
| CLACITE SYN              | 29.43              | 39.43 | 43.18 | 37.23            | 50.16 | 55.08  | 5-0586   |
| CALEDONITE               | 49.20              | 19.28 | 28.86 | 63.08            | 24.29 | 36.49  | 8-0153   |
| CANCRINITE               | 27.97              | 19.25 | 24.66 | 35.36            | 24.26 | 31.13  | 3-0503   |
| CANCRINITE SYN           | 27.43              | 18.88 | 24.24 | 34.66            | 23.79 | 30.59  | 15-0734  |
| CARNALLITE               | 27.00              | 30.58 | 19.06 | 34.11            | 38.70 | 24.01  | 8-0075   |
| CARNOTITE                | 13.48              | 28.58 | 25.20 | 16.96            | 36.14 | 31.82  | 8-0317   |
| CARPHOSIDERITE           | 29.14              | 18.08 | 46.02 | 36.85            | 22.77 | 58.83  | 2-0597   |
| CASSITERITE SYN          | 26.60              | 33.90 | 51.80 | 33.60            | 42.98 | 66.58  | 5-0467   |
| CELADONITE               | 34.74              | 19.58 | 24.44 | 44.06            | 24.67 | 30.85  | 17-0521  |
| CELESTITE SYN            | 30.07              | 27.06 | 32.79 | 38.05            | 34.19 | 41.55  | 5-0593   |
| CERARGYRITE              | 32.28              | 46.28 | 27.86 | 40.89            | 59.18 | 35.21  | 6-0480   |
| CERUSSITE                | 24.78              | 25.42 | 36.04 | 31.28            | 32.10 | 45.75  | 5-0417   |
| CHABAZITE                | 9.35               | 15.94 | 17.63 | 11.76            | 20.07 | 22.20  | 15-0618  |
| CHALCANTHITE             | 18.74              | 23.96 | 22.26 | 23.61            | 30.24 | 28.07  | 11-0646  |
| CHALCOCITE ALPHA LOW     | 48.69              | 46.10 | 37.47 | 62.39            | 58.94 | 47.60  | 9-0328   |
| CHALCOCITE SYN           | 37.46              | 37.50 | 46.02 | 47.59            | 47.64 | 58.83  | 12-0227  |
| CHALCOPHANIITE           | 12.70              | 25.42 | 21.76 | 15.98            | 32.10 | 27.44  | 15-0807  |
| CHALCOPYRITE             | 29.48              | 49.14 | 57.96 | 37.29            | 63.00 | 75.00  | 9-0423   |
| CHALCOPYRITE (BETA)      | 29.18              | 48.58 | 90.87 | 36.90            | 62.25 | 127.07 | 11-0515  |
| CHALCOPYRITE (GAMMA)     | 29.09              | 48.42 | 57.73 | 36.79            | 62.03 | 74.69  | 11-0570  |
| CHALCOSIDERITE           | 23.58              | 26.26 | 29.54 | 29.75            | 33.17 | 37.37  | 8-0127   |
| CHALCOSTILBITE           | 28.50              | 29.76 | 51.90 | 36.03            | 37.65 | 66.71  | 9-0143   |
| CHAMOSITE                | 12.56              | 25.30 | 35.63 | 15.80            | 31.94 | 45.22  | 7-0315   |
| CHAMOSITE (MG)           | 12.36              | 25.01 | 35.63 | 15.55            | 31.57 | 45.22  | 10-0404  |
| CHAMOSITE (MG)           | 12.47              | 25.23 | 6.31  | 15.69            | 31.86 | 7.93   | 5-0146   |
| CHAMOSITE FE (III)       | 12.54              | 25.23 | 36.53 | 15.78            | 31.86 | 46.38  | 7-0329   |
| CHAMOSITE FE (II)        | 12.43              | 25.08 | 35.48 | 15.64            | 31.66 | 45.02  | 7-0339   |
| CHLORAPATITE             | 32.32              | 31.39 | 46.57 | 40.94            | 39.74 | 59.57  | 2-0851   |
| CHLORAPATITE SYN         | 32.21              | 31.26 | 49.65 | 40.80            | 39.58 | 63.68  | 12-0263  |
| CHLORITE AL-MONT.        | 6.01               | 2.98  | 18.07 | 7.55             | 3.74  | 22.76  | 7-0051   |
| CHLORITE (APHROSIDERITE) | 12.56              | 25.30 | 6.27  | 15.80            | 31.94 | 7.88   | 12-0243  |
| CHLORITE (DIABANTITE)    | 12.50              | 6.31  | 25.15 | 15.72            | 7.93  | 31.75  | 7-0171   |
| CHLORITE (RIPIDOLITE)    | 12.52              | 6.27  | 25.18 | 15.75            | 7.88  | 31.79  | 7-0076   |
| CHLORITE (THURINGITE)    | 12.83              | 25.52 | 19.17 | 16.14            | 32.23 | 24.15  | 3-0067   |
| CHLORITE (THURINGITE)    | 12.56              | 25.23 | 35.63 | 15.80            | 31.86 | 45.22  | 13-0029  |
| CHLORITE-MONT.           | 19.60              | 5.89  | 17.85 | 24.70            | 7.40  | 22.48  | 12-0231  |
| CHLORITE-MONT.           | 6.10               | 2.90  | 9.12  | 7.67             | 3.64  | 11.47  | 7-0027   |
| CHLORITOID               | 20.00              | 30.09 | 58.41 | 25.21            | 38.07 | 75.63  | 7-0398   |
| CHLORITOID               | 19.91              | 30.19 | 38.13 | 25.09            | 38.20 | 48.46  | 6-0158   |
| CHLORITOID               | 19.74              | 19.97 | 30.16 | 24.88            | 25.17 | 38.16  | 14-0062  |
| CHONDROTITE              | 39.67              | 40.04 | 52.69 | 50.47            | 50.96 | 67.78  | 14-0010  |
| CHROMITE                 | 35.63              | 57.61 | 63.74 | 45.22            | 74.52 | 83.12  | 3-0873   |
| CHROMITE SYN             | 35.77              | 47.61 | 57.22 | 45.40            | 60.95 | 73.98  | 4-0759   |
| CHRYSOBERYL              | 27.53              | 43.27 | 56.87 | 34.79            | 55.20 | 73.50  | 11-0448  |
| CHRYSOBERYL SYN          | 43.36              | 56.95 | 27.60 | 55.32            | 73.61 | 34.88  | 10-0082  |
| CHRYSOCOLLA              | 62.13              | 30.62 | 10.66 | 80.84            | 38.75 | 13.41  | 11-0322  |
| CHRYSOCOLLA              | 20.42              | 62.78 | 26.53 | 25.74            | 81.76 | 33.51  | 3-0219   |
| CHRYSOLITE (OLIVINE)     | 32.31              | 35.70 | 36.51 | 40.93            | 45.31 | 46.36  | 7-0156   |
| CINNABAR SYN             | 26.54              | 31.24 | 45.83 | 33.53            | 39.55 | 58.58  | 6-0256   |
| CLINOCLASITE             | 24.78              | 28.40 | 12.26 | 31.28            | 35.91 | 15.42  | 12-0297  |
| CLINOENSTATITE SYN       | 31.07              | 29.98 | 28.11 | 39.33            | 37.93 | 35.53  | 13-0415  |

| MINERAL                      | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |        |        | FILE NO. |
|------------------------------|--------------------|-------|-------|------------------|--------|--------|----------|
| CLINOHUMITE                  | 52.66              | 17.67 | 24.05 | 67.74            | 22.25  | 30.35  | 14-0692  |
| CLINOHUMITE SYN              | 39.94              | 52.56 | 32.34 | 50.83            | 67.61  | 40.97  | 14-0009  |
| CLINOZOISITE                 | 31.16              | 32.32 | 48.97 | 39.45            | 40.94  | 62.77  | 16-0705  |
| COBALTITE                    | 32.90              | 50.66 | 36.50 | 41.69            | 65.04  | 46.34  | 16-0624  |
| COFFINITE                    | 19.02              | 25.65 | 33.92 | 23.96            | 32.39  | 43.00  | 08-0304  |
| COFFINITE SYN                | 25.58              | 19.10 | 33.92 | 32.30            | 24.07  | 43.00  | 11-0420  |
| COLEMANITE                   | 28.50              | 15.70 | 23.08 | 36.03            | 19.76  | 29.12  | 6-0331   |
| COLORADOITE                  | 23.77              | 29.32 | 46.54 | 30.00            | 37.08  | 59.53  | 8-0026   |
| COLUMBITE (TANTALITE)        | 30.19              | 24.32 | 53.22 | 38.20            | 30.70  | 68.50  | 16-0337  |
| COPIAPITE                    | 8.42               | 25.96 | 29.16 | 10.59            | 32.79  | 36.88  | 11-0395  |
| COPPER                       | 43.33              | 50.48 | 74.20 | 55.28            | 64.80  | 98.57  | 4-0836   |
| CORDIERITE                   | 28.52              | 10.36 | 10.47 | 36.06            | 13.03  | 13.17  | 12-0303  |
| CORDIERITE                   | 10.31              | 26.37 | 29.38 | 12.96            | 33.31  | 37.16  | 9-0472   |
| CORDIERITE (HIGH) SYN        | 10.43              | 29.51 | 28.44 | 13.12            | 37.33  | 35.96  | 13-0293  |
| CORDIERITE (LOW) SYN         | 10.47              | 10.38 | 29.39 | 13.17            | 13.05  | 37.17  | 13-0294  |
| CORDIERITE (FE)              | 10.36              | 21.89 | 25.98 | 13.03            | 27.60  | 32.81  | 9-0473   |
| CORDIERITE MU SYN            | 25.85              | 48.89 | 19.68 | 32.65            | 62.66  | 24.80  | 14-0249  |
| CORONADITE                   | 28.78              | 25.64 | 60.02 | 36.39            | 32.38  | 77.87  | 7-0361   |
| CORUNDUM (ALPHA ALUMINA)     | 43.40              | 35.16 | 57.57 | 55.37            | 44.61  | 74.46  | 10-0173  |
| CORVUSITE                    | 50.66              | 39.48 | 29.64 | 55.04            | 50.22  | 37.49  | 15-0247  |
| COSALITE                     | 25.88              | 31.82 | 26.42 | 32.68            | 40.30  | 33.37  | 13-0502  |
| COVELLITE                    | 31.82              | 47.82 | 29.26 | 40.30            | 61.23  | 37.01  | 6-0464   |
| CREDNERITE                   | 33.54              | 36.96 | 31.36 | 42.51            | 46.94  | 39.70  | 14-0623  |
| CRISTOBALITE BETA HIGH       | 21.41              | 35.48 | 56.04 | 26.99            | 45.02  | 72.35  | 4-0359   |
| CRISTOBALITE LOW SYN         | 21.95              | 36.15 | 31.49 | 27.68            | 45.89  | 39.87  | 11-0695  |
| CRYOLITE                     | 46.78              | 32.52 | 58.76 | 59.84            | 41.20  | 76.11  | 1-1273   |
| CRYOLITE                     | 46.80              | 32.60 | 22.90 | 59.87            | 41.30  | 28.89  | 12-0257  |
| CRYPTOMELANE                 | 37.49              | 28.70 | 55.56 | 47.63            | 36.29  | 71.70  | 4-0778   |
| CRYPTOMELANE                 | 37.47              | 28.70 | 49.54 | 47.60            | 36.29  | 63.53  | 6-0547   |
| CRYPTOMELANE                 | 12.83              | 37.47 | 28.52 | 16.14            | 47.60  | 36.06  | 12-0706  |
| CUBANITE                     | 27.68              | 48.64 | 52.22 | 34.98            | 62.33  | 67.14  | 9-0324   |
| CUMMINGTONITE                | 32.56              | 29.09 | 10.56 | 41.25            | 36.79  | 13.28  | 7-0382   |
| CUMMINGTONITE (MN)           | 29.18              | 32.80 | 10.72 | 36.90            | 41.56  | 13.48  | 13-0376  |
| CUPRITE SYN                  | 36.45              | 42.33 | 61.40 | 46.28            | 53.96  | 79.81  | 5-0667   |
| CUPROBISMUTITE               | 29.06              | 32.78 | 27.42 | 36.75            | 41.53  | 34.65  | 8-0086   |
| CUPRODESCLOIZITE             | 56.02              | 28.50 | 31.24 | 72.33            | 36.03  | 39.55  | 13-0240  |
| CUPROSKLOKOWSKITE            | 10.80              | 21.70 | 30.06 | 13.58            | 27.36  | 38.03  | 8-0290   |
| CYANOTRICHITE                | 8.66               | 22.90 | 16.84 | 10.89            | 28.89  | 21.20  | 11-0131  |
| DAHLLITE (CARBONATE-APATITE) | 31.83              | 32.80 | 25.85 | 40.31            | 41.56  | 32.65  | 12-0529  |
| DAHLLITE (CARBONATE-APATITE) | 31.71              | 32.90 | 25.82 | 40.15            | 41.69  | 32.61  | 15-0100  |
| DANALITE                     | 26.58              | 47.04 | 41.18 | 33.58            | 60.19  | 52.45  | 11-0491  |
| DATOLITE                     | 28.67              | 31.33 | 41.24 | 36.25            | 39.67  | 52.53  | 11-0070  |
| DESCLOIZITE                  | 27.58              | 17.30 | 30.80 | 34.86            | 21.79  | 38.98  | 12-0537  |
| DIAMOND                      | 43.95              | 75.37 | 91.63 | 56.09            | 100.37 | 128.59 | 6-0675   |
| DIASPORE                     | 22.28              | 38.87 | 42.42 | 28.10            | 49.43  | 54.08  | 5-0355   |
| DICKITE                      | 24.28              | 12.37 | 38.78 | 30.64            | 15.56  | 49.31  | 10-0430  |
| DICKITE                      | 12.38              | 24.87 | 38.71 | 15.57            | 31.40  | 49.22  | 10-0446  |
| DIGENITE                     | 46.02              | 27.76 | 32.06 | 58.83            | 35.09  | 40.60  | 9-0064   |
| DIGENITE SYN                 | 46.02              | 54.58 | 32.06 | 58.83            | 70.35  | 40.60  | 4-0861   |

| MINERAL              | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |        | FILE NO. |
|----------------------|--------------------|-------|-------|------------------|-------|--------|----------|
| DIOPSIDE             | 29.87              | 35.51 | 30.91 | 37.79            | 45.06 | 39.13  | 11-0654  |
| DIOPSIDE             | 29.78              | 35.63 | 56.83 | 37.67            | 45.22 | 73.44  | 2-0656   |
| DIOPSIDE SYN         | 35.48              | 29.78 | 56.83 | 45.02            | 37.67 | 73.44  | 3-0860   |
| DIOPTASE             | 34.50              | 12.16 | 42.73 | 43.75            | 15.30 | 54.49  | 7-0172   |
| DOLOMITE             | 30.99              | 41.18 | 51.14 | 39.23            | 52.45 | 65.68  | 11-0078  |
| DOLOMITE (FERROAN)   | 30.84              | 41.04 | 50.36 | 39.04            | 52.27 | 64.63  | 12-0088  |
| DOMYKITE             | 44.14              | 48.10 | 46.02 | 56.34            | 61.60 | 58.83  | 9-0333   |
| DUFRENITE            | 28.12              | 17.54 | 26.04 | 35.55            | 22.09 | 32.89  | 8-0155   |
| DUMORTIERITE         | 35.16              | 15.02 | 17.40 | 44.61            | 18.90 | 21.91  | 7-0071   |
| DUNDASITE            | 11.18              | 24.70 | 28.86 | 14.06            | 31.18 | 36.49  | 21-0936  |
| DYSCRASITE           | 39.30              | 37.12 | 68.42 | 49.99            | 47.15 | 89.89  | 10-0452  |
| EMBOLITE             | 31.94              | 45.54 | 75.36 | 40.45            | 58.20 | 100.36 | 14-0255  |
| EMMONSITE            | 28.50              | 31.24 | 35.74 | 36.03            | 39.55 | 45.36  | 7-0404   |
| EMPLECTITE           | 28.76              | 29.54 | 27.86 | 36.37            | 37.37 | 35.21  | 3-0581   |
| EMPLECTITE           | 27.68              | 29.36 | 28.68 | 34.98            | 37.14 | 36.26  | 2-0516   |
| EMPLECTITE           | 29.26              | 27.60 | 28.50 | 37.01            | 34.88 | 36.03  | 10-0474  |
| ENARGITE             | 27.70              | 49.00 | 31.16 | 35.01            | 62.81 | 39.45  | 10-0436  |
| ENSTATITE            | 28.18              | 31.14 | 36.01 | 35.62            | 39.42 | 45.71  | 7-0216   |
| EPIDOTE              | 30.83              | 37.54 | 56.26 | 39.02            | 47.70 | 72.66  | 9-0438   |
| EPSOMITE             | 21.08              | 16.54 | 33.40 | 26.58            | 20.83 | 42.33  | 8-0467   |
| ERYTHRITE            | 13.31              | 54.73 | 27.70 | 16.75            | 70.56 | 35.01  | 11-0626  |
| ERYTHRITE            | 13.23              | 27.79 | 29.88 | 16.65            | 35.12 | 37.80  | 10-0480  |
| ESCHYNITE            | 29.98              | 29.54 | 28.69 | 37.93            | 37.37 | 36.28  | 15-0864  |
| EUCLASE              | 12.36              | 27.68 | 23.14 | 15.55            | 34.98 | 29.19  | 14-0065  |
| EUCRYPTITE           | 22.45              | 26.46 | 32.68 | 28.32            | 33.42 | 41.40  | 14-0667  |
| EUCRYPTITE (BETA)    | 25.21              | 47.50 | 55.97 | 31.83            | 60.80 | 72.26  | 13-0378  |
| EUDIALYTE            | 12.31              | 15.44 | 31.16 | 15.49            | 19.44 | 39.45  | 8-0355   |
| EUXENITE             | 29.88              | 24.32 | 30.30 | 37.80            | 30.70 | 38.34  | 9-0442   |
| FAYALITE             | 31.60              | 35.90 | 34.97 | 40.01            | 45.57 | 44.36  | 7-0164   |
| FAYALITE             | 31.73              | 35.92 | 51.45 | 40.18            | 45.59 | 66.10  | 9-0484   |
| FAYALITE SYN         | 36.07              | 31.73 | 25.16 | 45.79            | 40.18 | 31.77  | 9-0307   |
| FAYALITE SYN         | 31.63              | 35.92 | 25.01 | 40.05            | 45.59 | 31.57  | 11-0262  |
| FERBERITE            | 30.38              | 53.54 | 36.34 | 38.44            | 68.94 | 46.14  | 10-0449  |
| FERBERITE SYN        | 30.38              | 18.70 | 23.70 | 38.44            | 23.56 | 29.91  | 12-0729  |
| FERGUSONITE          | 28.58              | 30.16 | 47.82 | 36.14            | 38.16 | 61.23  | 9-0443   |
| FERRIMOLYBDITE       | 8.95               | 10.52 | 13.14 | 11.25            | 13.23 | 16.53  | 13-0191  |
| FERRIMOLYBDITE       | 11.95              | 39.32 | 26.74 | 15.03            | 50.02 | 33.78  | 15-0290  |
| FERRIMOLYBDITE       | 22.90              | 11.10 | 21.82 | 28.89            | 13.96 | 27.52  | 15-0371  |
| FERRIMOLYBDITE SYN   | 8.82               | 10.64 | 13.10 | 11.09            | 13.38 | 16.48  | 15-0289  |
| FLUORAPATITE SYN     | 31.96              | 33.15 | 32.29 | 40.48            | 42.01 | 40.90  | 15-0876  |
| FLUORITE SYN         | 47.06              | 28.30 | 55.82 | 60.22            | 35.78 | 72.05  | 4-0864   |
| FORSTERITE (OLIVINE) | 36.56              | 22.90 | 35.76 | 46.42            | 28.89 | 45.38  | 7-0074   |
| FORSTERITE (OLIVINE) | 32.32              | 35.71 | 36.53 | 40.94            | 45.32 | 46.38  | 7-0079   |
| FORSTERITE (OLIVINE) | 32.31              | 35.70 | 22.85 | 40.93            | 45.31 | 28.82  | 7-0075   |
| FORSTERITE SYN       | 36.56              | 35.73 | 22.92 | 46.42            | 45.35 | 28.91  | 4-0768   |
| FRANKLINITE          | 35.16              | 61.80 | 29.86 | 44.61            | 80.37 | 37.78  | 10-0467  |

| MINERAL             | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |        | FILE NO. |
|---------------------|--------------------|-------|-------|------------------|-------|--------|----------|
| GADOLINITE          | 28.76              | 32.04 | 35.30 | 36.37            | 40.58 | 44.79  | 8-0190   |
| GAHNITE (FE)        | 36.80              | 31.24 | 65.19 | 46.73            | 39.55 | 85.20  | 12-0267  |
| GAHNITE SYN         | 36.87              | 31.26 | 65.29 | 46.82            | 39.58 | 85.35  | 5-0669   |
| GALAXITE            | 36.37              | 30.83 | 58.41 | 46.18            | 39.02 | 75.63  | 12-0431  |
| GALENA SYN          | 30.10              | 25.98 | 43.09 | 38.09            | 32.81 | 54.96  | 5-0592   |
| GARNET (FE,MN)      | 34.22              | 58.65 | 30.62 | 43.39            | 75.96 | 38.75  | 10-0367  |
| GARNIERITE          | 9.02               | 60.95 | 33.82 | 11.34            | 79.18 | 42.87  | 2-0060   |
| GEHLENITE SYN       | 31.39              | 52.15 | 29.09 | 39.74            | 67.05 | 36.79  | 9-0216   |
| GEHLENITE SYN       | 31.39              | 51.95 | 29.27 | 39.74            | 66.78 | 67.21  | 4-0690   |
| GERHARDTITE         | 12.80              | 34.20 | 38.96 | 16.10            | 43.37 | 49.55  | 14-0687  |
| GIBBSITE SYN        | 18.41              | 20.46 | 20.66 | 23.19            | 25.79 | 26.04  | 12-0460  |
| GLAUBERITE          | 28.48              | 14.22 | 33.66 | 36.01            | 17.89 | 42.67  | 2-0556   |
| GLAUCONITE          | 8.75               | 34.67 | 19.60 | 11.00            | 43.97 | 24.70  | 9-0439   |
| GOETHITE            | 21.10              | 33.31 | 36.84 | 26.60            | 42.22 | 46.79  | 8-0097   |
| GOETHITE            | 21.26              | 36.84 | 33.31 | 26.80            | 46.79 | 42.22  | 3-0249   |
| GOLD                | 38.22              | 44.43 | 77.62 | 48.58            | 56.73 | 103.91 | 4-0784   |
| GOSLARITE           | 21.08              | 16.52 | 21.23 | 26.58            | 20.80 | 26.77  | 9-0395   |
| GRAPHITE            | 26.61              | 54.81 | 44.41 | 33.62            | 70.67 | 56.70  | 13-0148  |
| GRAPHITE SYN        | 26.45              | 54.56 | 77.47 | 33.41            | 70.33 | 103.67 | 12-0212  |
| GREENOCKITE         | 28.22              | 24.84 | 26.50 | 35.68            | 31.36 | 33.48  | 6-0314   |
| GROSSULARITE        | 33.80              | 58.34 | 30.16 | 42.85            | 75.53 | 38.16  | 3-0826   |
| GRUNERITE           | 10.61              | 32.33 | 29.06 | 13.34            | 40.95 | 36.75  | 17-0725  |
| GYPSUM              | 11.71              | 29.19 | 20.80 | 14.73            | 36.92 | 26.22  | 6-0046   |
| HALITE SYN          | 31.72              | 45.49 | 56.53 | 40.17            | 58.13 | 73.03  | 5-0628   |
| HALLOYSITE          | 20.13              | 11.96 | 20.46 | 25.37            | 15.04 | 25.79  | 13-0375  |
| HALOTRICHITE        | 18.58              | 25.56 | 20.68 | 23.41            | 32.28 | 26.07  | 11-0506  |
| HARMOTOME           | 10.74              | 12.34 | 14.15 | 13.51            | 15.52 | 17.81  | 9-0480   |
| HARMOTOME           | 28.61              | 33.18 | 33.56 | 36.17            | 42.05 | 42.54  | 13-0494  |
| HAUSMANNITE         | 36.22              | 32.56 | 58.82 | 45.98            | 41.25 | 76.20  | 1-1127   |
| HAUYNITE            | 23.92              | 34.09 | 13.73 | 30.19            | 43.22 | 17.28  | 2-0331   |
| HEDENBERGITE        | 30.06              | 35.44 | 35.02 | 38.03            | 44.97 | 44.43  | 16-0701  |
| HELVITE             | 26.45              | 46.65 | 40.83 | 33.41            | 59.67 | 51.99  | 15-0253  |
| HEMATITE            | 33.31              | 54.28 | 35.77 | 42.22            | 69.94 | 45.40  | 13-0537  |
| HEMIMORPHITE        | 28.76              | 13.40 | 27.08 | 36.37            | 16.86 | 34.22  | 5-0555   |
| HERCYNITE           | 36.68              | 59.15 | 65.04 | 46.58            | 76.66 | 84.99  | 7-0068   |
| HESSITE             | 38.96              | 31.14 | 40.04 | 49.55            | 39.42 | 50.96  | 12-0695  |
| HEULANDITE          | 22.38              | 9.93  | 30.06 | 28.23            | 12.49 | 38.03  | 13-0196  |
| HOLLANDITE          | 28.40              | 28.68 | 25.20 | 35.91            | 36.26 | 31.82  | 4-0590   |
| HOLLANDITE          | 40.98              | 28.50 | 28.68 | 52.19            | 36.03 | 36.26  | 4-0813   |
| HOLLANDITE          | 28.30              | 28.58 | 41.38 | 35.78            | 36.14 | 52.71  | 12-0514  |
| HORNBLende          | 33.18              | 28.89 | 26.37 | 42.05            | 36.53 | 33.31  | 9-0434   |
| HORNBLende          | 35.19              | 64.73 | 33.43 | 44.65            | 84.54 | 42.37  | 11-0493  |
| HUEBNERITE SYN      | 29.82              | 30.26 | 18.33 | 37.73            | 38.29 | 23.09  | 13-0434  |
| HUMITE              | 39.96              | 36.87 | 62.83 | 50.85            | 46.82 | 81.83  | 12-0755  |
| HYALOPHANE          | 27.70              | 27.02 | 23.60 | 35.01            | 34.14 | 29.78  | 11-0417  |
| HYDROMAGNESITE      | 15.30              | 30.83 | 42.02 | 19.26            | 39.02 | 53.55  | 8-0179   |
| HYDROMUSCOVITE      | 26.61              | 34.50 | 45.58 | 33.62            | 43.75 | 58.25  | 2-0462   |
| HYDROXYLAPATITE SYN | 31.80              | 32.22 | 32.93 | 40.27            | 40.81 | 41.73  | 9-0432   |
| HYPERSTHENE         | 27.88              | 30.94 | 62.31 | 35.24            | 39.16 | 81.09  | 2-0520   |

| MINERAL                | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |        |       | FILE NO. |
|------------------------|--------------------|-------|-------|------------------|--------|-------|----------|
| IDOCRASE               | 32.54              | 34.59 | 56.79 | 41.22            | 43.87  | 73.39 | 11-0145  |
| ILLITE                 | 19.91              | 26.53 | 34.91 | 25.09            | 33.51  | 44.28 | 9-0334   |
| ILLITE (IRIOCT.)       | 8.84               | 19.82 | 26.77 | 11.11            | 24.98  | 33.82 | 9-0343   |
| ILMENITE               | 32.68              | 53.26 | 35.34 | 41.40            | 68.56  | 44.84 | 3-0781   |
| ILVAITE                | 33.02              | 31.48 | 12.14 | 41.84            | 39.86  | 15.27 | 14-0067  |
| IODYRITE               | 23.70              | 39.12 | 22.32 | 29.91            | 49.75  | 28.15 | 9-0374   |
| IRIDOSMINE             | 40.40              | 47.04 | 68.42 | 51.43            | 60.19  | 89.89 | 17-0213  |
| IRON (ALPHA)           | 44.71              | 82.43 | 65.09 | 57.10            | 111.77 | 85.06 | 6-0696   |
| JADEITE                | 31.61              | 37.15 | 30.62 | 40.03            | 47.19  | 38.75 | 9-0463   |
| JAMESONITE             | 25.98              | 24.05 | 31.81 | 32.81            | 30.35  | 40.28 | 13-0461  |
| JAROSITE               | 28.96              | 28.68 | 39.30 | 36.62            | 36.26  | 49.99 | 10-0443  |
| KAINITE                | 28.22              | 29.54 | 32.78 | 35.68            | 37.37  | 41.53 | 14-0591  |
| KAOLINITE              | 62.64              | 38.61 | 20.46 | 81.56            | 49.09  | 25.79 | 12-0447  |
| KAOLINITE              | 12.34              | 62.36 | 24.88 | 15.52            | 81.16  | 31.41 | 14-0164  |
| KALIOPHILITE           | 28.89              | 34.59 | 42.42 | 36.53            | 43.87  | 54.08 | 11-0313  |
| KAOLINITE (DISORDERED) | 24.87              | 12.33 | 62.41 | 31.40            | 15.51  | 81.23 | 6-0221   |
| KIESERITE SYN          | 26.34              | 18.38 | 35.16 | 33.27            | 23.15  | 44.61 | 1-0638   |
| KYANITE                | 28.06              | 68.49 | 47.09 | 35.47            | 90.00  | 60.26 | 3-0513   |
| KYANITE (DISTHENE)     | 28.06              | 68.09 | 26.61 | 35.47            | 89.41  | 33.62 | 11-0046  |
| LABRADORITE            | 27.88              | 28.06 | 22.00 | 35.24            | 35.47  | 27.74 | 9-0465   |
| LABRADORITE            | 27.88              | 21.84 | 35.48 | 35.24            | 27.54  | 45.02 | 3-0499   |
| LANGBEINITE            | 28.48              | 21.98 | 33.80 | 36.01            | 27.72  | 42.85 | 17-0740  |
| LARNITE                | 32.02              | 32.63 | 32.20 | 40.55            | 41.34  | 40.79 | 9-0351   |
| LAWSONITE              | 34.14              | 59.60 | 32.82 | 43.29            | 77.28  | 41.58 | 13-0533  |
| LAZULITE               | 29.07              | 28.46 | 14.40 | 36.76            | 35.98  | 18.12 | 14-0137  |
| LEAD SYN               | 31.33              | 36.30 | 62.17 | 39.67            | 46.08  | 80.90 | 4-0686   |
| LEONITE SYN            | 15.08              | 37.94 | 46.52 | 18.98            | 48.22  | 59.50 | 17-0134  |
| LEPIDOCROCITE          | 14.14              | 27.08 | 36.34 | 17.79            | 34.22  | 46.14 | 8-0098   |
| LEPIDOLITE             | 8.91               | 26.77 | 34.36 | 11.20            | 33.82  | 43.57 | 10-0483  |
| LEPIDOLITE (120)       | 26.94              | 34.63 | 45.78 | 34.04            | 43.92  | 58.52 | 15-0062  |
| LEPIDOLITE (1M)        | 26.69              | 8.84  | 17.77 | 33.72            | 11.11  | 22.38 | 10-0485  |
| LEPIDOLITE (2M2)       | 34.81              | 45.61 | 8.84  | 44.15            | 58.29  | 11.11 | 14-0011  |
| LEPIDOLITE (3M)        | 26.85              | 34.83 | 8.84  | 33.92            | 44.18  | 11.11 | 10-0484  |
| LAUCITE                | 27.31              | 25.92 | 16.45 | 34.51            | 32.74  | 20.71 | 15-0047  |
| LIBETHENITE            | 18.42              | 34.06 | 15.12 | 23.20            | 43.18  | 29.03 | 8-0107   |
| LIBETHENITE SYN        | 18.42              | 34.06 | 30.70 | 23.20            | 43.18  | 38.86 | 1-0274   |
| LINARITE               | 28.58              | 25.20 | 50.96 | 36.14            | 31.82  | 65.44 | 4-0598   |
| LITHIOPHILITE          | 35.44              | 29.66 | 25.64 | 44.97            | 37.52  | 32.38 | 13-0336  |
| LOELLINGITE SYN        | 34.32              | 38.60 | 34.46 | 43.52            | 49.08  | 43.70 | 11-0699  |
| MAGHEMITE SYN          | 35.60              | 30.26 | 57.14 | 45.18            | 38.29  | 73.87 | 15-0615  |
| MAGNESIOFERRITE        | 35.52              | 30.16 | 62.68 | 45.07            | 38.16  | 81.62 | 17-0464  |
| MAGNESITE SYN          | 32.66              | 43.03 | 53.93 | 41.38            | 54.88  | 69.47 | 8-0479   |



| MINERAL                  | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |       | FILE NO. |
|--------------------------|--------------------|-------|-------|------------------|-------|-------|----------|
| MAGNETITE                | 35.48              | 57.06 | 62.64 | 45.02            | 73.76 | 81.56 | 11-0614  |
| MALACHITE SYN            | 31.31              | 24.10 | 17.54 | 39.64            | 30.42 | 22.09 | 10-0399  |
| MANGANITE                | 26.21              | 33.96 | 39.52 | 33.11            | 43.06 | 50.28 | 8-0099   |
| MANGANITE SYN            | 26.21              | 37.31 | 54.63 | 33.11            | 47.40 | 70.42 | 8-0016   |
| MANGANOSITE SYN          | 40.60              | 34.88 | 58.74 | 51.69            | 44.24 | 76.09 | 7-0230   |
| MARCASITE                | 33.05              | 51.95 | 25.90 | 41.88            | 66.78 | 32.71 | 3-0799   |
| MARGARITE                | 35.77              | 27.88 | 20.18 | 45.40            | 35.24 | 25.43 | 12-0188  |
| MASSICOT SYN             | 29.12              | 30.34 | 32.63 | 36.83            | 38.39 | 41.34 | 5-0570   |
| MELANOTEKITE             | 30.70              | 32.78 | 16.04 | 38.86            | 41.53 | 20.19 | 15-0633  |
| MELANTERITE              | 18.08              | 23.52 | 27.60 | 22.77            | 29.68 | 34.88 | 1-0255   |
| MERCURY                  | 32.66              | 40.42 | 63.68 | 41.38            | 51.45 | 83.04 | 9-0253   |
| MERWINITE                | 33.66              | 47.84 | 60.44 | 42.67            | 61.26 | 78.46 | 4-0728   |
| META-AUTUNITE I          | 10.44              | 24.64 | 42.82 | 13.13            | 31.10 | 54.60 | 12-0423  |
| METACINNABAR             | 26.68              | 43.74 | 51.77 | 33.71            | 55.82 | 66.54 | 6-0261   |
| METATORBERNITE           | 10.16              | 24.16 | 25.58 | 12.78            | 30.49 | 32.30 | 16-0404  |
| METATYUYAMUNITE          | 10.38              | 21.02 | 27.34 | 13.05            | 26.50 | 34.55 | 8-0287   |
| MIARGYRITE               | 30.92              | 25.80 | 32.52 | 39.14            | 32.58 | 41.20 | 4-0675   |
| MICROCLINE               | 27.49              | 21.10 | 23.22 | 34.74            | 26.60 | 29.30 | 10-0479  |
| MICROCLINE               | 27.36              | 20.90 | 41.82 | 34.57            | 26.35 | 53.29 | 12-0703  |
| MICROLITE                | 58.74              | 49.48 | 29.74 | 76.09            | 63.45 | 37.62 | 3-1139   |
| MILLERITE                | 32.23              | 48.89 | 35.73 | 40.82            | 62.66 | 45.35 | 12-0041  |
| MIMETITE                 | 29.26              | 29.74 | 43.24 | 37.01            | 37.62 | 55.16 | 13-0056  |
| MINUIM SYN               | 26.37              | 30.80 | 32.12 | 33.31            | 38.98 | 40.68 | 8-0019   |
| MIRABILITE               | 16.14              | 27.76 | 27.34 | 20.32            | 35.09 | 34.55 | 11-0647  |
| MOLYBDENITE (2H) SYN     | 14.38              | 39.48 | 49.76 | 18.10            | 50.22 | 63.83 | 6-0097   |
| MOLYBDENITE (3R)         | 14.52              | 33.02 | 58.34 | 18.27            | 41.84 | 75.53 | 17-0744  |
| MONAZITE                 | 28.86              | 31.14 | 27.00 | 36.49            | 39.42 | 34.11 | 11-0556  |
| MONTICELLITE             | 33.62              | 24.47 | 34.69 | 42.62            | 30.89 | 44.00 | 11-0353  |
| MONTICELLITE SYN         | 33.49              | 24.45 | 34.52 | 42.45            | 30.86 | 43.78 | 11-0129  |
| MONTMORILLONITE          | 7.43               | 19.95 | 35.05 | 9.34             | 25.14 | 44.47 | 2-0037   |
| MONTMORILLONITE          | 6.50               | 19.86 | 26.69 | 8.17             | 25.03 | 33.72 | 13-0259  |
| MONTMORILLONITE          | 5.89               | 19.73 | 17.70 | 7.40             | 24.86 | 22.29 | 13-0135  |
| MONTMORILLONITE          | 5.78               | 19.73 | 29.09 | 7.26             | 24.86 | 36.79 | 3-0009   |
| MONTMORILLONITE (ANHY)   | 19.82              | 27.70 | 9.12  | 24.98            | 35.01 | 11.47 | 7-0304   |
| MONTMORILLONITE (AL) SYN | 7.96               | 28.15 | 16.40 | 10.01            | 35.59 | 20.65 | 11-0303  |
| MONTMORILLONITE SYN      | 6.31               | 20.13 | 35.77 | 7.93             | 25.37 | 45.40 | 3-0016   |
| MOTTRAMITE               | 27.50              | 17.48 | 31.14 | 34.75            | 22.01 | 39.42 | 12-0538  |
| MULLITE                  | 26.29              | 25.99 | 40.91 | 33.21            | 32.82 | 52.10 | 15-0776  |
| MURDOCHITE               | 16.72              | 33.66 | 56.40 | 21.05            | 42.67 | 72.85 | 7-0028   |
| MUSCOVITE                | 26.85              | 8.89  | 34.97 | 33.92            | 11.18 | 44.36 | 6-0263   |
| MUSCOVITE (AMMONIUM) SYN | 19.73              | 8.50  | 35.05 | 24.86            | 10.69 | 44.47 | 13-0573  |
| MUSCOVITE (BA)           | 35.05              | 8.86  | 19.82 | 44.47            | 11.14 | 24.98 | 10-0490  |
| MUSCOVITE (LI)           | 31.39              | 26.77 | 34.77 | 39.74            | 33.82 | 44.10 | 10-0482  |
| MUSCOVITE (NAT. 3T)      | 8.87               | 26.76 | 17.77 | 11.15            | 33.81 | 22.38 | 7-0042   |
| MUSCOVITE (SYN 1M)       | 8.77               | 26.53 | 19.77 | 11.03            | 33.51 | 24.91 | 7-0025   |
| MUSCOVITE (SYN 2M)       | 8.83               | 26.60 | 35.02 | 11.10            | 33.60 | 44.43 | 7-0032   |
| NAGYAGITE                | 29.54              | 31.82 | 61.34 | 37.37            | 40.30 | 79.72 | 8-0003   |
| NATROJAROSITE            | 17.50              | 29.16 | 28.58 | 22.04            | 36.88 | 36.14 | 11-0302  |
| NATROLITE                | 31.27              | 15.02 | 20.27 | 39.59            | 18.90 | 25.55 | 3-0705   |

| MINERAL                  | TWO-THETA (COPPER) |       |        | TWO-THETA (IRON) |       |       | FILE NO. |
|--------------------------|--------------------|-------|--------|------------------|-------|-------|----------|
| NATROLITE (K) SYN        | 12.65              | 30.19 | 28.89  | 15.91            | 38.20 | 36.53 | 3-0062   |
| NEPHELINE                | 29.78              | 21.26 | 27.27  | 37.67            | 26.80 | 34.46 | 9-0458   |
| NEPHELINE (K)            | 29.10              | 20.90 | 22.11  | 36.80            | 26.35 | 27.88 | 12-0198  |
| NEPHELINE HYDRATE I SYN  | 26.21              | 20.23 | 30.30  | 33.11            | 25.50 | 38.34 | 10-0460  |
| NEPHELINE HYDRATE II SYN | 30.30              | 21.84 | 19.00  | 38.34            | 27.54 | 23.94 | 10-0459  |
| NEPHELINE III SYN        | 30.51              | 19.91 | 15.83  | 38.61            | 25.09 | 19.93 | 12-0247  |
| NEPHELINE SYN            | 29.51              | 22.98 | 27.07  | 37.33            | 28.99 | 34.20 | 9-0338   |
| NICCOLITE                | 33.69              | 46.30 | 50.39  | 42.71            | 59.21 | 64.67 | 9-0001   |
| NITER (NA) SYN           | 29.48              | 38.97 | 47.93  | 37.29            | 49.56 | 61.38 | 7-0271   |
| NITER SYN                | 23.54              | 23.86 | 29.45  | 29.70            | 30.11 | 37.25 | 5-0377   |
| NITROCALCITE             | 17.04              | 11.34 | 31.82  | 21.46            | 14.26 | 40.30 | 1-0229   |
| NONTRONITE               | 6.36               | 19.98 | 25.14  | 7.99             | 25.18 | 31.74 | 2-0027   |
| NONTRONITE               | 5.74               | 19.44 | 60.90  | 7.21             | 24.50 | 79.11 | 2-0008   |
| NONTRONITE               | 6.64               | 19.66 | 25.50  | 8.35             | 24.77 | 32.20 | 13-0508  |
| NOSEAN SYN               | 24.14              | 34.39 | 13.84  | 30.47            | 43.61 | 17.41 | 15-0470  |
| NOVACEKITE               | 8.66               | 24.84 | 17.50  | 10.89            | 31.36 | 22.04 | 8-0286   |
| OKENITE                  | 9.92               | 30.16 | 31.58  | 12.47            | 38.16 | 39.99 | 3-0029   |
| OKENITE                  | 4.20               | 10.04 | 24.98  | 5.28             | 12.62 | 31.54 | 9-0469   |
| OLIGOCLASE               | 28.06              | 22.06 | 27.88  | 35.47            | 27.82 | 35.24 | 9-0457   |
| OLIVENITE                | 29.98              | 18.41 | 14.99  | 37.93            | 23.19 | 18.87 | 4-0657   |
| ORPIMENT                 | 18.38              | 33.14 | 22.20  | 23.15            | 42.00 | 28.00 | 1-0273   |
| ORTHOCLASE               | 28.06              | 22.11 | 23.41  | 35.47            | 27.88 | 29.54 | 9-0462   |
| ORTHOCLASE (FE)          | 27.53              | 23.54 | 26.85  | 34.79            | 29.70 | 33.92 | 8-0048   |
| PALLADIUM                | 40.22              | 46.66 | 68.08  | 51.19            | 59.68 | 89.40 | 5-0681   |
| PARAGONITE               | 20.42              | 35.60 | 62.59  | 25.74            | 45.18 | 81.49 | 9-0428   |
| PARAGONITE               | 20.00              | 35.39 | 9.12   | 25.21            | 44.91 | 11.47 | 12-0165  |
| PARAGONITE               | 35.60              | 20.23 | 27.85  | 45.18            | 25.50 | 35.20 | 2-0187   |
| PARAGONITE SYN           | 62.78              | 35.77 | 28.06  | 81.76            | 45.40 | 35.47 | 10-0420  |
| PEARCEITE                | 29.74              | 31.48 | 28.68  | 37.62            | 39.86 | 36.26 | 8-0132   |
| PEARCEITE                | 30.06              | 31.94 | 36.34  | 38.03            | 40.45 | 46.14 | 8-0130   |
| PECTOLITE                | 30.61              | 28.80 | 22.80  | 38.74            | 36.42 | 28.76 | 12-0238  |
| PENNINITE                | 12.31              | 18.48 | 24.73  | 15.49            | 23.28 | 31.22 | 10-0183  |
| PENNINITE                | 6.22               | 31.50 | 18.80  | 7.82             | 39.88 | 23.69 | 10-0412  |
| PENTLANDITE              | 51.48              | 29.48 | 47.06  | 66.14            | 37.29 | 60.22 | 8-0090   |
| PERICLASE                | 42.94              | 62.36 | 109.84 | 54.76            | 81.16 | ***** | 4-0829   |
| PEROVSKITE               | 33.18              | 47.61 | 59.23  | 42.05            | 60.95 | 76.77 | 8-0091   |
| PEROVSKITE SYN           | 33.18              | 47.63 | 59.10  | 42.05            | 60.98 | 76.59 | 9-0365   |
| PETALITE                 | 23.85              | 24.25 | 25.34  | 30.10            | 30.61 | 32.00 | 12-0451  |
| PETZITE                  | 32.28              | 42.60 | 44.60  | 40.89            | 54.31 | 56.95 | 12-0424  |
| PHENAKITE                | 28.58              | 24.30 | 35.60  | 36.14            | 30.67 | 45.18 | 9-0431   |
| PHILLIPSITE              | 12.38              | 27.88 | 21.57  | 15.57            | 35.24 | 27.20 | 13-0455  |
| PHLOGOPITE               | 8.73               | 26.51 | 34.17  | 10.98            | 33.49 | 43.33 | 10-0493  |
| PHLOGOPITE (1M)          | 8.90               | 26.62 | 34.30  | 11.19            | 33.63 | 43.49 | 10-0495  |
| PHLOGOPITE (3T SYN)      | 8.70               | 26.31 | 39.67  | 10.94            | 33.23 | 50.47 | 10-0481  |
| PHLOGOPITE (3T)          | 8.73               | 26.58 | 45.13  | 10.98            | 33.58 | 57.65 | 10-0492  |
| PHLOGOPITE (BORON SYN)   | 8.67               | 26.39 | 34.24  | 10.90            | 33.34 | 43.42 | 14-0466  |
| PHLOGOPITE SYN           | 26.85              | 8.88  | 45.39  | 33.92            | 11.16 | 58.00 | 16-0352  |
| PHLOGOPITE SYN           | 8.88               | 26.77 | 45.44  | 11.16            | 33.82 | 58.06 | 16-0344  |

| MINERAL            | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |        | FILE NO. |
|--------------------|--------------------|-------|-------|------------------|-------|--------|----------|
| PHOSGENITE         | 32.06              | 24.64 | 35.02 | 40.60            | 31.10 | 44.43  | 12-0218  |
| PICKERINGITE       | 18.38              | 25.34 | 20.54 | 23.15            | 32.00 | 25.89  | 12-0299  |
| PICROCHROMITE SYN  | 35.74              | 18.43 | 43.44 | 45.36            | 23.22 | 55.42  | 10-0351  |
| PIGEONITE          | 29.57              | 30.79 | 27.79 | 37.41            | 38.97 | 35.12  | 13-0421  |
| PLAGIOCLASE        | 27.88              | 22.11 | 23.79 | 35.24            | 27.88 | 30.02  | 9-0456   |
| PLAGIOCLASE SYN    | 27.88              | 22.06 | 23.73 | 35.24            | 27.82 | 29.94  | 10-0360  |
| PLATINUM           | 39.80              | 46.27 | 81.33 | 50.64            | 59.17 | 109.93 | 4-0802   |
| PLATTNERITE        | 29.42              | 31.92 | 48.92 | 32.10            | 40.42 | 62.70  | 8-0185   |
| PLUMBICJAROSITE    | 32.04              | 8.10  | 40.22 | 40.58            | 10.18 | 51.19  | 15-0648  |
| POLLUCITE          | 26.02              | 30.72 | 24.35 | 32.86            | 38.88 | 30.73  | 15-0317  |
| POLYBASITE         | 29.74              | 27.94 | 31.02 | 37.62            | 35.32 | 39.27  | 8-0123   |
| POLYHALITE         | 30.70              | 30.94 | 28.10 | 38.86            | 39.16 | 35.52  | 13-0526  |
| POTASH ALUM        | 20.65              | 27.42 | 21.91 | 26.03            | 34.65 | 27.63  | 7-0017   |
| PGMPELLYITE        | 30.80              | 23.45 | 32.60 | 38.98            | 29.59 | 41.30  | 10-0447  |
| POWELLITE          | 28.80              | 47.11 | 18.64 | 36.42            | 60.28 | 23.48  | 7-0212   |
| PREHNITE           | 28.94              | 35.16 | 25.58 | 36.60            | 44.61 | 32.30  | 7-0333   |
| PROUSTITE SYN      | 32.66              | 36.18 | 27.24 | 41.38            | 45.93 | 34.42  | 11-0470  |
| PSEUDOBROODITE SYN | 25.58              | 32.52 | 17.94 | 32.30            | 41.20 | 22.60  | 9-0182   |
| PSILOMELANE        | 37.28              | 41.18 | 25.58 | 47.36            | 52.45 | 32.30  | 14-0627  |
| PYRRARGYRITE SYN   | 32.17              | 34.88 | 27.68 | 40.75            | 44.24 | 34.98  | 14-0280  |
| PYRITE SYN         | 56.34              | 33.07 | 37.10 | 72.77            | 41.91 | 47.12  | 6-0710   |
| PYROCHLORE         | 29.78              | 49.60 | 58.90 | 37.67            | 63.61 | 76.31  | 13-0254  |
| PYROLUSITE         | 28.42              | 37.31 | 56.45 | 35.93            | 47.40 | 72.92  | 12-0716  |
| PYROMORPHITE       | 30.16              | 29.86 | 43.68 | 38.16            | 37.78 | 55.74  | 12-0704  |
| PYROPE             | 34.77              | 60.08 | 92.19 | 44.10            | 77.96 | 129.73 | 2-1008   |
| PYROPE SYN         | 35.02              | 31.22 | 60.47 | 44.43            | 39.52 | 78.50  | 15-0742  |
| PYROPHYLLITE       | 29.38              | 19.42 | 9.68  | 37.16            | 24.47 | 12.17  | 2-0613   |
| PYROPHYLLITE       | 29.09              | 20.04 | 37.15 | 36.79            | 25.26 | 47.19  | 3-0574   |
| PYROPHYLLITE       | 28.99              | 9.60  | 19.38 | 36.66            | 12.07 | 24.42  | 12-0203  |
| PYROSTILPNITE      | 31.36              | 33.80 | 37.12 | 39.70            | 42.85 | 47.15  | 8-0129   |
| PYRRHOTITE SYN     | 43.95              | 30.09 | 33.82 | 56.09            | 38.07 | 42.87  | 1-1247   |
| QUARTZ (ALPHA)     | 26.66              | 20.85 | 50.21 | 33.68            | 26.28 | 64.43  | 5-0490   |
| QUARTZ (BETA)      | 26.21              | 20.46 | 49.63 | 33.11            | 25.79 | 63.65  | 11-0252  |
| QUARTZ (BETA)      | 26.05              | 49.25 | 58.82 | 32.90            | 63.14 | 76.20  | 7-0346   |
| RAMMELSBERGITE SYN | 35.16              | 36.20 | 31.48 | 44.61            | 45.96 | 39.86  | 11-0014  |
| RAMSDELLITE        | 21.86              | 38.78 | 35.16 | 27.57            | 49.31 | 44.61  | 11-0055  |
| RAMSDELLITE        | 21.82              | 35.16 | 55.28 | 27.52            | 44.61 | 71.31  | 7-0222   |
| REALGAR            | 16.42              | 27.97 | 30.40 | 20.67            | 35.36 | 38.47  | 9-0441   |
| RHODOCHROSITE SYN  | 31.50              | 24.32 | 51.86 | 39.88            | 30.70 | 66.66  | 7-0268   |
| RHODONITE          | 32.29              | 29.98 | 30.57 | 40.90            | 37.93 | 38.69  | 13-0138  |
| RICKARDITE         | 43.68              | 26.58 | 35.16 | 55.74            | 33.58 | 44.61  | 6-0661   |
| RIEBECKITE         | 10.51              | 32.94 | 28.89 | 13.22            | 41.74 | 36.53  | 14-0230  |
| RIEBECKITE SYN     | 10.53              | 28.72 | 32.82 | 13.24            | 36.32 | 41.58  | 15-0516  |
| ROCKBRIDGEITE      | 27.94              | 26.26 | 57.92 | 35.32            | 33.17 | 74.95  | 8-0159   |
| ROSASITE           | 24.16              | 34.60 | 17.58 | 30.49            | 43.88 | 22.14  | 17-0216  |
| ROSCOEILITE        | 8.82               | 19.54 | 26.58 | 11.09            | 24.62 | 33.58  | 10-0496  |
| RUTHERFORDINE SYN  | 19.44              | 20.88 | 27.94 | 24.50            | 26.32 | 35.32  | 9-0163   |
| RUTILE             | 27.49              | 54.38 | 36.09 | 34.74            | 70.08 | 45.81  | 4-0551   |

| MINERAL             | TWO-THETA (COPPER) |       |        | TWO-THETA (IRON) |        |        | FILE NO. |
|---------------------|--------------------|-------|--------|------------------|--------|--------|----------|
| SAFFLORITE          | 34.70              | 34.88 | 38.10  | 44.01            | 44.24  | 48.42  | 11-0140  |
| SANIDINE            | 27.37              | 27.71 | 23.73  | 34.59            | 35.02  | 29.94  | 13-0456  |
| SANIDINE (HIGH) SYN | 27.49              | 27.77 | 23.75  | 34.74            | 35.10  | 29.97  | 10-0357  |
| SANIDINE (HIGH) SYN | 26.79              | 23.48 | 27.68  | 33.85            | 29.63  | 34.98  | 10-0353  |
| SANTAFEITE          | 5.92               | 11.84 | 33.14  | 7.44             | 14.89  | 42.00  | 11-0169  |
| SAPONITE            | 4.70               | 60.25 | 34.36  | 5.91             | 78.19  | 43.57  | 6-0002   |
| SAPONITE            | 5.32               | 60.95 | 19.68  | 6.69             | 79.18  | 24.80  | 11-0056  |
| SAPONITE            | 6.22               | 60.51 | 24.25  | 7.82             | 78.56  | 30.61  | 13-0086  |
| SAPONITE SYN        | 5.20               | 26.45 | 60.29  | 6.54             | 33.41  | 78.25  | 12-0168  |
| SAPONITE, FE RICH   | 5.67               | 60.38 | 19.47  | 7.13             | 78.38  | 24.53  | 12-0160  |
| SCAPOLITE           | 25.90              | 29.48 | 23.54  | 32.71            | 37.29  | 29.70  | 2-0412   |
| SCAPOLITE           | 25.72              | 29.10 | 23.26  | 32.48            | 36.80  | 29.35  | 14-0170  |
| SCAPOLITE           | 25.67              | 28.99 | 43.73  | 32.42            | 36.66  | 55.80  | 2-0405   |
| SCAWITE             | 29.36              | 47.88 | 29.58  | 37.14            | 61.31  | 37.42  | 10-0400  |
| SCAWITE             | 29.46              | 29.84 | 14.78  | 37.26            | 37.75  | 18.60  | 12-0777  |
| SCHHEELITE          | 28.80              | 18.64 | 29.07  | 36.42            | 23.48  | 36.76  | 7-0210   |
| SCHHEELITE          | 28.70              | 57.77 | 46.83  | 36.29            | 74.74  | 59.91  | 8-0145   |
| SCHOEPIITE          | 12.14              | 17.44 | 25.88  | 15.27            | 21.96  | 32.68  | 13-0407  |
| SCHOEPIITE          | 12.03              | 24.30 | 27.50  | 15.13            | 30.67  | 34.75  | 13-0241  |
| SCHREIBERSITE       | 41.18              | 42.82 | 46.02  | 52.45            | 54.60  | 58.83  | 16-0707  |
| SCHROECKERITE SYN   | 12.18              | 18.46 | 10.42  | 15.32            | 23.25  | 13.10  | 8-0397   |
| SCORODITE           | 15.92              | 19.98 | 28.22  | 20.04            | 25.18  | 35.68  | 5-0216   |
| SEPIOLITE           | 7.31               | 35.05 | 20.63  | 9.19             | 44.47  | 26.00  | 13-0595  |
| SEPIOLITE           | 7.19               | 33.56 | 36.07  | 9.04             | 42.54  | 45.79  | 14-0001  |
| SERICITE            | 8.88               | 19.86 | 26.85  | 11.16            | 25.03  | 33.92  | 2-0056   |
| SERPENTINE          | 12.48              | 25.08 | 37.85  | 15.70            | 31.66  | 48.10  | 11-0388  |
| SERPENTINE          | 12.07              | 24.32 | 35.89  | 15.18            | 30.70  | 45.55  | 9-0444   |
| SERPENTINE SYN      | 35.88              | 12.21 | 24.59  | 45.54            | 15.36  | 31.04  | 11-0386  |
| SERPENTINE (AL)     | 12.48              | 36.04 | 25.05  | 15.70            | 45.75  | 31.63  | 13-0004  |
| SERPENTINE (AL)     | 12.43              | 37.82 | 25.01  | 15.64            | 48.06  | 31.57  | 13-0583  |
| SERPENTINE (AL) SYN | 24.94              | 60.25 | 12.34  | 31.49            | 78.19  | 15.52  | 11-0096  |
| SERPIERITE          | 8.82               | 17.72 | 26.34  | 11.09            | 22.32  | 33.27  | 14-0188  |
| SHATTUCKITE         | 20.02              | 26.92 | 17.90  | 25.23            | 34.01  | 22.55  | 13-0507  |
| SIDERITE            | 32.08              | 52.79 | 111.79 | 40.63            | 67.92  | *****  | 8-0133   |
| SIDERITE SYN        | 32.09              | 52.92 | 52.76  | 40.64            | 68.09  | 67.88  | 12-0531  |
| SILLIMANITE         | 26.53              | 41.02 | 26.13  | 33.51            | 52.24  | 33.00  | 10-0369  |
| SILVER              | 38.15              | 44.31 | 77.55  | 48.49            | 56.57  | 103.80 | 4-0783   |
| SKLODOWSKITE        | 10.49              | 21.18 | 27.24  | 13.19            | 26.70  | 34.42  | 8-0447   |
| SKUTTERUDITE        | 34.36              | 49.51 | 56.98  | 43.57            | 63.49  | 73.65  | 10-0497  |
| SKUTTERUDITE SYN    | 34.60              | 41.16 | 49.68  | 43.88            | 52.42  | 63.72  | 10-0328  |
| SMITHSONITE         | 32.52              | 25.06 | 53.88  | 41.20            | 31.64  | 69.40  | 8-0449   |
| SODALITE            | 24.52              | 43.51 | 14.06  | 30.95            | 55.51  | 17.69  | 3-0338   |
| SODA-NITER SYN      | 29.46              | 38.96 | 47.84  | 37.26            | 49.55  | 61.26  | 7-0271   |
| SODDYITE            | 19.40              | 14.08 | 26.50  | 24.45            | 17.72  | 33.48  | 8-0195   |
| SODDYITE            | 26.82              | 19.80 | 14.42  | 33.88            | 24.95  | 18.15  | 12-0180  |
| SPANGOLITE          | 12.45              | 24.78 | 35.30  | 15.66            | 31.28  | 44.79  | 5-0142   |
| SPERRYLITE          | 50.66              | 84.10 | 29.96  | 65.04            | 114.62 | 37.91  | 9-0452   |
| SPESSARTITE         | 34.50              | 59.65 | 91.09  | 43.75            | 77.35  | 127.51 | 2-0992   |
| SPESSARTITE SYN     | 34.50              | 59.36 | 57.06  | 43.75            | 76.95  | 73.76  | 10-0354  |

| MINERAL               | TWO-THETA (COPPER) |       |        | TWO-THETA (IRON) |       |       | FILE NO. |
|-----------------------|--------------------|-------|--------|------------------|-------|-------|----------|
| SPHALERITE SYN        | 28.58              | 47.56 | 56.34  | 36.14            | 60.88 | 72.77 | 5-0566   |
| SPHENE                | 27.59              | 29.89 | 34.56  | 34.87            | 37.82 | 43.83 | 11-0142  |
| SPINEL (LI) SYN       | 35.74              | 30.35 | 63.11  | 45.36            | 38.41 | 82.23 | 13-0207  |
| SPINEL (LI)           | 37.63              | 66.82 | 49.83  | 47.81            | 87.56 | 58.58 | 3-0911   |
| SPINEL (MN)           | 34.09              | 17.39 | 28.89  | 43.22            | 21.90 | 36.53 | 4-0732   |
| SPINEL (MN,NI)        | 35.48              | 62.78 | 43.29  | 45.02            | 81.76 | 55.22 | 1-1110   |
| SPINEL SYN            | 36.90              | 44.85 | 65.29  | 46.86            | 57.28 | 85.35 | 5-0672   |
| SPINEL SYN            | 36.84              | 65.24 | 31.16  | 46.79            | 85.27 | 39.45 | 2-0175   |
| SPODUMENE (ALPHA)     | 30.51              | 31.96 | 58.90  | 38.61            | 40.48 | 76.31 | 9-0468   |
| SPODUMENE (ALPHA) SYN | 30.19              | 31.61 | 36.22  | 38.20            | 40.03 | 45.98 | 9-0029   |
| SPODUMENE (BETA) SYN  | 25.54              | 22.68 | 48.36  | 32.25            | 28.61 | 61.95 | 13-0251  |
| SPURRITE              | 33.17              | 34.02 | 29.59  | 42.04            | 43.13 | 37.43 | 13-0496  |
| STANNITE              | 28.61              | 47.29 | 56.00  | 36.17            | 60.52 | 72.30 | 11-0062  |
| STAUROLITE            | 29.66              | 33.27 | 37.93  | 37.52            | 42.16 | 48.20 | 15-0397  |
| STEPHANITE            | 28.96              | 34.74 | 30.92  | 36.62            | 44.06 | 39.14 | 11-0108  |
| STERNBERGITE          | 20.68              | 32.06 | 27.68  | 26.07            | 40.60 | 34.98 | 11-0061  |
| STETEFELDITE          | 29.54              | 34.32 | 48.92  | 37.37            | 43.52 | 62.70 | 8-0012   |
| STIBICONITE           | 30.16              | 14.92 | 50.36  | 38.16            | 18.78 | 64.63 | 10-0388  |
| STIBNITE SYN          | 32.40              | 29.26 | 25.00  | 41.04            | 37.01 | 31.56 | 6-0474   |
| STILBITE              | 21.76              | 9.70  | 18.94  | 27.44            | 12.20 | 23.86 | 10-0433  |
| STILPNOMELANE         | 7.43               | 6.80  | 22.00  | 9.34             | 8.55  | 27.74 | 17-0505  |
| STOLZITE              | 27.50              | 55.30 | 44.82  | 34.75            | 71.34 | 57.24 | 8-0108   |
| STOLZITE SYN          | 27.42              | 44.82 | 55.30  | 34.65            | 57.24 | 71.34 | 8-0476   |
| STROMEYERITE          | 34.32              | 26.74 | 43.68  | 43.52            | 33.78 | 55.74 | 9-0499   |
| STRONTIANITE SYN      | 25.19              | 25.82 | 44.11  | 31.80            | 32.61 | 56.30 | 5-0418   |
| SULPHUR               | 27.10              | 13.31 | 23.79  | 34.24            | 16.75 | 30.02 | 13-0141  |
| SYLVANITE             | 29.26              | 42.20 | 40.04  | 37.01            | 53.79 | 50.96 | 9-0477   |
| SYLVITE               | 28.37              | 40.56 | 50.24  | 35.87            | 51.64 | 64.47 | 4-0587   |
| TALC                  | 36.07              | 19.38 | 60.51  | 45.79            | 24.42 | 78.56 | 3-0881   |
| TALC                  | 9.47               | 28.65 | 19.04  | 11.91            | 36.23 | 23.99 | 13-0558  |
| TANTALUM              | 38.60              | 69.58 | 121.34 | 49.08            | 91.60 | ***** | 4-0788   |
| TELLURIUM             | 27.60              | 38.26 | 40.22  | 34.88            | 48.63 | 51.19 | 4-0554   |
| TELLUROBISMUTHITE     | 27.68              | 37.76 | 41.18  | 34.98            | 47.98 | 52.45 | 15-0863  |
| TENNANTITE            | 30.40              | 50.69 | 60.29  | 38.47            | 65.08 | 78.25 | 11-0102  |
| TENORITE              | 35.60              | 38.78 | 35.44  | 45.18            | 49.31 | 44.97 | 5-0661   |
| TETRADYMITE           | 28.68              | 39.32 | 55.66  | 36.26            | 50.02 | 71.83 | 9-0447   |
| TETRAHEDRITE          | 29.78              | 49.80 | 59.10  | 37.67            | 63.88 | 76.59 | 11-0107  |
| THAUMASITE            | 9.14               | 23.46 | 19.36  | 11.49            | 29.60 | 24.39 | 13-0156  |
| THENARDITE            | 32.16              | 19.02 | 28.74  | 40.73            | 23.96 | 36.34 | 5-0631   |
| THOMSONITE            | 31.27              | 30.19 | 33.43  | 39.59            | 38.20 | 42.37 | 9-0490   |
| THORITE               | 18.96              | 25.08 | 33.82  | 23.89            | 31.66 | 42.87 | 11-0172  |
| THORITE SYN           | 25.08              | 18.80 | 33.49  | 31.66            | 23.69 | 42.45 | 11-0419  |
| THURINGITE            | 12.81              | 25.50 | 19.14  | 16.12            | 32.20 | 24.12 | 3-0067   |
| TILLEYITE             | 29.66              | 28.76 | 47.84  | 37.52            | 36.37 | 61.26 | 13-0416  |
| TIN (BETA)            | 30.64              | 32.01 | 44.90  | 38.78            | 40.54 | 57.35 | 4-0673   |
| TOPAZ                 | 30.43              | 27.92 | 24.10  | 38.51            | 35.29 | 30.42 | 12-0765  |
| TORBERNITE SYN        | 8.58               | 17.94 | 24.84  | 10.79            | 22.60 | 31.36 | 8-0360   |
| TOURMALINE            | 34.83              | 22.28 | 30.18  | 44.18            | 28.10 | 38.19 | 14-0076  |
| TREMOLITE             | 10.56              | 28.60 | 33.12  | 13.28            | 36.16 | 41.97 | 13-0437  |

| MINERAL                | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |       | FILE NO. |
|------------------------|--------------------|-------|-------|------------------|-------|-------|----------|
| TREMOLITE (FLUOR) SYN  | 10.57              | 28.74 | 32.06 | 13.29            | 36.34 | 40.60 | 9-0330   |
| TRIDYMITE              | 21.68              | 20.61 | 23.35 | 27.34            | 25.98 | 29.46 | 16-0152  |
| TRIDYMITE              | 20.81              | 21.81 | 23.41 | 26.23            | 27.50 | 29.54 | 14-0260  |
| TROILITE               | 43.29              | 33.69 | 53.29 | 55.22            | 42.71 | 68.60 | 11-0151  |
| TROILITE (PYRRHO.) SYN | 43.95              | 30.09 | 33.82 | 56.09            | 38.07 | 42.87 | 1-1247   |
| TROILITE (PYRRHO.) SYN | 43.29              | 29.98 | 33.56 | 55.22            | 37.93 | 42.54 | 4-0832   |
| TRONA                  | 33.66              | 28.98 | 8.94  | 42.67            | 36.65 | 11.24 | 11-0643  |
| TUNGSTITE              | 25.50              | 33.40 | 35.02 | 32.20            | 42.33 | 44.43 | 6-0242   |
| TURQUIS                | 24.16              | 30.70 | 14.34 | 30.49            | 38.86 | 18.05 | 6-0214   |
| TYUYAMUNITE            | 8.66               | 17.64 | 27.86 | 10.89            | 22.22 | 35.21 | 6-0017   |
| ULEXITE                | 7.24               | 11.41 | 14.75 | 9.10             | 14.35 | 18.56 | 12-0419  |
| URANINITE              | 28.86              | 33.28 | 47.84 | 36.49            | 42.18 | 61.26 | 13-0225  |
| URANINITE SYN          | 28.22              | 47.04 | 32.64 | 35.68            | 60.19 | 41.35 | 5-0550   |
| URANOPHANE             | 11.22              | 22.54 | 29.84 | 14.11            | 28.43 | 37.75 | 8-0442   |
| UVANITE                | 30.38              | 53.54 | 40.22 | 38.44            | 68.94 | 51.19 | 8-0322   |
| UVAROVITE              | 33.40              | 29.74 | 57.56 | 42.33            | 37.62 | 74.45 | 11-0696  |
| VANADINITE             | 29.84              | 29.06 | 26.34 | 37.75            | 36.75 | 33.27 | 13-0585  |
| VERMICULITE            | 6.31               | 25.82 | 60.47 | 7.93             | 32.61 | 78.50 | 10-0439  |
| VERMICULITE            | 6.22               | 60.60 | 19.42 | 7.82             | 78.68 | 24.47 | 16-0613  |
| VESUVIANITE            | 32.50              | 34.56 | 56.74 | 41.17            | 43.83 | 73.32 | 11-0145  |
| VIVIANITE SYN          | 13.02              | 30.09 | 33.05 | 16.38            | 38.07 | 41.88 | 3-0070   |
| VOLTAITE               | 25.14              | 26.10 | 15.90 | 31.74            | 32.97 | 20.02 | 17-0539  |
| WAVELLITE              | 10.53              | 25.88 | 27.86 | 13.24            | 32.68 | 35.21 | 2-0075   |
| WAVELLITE              | 25.88              | 27.34 | 10.30 | 32.68            | 34.55 | 12.95 | 17-0203  |
| WEDDELLITE             | 14.32              | 32.16 | 40.08 | 18.02            | 40.73 | 51.01 | 17-0541  |
| WEISSITE               | 43.24              | 24.78 | 45.06 | 55.16            | 31.28 | 57.56 | 10-0421  |
| WHEWELLITE             | 14.87              | 24.36 | 38.10 | 18.72            | 30.75 | 48.42 | 6-0106   |
| WILLEMITE              | 34.06              | 31.58 | 25.50 | 43.18            | 39.99 | 32.20 | 8-0492   |
| WITHERITE SYN          | 23.92              | 24.18 | 42.02 | 30.19            | 30.52 | 53.55 | 5-0378   |
| WOLFRAMITE             | 30.27              | 36.18 | 18.64 | 38.30            | 45.93 | 23.48 | 11-0591  |
| WOLFRAMITE SYN         | 30.11              | 30.34 | 18.56 | 38.10            | 38.39 | 23.38 | 12-0727  |
| WOLLASTONITE           | 30.09              | 23.22 | 25.30 | 38.07            | 29.30 | 31.94 | 10-0487  |
| WULFENITE              | 27.60              | 44.82 | 55.66 | 34.88            | 57.24 | 71.83 | 8-0110   |
| WURTZITE               | 28.61              | 47.77 | 56.60 | 36.17            | 61.16 | 73.13 | 12-0688  |
| XANTHOCONITE           | 29.76              | 31.70 | 28.40 | 37.65            | 40.14 | 35.91 | 8-0134   |
| XENOTIME               | 25.82              | 35.05 | 51.70 | 32.61            | 44.47 | 66.44 | 11-0254  |
| YTTROTANTALITE         | 30.26              | 50.36 | 59.60 | 38.29            | 64.63 | 77.28 | 11-0116  |
| ZARATITE               | 17.48              | 9.93  | 36.64 | 22.01            | 12.49 | 46.53 | 16-0164  |
| ZINCITE SYN            | 36.18              | 31.70 | 34.46 | 45.93            | 40.14 | 43.70 | 5-0664   |
| ZINC                   | 43.23              | 36.29 | 38.99 | 55.14            | 46.07 | 49.58 | 4-0831   |



| MINERAL       | TWO-THETA (COPPER) |       |       | TWO-THETA (IRON) |       |       | FILE NO. |
|---------------|--------------------|-------|-------|------------------|-------|-------|----------|
| ZINKOSITE SYN | 25.14              | 21.28 | 33.80 | 31.74            | 26.83 | 42.85 | 8-0491   |
| ZINNWALDITE   | 27.10              | 9.02  | 45.83 | 34.24            | 11.34 | 58.58 | 13-0227  |
| ZIRCON        | 27.00              | 20.02 | 35.66 | 34.11            | 25.23 | 45.26 | 6-0266   |
| ZOISITE       | 31.17              | 33.14 | 57.02 | 39.46            | 42.00 | 73.70 | 11-0665  |
| ZOISITE SYN   | 33.27              | 31.12 | 22.06 | 42.16            | 39.40 | 27.82 | 13-0562  |
| ZUNYITE       | 10.95              | 21.08 | 33.41 | 13.77            | 26.58 | 42.35 | 14-0698  |

| TWO-THETA (IRON) |       |       |       |        |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|--------|-------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 3.64             | 7.67  | 11.47 | 15.36 | 30.86  | 23.04 | 50                 | 100 | 20  | 20  | 20  | 15  | CHLORITE-MONT.           | 7-0027   |
| 3.74             | 7.55  | 22.76 | 80.06 | 15.21  | 34.14 | 50                 | 100 | 50  | 40  | 25  | 25  | CHLORITE AL-MONT.        | 7-0051   |
| 5.28             | 12.62 | 31.54 | 38.57 | 36.75  | 37.01 | 100                | 80  | 80  | 80  | 60  | 60  | OKENITE                  | 9-0469   |
| 5.91             | 78.19 | 43.57 | 12.22 | 24.58  | 31.13 | 100                | 70  | 60  | 50  | 50  | 50  | SAPONITE                 | 6-0002   |
| 6.54             | 33.41 | 78.25 | 13.09 | 24.42  | 19.60 | 100                | 80  | 70  | 50  | 50  | 40  | SAPONITE SYN             | 12-0168  |
| 6.69             | 79.18 | 24.80 | 44.10 | 95.37  | 30.35 | 100                | 90  | 80  | 50  | 50  | 40  | SAPONITE                 | 11-0056  |
| 7.13             | 78.38 | 24.53 | 43.22 | *****  | ***** | 100                | 50  | 40  | 30  | *** | *** | SAPONITE, FE RICH        | 12-0160  |
| 7.21             | 24.50 | 79.11 | 43.00 | 44.43  | 46.94 | 100                | 100 | 100 | 80  | 80  | 40  | NONTRONITE               | 2-0008   |
| 7.26             | 24.86 | 36.79 | 43.57 | 44.65  | 70.42 | 100                | 100 | 100 | 100 | 100 | 100 | MONTMORILLONITE          | 3-0009   |
| 7.34             | 25.10 | 37.39 | 43.70 | 45.75  | 71.83 | 100                | 100 | 100 | 100 | 100 | 100 | BEIDELLITE               | 3-0013   |
| 7.40             | 24.70 | 22.48 | 3.69  | 44.84  | 79.87 | 90                 | 100 | 75  | 60  | 50  | 50  | CHLORITE-MONT.           | 12-0231  |
| 7.40             | 24.86 | 22.29 | 37.42 | 80.44  | 80.90 | 100                | 80  | 60  | 60  | 50  | 50  | MONTMORILLONITE          | 13-0135  |
| 7.44             | 14.89 | 42.00 | 40.60 | 70.82  | 30.67 | 100                | 50  | 50  | 40  | 40  | 30  | SANTAFEITE               | 11-0169  |
| 7.55             | 3.74  | 22.76 | 80.06 | 15.21  | 34.14 | 100                | 50  | 50  | 40  | 25  | 25  | CHLORITE AL-MONT.        | 7-0051   |
| 7.67             | 3.64  | 11.47 | 15.36 | 30.86  | 23.04 | 100                | 50  | 20  | 20  | 20  | 15  | CHLORITE-MONT.           | 7-0027   |
| 7.82             | 39.88 | 23.69 | 31.77 | 15.70  | 46.38 | 100                | 90  | 60  | 60  | 40  | 30  | PENNINITE                | 10-0412  |
| 7.82             | 78.56 | 30.61 | 24.47 | 22.52  | 94.42 | 100                | 90  | 80  | 50  | 40  | 40  | SAPONITE                 | 13-0086  |
| 7.82             | 78.68 | 24.47 | 43.48 | 44.28  | 45.11 | 100                | 70  | 60  | 50  | 50  | 45  | VERMICULITE              | 16-0613  |
| 7.88             | 15.75 | 31.79 | 23.66 | 44.54  | 46.58 | 80                 | 100 | 50  | 30  | 30  | 30  | CHLORITE (RIPIDOLITE)    | 7-0076   |
| 7.88             | 15.80 | 31.94 | 23.84 | 45.40  | 76.82 | 50                 | 100 | 90  | 50  | 50  | 50  | CHLORITE (APHROSIDERITE) | 12-0243  |
| 7.93             | 15.69 | 31.86 | 23.79 | 77.06  | 40.03 | 90                 | 100 | 100 | 70  | 60  | 50  | CHAMOSITE (MG)           | 5-0146   |
| 7.93             | 15.72 | 31.75 | 43.69 | 46.42  | 44.50 | 80                 | 100 | 80  | 80  | 80  | 70  | CHLORITE (DIABANTITE)    | 7-0171   |
| 7.93             | 25.37 | 45.40 | 81.09 | 36.53  | 71.90 | 100                | 100 | 80  | 80  | 60  | 60  | MONTMORILLONITE SYN      | 3-0016   |
| 7.93             | 32.61 | 78.50 | 24.47 | 32.03  | 43.39 | 100                | 60  | 60  | 40  | 40  | 40  | VERMICULITE              | 10-0439  |
| 7.99             | 25.18 | 31.74 | 79.11 | 81.67  | 15.67 | 100                | 80  | 50  | 50  | 50  | 20  | NONTRONITE               | 2-0027   |
| 8.17             | 25.03 | 33.72 | 34.91 | 38.75  | 43.92 | 100                | 18  | 10  | 10  | 8   | 5   | MONTMORILLONITE          | 13-0259  |
| 8.35             | 24.77 | 32.20 | 65.44 | *****  | ***** | 100                | 60  | 50  | 40  | *** | *** | NONTRONITE               | 13-0508  |
| 8.35             | 24.95 | 25.46 | 25.89 | 28.23  | 28.74 | 60                 | 100 | 30  | 25  | 20  | 20  | ALUNOGEN                 | 16-0360  |
| 8.55             | 9.34  | 27.74 | 37.29 | 44.47  | 48.91 | 60                 | 100 | 50  | 40  | 40  | 30  | STILPNOMELANE            | 17-0505  |
| 9.04             | 42.54 | 45.79 | 24.86 | 26.04  | 41.31 | 100                | 60  | 60  | 35  | 35  | 35  | SEPIOLITE                | 14-0001  |
| 9.10             | 14.35 | 18.56 | 26.91 | 25.81  | 37.52 | 100                | 80  | 30  | 30  | 16  | 16  | ULEXITE                  | 12-0419  |
| 9.19             | 44.47 | 26.00 | 35.29 | 29.94  | 33.45 | 100                | 55  | 40  | 35  | 30  | 30  | SEPIOLITE                | 13-0595  |
| 9.34             | 8.55  | 27.74 | 37.29 | 44.47  | 48.91 | 100                | 60  | 50  | 40  | 40  | 30  | STILPNOMELANE            | 17-0505  |
| 9.34             | 25.14 | 44.47 | 81.09 | 38.07  | 69.94 | 100                | 90  | 80  | 80  | 60  | 60  | MONTMORILLONITE          | 2-0037   |
| 10.01            | 35.59 | 20.65 | 25.08 | 58.22  | 62.21 | 100                | 37  | 3   | 3   | 2   | 1   | MONTMORILLONITE (AL) SYN | 11-0303  |
| 10.11            | 34.14 | 52.24 | 87.56 | 107.64 | ***** | 100                | 80  | 60  | 40  | 20  | *** | ALLOPHANE                | 2-0039   |
| 10.18            | 40.58 | 51.19 | 37.26 | 20.17  | 62.70 | 85                 | 100 | 25  | 14  | 10  | 8   | PLUMBOJAROSITE           | 15-0648  |
| 10.59            | 32.79 | 36.88 | 41.69 | 16.20  | 26.98 | 100                | 40  | 40  | 40  | 30  | 30  | COPIAPITE                | 11-0395  |
| 10.69            | 24.86 | 44.47 | 30.35 | 80.44  | 21.60 | 80                 | 100 | 80  | 60  | 60  | 40  | MUSCOVITE (AMMONIUM) SYN | 13-0573  |
| 10.79            | 22.49 | 31.28 | 32.20 | 33.78  | 24.95 | 100                | 80  | 70  | 70  | 70  | 60  | AUTUNITE                 | 8-0314   |
| 10.79            | 22.60 | 31.36 | 32.01 | 16.83  | 24.95 | 100                | 90  | 90  | 80  | 40  | 40  | TORBERNITE SYN           | 8-0360   |
| 10.89            | 15.98 | 33.88 | 22.93 | 42.00  | 27.57 | 100                | 50  | 50  | 40  | 40  | 30  | BISBEEITE                | 14-0685  |
| 10.89            | 22.22 | 35.21 | 56.64 | 16.81  | 33.35 | 100                | 90  | 50  | 40  | 30  | 30  | TYUYAMUNITE              | 6-0017   |
| 10.89            | 28.89 | 21.20 | 20.37 | 37.14  | 33.27 | 100                | 90  | 80  | 50  | 40  | 35  | CYANOTRICHITE            | 11-0131  |
| 10.89            | 31.36 | 22.04 | 33.58 | 16.36  | 65.44 | 100                | 90  | 80  | 50  | 40  | 30  | NOVACEKITE               | 8-0286   |

| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 10.90            | 33.34 | 43.42 | 46.90 | 78.68 | 24.47 | 100                | 100 | 60  | 30  | 30  | 25  | PHLOGOPITE (BORON SYN) | 14-0466  |
| 10.94            | 33.23 | 50.47 | 43.42 | 56.94 | 33.02 | 100                | 100 | 60  | 55  | 50  | 40  | PHLOGOPITE (3T SYN)    | 10-0481  |
| 10.98            | 33.49 | 43.33 | 57.40 | 78.07 | 52.76 | 100                | 100 | 100 | 65  | 50  | 45  | PHLOGOPITE             | 10-0493  |
| 10.98            | 33.58 | 57.65 | 45.38 | 33.03 | 70.76 | 100                | 100 | 100 | 50  | 45  | 35  | PHLOGOPITE (3T)        | 10-0492  |
| 11.00            | 33.41 | 42.71 | 46.58 | 52.76 | 57.93 | 100                | 100 | 80  | 80  | 80  | 80  | BIOTITE                | 2-0045   |
| 11.00            | 43.97 | 24.70 | 33.82 | 47.70 | 79.74 | 100                | 100 | 80  | 60  | 60  | 60  | GLAUCONITE             | 9-0439   |
| 11.03            | 33.51 | 24.91 | 44.37 | 30.70 | 36.79 | 100                | 100 | 90  | 90  | 60  | 50  | MUSCOVITE (SYN 1M)     | 7-0025   |
| 11.09            | 13.38 | 16.48 | 33.37 | 34.98 | 36.88 | 100                | 100 | 90  | 80  | 70  | 60  | FERRIMOLYBDITE SYN     | 15-0289  |
| 11.09            | 22.32 | 33.27 | 76.11 | 41.84 | 43.00 | 100                | 90  | 90  | 50  | 40  | 40  | SERPIERITE             | 14-0188  |
| 11.09            | 24.62 | 33.58 | 43.70 | 79.11 | 30.67 | 100                | 80  | 80  | 80  | 60  | 50  | ROSCEOLITE             | 10-0496  |
| 11.10            | 33.60 | 44.43 | 57.63 | 25.09 | 22.25 | 100                | 100 | 90  | 75  | 65  | 55  | MUSCOVITE (SYN 2M)     | 7-0032   |
| 11.11            | 24.98 | 33.82 | 43.57 | 78.56 | 47.19 | 100                | 90  | 90  | 60  | 60  | 40  | ILLITE (TRIOCT.)       | 9-0343   |
| 11.11            | 33.72 | 22.38 | 31.04 | 36.66 | 44.14 | 75                 | 100 | 75  | 75  | 75  | 75  | LEPIDOLITE (1M)        | 10-0485  |
| 11.11            | 33.92 | 44.18 | 22.43 | 25.03 | 29.14 | 50                 | 100 | 75  | 50  | 50  | 50  | LEPIDOLITE (3M)        | 10-0484  |
| 11.11            | 44.15 | 58.29 | 22.34 | 24.86 | 31.04 | 60                 | 100 | 80  | 50  | 50  | 50  | LEPIDOLITE (2M2)       | 14-0011  |
| 11.14            | 44.47 | 24.98 | 34.04 | 80.44 | 31.04 | 80                 | 100 | 80  | 80  | 80  | 60  | MUSCOVITE (BA)         | 10-0490  |
| 11.15            | 33.81 | 22.38 | 57.97 | 44.39 | 24.91 | 100                | 100 | 53  | 47  | 27  | 19  | MUSCOVITE (NAT.3T)     | 7-0042   |
| 11.16            | 25.03 | 33.92 | 44.47 | 22.48 | 29.94 | 100                | 100 | 100 | 100 | 80  | 80  | SERICITE               | 2-0056   |
| 11.16            | 33.82 | 58.06 | 33.31 | 36.06 | 38.98 | 100                | 65  | 16  | 10  | 10  | 8   | PHLOGOPITE SYN         | 16-0344  |
| 11.16            | 33.92 | 58.00 | 43.48 | 71.15 | 47.02 | 70                 | 100 | 30  | 20  | 20  | 18  | PHLOGOPITE SYN         | 16-0352  |
| 11.18            | 33.92 | 44.36 | 58.16 | 37.84 | 22.48 | 95                 | 100 | 54  | 46  | 34  | 31  | MUSCOVITE              | 6-0263   |
| 11.19            | 33.63 | 43.49 | 57.59 | 33.21 | 45.35 | 100                | 100 | 30  | 30  | 20  | 15  | PHLOGOPITE (1M)        | 10-0495  |
| 11.20            | 33.82 | 43.57 | 22.85 | 24.58 | 31.49 | 100                | 100 | 80  | 60  | 60  | 60  | LEPIDOLITE             | 10-0483  |
| 11.24            | 42.67 | 36.65 | 35.09 | 46.53 | 22.68 | 60                 | 100 | 80  | 60  | 60  | 40  | TRONA                  | 11-0643  |
| 11.25            | 13.23 | 16.53 | 36.62 | 32.10 | 21.61 | 100                | 55  | 20  | 20  | 6   | 4   | FERRIMOLYBDITE         | 13-0191  |
| 11.34            | 34.24 | 58.58 | 36.60 | 33.72 | 39.16 | 80                 | 100 | 55  | 40  | 35  | 30  | ZINNWALDITE            | 13-0227  |
| 11.34            | 79.18 | 42.87 | 47.60 | 70.42 | 95.37 | 100                | 80  | 60  | 60  | 50  | 50  | GARNIERITE             | 2-0060   |
| 11.47            | 7.67  | 3.64  | 15.36 | 30.86 | 23.04 | 20                 | 100 | 50  | 20  | 20  | 15  | CHLORITE-MONT.         | 7-0027   |
| 11.47            | 24.98 | 35.01 | 23.04 | 43.92 | 45.59 | 60                 | 100 | 80  | 60  | 60  | 60  | MONTMORILLONITE (ANHY) | 7-0304   |
| 11.47            | 25.21 | 44.91 | 46.98 | 81.36 | 38.74 | 80                 | 100 | 90  | 80  | 80  | 70  | PARAGONITE             | 12-0165  |
| 11.49            | 29.60 | 24.39 | 45.54 | 20.14 | 43.88 | 100                | 75  | 65  | 65  | 45  | 40  | THAUMASITE             | 13-0156  |
| 11.76            | 20.07 | 22.20 | 25.88 | 28.98 | 38.66 | 100                | 100 | 100 | 100 | 100 | 100 | CHABAZITE              | 15-0618  |
| 11.91            | 36.23 | 23.99 | 46.06 | 62.39 | 78.74 | 100                | 100 | 90  | 65  | 40  | 40  | TALC                   | 13-0558  |
| 12.07            | 36.66 | 24.42 | 25.43 | 26.87 | 46.79 | 60                 | 100 | 50  | 20  | 15  | 15  | PYROPHYLLITE           | 12-0203  |
| 12.17            | 37.16 | 24.47 | 47.60 | 63.92 | 89.16 | 40                 | 100 | 50  | 40  | 40  | 40  | PYROPHYLLITE           | 2-0613   |
| 12.20            | 27.44 | 23.86 | 37.26 | 32.97 | 35.21 | 90                 | 100 | 70  | 70  | 50  | 50  | STILBITE               | 10-0433  |
| 12.47            | 38.16 | 39.99 | 31.28 | 36.49 | 37.78 | 100                | 80  | 80  | 60  | 60  | 60  | OKENITE                | 3-0029   |
| 12.49            | 22.01 | 46.53 | 41.53 | 57.88 | 60.88 | 70                 | 100 | 70  | 50  | 35  | 20  | ZARATITE               | 16-0164  |
| 12.49            | 28.23 | 38.03 | 32.86 | 21.89 | 40.45 | 70                 | 100 | 70  | 50  | 40  | 40  | HEULANDITE             | 13-0196  |
| 12.62            | 5.28  | 31.54 | 38.57 | 36.75 | 37.01 | 80                 | 100 | 80  | 80  | 60  | 60  | OKENITE                | 9-0469   |
| 12.78            | 30.49 | 32.30 | 34.88 | 20.50 | 22.65 | 100                | 100 | 80  | 80  | 75  | 75  | METATORBERNITE         | 16-0404  |
| 12.94            | 22.82 | 32.48 | 52.19 | 26.40 | 27.64 | 60                 | 100 | 100 | 60  | 30  | 30  | BASSETTE               | 7-0288   |
| 12.95            | 32.68 | 34.55 | 44.24 | 34.87 | 58.20 | 80                 | 100 | 100 | 80  | 80  | 80  | WAVELLITE              | 17-0203  |
| 12.96            | 33.31 | 37.16 | 27.26 | 35.47 | 69.85 | 100                | 90  | 90  | 80  | 80  | 70  | CORDIERITE             | 9-0472   |
| 13.03            | 27.60 | 32.81 | 37.29 | 36.06 | 70.18 | 100                | 80  | 80  | 80  | 65  | 65  | CORDIERITE (FE)        | 9-0473   |

| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |       |     |     |     |     | MINERAL NAME            | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-------|-----|-----|-----|-----|-------------------------|----------|
| 13.03            | 36.06 | 13.17 | 27.40 | 33.21 | 37.08 | 80                 | 100   | 80  | 75  | 70  | 65  | CORDIERITE              | 12-0303  |
| 13.05            | 26.50 | 34.55 | 37.01 | 21.48 | 29.75 | 100                | 80    | 60  | 60  | 40  | 40  | METATYUYAMUNITE         | 8-0287   |
| 13.05            | 13.17 | 37.17 | 37.23 | 36.03 | 37.52 | 95                 | 100   | 65  | 65  | 55  | 55  | CORDIERITE (LOW) SYN    | 13-0294  |
| 13.07            | 35.69 | 41.53 | 32.88 | 43.68 | 52.63 | 70                 | 100   | 80  | 45  | 35  | 35  | ARFVEDSONITE            | 14-0633  |
| 13.10            | 15.32 | 23.25 | 39.27 | 7.75  | 26.83 | 70                 | 100   | 80  | 70  | 30  | 20  | SCHROECKERITE SYN       | 8-0397   |
| 13.12            | 37.33 | 35.96 | 33.32 | 27.38 | 22.85 | 100                | 85    | 65  | 55  | 50  | 30  | CORDIERITE (HIGH) SYN   | 13-0293  |
| 13.13            | 31.10 | 54.60 | 26.45 | 20.77 | 43.52 | 100                | 85    | 70  | 65  | 45  | 35  | META-AUTUNITE I         | 12-0423  |
| 13.17            | 13.05 | 37.17 | 37.23 | 36.03 | 37.52 | 100                | 95    | 65  | 65  | 55  | 55  | CORDIERITE (LOW) SYN    | 13-0294  |
| 13.17            | 36.06 | 13.03 | 27.40 | 33.21 | 37.08 | 80                 | 100   | 80  | 75  | 70  | 65  | CORDIERITE              | 12-0303  |
| 13.19            | 26.70 | 34.42 | 31.92 | 37.65 | 18.85 | 100                | 80    | 70  | 60  | 60  | 50  | SKLADOWSKITE            | 8-0447   |
| 13.22            | 41.74 | 36.53 | 32.81 | 45.02 | 24.75 | 100                | 100   | 80  | 60  | 60  | 50  | RIEBECKITE              | 14-0230  |
| 13.22            | 41.88 | 36.29 | 33.31 | 34.46 | 38.47 | 70                 | 100   | 80  | 70  | 60  | 60  | ACTINOLITE              | 7-0336   |
| 13.23            | 11.25 | 16.53 | 36.62 | 32.10 | 21.61 | 55                 | 100   | 20  | 20  | 6   | 4   | FERRIMOLYBDITE          | 13-0191  |
| 13.24            | 32.68 | 35.21 | 44.43 | 19.76 | 38.30 | 100                | 80    | 80  | 80  | 60  | 60  | WAVELLITE               | 2-0075   |
| 13.24            | 36.32 | 41.58 | 44.97 | 24.81 | 37.92 | 100                | 55    | 50  | 45  | 20  | 20  | RIEBECKITE SYN          | 15-0516  |
| 13.28            | 36.16 | 41.97 | 34.49 | 61.59 | 40.40 | 100                | 100   | 90  | 75  | 50  | 45  | TREMOLITE               | 13-0437  |
| 13.28            | 41.25 | 36.79 | 28.99 | 32.61 | 34.57 | 70                 | 100   | 80  | 60  | 60  | 60  | CUMMINGTONITE           | 7-0382   |
| 13.29            | 36.34 | 40.60 | 28.01 | 34.55 | 72.15 | 100                | 85    | 21  | 20  | 18  | 15  | TREMOLITE (FLUOR) SYN   | 9-0330   |
| 13.34            | 40.95 | 36.75 | 45.41 | 32.38 | 12.06 | 100                | 90    | 80  | 60  | 55  | 50  | GRUNERITE               | 17-0725  |
| 13.36            | 36.90 | 34.91 | 24.91 | 80.44 | 23.94 | 70                 | 100   | 50  | 35  | 25  | 20  | ANTHOPHYLLITE MG SYN    | 16-0401  |
| 13.38            | 11.09 | 16.48 | 33.37 | 34.98 | 36.88 | 100                | 100   | 90  | 80  | 70  | 60  | FERRIMOLYBDITE SYN      | 15-0289  |
| 13.41            | 80.84 | 38.75 | 45.79 | 72.51 | 19.50 | 60                 | 100   | 80  | 45  | 45  | 30  | CHRYSOCOLLA             | 11-0322  |
| 13.47            | 37.03 | 34.79 | 39.88 | 44.84 | 30.78 | 95                 | 100   | 60  | 40  | 40  | 35  | ANTHOPHYLLITE           | 9-0455   |
| 13.48            | 36.90 | 41.56 | 45.40 | 87.17 | 53.03 | 80                 | 100   | 90  | 80  | 80  | 60  | CUMMINGTONITE (MN)      | 13-0376  |
| 13.51            | 15.52 | 17.81 | 27.82 | 35.24 | 36.90 | 100                | 100   | 100 | 100 | 100 | 100 | HARMOTOME               | 9-0480   |
| 13.52            | 37.12 | 35.00 | 12.42 | 24.14 | 42.40 | 100                | 75    | 20  | 12  | 10  | 10  | ANTHOPHYLLITE AL-FE     | 11-0253  |
| 13.58            | 27.36 | 38.03 | 23.15 | 18.25 | 31.92 | 100                | 90    | 80  | 70  | 60  | 60  | CUPROSKLADOWSKITE       | 8-0290   |
| 13.77            | 26.58 | 42.35 | 72.33 | 27.87 | 39.86 | 100                | 100   | 90  | 90  | 60  | 50  | ZUNYITE                 | 14-0698  |
| 13.95            | 39.50 | 34.64 | 24.32 | 28.10 | 37.48 | 90                 | 100   | 95  | 50  | 45  | 35  | BERYL                   | 9-0430   |
| 13.96            | 28.89 | 27.52 | 32.58 | 19.13 | 25.94 | 90                 | 100   | 90  | 70  | 60  | 60  | FERRIMOLYBDITE          | 15-0371  |
| 14.06            | 31.18 | 36.49 | 24.14 | 34.88 | 42.51 | 100                | 80    | 60  | 50  | 50  | 50  | DUNDASITE               | 21-0936  |
| 14.11            | 28.43 | 37.75 | 38.86 | 58.85 | 23.46 | 100                | 90    | 80  | 80  | 70  | 50  | URANOPHANE              | 8-0442   |
| 14.19            | 28.81 | 32.02 | 35.32 | 43.88 | 16.71 | 100                | 90    | 60  | 50  | 50  | 40  | BETA URANOPHANE         | 8-0301   |
| 14.24            | 37.98 | 45.77 | 31.38 | 24.72 | 28.58 | 100                | 100   | 100 | 80  | 65  | 65  | APOPHYLLITE             | 7-0170   |
| 14.26            | 21.46 | 40.30 | 49.31 | 56.95 | 36.11 | 45                 | 100   | 40  | 40  | 40  | 35  | NITROCALCITE            | 1-0229   |
| 14.35            | 9.10  | 18.56 | 26.91 | 25.81 | 37.52 | 80                 | 100   | 30  | 30  | 16  | 16  | ULEXITE                 | 12-0419  |
| 14.73            | 36.92 | 26.22 | 42.40 | 39.50 | 29.67 | 100                | 57    | 51  | 28  | 27  | 21  | GYPNUM                  | 6-0046   |
| 14.89            | 7.44  | 42.00 | 40.60 | 70.82 | 30.67 | 50                 | 100   | 50  | 40  | 40  | 30  | SANTAFEITE              | 11-0169  |
| 15.03            | 50.02 | 33.78 | 41.84 | 13.38 | 16.43 | 100                | 60    | 50  | 40  | 30  | 30  | FERRIMOLYBDITE          | 15-0290  |
| 15.04            | 25.37 | 25.79 | 31.04 | 47.81 | 49.35 | 95                 | 100   | 70  | 65  | 35  | 35  | HALLOYSITE              | 13-0375  |
| 15.13            | 30.67 | 34.75 | 46.53 | 35.09 | 35.68 | 100                | 50    | 10  | 10  | 4   | 4   | SCHOEPITE               | 13-0241  |
| 15.18            | 30.70 | 45.55 | 78.25 | 49.02 | 59.14 | 100                | 100   | 100 | 80  | 70  | 70  | SERPENTINE              | 9-0444   |
| 15.25            | 30.95 | 45.22 | 47.19 | 16.03 | 32.03 | 400                | 300   | 70  | 38  | 24  | 24  | ANTIGORITE (SERPENTINE) | 7-0417   |
| 15.27            | 21.96 | 32.68 | 30.67 | 32.02 | 34.98 | 100                | 70    | 25  | 15  | 12  | 12  | SCHOEPITE               | 13-0407  |
| 15.27            | 41.84 | 39.86 | 42.51 | 46.73 | 52.97 | 70                 | 100</ |     |     |     |     |                         |          |



| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 15.30            | 43.75 | 54.49 | 27.59 | 22.85 | 41.87 | 100                | 200 | 80  | 70  | 60  | 55  | DIOPTASE                 | 7-0172   |
| 15.30            | 45.40 | 31.22 | 53.03 | 77.12 | 78.38 | 90                 | 100 | 80  | 50  | 50  | 40  | ANTIGORITE               | 10-0402  |
| 15.32            | 23.25 | 13.10 | 39.27 | 7.75  | 26.83 | 100                | 80  | 70  | 70  | 30  | 20  | SCHROECKINGERITE SYN     | 8-0397   |
| 15.36            | 45.54 | 31.04 | 53.60 | 65.60 | 24.26 | 60                 | 100 | 60  | 35  | 25  | 20  | SERPENTINE SYN           | 11-0386  |
| 15.42            | 31.28 | 35.91 | 36.88 | 51.19 | 18.07 | 20                 | 100 | 25  | 15  | 15  | 13  | CLINOCLASITE             | 12-0297  |
| 15.49            | 19.44 | 39.45 | 25.79 | 37.80 | 17.19 | 100                | 80  | 80  | 70  | 70  | 60  | EUDIALYTE                | 8-0355   |
| 15.49            | 23.28 | 31.22 | 7.77  | 39.31 | 44.47 | 100                | 100 | 100 | 60  | 60  | 40  | PENNINITE                | 10-0183  |
| 15.51            | 31.40 | 81.23 | 48.88 | 24.98 | 44.37 | 100                | 100 | 100 | 90  | 80  | 80  | KAOLINITE (DISORDERED)   | 6-0221   |
| 15.52            | 13.51 | 17.81 | 27.82 | 35.24 | 36.90 | 100                | 100 | 100 | 100 | 100 | 100 | HARMOTOME                | 9-0480   |
| 15.52            | 31.49 | 78.19 | 24.37 | 45.59 | 43.06 | 80                 | 100 | 100 | 70  | 50  | 40  | SERPENTINE (AL) SYN      | 11-0096  |
| 15.52            | 81.16 | 31.41 | 73.44 | 25.64 | 75.28 | 100                | 90  | 80  | 70  | 60  | 60  | KAOLINITE                | 14-0164  |
| 15.55            | 31.57 | 45.22 | 24.20 | 42.37 | 77.24 | 100                | 100 | 60  | 40  | 20  | 20  | CHAMOSITE                | 10-0404  |
| 15.55            | 34.98 | 29.19 | 40.89 | 46.73 | 44.79 | 100                | 50  | 35  | 35  | 35  | 25  | EUCLASE                  | 14-0065  |
| 15.56            | 31.41 | 49.31 | 27.21 | 45.54 | 25.14 | 90                 | 100 | 90  | 80  | 80  | 70  | DICKITE                  | 10-0430  |
| 15.57            | 31.40 | 49.22 | 27.17 | 29.55 | 45.40 | 100                | 100 | 90  | 70  | 60  | 50  | DICKITE                  | 10-0446  |
| 15.57            | 35.24 | 27.20 | 34.79 | 35.93 | 38.61 | 100                | 100 | 80  | 80  | 80  | 80  | PHILLIPSITE              | 12-0455  |
| 15.64            | 31.66 | 45.02 | 53.55 | 76.59 | 65.98 | 100                | 100 | 100 | 70  | 70  | 60  | CHAMOSITE FE(II)         | 7-0339   |
| 15.64            | 48.06 | 31.57 | 78.43 | 43.21 | 57.91 | 100                | 90  | 80  | 55  | 40  | 40  | SERPENTINE (AL)          | 12-0583  |
| 15.66            | 31.28 | 44.79 | 65.04 | 58.52 | 48.42 | 100                | 80  | 70  | 70  | 60  | 50  | SPANGOLITE               | 5-0142   |
| 15.69            | 31.86 | 7.93  | 23.79 | 77.06 | 40.03 | 100                | 100 | 90  | 70  | 60  | 50  | CHAMOSITE (MG)           | 5-0146   |
| 15.70            | 31.66 | 48.10 | 78.32 | 43.13 | 44.18 | 100                | 100 | 80  | 65  | 55  | 40  | SERPENTINE               | 11-0388  |
| 15.70            | 45.75 | 31.63 | 78.38 | 59.98 | 24.32 | 100                | 80  | 70  | 50  | 45  | 40  | SERPENTINE (AL)          | 13-0004  |
| 15.72            | 7.93  | 31.75 | 43.69 | 46.42 | 44.50 | 100                | 80  | 80  | 80  | 80  | 70  | CHLORITE (DIABANTITE)    | 7-0171   |
| 15.75            | 7.88  | 31.79 | 23.66 | 44.54 | 46.58 | 100                | 80  | 50  | 30  | 30  | 30  | CHLORITE (RIPIDOLITE)    | 7-0076   |
| 15.78            | 31.86 | 46.38 | 43.22 | 79.36 | 24.64 | 100                | 100 | 80  | 70  | 70  | 60  | CHAMOSITE FE(III)        | 7-0329   |
| 15.80            | 31.86 | 45.22 | 7.88  | 23.74 | 53.55 | 100                | 80  | 50  | 40  | 40  | 40  | CHLORITE (THURINGITE)    | 13-0029  |
| 15.80            | 31.94 | 7.88  | 23.84 | 45.40 | 76.82 | 100                | 90  | 50  | 50  | 50  | 50  | CHLORITE (APHROSIDERITE) | 12-0243  |
| 15.80            | 31.94 | 45.22 | 77.06 | 53.83 | 42.37 | 100                | 100 | 90  | 70  | 60  | 40  | CHAMOSITE                | 7-0315   |
| 15.91            | 38.20 | 36.53 | 63.92 | 70.42 | 43.22 | 100                | 100 | 80  | 70  | 70  | 60  | NATROLITE (K) SYN        | 3-0062   |
| 15.98            | 10.89 | 33.88 | 22.93 | 42.00 | 27.57 | 50                 | 100 | 50  | 40  | 40  | 30  | BISBEEITE                | 14-0685  |
| 15.98            | 32.10 | 27.44 | 51.19 | 44.24 | 74.42 | 100                | 60  | 50  | 50  | 40  | 40  | CHALCOPHANITE            | 15-0807  |
| 16.10            | 43.37 | 49.55 | 75.53 | 43.88 | 32.58 | 100                | 80  | 80  | 80  | 70  | 60  | GERHARDTITE              | 14-0687  |
| 16.12            | 32.20 | 24.12 | 57.88 | 77.28 | 8.17  | 100                | 100 | 80  | 80  | 80  | 70  | THURINGITE               | 3-0067   |
| 16.14            | 32.23 | 24.15 | 57.93 | 77.35 | 8.17  | 100                | 100 | 80  | 80  | 80  | 70  | CHLORITE (THURINGITE)    | 3-0067   |
| 16.14            | 47.60 | 36.06 | 22.80 | 53.83 | 77.96 | 100                | 100 | 90  | 70  | 40  | 30  | CRYPTOMELANE             | 12-0706  |
| 16.38            | 38.07 | 41.88 | 35.24 | 22.76 | 29.22 | 100                | 67  | 67  | 53  | 40  | 40  | VIVIANITE SYN            | 3-0070   |
| 16.41            | 43.52 | 30.49 | 39.14 | 41.69 | 34.65 | 100                | 80  | 70  | 40  | 40  | 30  | AURICHALCITE             | 17-0743  |
| 16.48            | 11.09 | 13.38 | 33.37 | 34.98 | 36.88 | 90                 | 100 | 100 | 80  | 70  | 60  | FERRIMOLYBDITE SYN       | 15-0289  |
| 16.53            | 11.25 | 13.23 | 36.62 | 32.10 | 21.61 | 20                 | 100 | 55  | 20  | 6   | 4   | FERRIMOLYBDITE           | 13-0191  |
| 16.65            | 35.12 | 37.80 | 25.61 | 71.39 | 41.73 | 100                | 75  | 75  | 63  | 63  | 50  | ERYTHRITE                | 10-0480  |
| 16.75            | 70.56 | 35.01 | 33.72 | 42.05 | 49.35 | 100                | 14  | 12  | 8   | 8   | 8   | ERYTHRITE                | 11-0626  |
| 16.75            | 34.24 | 30.02 | 83.70 | 29.61 | 37.16 | 25                 | 100 | 20  | 18  | 14  | 12  | SULPHUR                  | 13-0141  |
| 16.86            | 36.37 | 34.22 | 34.11 | 20.80 | 47.57 | 86                 | 100 | 75  | 73  | 55  | 54  | HEMIMORPHITE             | 5-0555   |
| 16.94            | 37.93 | 35.47 | 14.22 | 25.85 | 41.88 | 100                | 30  | 26  | 25  | 20  | 18  | ANNABERGITE              | 11-0625  |
| 16.96            | 36.14 | 31.82 | 26.32 | 34.65 | 53.24 | 100                | 70  | 50  | 30  | 30  | 30  | CARNOTITE                | 8-0317   |

| TWO-THETA (IRON) |       |       |       |       |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 17.12            | 28.66 | 44.97 | 20.65 | 42.18 | 35.21  | 67                 | 100 | 67  | 58  | 50  | 42  | BROCHANTITE              | 3-0282   |
| 17.14            | 37.80 | 44.84 | 25.26 | 38.88 | 52.24  | 40                 | 100 | 60  | 40  | 40  | 20  | ACMITE (AEGIRINE)        | 3-0621   |
| 17.28            | 30.19 | 43.22 | 39.31 | 53.55 | 65.52  | 30                 | 100 | 50  | 30  | 30  | 30  | HAUYNITE                 | 2-0331   |
| 17.41            | 30.47 | 43.61 | 39.59 | 54.18 | 66.32  | 40                 | 100 | 75  | 40  | 40  | 20  | NOSEAN SYN               | 15-0470  |
| 17.44            | 35.29 | 29.70 | 30.49 | 27.82 | 30.67  | 20                 | 100 | 25  | 20  | 15  | 15  | ALBITE                   | 9-0466   |
| 17.49            | 39.04 | 37.89 | 25.43 | 46.42 | 44.76  | 90                 | 100 | 90  | 45  | 45  | 30  | ACMITE SYN               | 15-0787  |
| 17.69            | 30.95 | 55.51 | 48.24 | 44.47 | 76.77  | 17                 | 100 | 33  | 17  | 13  | 10  | SODALITE                 | 3-0338   |
| 17.69            | 40.30 | 32.52 | 35.93 | 38.01 | 53.50  | 70                 | 100 | 80  | 70  | 70  | 70  | AXINITE (TINZENITE)      | 6-0444   |
| 17.72            | 24.45 | 33.48 | 41.53 | 45.75 | 37.65  | 90                 | 100 | 90  | 80  | 80  | 70  | SODDYITE                 | 8-0195   |
| 17.79            | 34.22 | 46.14 | 59.84 | 68.04 | 129.51 | 100                | 90  | 80  | 70  | 40  | 40  | LEPIDOCROCITE            | 8-0098   |
| 17.81            | 13.51 | 15.52 | 27.82 | 35.24 | 36.90  | 100                | 100 | 100 | 100 | 100 | 100 | HARMOTOME                | 9-0480   |
| 17.89            | 36.01 | 42.67 | 40.45 | 46.14 | 49.08  | 80                 | 100 | 80  | 70  | 70  | 70  | GLAUBERITE               | 2-0556   |
| 18.02            | 40.73 | 51.01 | 51.19 | 47.36 | 61.26  | 100                | 65  | 30  | 25  | 16  | 16  | WEDDELLITE               | 17-0541  |
| 18.05            | 30.49 | 38.86 | 32.68 | 34.32 | 23.27  | 70                 | 100 | 80  | 70  | 70  | 60  | TURQUOIS                 | 6-0214   |
| 18.10            | 50.22 | 63.83 | 41.35 | 75.53 | 77.87  | 100                | 45  | 25  | 16  | 12  | 12  | MOLYBDENITE (2H) SYN     | 6-0097   |
| 18.12            | 36.76 | 35.98 | 51.39 | 35.28 | 44.72  | 75                 | 100 | 95  | 75  | 65  | 25  | LAZULITE                 | 14-0137  |
| 18.15            | 33.88 | 42.95 | 42.18 | 46.14 | 63.08  | 80                 | 100 | 90  | 70  | 60  | 50  | SODDYITE                 | 12-0180  |
| 18.27            | 41.84 | 75.53 | 78.46 | 43.18 | 48.87  | 100                | 70  | 70  | 70  | 60  | 60  | MOLYBDENITE (3R)         | 17-0744  |
| 18.53            | 37.65 | 40.43 | 32.48 | 63.45 | 54.05  | 95                 | 100 | 50  | 45  | 12  | 10  | BASSANITE                | 14-0453  |
| 18.56            | 9.10  | 14.35 | 26.91 | 25.81 | 37.52  | 30                 | 100 | 80  | 30  | 16  | 16  | ULEXITE                  | 12-0419  |
| 18.60            | 37.26 | 37.75 | 24.72 | 26.70 | 29.51  | 60                 | 100 | 100 | 60  | 60  | 60  | SCAWTITE                 | 12-0777  |
| 18.78            | 38.16 | 64.63 | 36.49 | 77.28 | 44.24  | 90                 | 100 | 80  | 70  | 60  | 40  | STIBICONITE              | 10-0388  |
| 18.87            | 37.93 | 23.19 | 46.18 | 47.81 | 26.73  | 70                 | 100 | 90  | 70  | 70  | 60  | OLIVENITE                | 4-0657   |
| 18.90            | 39.59 | 25.55 | 16.89 | 35.70 | 38.47  | 64                 | 100 | 64  | 48  | 48  | 48  | NATROLITE                | 3-0705   |
| 18.90            | 44.61 | 21.91 | 38.57 | 34.88 | 32.58  | 90                 | 100 | 90  | 90  | 85  | 75  | DUMORTIERITE             | 7-0071   |
| 18.98            | 48.22 | 59.50 | 32.86 | 37.14 | 32.20  | 100                | 50  | 45  | 35  | 30  | 20  | LEONITE SYN              | 17-0134  |
| 19.03            | 23.20 | 43.18 | 38.70 | 30.42 | 68.94  | 90                 | 100 | 100 | 90  | 70  | 70  | LIBETHENITE              | 8-0107   |
| 19.03            | 37.24 | 50.22 | 31.28 | 34.01 | 59.50  | 100                | 95  | 45  | 40  | 35  | 30  | BEAVERITE                | 17-0541  |
| 19.26            | 39.02 | 53.55 | 12.11 | 17.30 | 34.04  | 100                | 90  | 50  | 40  | 40  | 30  | HYDROMAGNESITE           | 8-0179   |
| 19.44            | 15.49 | 39.45 | 25.79 | 37.80 | 17.19  | 80                 | 100 | 80  | 70  | 70  | 60  | EUDIALYTE                | 8-0355   |
| 19.76            | 36.03 | 29.12 | 44.61 | 57.56 | 28.00  | 50                 | 100 | 50  | 50  | 50  | 35  | COLEMANITE               | 6-0331   |
| 19.89            | 32.81 | 38.68 | 68.73 | 42.16 | 45.50  | 80                 | 100 | 80  | 60  | 50  | 50  | ANALCIME (ZEOLITE)       | 7-0340   |
| 19.89            | 32.82 | 38.62 | 45.48 | 67.48 | 23.04  | 80                 | 100 | 70  | 50  | 50  | 40  | ANALCIME (ZEOLITE)       | 7-0363   |
| 19.93            | 38.61 | 25.09 | 13.57 | 14.64 | 23.99  | 60                 | 100 | 80  | 40  | 40  | 40  | NEPHELINE III SYN        | 12-0247  |
| 19.99            | 40.63 | 28.32 | 31.94 | 48.49 | 51.55  | 100                | 60  | 35  | 15  | 15  | 15  | ANDALUSITE X SYN         | 13-0231  |
| 20.02            | 31.74 | 32.97 | 37.14 | 11.50 | 16.38  | 70                 | 100 | 90  | 50  | 30  | 30  | VOLTAITE                 | 17-0539  |
| 20.04            | 25.18 | 35.68 | 44.06 | 37.01 | 22.55  | 100                | 100 | 100 | 90  | 80  | 60  | SCORADITE                | 5-0216   |
| 20.07            | 11.76 | 22.20 | 25.88 | 28.98 | 38.66  | 100                | 100 | 100 | 100 | 100 | 100 | CHABAZITE                | 15-0618  |
| 20.14            | 24.70 | 40.94 | 53.03 | 28.61 | 31.94  | 100                | 90  | 90  | 90  | 70  | 60  | ANDALUSITE               | 13-0122  |
| 20.19            | 38.86 | 41.53 | 32.20 | 34.65 | 22.19  | 80                 | 100 | 100 | 80  | 80  | 60  | MELANOTEKITE             | 15-0633  |
| 20.32            | 35.09 | 34.55 | 36.26 | 23.41 | 29.27  | 100                | 75  | 60  | 60  | 45  | 40  | MIRABILITE               | 11-0647  |
| 20.65            | 10.01 | 35.59 | 25.08 | 58.22 | 62.21  | 3                  | 100 | 37  | 3   | 2   | 1   | MONTMORILLONITE (AL) SYN | 11-0303  |
| 20.65            | 22.32 | 40.14 | 41.20 | 50.69 | 64.26  | 100                | 100 | 100 | 100 | 100 | 80  | ATACAMITE                | 2-0146   |
| 20.67            | 35.36 | 38.47 | 41.56 | 62.81 | 45.79  | 100                | 90  | 80  | 80  | 60  | 50  | REALGAR                  | 9-0441   |
| 20.71            | 34.51 | 32.74 | 38.78 | 39.86 | 48.33  | 80                 | 100 | 85  | 70  | 70  | 65  | LEUCITE                  |          |

| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME        | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|---------------------|----------|
| 20.80            | 26.58 | 26.77 | 21.08 | 39.42 | 42.85 | 80                 | 100 | 50  | 35  | 35  | 30  | GOSLARITE           | 9-0395   |
| 20.83            | 26.58 | 42.33 | 18.60 | 40.73 | 42.67 | 25                 | 100 | 25  | 20  | 20  | 20  | EPSOMITE            | 8-0467   |
| 21.05            | 42.67 | 72.85 | 49.75 | 54.60 | 34.65 | 100                | 100 | 100 | 90  | 90  | 80  | MURDOCHITE          | 7-0028   |
| 21.20            | 10.89 | 28.89 | 20.37 | 37.14 | 33.27 | 80                 | 100 | 90  | 50  | 40  | 35  | CYANOTRICHITE       | 11-0131  |
| 21.46            | 14.26 | 40.30 | 49.31 | 56.95 | 36.11 | 100                | 45  | 40  | 40  | 40  | 35  | NITROCALCITE        | 1-0229   |
| 21.69            | 31.88 | 45.28 | 30.67 | 49.00 | 50.12 | 70                 | 100 | 60  | 40  | 30  | 30  | AZURITE             | 11-0136  |
| 21.69            | 31.98 | 51.64 | 30.57 | 45.40 | 50.12 | 55                 | 100 | 70  | 50  | 35  | 35  | AZURITE             | 11-0682  |
| 21.79            | 34.86 | 38.98 | 71.83 | 26.32 | 49.75 | 80                 | 100 | 80  | 80  | 60  | 60  | DESCLOIZITE         | 12-0537  |
| 21.90            | 43.22 | 36.53 | 70.90 | 78.56 | 45.40 | 80                 | 100 | 20  | 20  | 18  | 15  | SPINEL (MN)         | 4-0732   |
| 21.91            | 44.61 | 18.90 | 38.57 | 34.88 | 32.58 | 90                 | 100 | 90  | 90  | 85  | 75  | DUMORTIERITE        | 7-0071   |
| 21.96            | 15.27 | 32.68 | 30.67 | 32.02 | 34.98 | 70                 | 100 | 25  | 15  | 12  | 12  | SCHOEPITE           | 13-0407  |
| 22.01            | 12.49 | 46.53 | 41.53 | 57.88 | 60.88 | 100                | 70  | 70  | 50  | 35  | 20  | ZARATITE            | 16-0164  |
| 22.01            | 34.75 | 39.42 | 42.33 | 42.67 | 43.88 | 80                 | 100 | 80  | 80  | 80  | 80  | MOTTRAMITE          | 12-0538  |
| 22.04            | 10.89 | 31.36 | 33.58 | 16.36 | 65.44 | 80                 | 100 | 90  | 50  | 40  | 30  | NOVACEKITE          | 8-0286   |
| 22.04            | 36.88 | 36.14 | 51.19 | 58.52 | 20.02 | 100                | 80  | 70  | 60  | 60  | 50  | NATROJAROSITE       | 11-0302  |
| 22.09            | 35.55 | 32.89 | 34.75 | 39.27 | 46.73 | 90                 | 100 | 90  | 80  | 50  | 50  | DUFRENITE           | 8-0155   |
| 22.09            | 39.64 | 30.42 | 18.60 | 45.22 | 40.81 | 75                 | 100 | 85  | 55  | 55  | 45  | MALACHITE SYN       | 10-0399  |
| 22.14            | 30.49 | 43.88 | 18.53 | 44.97 | 38.32 | 80                 | 100 | 100 | 70  | 60  | 50  | ROSASITE            | 17-0216  |
| 22.20            | 11.76 | 20.07 | 25.88 | 28.98 | 38.66 | 100                | 100 | 100 | 100 | 100 | 100 | CHABAZITE           | 15-0618  |
| 22.22            | 10.89 | 35.21 | 56.64 | 16.81 | 33.35 | 90                 | 100 | 50  | 40  | 30  | 30  | TYUYAMUNITE         | 6-0017   |
| 22.25            | 67.74 | 30.35 | 42.38 | 44.84 | 45.40 | 70                 | 100 | 70  | 70  | 70  | 70  | CLINOHUMITE         | 14-0692  |
| 22.29            | 7.40  | 24.86 | 37.42 | 80.44 | 80.90 | 60                 | 100 | 80  | 60  | 50  | 50  | MONTMORILLONITE     | 13-0135  |
| 22.32            | 11.09 | 33.27 | 76.11 | 41.84 | 43.00 | 90                 | 100 | 90  | 50  | 40  | 40  | SERPENTINE          | 14-0188  |
| 22.32            | 20.65 | 40.14 | 41.20 | 50.69 | 64.26 | 100                | 100 | 100 | 100 | 100 | 80  | ATACAMITE           | 2-0146   |
| 22.38            | 11.15 | 33.81 | 57.97 | 44.39 | 24.91 | 53                 | 100 | 100 | 47  | 27  | 19  | MUSCOVITE (NAT. 3T) | 7-0042   |
| 22.38            | 33.72 | 11.11 | 31.04 | 36.66 | 44.14 | 75                 | 100 | 75  | 75  | 75  | 75  | LEPIDOLITE (1M)     | 10-0485  |
| 22.44            | 35.78 | 31.28 | 37.01 | 34.98 | 45.93 | 100                | 80  | 60  | 60  | 40  | 40  | BUTLERITE           | 16-0819  |
| 22.48            | 24.70 | 7.40  | 3.69  | 44.84 | 79.87 | 75                 | 100 | 90  | 60  | 50  | 50  | CHLORITE-MONT.      | 12-0231  |
| 22.49            | 10.79 | 31.28 | 32.20 | 33.78 | 24.95 | 80                 | 100 | 70  | 70  | 70  | 60  | AUTUNITE            | 8-0314   |
| 22.55            | 25.23 | 34.01 | 32.10 | 65.44 | 73.37 | 70                 | 100 | 80  | 70  | 70  | 70  | SHATTUCKITE         | 13-0507  |
| 22.60            | 10.79 | 31.36 | 32.01 | 16.83 | 24.95 | 90                 | 100 | 90  | 80  | 40  | 40  | TORBERNITE SYN      | 8-0360   |
| 22.60            | 32.30 | 41.20 | 77.87 | 62.70 | 47.57 | 45                 | 100 | 80  | 35  | 30  | 25  | PSEUDOBROOKITE SYN  | 9-0182   |
| 22.76            | 7.55  | 3.74  | 80.06 | 15.21 | 34.14 | 50                 | 100 | 50  | 40  | 25  | 25  | CHLORITE AL-MONT.   | 7-0051   |
| 22.77            | 29.68 | 34.88 | 43.18 | 20.27 | 41.20 | 100                | 64  | 20  | 16  | 13  | 11  | MELANTERITE         | 1-0255   |
| 22.77            | 36.85 | 58.83 | 64.23 | 51.92 | 41.20 | 70                 | 100 | 70  | 70  | 60  | 50  | CARPHOSIDERITE      | 2-0597   |
| 22.82            | 32.48 | 12.94 | 52.19 | 26.40 | 27.64 | 100                | 100 | 60  | 60  | 30  | 30  | BASSETITE           | 7-0288   |
| 22.87            | 39.27 | 31.54 | 56.03 | 57.24 | 61.26 | 40                 | 100 | 70  | 40  | 40  | 40  | LIBETHENITE SYN     | 11-0340  |
| 22.98            | 44.24 | 31.18 | 42.33 | 18.53 | 20.65 | 100                | 85  | 75  | 75  | 25  | 25  | ANTLERITE           | 7-0407   |
| 22.99            | 44.28 | 39.88 | 28.32 | 19.57 | 38.07 | 47                 | 100 | 53  | 40  | 20  | 20  | BORAX               | 1-1097   |
| 23.09            | 37.73 | 38.29 | 29.70 | 30.35 | 45.66 | 65                 | 100 | 95  | 60  | 55  | 55  | HUEBNERITE SYN      | 13-0434  |
| 23.15            | 32.00 | 25.89 | 27.16 | 29.60 | 18.32 | 100                | 90  | 35  | 30  | 30  | 20  | PICKERINGITE        | 12-0299  |
| 23.15            | 33.27 | 44.61 | 36.75 | 56.34 | 70.82 | 40                 | 100 | 40  | 20  | 17  | 17  | KIESERITE SYN       | 1-0638   |
| 23.15            | 42.00 | 28.00 | 23.15 | 39.70 | 46.53 | 100                | 53  | 47  | 47  | 47  | 47  | ORPIMENT            | 1-0273   |
| 23.19            | 25.79 | 26.04 | 48.24 | 46.79 | 57.01 | 100                | 40  | 20  | 20  | 16  | 12  | GIBBSITE SYN        | 12-0460  |
| 23.19            | 37.93 | 18.87 | 46.18 | 47.81 | 26.73 | 90                 | 100 | 70  | 70  | 70  | 60  | OLIVENITE           | 4-0657   |

| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|-----|-----|--------------------------|----------|
| 23.20            | 43.18 | 19.03 | 38.70 | 30.42 | 68.94 | 100                | 100 | 90  | 90 | 70  | 70  | LIBETHENITE              | 8-0107   |
| 23.20            | 43.18 | 38.86 | 19.21 | 30.24 | 68.94 | 100                | 100 | 50  | 40 | 28  | 20  | LIBETHENITE SYN          | 1-0274   |
| 23.22            | 45.36 | 55.42 | 82.23 | 74.35 | 38.41 | 65                 | 100 | 55  | 55 | 40  | 13  | PICROCHROMITE SYN        | 10-0351  |
| 23.25            | 15.32 | 13.10 | 39.27 | 7.75  | 26.83 | 80                 | 100 | 70  | 70 | 30  | 20  | SCHROECKINGERITE SYN     | 8-0397   |
| 23.28            | 15.49 | 31.22 | 7.77  | 39.31 | 44.47 | 100                | 100 | 100 | 60 | 60  | 40  | PENNINITE                | 10-0183  |
| 23.38            | 38.10 | 38.39 | 29.86 | 30.70 | 45.83 | 60                 | 100 | 90  | 55 | 55  | 45  | WOLFRAMITE SYN           | 12-0727  |
| 23.41            | 32.28 | 26.07 | 27.39 | 29.91 | 28.35 | 100                | 100 | 55  | 45 | 40  | 35  | HALOTRICHITE             | 11-0506  |
| 23.43            | 48.36 | 65.36 | 76.02 | 80.84 | 89.75 | 90                 | 100 | 56  | 36 | 18  | 16  | BRUCITE SYN              | 7-0239   |
| 23.48            | 36.42 | 36.76 | 74.95 | 60.32 | 43.37 | 53                 | 100 | 31  | 30 | 28  | 23  | SCHEELITE                | 7-0210   |
| 23.48            | 36.42 | 60.28 | 75.17 | 43.57 | 69.75 | 28                 | 100 | 30  | 22 | 16  | 14  | POWELLITE                | 7-0212   |
| 23.48            | 38.30 | 45.93 | 30.02 | 30.80 | 68.73 | 50                 | 100 | 60  | 50 | 50  | 50  | WOLFRAMITE               | 11-0591  |
| 23.56            | 32.68 | 33.58 | 18.42 | 37.37 | 38.98 | 95                 | 100 | 100 | 35 | 35  | 35  | BRANNERITE SYN           | 12-0477  |
| 23.56            | 38.44 | 29.91 | 30.85 | 46.14 | 68.94 | 40                 | 100 | 35  | 35 | 30  | 30  | FEBERITE SYN             | 12-0729  |
| 23.61            | 30.24 | 28.07 | 34.11 | 20.34 | 41.20 | 100                | 85  | 60  | 60 | 55  | 50  | CHALCANTHITE             | 11-0646  |
| 23.69            | 7.82  | 39.88 | 31.77 | 15.70 | 46.38 | 60                 | 100 | 90  | 60 | 40  | 30  | PENNINITE                | 10-0412  |
| 23.69            | 31.66 | 42.45 | 63.76 | 39.86 | 45.28 | 85                 | 100 | 75  | 65 | 45  | 30  | THORITE SYN              | 11-0419  |
| 23.79            | 34.66 | 30.59 | 41.12 | 43.16 | 43.95 | 80                 | 100 | 80  | 35 | 30  | 30  | CANCRINITE SYN           | 15-0734  |
| 23.86            | 27.44 | 12.20 | 37.26 | 32.97 | 35.21 | 70                 | 100 | 90  | 70 | 50  | 50  | STILBITE                 | 10-0433  |
| 23.89            | 31.66 | 42.87 | 64.11 | 39.88 | 40.18 | 100                | 100 | 60  | 30 | 20  | 20  | THORITE                  | 11-0172  |
| 23.94            | 38.34 | 27.54 | 30.61 | 34.79 | 25.79 | 70                 | 100 | 90  | 70 | 70  | 60  | NEPHELINE HYDRATE II SYN | 10-0459  |
| 23.96            | 32.39 | 43.00 | 65.04 | 40.73 | 52.71 | 100                | 100 | 70  | 70 | 40  | 40  | COFFINITE                | 8-0304   |
| 23.96            | 40.73 | 36.34 | 42.85 | 36.75 | 62.70 | 73                 | 100 | 51  | 48 | 47  | 31  | THENARDITE               | 5-0631   |
| 23.99            | 11.91 | 36.23 | 46.06 | 62.39 | 78.74 | 90                 | 100 | 100 | 65 | 40  | 40  | TALC                     | 13-0558  |
| 23.99            | 38.71 | 34.49 | 17.69 | 24.75 | 35.33 | 100                | 80  | 40  | 30 | 30  | 30  | BREWSTERITE              | 15-0582  |
| 24.01            | 34.11 | 38.70 | 29.75 | 31.56 | 58.83 | 50                 | 100 | 70  | 50 | 50  | 45  | CARNALLITE               | 8-0075   |
| 24.07            | 32.30 | 43.00 | 65.04 | 40.60 | 63.08 | 95                 | 100 | 95  | 70 | 45  | 35  | COFFINITE SYN            | 11-0420  |
| 24.10            | 35.80 | 38.68 | 47.90 | 54.76 | 59.78 | 100                | 100 | 100 | 50 | 40  | 40  | AMBLYGONITE              | 8-0102   |
| 24.12            | 16.12 | 32.20 | 57.88 | 77.28 | 8.17  | 80                 | 100 | 100 | 80 | 80  | 70  | THURINGITE               | 3-0067   |
| 24.15            | 16.14 | 32.23 | 57.93 | 77.35 | 8.17  | 80                 | 100 | 100 | 80 | 80  | 70  | CHLORITE (THURINGITE)    | 3-0067   |
| 24.26            | 35.36 | 31.13 | 25.74 | 39.88 | 44.10 | 67                 | 100 | 40  | 27 | 20  | 15  | CANCRINITE               | 3-0503   |
| 24.29            | 63.08 | 36.49 | 71.34 | 50.69 | 51.92 | 80                 | 100 | 80  | 70 | 60  | 60  | CALEDONITE               | 8-0153   |
| 24.39            | 11.49 | 29.60 | 45.54 | 20.14 | 43.88 | 65                 | 100 | 75  | 65 | 45  | 40  | THAUMASITE               | 13-0156  |
| 24.42            | 36.66 | 12.07 | 25.43 | 26.87 | 46.79 | 50                 | 100 | 60  | 20 | 15  | 15  | PYROPHYLLITE             | 12-0203  |
| 24.42            | 45.79 | 78.56 | 11.96 | 36.06 | 43.39 | 64                 | 100 | 64  | 48 | 40  | 32  | TALC                     | 3-0881   |
| 24.45            | 17.72 | 33.48 | 41.53 | 45.75 | 37.65 | 100                | 90  | 90  | 80 | 80  | 70  | SODDYITE                 | 8-0195   |
| 24.47            | 7.82  | 78.68 | 43.48 | 44.28 | 45.11 | 60                 | 100 | 70  | 50 | 50  | 45  | VERMICULITE              | 16-0613  |
| 24.47            | 37.16 | 12.17 | 47.60 | 63.92 | 89.16 | 50                 | 100 | 40  | 40 | 40  | 40  | PYROPHYLLITE             | 2-0613   |
| 24.50            | 7.21  | 79.11 | 43.00 | 44.43 | 46.94 | 100                | 100 | 100 | 80 | 80  | 40  | NONTRONITE               | 2-0008   |
| 24.50            | 26.32 | 35.32 | 29.04 | 49.99 | 56.34 | 100                | 35  | 35  | 30 | 30  | 30  | RUTHERFORDINE SYN        | 9-0163   |
| 24.53            | 7.13  | 78.38 | 43.22 | ***** | ***** | 40                 | 100 | 50  | 30 | *** | *** | SAPONITE FE RICH         | 12-0160  |
| 24.62            | 11.09 | 33.58 | 43.70 | 79.11 | 30.67 | 80                 | 100 | 80  | 80 | 60  | 50  | ROSCOEILITE              | 10-0496  |
| 24.67            | 34.65 | 41.84 | 43.18 | 38.16 | 44.24 | 80                 | 100 | 40  | 40 | 30  | 30  | BLEDITE                  | 4-0549   |
| 24.67            | 44.06 | 30.85 | 36.49 | 42.33 | 33.88 | 85                 | 100 | 80  | 80 | 75  | 70  | CELEDONITE               | 17-0521  |
| 24.70            | 7.40  | 22.48 | 3.69  | 44.84 | 79.87 | 100                | 90  | 75  | 60 | 50  | 50  | CHLORITE-MONT.           | 12-0231  |
| 24.70            | 11.00 | 43.97 | 33.82 | 47.70 | 79.74 | 80                 | 100 | 100 | 60 | 60  | 60  | GLAUCONITE               | 9-0439   |



| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME            | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|-----|-----|-----|-------------------------|----------|
| 24.70            | 20.14 | 40.94 | 53.03 | 28.61 | 31.94 | 90                 | 100 | 90  | 90  | 70  | 60  | ANDALUSITE              | 13-0122  |
| 24.72            | 43.52 | 44.61 | 80.37 | 7.29  | 69.40 | 100                | 100 | 100 | 100 | 60  | 60  | BEIDELLITE              | 3-0178   |
| 24.77            | 8.35  | 32.20 | 65.44 | ***** | ***** | 60                 | 100 | 50  | 40  | *** | *** | NONTRONITE              | 13-0508  |
| 24.80            | 6.69  | 79.18 | 44.10 | 95.37 | 30.35 | 80                 | 100 | 90  | 50  | 50  | 40  | SAPONITE                | 11-0056  |
| 24.80            | 32.65 | 62.66 | 50.96 | 73.29 | 87.88 | 20                 | 100 | 30  | 15  | 15  | 12  | CORDIERITE MU SYN       | 14-0249  |
| 24.86            | 7.26  | 36.79 | 43.57 | 44.65 | 70.42 | 100                | 100 | 100 | 100 | 100 | 100 | MONTMORILLONITE         | 3-0009   |
| 24.86            | 7.40  | 22.29 | 37.42 | 80.44 | 80.90 | 80                 | 100 | 60  | 60  | 50  | 50  | MONTMORILLONITE         | 13-0135  |
| 24.86            | 10.69 | 44.47 | 30.35 | 80.44 | 21.60 | 100                | 80  | 80  | 60  | 60  | 40  | MUSCOVITE (AMMNIUM) SYN | 13-0573  |
| 24.88            | 25.17 | 38.16 | 75.57 | 48.31 | 49.68 | 100                | 100 | 90  | 80  | 70  | 70  | CHLORITOID              | 14-0062  |
| 24.91            | 11.03 | 33.51 | 44.37 | 30.70 | 36.79 | 90                 | 100 | 100 | 90  | 60  | 50  | MUSCOVITE (SYN 1M)      | 7-0025   |
| 24.95            | 8.35  | 25.46 | 25.89 | 28.23 | 28.74 | 100                | 60  | 30  | 25  | 20  | 20  | ALUNOGEN                | 16-0360  |
| 24.95            | 33.88 | 18.15 | 42.18 | 46.14 | 63.08 | 90                 | 100 | 80  | 70  | 60  | 50  | SOODYITE                | 12-0180  |
| 24.98            | 35.01 | 11.47 | 23.04 | 43.92 | 45.59 | 100                | 80  | 60  | 60  | 60  | 60  | MONTMORILLONITE (ANHY)  | 7-0304   |
| 24.98            | 44.47 | 11.14 | 34.04 | 80.44 | 31.04 | 80                 | 100 | 80  | 80  | 80  | 60  | MUSCOVITE (BA)          | 10-0490  |
| 24.98            | 11.11 | 33.82 | 43.57 | 78.56 | 47.19 | 90                 | 100 | 90  | 60  | 60  | 40  | ILLITE (TRIOI.)         | 9-0343   |
| 25.03            | 8.17  | 33.72 | 34.91 | 38.75 | 43.92 | 18                 | 100 | 10  | 10  | 8   | 5   | MONTMORILLONITE         | 13-0259  |
| 25.03            | 11.16 | 33.92 | 44.47 | 22.48 | 29.94 | 100                | 100 | 100 | 100 | 80  | 80  | SERICITE                | 2-0056   |
| 25.09            | 33.51 | 44.28 | 11.23 | 80.44 | 22.80 | 100                | 100 | 100 | 80  | 80  | 60  | ILLITE                  | 9-0334   |
| 25.09            | 38.20 | 48.46 | 49.82 | 75.57 | 43.39 | 100                | 30  | 30  | 30  | 30  | 20  | CHLORITOID              | 6-0158   |
| 25.09            | 38.61 | 19.93 | 13.57 | 14.64 | 23.99 | 80                 | 100 | 60  | 40  | 40  | 40  | NEPHELINE III SYN       | 12-0247  |
| 25.10            | 7.34  | 37.39 | 43.70 | 45.75 | 71.83 | 100                | 100 | 100 | 100 | 100 | 100 | BEIDELLITE              | 3-0013   |
| 25.14            | 9.34  | 44.47 | 81.09 | 38.07 | 69.94 | 90                 | 100 | 80  | 80  | 60  | 60  | MONTMORILLONITE         | 2-0037   |
| 25.17            | 24.88 | 38.16 | 75.57 | 48.31 | 49.68 | 100                | 100 | 90  | 80  | 70  | 70  | CHLORITOID              | 14-0062  |
| 25.18            | 7.99  | 31.74 | 79.11 | 81.67 | 15.67 | 80                 | 100 | 50  | 50  | 50  | 20  | NONTRONITE              | 2-0027   |
| 25.18            | 20.04 | 35.68 | 44.06 | 37.01 | 22.55 | 100                | 100 | 100 | 90  | 80  | 60  | SCORODITE               | 5-0216   |
| 25.21            | 38.07 | 75.63 | 22.80 | 48.46 | 49.58 | 100                | 60  | 60  | 50  | 50  | 50  | CHLORITOID              | 7-0398   |
| 25.21            | 44.91 | 11.47 | 46.98 | 81.36 | 38.74 | 100                | 90  | 80  | 80  | 80  | 70  | PARAGONITE              | 12-0165  |
| 25.23            | 34.01 | 22.55 | 32.10 | 65.44 | 73.37 | 100                | 80  | 70  | 70  | 70  | 70  | SHATTUCKITE             | 13-0507  |
| 25.23            | 34.11 | 45.26 | 68.91 | 55.92 | 71.85 | 45                 | 100 | 45  | 40  | 20  | 14  | ZIRCON                  | 6-0266   |
| 25.26            | 36.79 | 47.19 | 44.47 | 11.71 | 81.09 | 86                 | 100 | 72  | 57  | 46  | 40  | PYROPHYLLITE            | 3-0574   |
| 25.37            | 7.93  | 45.40 | 81.09 | 36.53 | 71.90 | 100                | 100 | 80  | 80  | 60  | 60  | MONTMORILLONITE SYN     | 3-0016   |
| 25.37            | 15.04 | 25.79 | 31.04 | 47.81 | 49.35 | 100                | 95  | 70  | 65  | 35  | 35  | HALLOYSITE              | 13-0375  |
| 25.43            | 45.40 | 35.24 | 33.21 | 47.19 | 75.06 | 80                 | 100 | 90  | 80  | 80  | 80  | MARGARITE               | 12-0188  |
| 25.46            | 24.95 | 8.35  | 25.89 | 28.23 | 28.74 | 30                 | 100 | 60  | 25  | 20  | 20  | ALUNOGEN                | 16-0360  |
| 25.50            | 33.11 | 38.34 | 43.75 | 46.98 | 13.41 | 90                 | 100 | 90  | 70  | 70  | 60  | NEPHELINE HYDRATE I SYN | 10-0460  |
| 25.50            | 45.18 | 35.20 | 48.82 | 11.58 | 44.65 | 90                 | 100 | 80  | 80  | 70  | 70  | PARAGONITE              | 12-0187  |
| 25.55            | 39.59 | 18.90 | 16.89 | 35.70 | 38.47 | 64                 | 100 | 64  | 48  | 48  | 48  | NATROLITE               | 3-0705   |
| 25.74            | 45.18 | 81.49 | 35.12 | 11.57 | 47.64 | 100                | 90  | 90  | 80  | 70  | 60  | PARAGONITE              | 9-0428   |
| 25.74            | 81.76 | 33.51 | 38.75 | 40.33 | 46.38 | 100                | 80  | 50  | 20  | 20  | 20  | CHRYSOCOLLA             | 3-0219   |
| 25.79            | 23.19 | 26.04 | 48.24 | 46.79 | 57.01 | 40                 | 100 | 20  | 20  | 16  | 12  | GIBBSITE SYN            | 12-0460  |
| 25.79            | 25.37 | 15.04 | 31.04 | 47.81 | 49.35 | 70                 | 100 | 95  | 65  | 35  | 35  | HALLOYSITE              | 13-0375  |
| 25.79            | 33.11 | 63.65 | 53.03 | 57.63 | 76.42 | 20                 | 100 | 10  | 4   | 4   | 4   | QUARTZ (BETA)           | 11-0252  |
| 25.79            | 81.56 | 49.09 | 44.59 | 45.90 | 25.09 | 85                 | 100 | 95  | 85  | 85  | 75  | KAOLINITE               | 12-0447  |
| 25.84            | 27.44 | 34.42 | 15.72 | 20.34 | 30.31 | 100                | 80  | 75  | 55  | 55  | 35  | AMMONIA ALUM            | 7-0022   |
| 25.89            | 23.15 | 32.00 | 27.16 | 29.60 | 18.32 | 35                 | 100 | 90  | 30  | 30  | 20  | PICKERINGITE            | 12-0299  |

| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 25.98            | 27.34 | 29.46 | 38.10 | 34.68 | 45.89 | 65                 | 100 | 50  | 18 | 16 | 14 | TRIDYMITÉ                | 16-0152  |
| 26.00            | 9.19  | 44.47 | 35.29 | 29.94 | 33.45 | 40                 | 100 | 55  | 35 | 30 | 30 | SEPIOLITE                | 13-0595  |
| 26.03            | 34.65 | 27.63 | 20.50 | 40.60 | 37.26 | 100                | 55  | 45  | 40 | 35 | 25 | POTASH ALUM              | 7-0017   |
| 26.04            | 23.19 | 25.79 | 48.24 | 46.79 | 57.01 | 20                 | 100 | 40  | 20 | 16 | 12 | GIBBSITE SYN             | 12-0460  |
| 26.07            | 23.41 | 32.28 | 27.39 | 29.91 | 28.35 | 55                 | 100 | 100 | 45 | 40 | 35 | HALOTRICHITE             | 11-0506  |
| 26.07            | 40.58 | 34.98 | 65.44 | 43.18 | 59.84 | 100                | 70  | 50  | 50 | 40 | 30 | STERNBERGITE             | 11-0061  |
| 26.22            | 14.73 | 36.92 | 42.40 | 39.50 | 29.61 | 51                 | 100 | 57  | 28 | 27 | 21 | GYPSUM                   | 6-0046   |
| 26.23            | 27.50 | 29.54 | 38.26 | 45.73 | 45.98 | 100                | 90  | 90  | 60 | 60 | 60 | TRIDYMITÉ                | 14-0260  |
| 26.27            | 37.65 | 33.78 | 55.74 | 34.98 | 29.42 | 87                 | 100 | 86  | 76 | 71 | 57 | ANGLESITE                | 5-0577   |
| 26.28            | 33.68 | 64.43 | 46.42 | 50.24 | 89.57 | 35                 | 100 | 17  | 12 | 12 | 11 | QUARTZ (ALPHA)           | 5-0490   |
| 26.32            | 24.50 | 35.32 | 29.04 | 49.99 | 56.34 | 35                 | 100 | 35  | 30 | 30 | 30 | RUTHERFORDINE SYN        | 9-0163   |
| 26.35            | 34.57 | 53.29 | 65.12 | 27.68 | 29.22 | 40                 | 100 | 25  | 25 | 13 | 13 | MICROCLINE               | 12-0703  |
| 26.35            | 36.80 | 27.88 | 33.62 | 44.49 | 54.18 | 75                 | 100 | 70  | 60 | 60 | 50 | NAPHELINE (K)            | 12-0198  |
| 26.50            | 13.05 | 34.55 | 37.01 | 21.48 | 29.75 | 80                 | 100 | 60  | 60 | 40 | 40 | METATUYAMUNITE           | 8-0287   |
| 26.58            | 13.77 | 42.35 | 72.33 | 27.87 | 39.86 | 100                | 100 | 90  | 90 | 60 | 50 | ZUNYITE                  | 14-0698  |
| 26.58            | 20.80 | 26.77 | 21.08 | 39.42 | 42.85 | 100                | 80  | 50  | 35 | 35 | 30 | GOSLARITE                | 9-0395   |
| 26.58            | 20.83 | 42.33 | 18.60 | 40.73 | 42.67 | 100                | 25  | 25  | 20 | 20 | 20 | EPSOMITE                 | 8-0467   |
| 26.60            | 34.74 | 29.30 | 32.33 | 33.51 | 38.15 | 60                 | 100 | 50  | 50 | 50 | 50 | MICROCLINE               | 10-0479  |
| 26.60            | 42.22 | 46.79 | 68.60 | 52.76 | 76.59 | 100                | 80  | 70  | 50 | 40 | 30 | GOETHITE                 | 8-0097   |
| 26.70            | 13.19 | 34.42 | 31.92 | 37.65 | 18.85 | 80                 | 100 | 70  | 60 | 60 | 50 | SKLODOWSKITE             | 8-0447   |
| 26.77            | 26.58 | 20.80 | 21.08 | 39.42 | 42.85 | 50                 | 100 | 80  | 35 | 35 | 30 | GOSLARITE                | 9-0395   |
| 26.80            | 37.67 | 34.46 | 39.31 | 48.91 | 76.77 | 70                 | 100 | 70  | 70 | 60 | 60 | NEPHELINE                | 9-0458   |
| 26.80            | 46.79 | 42.22 | 68.56 | 22.48 | 33.51 | 100                | 80  | 70  | 70 | 60 | 60 | GOETHITE                 | 3-0249   |
| 26.83            | 31.74 | 42.85 | 43.37 | 46.53 | 31.00 | 80                 | 100 | 75  | 70 | 60 | 50 | ZINKOSITE SYN            | 8-0491   |
| 26.99            | 45.02 | 72.35 | 83.12 | 55.80 | 99.83 | 100                | 80  | 60  | 50 | 30 | 30 | CHRISTOBALITE BETA HIGH  | 4-0359   |
| 27.20            | 15.57 | 35.24 | 34.79 | 35.93 | 38.61 | 80                 | 100 | 100 | 80 | 80 | 80 | PHILLIPSITE              | 12-0455  |
| 27.29            | 35.11 | 34.75 | 53.24 | 17.16 | 29.79 | 15                 | 100 | 90  | 15 | 13 | 13 | ANORTHOCLASE             | 9-0478   |
| 27.34            | 25.98 | 29.46 | 38.10 | 34.68 | 45.89 | 100                | 65  | 50  | 18 | 16 | 14 | TRIDYMITÉ                | 16-0152  |
| 27.36            | 13.58 | 38.03 | 23.15 | 18.25 | 31.92 | 90                 | 100 | 80  | 70 | 60 | 60 | CUPROSKLODOWSKITE        | 8-0290   |
| 27.39            | 34.84 | 35.19 | 29.89 | 30.28 | 38.82 | 40                 | 100 | 70  | 30 | 15 | 15 | ANORTHOCLASE SYN         | 10-0361  |
| 27.44            | 12.20 | 23.86 | 37.26 | 32.97 | 35.21 | 100                | 90  | 70  | 70 | 50 | 50 | STILBITE                 | 10-0433  |
| 27.44            | 15.98 | 32.10 | 51.19 | 44.24 | 74.42 | 50                 | 100 | 60  | 50 | 40 | 40 | CHALCOPHANITE            | 15-0807  |
| 27.44            | 25.84 | 34.42 | 15.72 | 20.34 | 30.31 | 80                 | 100 | 75  | 55 | 55 | 35 | AMMONIA ALUM             | 7-0022   |
| 27.50            | 26.23 | 29.54 | 38.26 | 45.73 | 45.98 | 90                 | 100 | 90  | 60 | 60 | 60 | TRIDYMITÉ                | 14-0260  |
| 27.52            | 28.89 | 13.96 | 32.58 | 19.13 | 25.94 | 90                 | 100 | 90  | 70 | 60 | 60 | FERRIMOLYBDITE           | 15-0371  |
| 27.52            | 44.61 | 71.31 | 73.37 | 82.36 | 90.75 | 100                | 100 | 80  | 80 | 80 | 80 | RAMSDELLITE              | 7-0222   |
| 27.54            | 35.24 | 45.02 | 29.78 | 30.86 | 37.67 | 40                 | 100 | 27  | 13 | 11 | 11 | LABRADORITE              | 3-0499   |
| 27.54            | 38.34 | 23.94 | 30.61 | 34.79 | 25.79 | 90                 | 100 | 70  | 70 | 70 | 60 | NEPHELINE HYDRATE II SYN | 10-0459  |
| 27.57            | 49.31 | 44.61 | 24.07 | 56.03 | 73.37 | 100                | 65  | 60  | 50 | 13 | 11 | RAMSDELLITE              | 11-0055  |
| 27.60            | 13.03 | 32.81 | 37.29 | 36.06 | 70.18 | 80                 | 100 | 80  | 80 | 65 | 65 | CORDIERITE (FE)          | 9-0473   |
| 27.63            | 26.03 | 34.65 | 20.50 | 40.60 | 37.26 | 45                 | 100 | 55  | 40 | 35 | 25 | POTASH ALUM              | 7-0017   |
| 27.68            | 35.12 | 35.36 | 29.70 | 31.04 | 34.46 | 80                 | 100 | 90  | 80 | 80 | 80 | ANORTHITE SYN            | 10-0379  |
| 27.68            | 35.24 | 30.70 | 38.20 | 63.92 | 29.54 | 35                 | 100 | 25  | 25 | 18 | 16 | ALBITE (LOW)             | 1-0739   |
| 27.68            | 45.89 | 39.87 | 36.00 | 62.39 | 46.28 | 100                | 20  | 13  | 11 | 7  | 5  | CHRISTOBALITE LOW SYN    | 11-0695  |
| 27.72            | 36.01 | 42.85 | 37.75 | 47.57 | 41.35 | 30                 | 100 | 30  | 16 | 16 | 14 | LANGBEINITE              | 17-0740  |

| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |    |    |    |    | MINERAL NAME         | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|----|----|----|----|----------------------|----------|
| 27.74            | 9.34  | 8.55  | 37.29 | 44.47 | 48.91 | 50                 | 100 | 60 | 40 | 40 | 30 | STILPNOMELANE        | 17-0505  |
| 27.74            | 35.12 | 35.47 | 29.86 | 30.78 | 35.93 | 80                 | 100 | 90 | 70 | 70 | 70 | ANDESINE             | 10-0359  |
| 27.74            | 35.24 | 35.47 | 29.94 | 34.91 | 30.86 | 80                 | 100 | 90 | 80 | 80 | 70 | LABRADORITE          | 9-0465   |
| 27.74            | 35.24 | 35.47 | 34.57 | 36.17 | 35.12 | 60                 | 100 | 75 | 55 | 45 | 35 | ANORTHITE            | 12-0301  |
| 27.82            | 35.24 | 29.94 | 35.59 | 30.95 | 38.47 | 80                 | 100 | 80 | 80 | 70 | 70 | PLAGIOCLASE SYN      | 10-0360  |
| 27.82            | 35.24 | 30.20 | 35.59 | 31.04 | 38.47 | 80                 | 100 | 80 | 80 | 70 | 70 | BYTOWNITE            | 9-0467   |
| 27.82            | 35.47 | 35.24 | 29.86 | 38.61 | 17.47 | 80                 | 100 | 80 | 70 | 70 | 60 | OLIGOCLASE           | 9-0457   |
| 27.82            | 42.16 | 39.40 | 13.76 | 57.34 | 74.46 | 50                 | 100 | 65 | 40 | 35 | 35 | ZOISITE SYN          | 13-0562  |
| 27.87            | 36.03 | 35.91 | 25.76 | 53.24 | 45.36 | 40                 | 100 | 90 | 25 | 25 | 20 | BARYTOCALCITE        | 15-0285  |
| 27.88            | 35.24 | 30.02 | 35.59 | 30.95 | 36.17 | 80                 | 100 | 80 | 80 | 70 | 70 | PLAGIOCLASE          | 9-0456   |
| 27.88            | 35.47 | 29.54 | 83.82 | 33.82 | 37.67 | 90                 | 100 | 80 | 80 | 70 | 70 | ORTHOCLASE           | 9-0462   |
| 27.88            | 36.80 | 26.35 | 33.62 | 44.49 | 54.18 | 70                 | 100 | 75 | 60 | 60 | 50 | NEPHELINE (K)        | 12-0198  |
| 28.00            | 23.15 | 42.00 | 23.15 | 39.70 | 46.53 | 47                 | 100 | 53 | 47 | 47 | 47 | ORPIMENT             | 1-0273   |
| 28.07            | 23.61 | 30.24 | 34.11 | 20.34 | 41.20 | 60                 | 100 | 85 | 60 | 55 | 50 | CHALCANTHITE         | 11-0646  |
| 28.10            | 44.18 | 38.19 | 26.54 | 32.33 | 56.70 | 85                 | 100 | 85 | 65 | 60 | 45 | TOURMALINE           | 14-0076  |
| 28.10            | 49.43 | 54.08 | 55.59 | 72.77 | 44.50 | 100                | 56  | 52 | 49 | 43 | 30 | DIASPORE             | 5-0355   |
| 28.15            | 29.91 | 49.75 | 59.18 | 32.02 | 54.31 | 60                 | 100 | 85 | 50 | 40 | 30 | IDYRITE              | 9-0374   |
| 28.23            | 12.49 | 38.03 | 32.86 | 21.89 | 40.45 | 100                | 70  | 70 | 50 | 40 | 40 | HEULANDITE           | 13-0196  |
| 28.32            | 19.99 | 40.63 | 31.94 | 48.49 | 51.55 | 35                 | 100 | 60 | 15 | 15 | 15 | ANDALUSITE X SYN     | 13-0231  |
| 28.32            | 33.42 | 41.40 | 44.72 | 16.53 | 28.84 | 100                | 95  | 80 | 60 | 55 | 35 | EUCRYPTITE           | 14-0667  |
| 28.43            | 14.11 | 37.75 | 38.86 | 58.85 | 23.46 | 90                 | 100 | 80 | 80 | 70 | 50 | URANOPHANE           | 8-0442   |
| 28.61            | 32.25 | 61.95 | 62.29 | 24.26 | 35.62 | 60                 | 100 | 60 | 60 | 50 | 50 | SPODUMENE (BETA) SYN | 13-0251  |
| 28.66            | 17.12 | 44.97 | 20.65 | 42.18 | 35.21 | 100                | 67  | 67 | 58 | 50 | 42 | BROCHANTITE          | 3-0282   |
| 28.74            | 45.18 | 42.33 | 17.44 | 20.80 | 35.32 | 85                 | 100 | 50 | 40 | 40 | 40 | BROCHANTITE          | 13-0398  |
| 28.76            | 38.74 | 36.42 | 33.82 | 34.36 | 41.42 | 60                 | 100 | 80 | 60 | 60 | 60 | PECTOLITE            | 12-0238  |
| 28.81            | 14.19 | 32.02 | 35.32 | 43.88 | 16.71 | 90                 | 100 | 60 | 50 | 50 | 40 | BETA URANOPHANE      | 8-0301   |
| 28.82            | 40.93 | 45.31 | 46.36 | 21.85 | 67.17 | 60                 | 100 | 80 | 60 | 50 | 50 | FORSTERITE (OLIVINE) | 7-0075   |
| 28.89            | 10.89 | 21.20 | 20.37 | 37.14 | 32.27 | 90                 | 100 | 80 | 50 | 40 | 35 | CYANOTRICHITE        | 11-0131  |
| 28.89            | 13.96 | 27.52 | 32.58 | 19.13 | 25.94 | 100                | 90  | 90 | 70 | 60 | 60 | FERRIMOLYBDITE       | 15-0371  |
| 28.89            | 46.42 | 45.36 | 40.97 | 21.90 | 50.54 | 70                 | 100 | 70 | 60 | 50 | 40 | FORSTERITE (OLIVINE) | 7-0074   |
| 28.89            | 59.87 | 41.30 | 49.34 | 49.09 | 76.31 | 60                 | 100 | 95 | 50 | 45 | 45 | CRYOLITE             | 12-0257  |
| 28.91            | 46.42 | 45.35 | 67.31 | 50.56 | 40.97 | 69                 | 100 | 73 | 60 | 59 | 53 | FORSTERITE SYN       | 4-0768   |
| 28.99            | 37.33 | 34.20 | 26.60 | 38.96 | 48.49 | 60                 | 100 | 40 | 35 | 35 | 30 | NEPHELINE SYN        | 9-0338   |
| 29.12            | 36.03 | 19.76 | 44.61 | 57.56 | 28.00 | 50                 | 100 | 50 | 50 | 50 | 35 | COLEMANITE           | 6-0331   |
| 29.19            | 15.55 | 34.98 | 40.89 | 46.73 | 44.79 | 35                 | 100 | 50 | 35 | 35 | 25 | EUCLASE              | 14-0065  |
| 29.30            | 34.74 | 26.60 | 32.33 | 33.51 | 38.15 | 50                 | 100 | 60 | 50 | 50 | 50 | MICROCLINE           | 10-0479  |
| 29.30            | 38.07 | 31.94 | 34.04 | 46.18 | 52.76 | 80                 | 100 | 80 | 80 | 60 | 60 | WOLLASTONITE         | 10-0487  |
| 29.35            | 32.48 | 36.80 | 37.33 | 42.16 | 60.88 | 60                 | 100 | 70 | 55 | 30 | 30 | SCAPOLITE            | 14-0170  |
| 29.46            | 27.34 | 25.98 | 38.10 | 34.68 | 45.89 | 50                 | 100 | 65 | 18 | 16 | 14 | TRIDYMITE            | 16-0152  |
| 29.54            | 26.23 | 27.50 | 38.26 | 45.73 | 45.98 | 90                 | 100 | 90 | 60 | 60 | 60 | TRIDYMITE            | 14-0260  |
| 29.54            | 35.47 | 27.88 | 83.82 | 33.82 | 37.67 | 80                 | 100 | 90 | 80 | 70 | 70 | ORTHOCLASE           | 9-0462   |
| 29.59            | 38.98 | 41.30 | 46.53 | 43.00 | 51.95 | 50                 | 100 | 50 | 40 | 30 | 30 | PUMPELLYITE          | 10-0447  |
| 29.60            | 11.49 | 24.39 | 45.54 | 20.14 | 43.88 | 75                 | 100 | 65 | 65 | 45 | 40 | THAUMASITE           | 13-0156  |
| 29.63            | 33.85 | 34.98 | 34.28 | 26.41 | 32.53 | 80                 | 100 | 80 | 60 | 50 | 50 | SANIDINE (HIGH) SYN  | 10-0353  |
| 29.68            | 22.77 | 34.88 | 43.18 | 20.27 | 41.20 | 64                 | 100 | 20 | 16 | 13 | 11 | MELANTERITE          | 1-0255   |

| TWO-THETA (IRON) |       |       |       |       |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME          | FILE NO. |
|------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|----|----|----|-----------------------|----------|
| 29.70            | 30.11 | 37.25 | 42.93 | 42.68 | 52.45  | 100                | 56  | 55  | 55 | 41 | 41 | NITER SYN             | 5-0377   |
| 29.70            | 32.71 | 37.29 | 42.37 | 61.30 | 26.41  | 90                 | 100 | 100 | 90 | 90 | 70 | SCAPOLITE             | 2-0412   |
| 29.70            | 34.79 | 33.92 | 37.67 | 26.47 | 32.42  | 70                 | 100 | 70  | 50 | 40 | 30 | ORTHOCLASE (FE)       | 8-0048   |
| 29.70            | 35.29 | 17.44 | 30.49 | 27.82 | 30.67  | 25                 | 100 | 20  | 20 | 15 | 15 | ALBITE                | 9-0466   |
| 29.75            | 33.17 | 37.37 | 31.55 | 38.16 | 53.79  | 100                | 70  | 60  | 40 | 40 | 40 | CHALCOSIDERITE        | 8-0127   |
| 29.78            | 35.01 | 34.14 | 37.93 | 44.24 | 65.28  | 80                 | 100 | 90  | 80 | 80 | 80 | HYALOPHANE            | 11-0417  |
| 29.91            | 38.44 | 23.56 | 30.85 | 46.14 | 68.94  | 35                 | 100 | 40  | 35 | 30 | 30 | FERBERITE SYN         | 12-0729  |
| 29.91            | 49.75 | 28.15 | 59.18 | 32.02 | 54.31  | 100                | 85  | 60  | 50 | 40 | 30 | IDYRITE               | 9-0374   |
| 29.92            | 35.52 | 35.11 | 27.74 | 28.90 | 30.87  | 30                 | 100 | 30  | 15 | 11 | 11 | ALBITE (HIGH)         | 10-0393  |
| 29.94            | 34.59 | 35.02 | 26.98 | 32.57 | 37.98  | 70                 | 100 | 90  | 45 | 40 | 35 | SANIDINE              | 13-0456  |
| 29.94            | 35.24 | 27.82 | 35.59 | 30.95 | 38.47  | 80                 | 100 | 80  | 80 | 70 | 70 | PLAGIOCLASE SYN       | 10-0360  |
| 29.97            | 34.74 | 35.10 | 27.21 | 17.19 | 53.26  | 35                 | 100 | 40  | 25 | 20 | 20 | SANIDINE (HIGH) SYN   | 10-0357  |
| 30.00            | 37.08 | 59.53 | 94.50 | 81.42 | 104.51 | 100                | 90  | 70  | 40 | 30 | 30 | COLORADOITE           | 8-0026   |
| 30.02            | 34.24 | 16.75 | 83.70 | 29.61 | 37.16  | 20                 | 100 | 25  | 18 | 14 | 12 | SULPHUR               | 13-0141  |
| 30.02            | 35.24 | 27.88 | 35.59 | 30.95 | 36.17  | 80                 | 100 | 80  | 80 | 70 | 70 | PLAGIOCLASE           | 9-0456   |
| 30.10            | 30.61 | 32.00 | 44.28 | 55.78 | 60.11  | 100                | 90  | 30  | 16 | 12 | 12 | PETALITE              | 12-0451  |
| 30.11            | 29.70 | 37.25 | 42.93 | 42.68 | 52.45  | 56                 | 100 | 55  | 55 | 41 | 41 | NITER SYN             | 5-0377   |
| 30.19            | 30.52 | 53.55 | 43.26 | 43.92 | 57.34  | 100                | 53  | 28  | 24 | 23 | 21 | WITHERITE SYN         | 5-0378   |
| 30.19            | 40.33 | 62.81 | 67.13 | 35.12 | 37.55  | 100                | 90  | 80  | 50 | 40 | 40 | BOULANGERITE          | 9-0470   |
| 30.19            | 43.22 | 17.28 | 39.31 | 53.55 | 65.52  | 100                | 50  | 30  | 30 | 30 | 30 | HAUYNITE              | 2-0331   |
| 30.20            | 35.24 | 27.82 | 35.59 | 31.04 | 38.47  | 80                 | 100 | 80  | 80 | 70 | 70 | BYTOWNITE             | 9-0467   |
| 30.24            | 23.61 | 28.07 | 34.11 | 20.34 | 41.20  | 85                 | 100 | 60  | 60 | 55 | 50 | CHALCANTHITE          | 11-0646  |
| 30.35            | 32.81 | 40.28 | 41.82 | 29.38 | 36.66  | 35                 | 100 | 35  | 35 | 30 | 30 | JAMESONITE            | 13-0461  |
| 30.35            | 67.74 | 22.25 | 41.09 | 44.84 | 45.40  | 70                 | 100 | 70  | 70 | 70 | 70 | CLINOCHROME           | 14-0692  |
| 30.42            | 38.51 | 35.29 | 48.44 | 54.80 | 37.20  | 60                 | 100 | 65  | 45 | 45 | 35 | TOPAZ                 | 12-0765  |
| 30.42            | 39.64 | 22.09 | 18.60 | 45.22 | 40.81  | 85                 | 100 | 75  | 55 | 55 | 45 | MALACHITE SYN         | 10-0399  |
| 30.47            | 43.61 | 17.41 | 39.59 | 54.18 | 66.32  | 100                | 75  | 40  | 40 | 40 | 20 | NOSEAN SYN            | 15-0470  |
| 30.49            | 12.78 | 32.30 | 34.88 | 20.50 | 22.65  | 100                | 100 | 80  | 80 | 75 | 75 | METATORBERNITE        | 16-0404  |
| 30.49            | 16.41 | 43.52 | 39.14 | 41.69 | 34.65  | 70                 | 100 | 80  | 40 | 40 | 30 | AURICHALCITE          | 17-0743  |
| 30.49            | 38.86 | 18.05 | 32.68 | 34.32 | 23.27  | 100                | 80  | 70  | 70 | 70 | 60 | TURQUOIS              | 6-0214   |
| 30.49            | 43.88 | 22.14 | 18.53 | 44.97 | 38.32  | 100                | 100 | 80  | 70 | 60 | 50 | ROSASITE              | 17-0216  |
| 30.52            | 30.19 | 53.55 | 43.26 | 43.92 | 57.34  | 53                 | 100 | 28  | 24 | 23 | 21 | WITHERITE SYN         | 5-0378   |
| 30.59            | 34.66 | 23.79 | 41.12 | 43.16 | 43.95  | 80                 | 100 | 80  | 35 | 30 | 30 | CANCRINITE SYN        | 15-0734  |
| 30.61            | 7.82  | 78.56 | 24.47 | 22.52 | 94.42  | 80                 | 100 | 90  | 50 | 40 | 40 | SAPONITE              | 13-0086  |
| 30.61            | 30.10 | 32.00 | 44.28 | 55.78 | 60.11  | 90                 | 100 | 30  | 16 | 12 | 12 | PETALITE              | 12-0451  |
| 30.67            | 15.13 | 34.75 | 46.53 | 35.09 | 35.68  | 50                 | 100 | 10  | 10 | 4  | 4  | SCHOEPITE             | 13-0241  |
| 30.67            | 36.14 | 45.18 | 48.42 | 52.45 | 55.45  | 80                 | 100 | 75  | 70 | 60 | 50 | PHENAKITE             | 9-0431   |
| 30.70            | 15.18 | 45.55 | 78.25 | 49.02 | 59.14  | 100                | 100 | 100 | 80 | 70 | 70 | SERPENTINE            | 9-0444   |
| 30.70            | 35.24 | 27.68 | 38.20 | 63.92 | 29.54  | 25                 | 100 | 35  | 25 | 18 | 16 | ALBITE (LOW)          | 1-0739   |
| 30.70            | 37.80 | 38.34 | 43.75 | 63.92 | 68.23  | 40                 | 100 | 40  | 30 | 30 | 27 | EUXENITE              | 9-0442   |
| 30.70            | 38.20 | 68.50 | 66.28 | 82.78 | 15.61  | 50                 | 100 | 20  | 14 | 14 | 12 | COLUMBITE (TANTALITE) | 16-0337  |
| 30.70            | 39.88 | 66.66 | 66.36 | 52.97 | 57.93  | 35                 | 100 | 33  | 30 | 27 | 23 | RHODOCHROSITE SYN     | 7-0268   |
| 30.73            | 32.86 | 38.88 | 47.44 | 62.90 | 67.96  | 80                 | 100 | 100 | 80 | 80 | 80 | POLLUCITE             | 15-0317  |
| 30.85            | 44.06 | 24.67 | 36.49 | 42.33 | 33.88  | 80                 | 100 | 85  | 80 | 75 | 70 | CELADONITE            | 17-0521  |
| 30.86            | 42.45 | 43.78 | 35.33 | 38.48 | 26.73  | 80                 | 100 | 60  | 40 | 40 | 30 | MONTICELLITE SYN      | 11-0129  |



| TWO-THETA (IRON) |       |       |       |       |       | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME            | FILE NO. |
|------------------|-------|-------|-------|-------|-------|--------------------|-----|-----|----|----|----|-------------------------|----------|
| 30.89            | 42.62 | 44.00 | 26.73 | 38.55 | 44.78 | 40                 | 100 | 40  | 35 | 35 | 30 | MONTICELLITE            | 11-0353  |
| 30.95            | 15.25 | 45.22 | 47.19 | 16.03 | 32.03 | 300                | 400 | 70  | 38 | 24 | 24 | ANTIGORITE (SERPENTINE) | 7-0417   |
| 30.95            | 55.51 | 17.69 | 48.24 | 44.47 | 76.77 | 100                | 33  | 17  | 17 | 13 | 10 | SODALITE                | 3-0338   |
| 31.04            | 45.54 | 15.36 | 53.60 | 65.60 | 24.26 | 60                 | 100 | 60  | 35 | 25 | 20 | SERPENTINE SYN          | 11-0386  |
| 31.10            | 13.13 | 54.60 | 26.45 | 20.77 | 43.52 | 85                 | 100 | 70  | 65 | 45 | 35 | META-AUTUNITE I         | 12-0423  |
| 31.10            | 40.60 | 44.43 | 25.41 | 27.72 | 51.92 | 80                 | 100 | 80  | 60 | 50 | 40 | PHOSGENITE              | 12-0218  |
| 31.13            | 35.36 | 24.26 | 25.74 | 39.88 | 44.10 | 40                 | 100 | 67  | 27 | 20 | 15 | CANCRINITE              | 3-0503   |
| 31.18            | 14.06 | 36.49 | 24.14 | 34.88 | 42.51 | 180                | 100 | 60  | 50 | 50 | 50 | DUNDASITE               | 21-0936  |
| 31.18            | 22.98 | 44.24 | 42.33 | 18.53 | 20.65 | 75                 | 100 | 85  | 75 | 25 | 25 | ANTLERITE               | 7-0407   |
| 31.22            | 15.49 | 23.28 | 7.77  | 39.31 | 44.47 | 100                | 100 | 100 | 60 | 60 | 40 | PENNINITE               | 10-0183  |
| 31.22            | 45.40 | 15.30 | 53.03 | 77.12 | 78.38 | 80                 | 100 | 90  | 50 | 50 | 40 | ANTIGORITE              | 10-0402  |
| 31.28            | 10.79 | 22.49 | 32.20 | 33.78 | 24.95 | 70                 | 100 | 80  | 70 | 70 | 60 | AUTUNITE                | 8-0314   |
| 31.28            | 15.66 | 44.79 | 65.04 | 58.52 | 48.42 | 80                 | 100 | 70  | 70 | 60 | 50 | SPANGOLITE              | 5-0142   |
| 31.28            | 22.44 | 35.78 | 37.01 | 34.98 | 45.93 | 60                 | 100 | 80  | 60 | 40 | 40 | BUTLERITE               | 16-0819  |
| 31.28            | 32.10 | 45.75 | 55.45 | 36.75 | 62.70 | 100                | 43  | 32  | 27 | 24 | 21 | CERUSSITE               | 5-0417   |
| 31.28            | 35.91 | 15.42 | 36.88 | 51.19 | 18.07 | 100                | 25  | 20  | 15 | 15 | 13 | CLINOCLASITE            | 12-0297  |
| 31.28            | 55.16 | 57.56 | 34.75 | 65.04 | 44.61 | 70                 | 100 | 70  | 60 | 50 | 30 | WEISSITE                | 10-0421  |
| 31.36            | 10.79 | 22.60 | 32.01 | 16.83 | 24.95 | 90                 | 100 | 90  | 80 | 40 | 40 | TORBERNITE SYN          | 8-0360   |
| 31.36            | 10.89 | 22.04 | 33.58 | 16.36 | 65.44 | 90                 | 100 | 80  | 50 | 40 | 30 | NOVACEKITE              | 8-0286   |
| 31.36            | 35.68 | 33.48 | 55.74 | 66.71 | 61.26 | 75                 | 100 | 60  | 55 | 45 | 40 | GREENOCKITE             | 6-0314   |
| 31.40            | 15.51 | 81.23 | 48.88 | 24.98 | 44.37 | 100                | 100 | 100 | 90 | 80 | 80 | KAOLINITE (DISORDERED)  | 6-0221   |
| 31.40            | 15.57 | 49.22 | 27.17 | 29.55 | 45.40 | 100                | 100 | 90  | 70 | 60 | 50 | DICKITE                 | 10-0446  |
| 31.41            | 15.52 | 81.16 | 73.44 | 25.64 | 75.28 | 80                 | 100 | 90  | 70 | 60 | 60 | KAOLINITE               | 14-0164  |
| 31.41            | 15.56 | 49.31 | 27.21 | 45.54 | 25.14 | 100                | 90  | 90  | 80 | 80 | 70 | DICKITE                 | 10-0430  |
| 31.49            | 78.19 | 15.52 | 24.37 | 45.59 | 43.06 | 100                | 100 | 80  | 70 | 50 | 40 | SERPENTINE (AL) SYN     | 11-0096  |
| 31.54            | 5.28  | 12.62 | 38.57 | 36.75 | 37.01 | 80                 | 100 | 80  | 80 | 60 | 60 | OKENITE                 | 9-0469   |
| 31.54            | 39.27 | 22.87 | 56.03 | 57.24 | 61.26 | 70                 | 100 | 40  | 40 | 40 | 40 | BASTNAESITE             | 11-0340  |
| 31.56            | 41.04 | 37.01 | 31.46 | 22.09 | 42.33 | 70                 | 100 | 95  | 65 | 55 | 50 | STIBNITE SYN            | 6-0474   |
| 31.57            | 15.55 | 45.22 | 24.20 | 42.37 | 77.24 | 100                | 100 | 60  | 40 | 20 | 20 | CHAMOSITE               | 10-0404  |
| 31.57            | 15.64 | 48.06 | 78.43 | 43.21 | 57.91 | 80                 | 100 | 90  | 55 | 40 | 40 | SERPENTINE (AL)         | 12-0583  |
| 31.57            | 36.20 | 40.31 | 31.86 | 59.47 | 28.24 | 94                 | 100 | 63  | 60 | 55 | 38 | BISMUTHINITE SYN        | 6-0333   |
| 31.57            | 40.05 | 45.59 | 44.37 | 47.44 | 49.70 | 75                 | 100 | 80  | 60 | 35 | 35 | FAYALITE SYN            | 11-0262  |
| 31.63            | 15.70 | 45.75 | 78.38 | 59.98 | 24.32 | 70                 | 100 | 80  | 50 | 45 | 40 | SERPENTINE (AL)         | 13-0004  |
| 31.64            | 41.20 | 69.40 | 49.08 | 59.50 | 54.60 | 50                 | 100 | 45  | 25 | 25 | 18 | SMITHSONITE             | 8-0449   |
| 31.66            | 15.64 | 45.02 | 53.55 | 76.59 | 65.98 | 100                | 100 | 100 | 70 | 70 | 60 | CHAMOSITE Fe(II)        | 7-0339   |
| 31.66            | 15.70 | 48.10 | 78.32 | 43.13 | 44.18 | 100                | 100 | 80  | 65 | 55 | 40 | SERPENTINE              | 11-0388  |
| 31.66            | 23.69 | 42.45 | 63.76 | 39.86 | 45.28 | 100                | 85  | 75  | 65 | 45 | 30 | THORITE SYN             | 11-0419  |
| 31.66            | 23.89 | 42.87 | 64.11 | 39.88 | 40.18 | 100                | 100 | 60  | 30 | 20 | 20 | THORITE                 | 11-0172  |
| 31.74            | 7.99  | 25.18 | 79.11 | 81.67 | 15.67 | 50                 | 100 | 80  | 50 | 50 | 20 | NONTRONITE              | 2-0027   |
| 31.74            | 26.83 | 42.85 | 43.37 | 46.53 | 31.00 | 100                | 80  | 75  | 70 | 60 | 50 | ZINKOSITE SYN           | 8-0491   |
| 31.74            | 32.97 | 20.02 | 37.14 | 11.50 | 16.38 | 100                | 90  | 70  | 50 | 30 | 30 | VOLTAITE                | 17-0539  |
| 31.75            | 15.72 | 7.93  | 43.69 | 46.42 | 44.50 | 80                 | 100 | 80  | 80 | 80 | 70 | CHLORITE (DIABANTITE)   | 7-0171   |
| 31.77            | 45.79 | 40.18 | 44.65 | 65.94 | 79.18 | 75                 | 100 | 95  | 70 | 70 | 70 | FAYALITE SYN            | 9-0307   |
| 31.79            | 15.75 | 7.88  | 23.66 | 44.54 | 46.58 | 50                 | 100 | 80  | 30 | 30 | 30 | CHLORITE (RIPIDOLITE)   | 7-0076   |
| 31.80            | 32.61 | 56.30 | 46.42 | 61.12 | 43.38 | 100                | 70  | 50  | 40 | 35 | 34 | STRONTIANITE SYN        | 05-0418  |

| TWO-THETA (IRON) |       |       |       |       |        | RELATIVE INTENSITY |     |     |    |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|----|-----|-----|--------------------------|----------|
| 31.82            | 16.96 | 36.14 | 26.32 | 34.65 | 53.24  | 50                 | 100 | 70  | 30 | 30  | 30  | CARNOTITE                | 8-0317   |
| 31.82            | 35.91 | 36.26 | 32.38 | 35.44 | 36.62  | 90                 | 100 | 100 | 90 | 90  | 90  | HOLLANDITE               | 4-0590   |
| 31.82            | 36.14 | 65.44 | 24.95 | 53.24 | 55.16  | 70                 | 100 | 60  | 40 | 40  | 40  | LINARITE                 | 4-0598   |
| 31.83            | 60.80 | 72.26 | 24.58 | 84.47 | 103.80 | 100                | 40  | 25  | 20 | 16  | 14  | EUCRYPTITE (BETA)        | 13-0378  |
| 31.86            | 15.69 | 7.93  | 23.79 | 77.06 | 40.03  | 100                | 100 | 90  | 70 | 60  | 50  | CHAMOSITE (MG)           | 5-0146   |
| 31.86            | 15.78 | 46.38 | 43.22 | 79.36 | 24.64  | 100                | 100 | 80  | 70 | 70  | 60  | CHAMOSITE Fe(III)        | 7-0329   |
| 31.86            | 15.80 | 45.22 | 7.88  | 23.74 | 53.55  | 80                 | 100 | 50  | 40 | 40  | 40  | CHLORITE (THURINGITE)    | 13-0029  |
| 31.88            | 21.69 | 45.28 | 30.67 | 49.00 | 50.12  | 100                | 70  | 60  | 40 | 30  | 30  | AZURITE                  | 11-0136  |
| 31.92            | 40.89 | 61.95 | 56.34 | 76.70 | 66.31  | 26                 | 100 | 26  | 24 | 11  | 10  | ARSENIC                  | 5-0632   |
| 31.94            | 15.80 | 7.88  | 23.84 | 45.40 | 76.82  | 90                 | 100 | 50  | 50 | 50  | 50  | CHLORITE (APHROSIDERITE) | 12-0243  |
| 31.94            | 15.80 | 45.22 | 77.06 | 53.83 | 42.37  | 100                | 100 | 90  | 70 | 60  | 40  | CHAMOSITE                | 7-0315   |
| 31.94            | 38.07 | 29.30 | 34.04 | 46.18 | 52.76  | 80                 | 100 | 80  | 80 | 60  | 60  | WOLLASTONITE             | 10-0487  |
| 31.98            | 51.64 | 21.69 | 30.57 | 45.40 | 50.12  | 100                | 70  | 55  | 50 | 35  | 35  | AZURITE                  | 11-0682  |
| 32.00            | 23.15 | 25.89 | 27.16 | 29.60 | 18.32  | 90                 | 100 | 35  | 30 | 30  | 20  | PICKERINGITE             | 12-0299  |
| 32.00            | 30.10 | 30.61 | 44.28 | 55.78 | 60.11  | 30                 | 100 | 90  | 16 | 12  | 12  | PETALITE                 | 12-0451  |
| 32.02            | 14.19 | 28.81 | 35.32 | 43.88 | 16.71  | 60                 | 100 | 90  | 50 | 50  | 40  | BETA URANOPHANE          | 8-0301   |
| 32.03            | 39.02 | 32.42 | 61.55 | 71.30 | 46.06  | 100                | 90  | 80  | 30 | 30  | 25  | BROOKITE                 | 16-0617  |
| 32.03            | 61.63 | 48.06 | 69.52 | 71.15 | 81.76  | 100                | 33  | 22  | 21 | 19  | 13  | ANATASE SYN              | 4-0477   |
| 32.10            | 15.98 | 27.44 | 51.19 | 44.24 | 74.42  | 60                 | 100 | 50  | 50 | 40  | 40  | CHALCOPHANITE            | 15-0807  |
| 32.10            | 31.28 | 45.75 | 55.45 | 36.75 | 62.70  | 43                 | 100 | 32  | 27 | 24  | 21  | CERUSSITE                | 5-0417   |
| 32.10            | 40.42 | 62.70 | 45.93 | 78.49 | 81.02  | 100                | 100 | 100 | 70 | 70  | 70  | PLATTNERITE              | 8-0185   |
| 32.14            | 38.20 | 42.54 | 72.92 | 24.20 | 43.75  | 80                 | 100 | 80  | 60 | 50  | 40  | ALLANITE (METAMICT)      | 9-0474   |
| 32.15            | 39.76 | 36.26 | 52.04 | 62.43 | 72.00  | 100                | 33  | 22  | 20 | 15  | 14  | ANHYDRITE                | 6-0226   |
| 32.20            | 8.35  | 24.77 | 65.44 | ***** | *****  | 50                 | 100 | 60  | 40 | *** | *** | NONTRONITE               | 13-0508  |
| 32.20            | 16.12 | 24.12 | 57.88 | 77.28 | 8.17   | 100                | 100 | 80  | 80 | 80  | 70  | THURINGITE               | 3-0067   |
| 32.20            | 43.18 | 39.99 | 49.31 | 27.80 | 62.70  | 80                 | 100 | 95  | 45 | 35  | 35  | WILLEMITE                | 8-0492   |
| 32.23            | 16.14 | 24.15 | 57.93 | 77.35 | 8.17   | 100                | 100 | 80  | 80 | 80  | 70  | CHLORITE (THURINGITE)    | 3-0067   |
| 32.25            | 28.61 | 61.95 | 62.29 | 24.26 | 35.62  | 100                | 60  | 60  | 60 | 50  | 50  | SPODUMENE (BETA) SYN     | 13-0251  |
| 32.28            | 23.41 | 26.07 | 27.39 | 29.91 | 28.35  | 100                | 100 | 55  | 45 | 40  | 35  | HALOTRICHITE             | 11-0506  |
| 32.30            | 12.78 | 30.49 | 34.88 | 20.50 | 22.65  | 80                 | 100 | 100 | 80 | 75  | 75  | METATORBERNITE           | 16-0404  |
| 32.30            | 24.07 | 43.00 | 65.04 | 40.60 | 63.08  | 100                | 95  | 95  | 70 | 45  | 35  | COFFINITE SYN            | 11-0420  |
| 32.30            | 36.60 | 44.61 | 66.28 | 34.32 | 48.22  | 90                 | 100 | 100 | 70 | 60  | 40  | PREHNITE                 | 7-0333   |
| 32.30            | 41.20 | 22.60 | 77.87 | 62.70 | 47.57  | 100                | 80  | 45  | 35 | 30  | 25  | PSEUDOBROOKITE SYN       | 9-0182   |
| 32.30            | 47.36 | 52.45 | 15.98 | 48.19 | 39.27  | 60                 | 100 | 85  | 55 | 50  | 40  | PSILOMELANE              | 14-0627  |
| 32.38            | 36.39 | 77.87 | 47.57 | 52.19 | 53.50  | 60                 | 100 | 50  | 40 | 40  | 20  | CORONADITE               | 7-0361   |
| 32.38            | 44.97 | 37.52 | 67.14 | 26.27 | 79.72  | 80                 | 100 | 90  | 80 | 70  | 70  | LITHIOPHILITE            | 13-0336  |
| 32.39            | 23.96 | 43.00 | 65.04 | 40.73 | 52.71  | 100                | 100 | 70  | 70 | 40  | 40  | COFFINITE                | 8-0304   |
| 32.42            | 32.03 | 39.02 | 61.55 | 71.30 | 46.06  | 80                 | 100 | 90  | 30 | 30  | 25  | BROOKITE                 | 16-0617  |
| 32.42            | 36.66 | 55.80 | 41.56 | 60.95 | 90.00  | 100                | 100 | 100 | 80 | 80  | 80  | SCAPOLITE                | 2-0405   |
| 32.48            | 22.82 | 12.94 | 52.19 | 26.40 | 27.64  | 100                | 100 | 60  | 60 | 30  | 30  | BASSETITE                | 7-0288   |
| 32.48            | 36.80 | 29.35 | 37.33 | 42.16 | 60.88  | 100                | 70  | 60  | 55 | 30  | 30  | SCAPOLITE                | 14-0170  |
| 32.48            | 46.73 | 57.88 | 68.04 | ***** | *****  | 70                 | 100 | 85  | 50 | *** | *** | ARGENTITE                | 4-0774   |
| 32.52            | 40.30 | 17.69 | 35.93 | 38.01 | 53.50  | 80                 | 100 | 70  | 70 | 70  | 70  | AXINITE (TINZENITE)      | 6-0444   |
| 32.52            | 40.30 | 35.70 | 17.69 | 30.52 | 34.36  | 80                 | 100 | 90  | 70 | 60  | 60  | AXINITE                  | 6-0448   |
| 32.58            | 39.14 | 41.20 | 57.56 | 59.18 | 60.88  | 90                 | 100 | 80  | 40 | 40  | 30  | MIARGYRITE               | 4-0675   |

| TWO-THETA (IRON) |       |       |       |       |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME                | FILE NO. |
|------------------|-------|-------|-------|-------|--------|--------------------|-----|-----|----|----|----|-----------------------------|----------|
| 32.61            | 7.93  | 78.50 | 24.47 | 32.03 | 43.39  | 60                 | 100 | 60  | 40 | 40 | 40 | VERMICULITE                 | 10-0439  |
| 32.61            | 31.80 | 56.30 | 46.42 | 61.12 | 45.97  | 70                 | 100 | 50  | 40 | 35 | 34 | STRONTIANITE SYN            | 5-0418   |
| 32.61            | 40.15 | 41.69 | 50.50 | 62.14 | 68.46  | 70                 | 100 | 90  | 70 | 70 | 60 | DAHLITE (CARBONATE-APATITE) | 15-0100  |
| 32.61            | 44.47 | 66.44 | 24.58 | 68.32 | 46.79  | 100                | 50  | 50  | 25 | 18 | 13 | XENOTIME                    | 11-0254  |
| 32.65            | 40.31 | 41.56 | 36.47 | 50.52 | 59.67  | 30                 | 100 | 80  | 30 | 30 | 30 | DAHLITE (CARBONATE-APATITE) | 12-0529  |
| 32.65            | 62.66 | 24.80 | 50.96 | 73.29 | 87.88  | 100                | 30  | 20  | 15 | 15 | 12 | CORDIERITE MU SYN           | 14-0249  |
| 32.68            | 13.24 | 35.21 | 44.43 | 19.76 | 38.30  | 80                 | 100 | 80  | 80 | 60 | 60 | WAVELLITE                   | 2-0075   |
| 32.68            | 15.27 | 21.96 | 30.67 | 32.02 | 34.98  | 25                 | 100 | 70  | 15 | 12 | 12 | SCHOEPIE                    | 13-0407  |
| 32.68            | 33.58 | 23.56 | 18.42 | 37.37 | 38.98  | 100                | 100 | 95  | 35 | 35 | 35 | BRANNERITE SYN              | 12-0477  |
| 32.68            | 34.55 | 12.95 | 44.24 | 54.87 | 58.20  | 100                | 100 | 80  | 80 | 80 | 80 | WAVELLITE                   | 17-0203  |
| 32.68            | 36.41 | 54.38 | 54.83 | 33.96 | 28.76  | 100                | 97  | 80  | 76 | 67 | 57 | BARITE SYN                  | 5-0448   |
| 32.68            | 40.30 | 33.37 | 38.16 | 60.88 | 30.16  | 100                | 30  | 25  | 20 | 16 | 14 | COSALITE                    | 13-0502  |
| 32.71            | 37.29 | 29.70 | 42.37 | 61.30 | 26.41  | 100                | 100 | 90  | 90 | 90 | 70 | SCAPOLITE                   | 2-0412   |
| 32.71            | 41.88 | 66.78 | 60.95 | 47.40 | 49.35  | 40                 | 100 | 63  | 30 | 25 | 25 | MARCASITE                   | 3-0799   |
| 32.74            | 34.51 | 20.71 | 38.78 | 39.86 | 48.33  | 85                 | 100 | 80  | 70 | 70 | 65 | LEUCITE                     | 15-0047  |
| 32.79            | 10.59 | 36.88 | 41.69 | 16.20 | 26.98  | 40                 | 100 | 40  | 40 | 30 | 30 | COPIAPITE                   | 11-0395  |
| 32.81            | 13.03 | 27.60 | 37.29 | 36.06 | 70.18  | 80                 | 100 | 80  | 80 | 65 | 65 | CORDIERITE (FE)             | 9-0473   |
| 32.81            | 19.89 | 38.68 | 68.73 | 42.16 | 45.50  | 100                | 80  | 80  | 60 | 50 | 50 | ANALCIME (ZEOLITE)          | 7-0340   |
| 32.81            | 30.35 | 40.28 | 41.82 | 29.38 | 36.66  | 100                | 35  | 35  | 35 | 30 | 30 | JAMESONITE                  | 13-0461  |
| 32.81            | 38.09 | 54.96 | 65.52 | 93.76 | 68.83  | 84                 | 100 | 57  | 35 | 17 | 16 | GALENA SYN                  | 5-0592   |
| 32.82            | 19.89 | 38.62 | 45.48 | 67.48 | 23.04  | 100                | 80  | 70  | 50 | 50 | 40 | ANALCIME (ZEOLITE)          | 7-0363   |
| 32.82            | 33.21 | 52.10 | 20.71 | 44.80 | 42.15  | 95                 | 100 | 60  | 50 | 50 | 40 | MULLITE                     | 15-0776  |
| 32.86            | 38.88 | 30.73 | 47.44 | 62.90 | 67.96  | 100                | 100 | 60  | 80 | 80 | 80 | POLLUCITE                   | 15-0317  |
| 32.89            | 35.55 | 22.09 | 34.75 | 39.27 | 46.73  | 90                 | 100 | 90  | 80 | 50 | 50 | DUFRENITE                   | 8-0155   |
| 32.89            | 61.23 | 46.34 | 50.22 | 33.88 | 62.70  | 100                | 80  | 70  | 70 | 60 | 60 | BRANNERITE                  | 8-0002   |
| 32.90            | 63.14 | 76.20 | 85.95 | 88.11 | 25.26  | 100                | 90  | 80  | 80 | 80 | 60 | QUARTZ (BETA)               | 7-0346   |
| 32.97            | 31.74 | 20.02 | 37.14 | 11.50 | 16.38  | 90                 | 100 | 70  | 50 | 30 | 30 | VOLTAITE                    | 17-0539  |
| 33.00            | 33.51 | 52.24 | 45.02 | 79.43 | 42.54  | 90                 | 100 | 100 | 90 | 90 | 80 | SILLIMANITE                 | 10-0369  |
| 33.08            | 40.97 | 42.25 | 43.62 | 60.22 | 63.76  | 70                 | 100 | 70  | 70 | 70 | 70 | APATITE SYN (CARBONATE)     | 13-0001  |
| 33.11            | 25.50 | 38.34 | 43.75 | 46.98 | 13.41  | 100                | 90  | 90  | 70 | 70 | 60 | NEPHELINE HYDRATE I SYN     | 10-0460  |
| 33.11            | 25.79 | 63.65 | 53.03 | 57.63 | 76.42  | 100                | 20  | 10  | 4  | 4  | 4  | QUARTZ (BETA)               | 11-0252  |
| 33.11            | 43.06 | 50.28 | 69.10 | 72.62 | 116.52 | 100                | 65  | 50  | 40 | 40 | 40 | MANGANITE                   | 8-0099   |
| 33.11            | 47.40 | 70.42 | 43.22 | 66.36 | 45.02  | 100                | 70  | 70  | 60 | 50 | 40 | MANGANITE SYN               | 8-0016   |
| 33.14            | 58.67 | 34.43 | 42.05 | 48.20 | 45.97  | 100                | 65  | 52  | 46 | 38 | 33 | ARAGONITE SYN               | 5-0453   |
| 33.17            | 29.75 | 37.37 | 31.55 | 38.16 | 53.79  | 70                 | 100 | 60  | 40 | 40 | 40 | CHALCOSIDERITE              | 8-0127   |
| 33.17            | 35.32 | 74.95 | 31.36 | 47.36 | 37.37  | 50                 | 100 | 50  | 40 | 40 | 30 | ROCKBRIDGEITE               | 8-0159   |
| 33.21            | 32.82 | 52.10 | 20.71 | 44.80 | 42.15  | 100                | 95  | 60  | 50 | 50 | 40 | MULLITE                     | 15-0776  |
| 33.23            | 10.94 | 50.47 | 43.42 | 56.94 | 33.02  | 100                | 100 | 60  | 55 | 50 | 40 | PHLOGOPITE (3T SYN)         | 10-0481  |
| 33.27            | 11.09 | 22.32 | 76.11 | 41.84 | 43.00  | 90                 | 100 | 90  | 50 | 40 | 40 | SERPIERITE                  | 14-0188  |
| 33.27            | 23.15 | 44.61 | 36.75 | 56.34 | 70.82  | 100                | 40  | 40  | 20 | 17 | 17 | KIESERITE SYN               | 1-0638   |
| 33.27            | 37.75 | 36.75 | 26.53 | 58.52 | 60.88  | 60                 | 100 | 85  | 40 | 40 | 35 | VANADINITE                  | 13-0585  |
| 33.31            | 12.96 | 37.16 | 27.26 | 35.47 | 69.85  | 90                 | 100 | 90  | 80 | 80 | 70 | CORDIERITE                  | 9-0472   |
| 33.31            | 38.98 | 40.68 | 43.18 | 67.00 | 61.19  | 100                | 46  | 45  | 30 | 30 | 22 | MINUM SYN                   | 8-0019   |
| 33.31            | 42.05 | 36.53 | 34.24 | 43.92 | 44.32  | 90                 | 100 | 95  | 70 | 70 | 70 | HORNBLende                  | 9-0434   |
| 33.34            | 10.90 | 43.42 | 46.90 | 78.68 | 24.47  | 100                | 100 | 60  | 30 | 30 | 25 | PHLOGOPITE (BORON SYN)      | 14-0466  |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME        | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|----|----|---------------------|----------|
| 33.37            | 32.68 | 40.30  | 38.16  | 60.88  | 30.16  | 25                 | 100 | 30  | 20  | 16 | 14 | COSALITE            | 13-0502  |
| 33.41            | 6.54  | 78.25  | 13.09  | 24.42  | 19.60  | 80                 | 100 | 70  | 50  | 50 | 40 | SAPONITE SYN        | 12-0168  |
| 33.41            | 11.00 | 42.71  | 46.58  | 52.76  | 57.93  | 100                | 100 | 80  | 80  | 80 | 80 | BIOTITE             | 2-0045   |
| 33.41            | 59.67 | 51.99  | 43.57  | 83.12  | 86.18  | 100                | 90  | 70  | 50  | 50 | 50 | HELVITE             | 15-0253  |
| 33.41            | 70.33 | 103.67 | 114.00 | 154.06 | 56.82  | 100                | 8   | 6   | 6   | 4  | 3  | GRAPHITE SYN        | 12-0212  |
| 33.42            | 28.32 | 41.40  | 44.72  | 16.53  | 28.84  | 95                 | 100 | 80  | 60  | 55 | 35 | EUCRYPTITE          | 14-0667  |
| 33.48            | 24.45 | 17.72  | 41.53  | 45.75  | 37.65  | 90                 | 100 | 90  | 80  | 80 | 70 | SODDYITE            | 8-0195   |
| 33.48            | 35.68 | 31.36  | 55.74  | 66.71  | 61.26  | 60                 | 100 | 75  | 55  | 45 | 40 | GREENOCKITE         | 6-0314   |
| 33.49            | 10.98 | 43.33  | 57.40  | 78.07  | 52.76  | 100                | 100 | 100 | 65  | 50 | 45 | PHLOGOPITE          | 10-0493  |
| 33.51            | 11.03 | 24.91  | 44.37  | 30.70  | 36.79  | 100                | 100 | 90  | 90  | 60 | 50 | MUSCOVITE (SYN 1M)  | 7-0025   |
| 33.51            | 25.09 | 44.28  | 11.23  | 80.44  | 22.80  | 100                | 100 | 100 | 80  | 80 | 60 | ILLITE              | 9-0334   |
| 33.51            | 25.74 | 81.76  | 33.75  | 40.33  | 46.38  | 50                 | 100 | 80  | 20  | 20 | 20 | CHRYSOCOLLA         | 3-0219   |
| 33.51            | 52.24 | 33.00  | 45.02  | 79.43  | 42.54  | 100                | 100 | 90  | 90  | 90 | 80 | SILLIMANITE         | 10-0369  |
| 33.53            | 39.55 | 58.58  | 35.64  | 67.88  | 55.68  | 100                | 94  | 29  | 28  | 27 | 26 | CINNABAR SYN        | 6-0256   |
| 33.58            | 10.98 | 57.65  | 45.38  | 33.03  | 70.76  | 100                | 100 | 100 | 50  | 45 | 35 | PHLOGOPITE (3T)     | 10-0492  |
| 33.58            | 11.09 | 24.62  | 43.70  | 79.11  | 30.67  | 80                 | 100 | 80  | 80  | 60 | 50 | ROSCCELITE          | 10-0496  |
| 33.58            | 32.68 | 23.56  | 18.42  | 37.37  | 38.98  | 100                | 100 | 95  | 35  | 35 | 35 | BRANNERITE SYN      | 12-0477  |
| 33.58            | 55.74 | 44.61  | 58.20  | 113.07 | 40.30  | 60                 | 100 | 40  | 40  | 30 | 20 | RICKARDITE          | 6-0661   |
| 33.58            | 60.19 | 52.45  | 119.57 | 137.04 | 30.49  | 100                | 70  | 50  | 50  | 50 | 40 | DANALITE            | 11-0491  |
| 33.60            | 11.10 | 44.43  | 57.63  | 25.09  | 22.25  | 100                | 100 | 90  | 75  | 65 | 55 | MUSCOVITE (SYN 2M)  | 7-0032   |
| 33.60            | 42.98 | 66.58  | 70.67  | 48.27  | 84.63  | 100                | 81  | 63  | 63  | 24 | 17 | CASSITERITE SYN     | 5-0467   |
| 33.62            | 35.47 | 89.41  | 59.17  | 60.08  | 60.26  | 65                 | 100 | 75  | 55  | 50 | 50 | KYANITE (DISTHENE)  | 11-0046  |
| 33.62            | 43.75 | 58.25  | 11.11  | 22.20  | 30.95  | 100                | 100 | 100 | 80  | 80 | 80 | HYDROMUSCOVITE      | 2-0462   |
| 33.62            | 70.67 | 56.70  | 114.15 | 103.91 | 155.63 | 100                | 80  | 50  | 40  | 30 | 30 | GRAPHITE            | 13-0148  |
| 33.63            | 11.19 | 43.49  | 57.59  | 33.21  | 45.35  | 100                | 100 | 30  | 30  | 20 | 15 | PHLOGOPITE (1M)     | 10-0495  |
| 33.68            | 26.28 | 64.43  | 46.42  | 50.24  | 89.57  | 100                | 35  | 17  | 12  | 12 | 11 | QUARTZ (ALPHA)      | 5-0490   |
| 33.71            | 55.82 | 66.54  | 38.62  | 92.27  | 69.92  | 100                | 55  | 45  | 35  | 12 | 10 | METACINNABAR        | 6-0261   |
| 33.72            | 8.17  | 25.03  | 34.91  | 38.75  | 43.92  | 10                 | 100 | 18  | 10  | 8  | 5  | MONTMORILLONITE     | 13-0259  |
| 33.72            | 11.11 | 22.38  | 31.04  | 36.66  | 44.14  | 100                | 75  | 75  | 75  | 75 | 75 | LEPIDOLITE (1M)     | 10-0485  |
| 33.78            | 15.03 | 50.02  | 41.84  | 13.38  | 16.43  | 50                 | 100 | 60  | 40  | 30 | 30 | FERRIMOLYBDITE      | 15-0290  |
| 33.78            | 37.65 | 26.27  | 55.74  | 34.98  | 29.42  | 86                 | 100 | 87  | 76  | 71 | 57 | ANGLESITE           | 5-0577   |
| 33.78            | 43.52 | 55.74  | 32.48  | 58.20  | 36.75  | 80                 | 100 | 80  | 70  | 70 | 60 | STROMEYERITE        | 9-0499   |
| 33.81            | 11.15 | 22.38  | 57.97  | 44.39  | 24.91  | 100                | 100 | 53  | 47  | 27 | 19 | MUSCOVITE (NAT. 3T) | 7-0042   |
| 33.82            | 11.11 | 24.98  | 43.57  | 78.56  | 47.19  | 90                 | 100 | 90  | 60  | 60 | 40 | ILLITE (TRIOCT.)    | 9-0343   |
| 33.82            | 11.16 | 58.06  | 33.31  | 36.06  | 38.98  | 65                 | 100 | 16  | 10  | 10 | 8  | PHLOGOPITE SYN      | 16-0344  |
| 33.82            | 11.20 | 43.57  | 22.85  | 24.58  | 31.49  | 100                | 100 | 80  | 60  | 60 | 60 | LEPIDOLITE          | 10-0483  |
| 33.82            | 39.74 | 44.10  | 11.09  | 22.22  | 24.77  | 80                 | 100 | 80  | 60  | 60 | 60 | MUSCOVITE (LI)      | 10-0482  |
| 33.85            | 29.63 | 34.98  | 34.28  | 26.41  | 32.53  | 100                | 80  | 80  | 60  | 50 | 50 | SANIDINE (HIGH) SYN | 10-0353  |
| 33.88            | 10.89 | 15.98  | 22.93  | 42.00  | 27.57  | 50                 | 100 | 50  | 40  | 40 | 30 | BISBEEITE           | 14-0685  |
| 33.88            | 24.95 | 18.15  | 42.18  | 46.14  | 63.08  | 100                | 90  | 80  | 70  | 60 | 50 | SODDYITE            | 12-0180  |
| 33.92            | 11.16 | 25.03  | 44.47  | 22.48  | 29.94  | 100                | 100 | 100 | 100 | 80 | 80 | SERICITE            | 2-0056   |
| 33.92            | 11.16 | 58.00  | 43.48  | 71.15  | 47.02  | 100                | 70  | 30  | 20  | 20 | 18 | PHLOGOPITE SYN      | 16-0352  |
| 33.92            | 11.18 | 44.36  | 58.16  | 37.84  | 22.48  | 100                | 95  | 54  | 46  | 34 | 31 | MUSCOVITE           | 6-0263   |
| 33.92            | 34.79 | 29.70  | 37.67  | 26.47  | 32.42  | 70                 | 100 | 70  | 50  | 40 | 30 | ORTHOCLASE (FE)     | 8-0048   |
| 33.92            | 44.18 | 11.11  | 22.43  | 25.03  | 29.14  | 100                | 75  | 50  | 50  | 50 | 50 | LEPIDOLITE (3M)     | 10-0484  |



| TWO-THETA (IRON) |       |       |       |        |        | RELATIVE INTENSITY |     |     |    |    |     | MINERAL NAME        | FILE NO. |
|------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|----|----|-----|---------------------|----------|
| 34.01            | 25.23 | 22.55 | 32.10 | 65.44  | 73.37  | 80                 | 100 | 70  | 70 | 70 | 70  | SHATTUCKITE         | 13-0507  |
| 34.04            | 43.92 | 58.52 | 11.19 | 22.43  | 35.70  | 100                | 100 | 100 | 80 | 80 | 80  | LEPIDOLITE (120)    | 15-0062  |
| 34.11            | 25.23 | 45.26 | 68.91 | 55.92  | 71.85  | 100                | 45  | 45  | 40 | 20 | 14  | ZIRCON              | 6-0266   |
| 34.11            | 36.49 | 39.42 | 26.83 | 32.02  | 53.50  | 50                 | 100 | 70  | 25 | 25 | 25  | MONAZITE            | 11-0556  |
| 34.11            | 38.70 | 24.01 | 29.75 | 31.56  | 58.83  | 100                | 70  | 50  | 50 | 50 | 45  | CARNALLITE          | 8-0075   |
| 34.14            | 10.11 | 52.24 | 87.56 | 107.64 | *****  | 80                 | 100 | 60  | 40 | 20 | *** | ALLOPHANE           | 2-0039   |
| 34.14            | 35.01 | 29.78 | 37.93 | 44.24  | 65.28  | 90                 | 100 | 80  | 80 | 80 | 80  | HYALOPHANE          | 11-0417  |
| 34.19            | 38.05 | 41.55 | 35.51 | 56.66  | 56.54  | 98                 | 100 | 63  | 59 | 57 | 55  | CELESTITE SYN       | 5-0593   |
| 34.20            | 37.33 | 28.99 | 26.60 | 38.96  | 48.49  | 40                 | 100 | 60  | 35 | 35 | 30  | NEPHELINE SYN       | 9-0338   |
| 34.22            | 17.79 | 46.14 | 59.84 | 68.04  | 129.51 | 90                 | 100 | 80  | 70 | 40 | 40  | LEPIDOCROCITE       | 8-0098   |
| 34.22            | 36.37 | 16.86 | 34.11 | 20.80  | 47.57  | 75                 | 100 | 86  | 73 | 55 | 54  | HEMIMORPHITE        | 5-0555   |
| 34.24            | 11.34 | 58.58 | 36.60 | 33.72  | 39.16  | 100                | 80  | 55  | 40 | 35 | 30  | ZINNWALDITE         | 13-0227  |
| 34.24            | 16.75 | 30.02 | 83.70 | 29.61  | 37.16  | 100                | 25  | 20  | 18 | 14 | 12  | SULPHUR             | 13-0141  |
| 34.32            | 50.46 | 47.77 | 62.33 | 84.47  | 81.02  | 100                | 41  | 40  | 23 | 16 | 13  | BISMUTH             | 5-0519   |
| 34.42            | 13.19 | 26.70 | 31.92 | 37.65  | 18.85  | 70                 | 100 | 80  | 60 | 60 | 50  | SKLODOWSKITE        | 8-0447   |
| 34.42            | 25.84 | 27.44 | 15.72 | 20.34  | 30.31  | 75                 | 100 | 80  | 55 | 55 | 35  | AMMONIA ALUM        | 7-0022   |
| 34.42            | 41.38 | 45.93 | 44.61 | 35.55  | 36.26  | 80                 | 100 | 90  | 80 | 70 | 70  | PROUSTITE SYN       | 11-0470  |
| 34.43            | 33.14 | 58.67 | 42.05 | 48.20  | 45.97  | 52                 | 100 | 65  | 46 | 38 | 33  | ARAGONITE SYN       | 5-0453   |
| 34.46            | 37.67 | 26.80 | 39.31 | 48.91  | 76.77  | 70                 | 100 | 70  | 70 | 60 | 60  | NEPHELINE           | 9-0458   |
| 34.49            | 23.99 | 38.71 | 17.69 | 24.75  | 35.33  | 40                 | 100 | 80  | 30 | 30 | 30  | BREWSTERITE         | 15-0582  |
| 34.51            | 32.74 | 20.71 | 38.78 | 39.86  | 48.33  | 100                | 85  | 80  | 70 | 70 | 65  | LEUCITE             | 15-0047  |
| 34.55            | 13.05 | 26.50 | 37.01 | 21.48  | 29.75  | 60                 | 100 | 80  | 60 | 40 | 40  | METATUYAMUNITE      | 8-0287   |
| 34.55            | 20.32 | 35.09 | 36.26 | 23.41  | 29.27  | 60                 | 100 | 75  | 60 | 45 | 40  | MIRABILITE          | 11-0647  |
| 34.55            | 32.68 | 12.95 | 44.24 | 54.87  | 58.20  | 100                | 100 | 80  | 80 | 80 | 80  | WAVELLITE           | 17-0203  |
| 34.57            | 26.35 | 53.29 | 65.12 | 27.68  | 29.22  | 100                | 40  | 25  | 25 | 13 | 13  | MICROCLINE          | 12-0703  |
| 34.57            | 35.24 | 35.59 | 27.74 | 29.70  | 31.04  | 80                 | 100 | 80  | 70 | 70 | 70  | ANORTHITE           | 9-0464   |
| 34.59            | 35.02 | 29.94 | 26.98 | 32.57  | 37.98  | 100                | 90  | 70  | 45 | 40 | 35  | SANIDINE            | 13-0456  |
| 34.64            | 39.50 | 13.95 | 24.32 | 28.10  | 37.48  | 95                 | 100 | 90  | 50 | 45 | 35  | BERYL               | 9-0430   |
| 34.65            | 24.67 | 41.84 | 43.18 | 38.16  | 44.24  | 100                | 80  | 40  | 40 | 30 | 30  | BLOEDITE            | 4-0549   |
| 34.65            | 26.03 | 27.63 | 20.50 | 40.60  | 37.26  | 55                 | 100 | 45  | 40 | 35 | 25  | POTASH ALUM         | 7-0017   |
| 34.65            | 36.75 | 41.53 | 30.82 | 59.18  | 68.47  | 40                 | 100 | 60  | 30 | 30 | 30  | CUPROBISMUTITE      | 8-0086   |
| 34.65            | 42.18 | 41.84 | 34.01 | 35.44  | 59.18  | 100                | 45  | 40  | 35 | 25 | 25  | BISMITE             | 14-0699  |
| 34.65            | 57.24 | 71.34 | 41.53 | 37.52  | 65.87  | 100                | 35  | 35  | 30 | 20 | 20  | STOLZITE SYN        | 8-0476   |
| 34.66            | 23.79 | 30.59 | 41.12 | 43.16  | 43.95  | 100                | 80  | 80  | 35 | 30 | 30  | CANCRINITE SYN      | 15-0734  |
| 34.74            | 26.60 | 29.30 | 32.33 | 33.51  | 38.15  | 100                | 60  | 50  | 50 | 50 | 50  | MICROCLINE          | 10-0479  |
| 34.74            | 35.10 | 29.97 | 27.21 | 17.19  | 53.26  | 100                | 40  | 35  | 25 | 20 | 20  | SANIDINE (HIGH) SYN | 10-0357  |
| 34.74            | 70.08 | 45.81 | 52.55 | 73.24  | 90.84  | 100                | 50  | 41  | 22 | 16 | 16  | RUTILE              | 4-0051   |
| 34.75            | 15.13 | 30.67 | 46.53 | 35.09  | 35.68  | 10                 | 100 | 50  | 10 | 4  | 4   | SCHOEPIITE          | 13-0241  |
| 34.75            | 22.01 | 39.42 | 42.33 | 42.67  | 43.88  | 100                | 80  | 80  | 80 | 80 | 80  | MOTTRAMITE          | 12-0538  |
| 34.75            | 35.11 | 27.29 | 53.24 | 17.16  | 29.79  | 90                 | 100 | 15  | 15 | 13 | 13  | ANORTHOCLASE        | 9-0478   |
| 34.75            | 71.34 | 57.24 | 41.69 | 65.87  | 73.37  | 100                | 90  | 80  | 60 | 60 | 60  | STOLZITE            | 8-0108   |
| 34.79            | 29.70 | 33.92 | 37.67 | 26.47  | 32.42  | 100                | 70  | 70  | 50 | 40 | 30  | ORTHOCLASE (FE)     | 8-0048   |
| 34.79            | 37.03 | 13.47 | 39.88 | 44.84  | 30.78  | 60                 | 100 | 55  | 40 | 40 | 35  | ANTHOPHYLLITE       | 9-0455   |
| 34.79            | 55.20 | 73.50 | 27.96 | 44.41  | 50.64  | 100                | 90  | 80  | 50 | 50 | 45  | CHRYSOBERYL         | 11-0448  |
| 34.84            | 35.19 | 27.39 | 29.89 | 30.28  | 38.82  | 100                | 70  | 40  | 30 | 15 | 15  | ANORTHOCLASE SYN    | 10-0361  |

| TWO-THETA (IRON) |       |       |        |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME           | FILE NO. |
|------------------|-------|-------|--------|--------|--------|--------------------|-----|-----|----|----|----|------------------------|----------|
| 34.86            | 21.79 | 38.98 | 71.83  | 26.32  | 49.75  | 100                | 80  | 80  | 80 | 60 | 60 | DESCLOIZITE            | 12-0537  |
| 34.86            | 50.22 | 84.47 | 95.25  | 62.70  | 129.51 | 100                | 80  | 50  | 40 | 30 | 20 | ALTAITE                | 8-0028   |
| 34.87            | 37.82 | 43.83 | 56.16  | 72.26  | 80.84  | 100                | 90  | 90  | 40 | 40 | 40 | SPHENE                 | 11-0142  |
| 34.88            | 22.77 | 29.68 | 43.18  | 20.27  | 41.20  | 20                 | 100 | 64  | 16 | 13 | 11 | MELANITERITE           | 1-0255   |
| 34.88            | 37.01 | 36.03 | 15.07  | 52.97  | 62.70  | 90                 | 100 | 70  | 50 | 40 | 30 | EMPLECTITE             | 10-0474  |
| 34.88            | 48.63 | 51.19 | 29.04  | 63.85  | 81.67  | 100                | 37  | 31  | 20 | 20 | 13 | TELLURIUM              | 4-0554   |
| 34.88            | 55.32 | 73.61 | 73.81  | 55.57  | 27.96  | 85                 | 100 | 90  | 75 | 60 | 50 | CHRYSOBERYL SYN        | 10-0082  |
| 34.91            | 36.90 | 13.36 | 24.91  | 80.44  | 23.94  | 50                 | 100 | 70  | 35 | 25 | 20 | ANTHOPHYLLITE MG SYN   | 16-0401  |
| 34.98            | 15.55 | 29.19 | 40.89  | 46.73  | 44.79  | 50                 | 100 | 35  | 35 | 35 | 25 | EUCLASE                | 14-0065  |
| 34.98            | 26.07 | 40.58 | 65.44  | 43.18  | 59.84  | 50                 | 100 | 70  | 50 | 40 | 30 | STERNBERGITE           | 11-0061  |
| 34.98            | 33.85 | 29.63 | 34.28  | 26.41  | 32.53  | 80                 | 100 | 80  | 60 | 50 | 50 | SANIDINE (HIGH) SYN    | 10-0353  |
| 34.98            | 37.14 | 36.26 | 48.87  | 53.24  | 65.04  | 100                | 100 | 90  | 90 | 90 | 80 | EMPLECTITE             | 2-0516   |
| 34.98            | 40.75 | 44.24 | 44.97  | 33.68  | 35.44  | 90                 | 100 | 95  | 90 | 80 | 70 | PYRARGYRITE SYN        | 14-0280  |
| 34.98            | 47.98 | 52.45 | 21.96  | 64.63  | 81.02  | 100                | 25  | 25  | 8  | 8  | 8  | TELLUROBISMUTHITE      | 15-0863  |
| 34.98            | 62.33 | 67.14 | 113.07 | 134.34 | 32.20  | 100                | 80  | 70  | 50 | 50 | 40 | CUBANITE               | 9-0324   |
| 35.00            | 13.52 | 37.12 | 12.42  | 24.14  | 42.40  | 20                 | 100 | 75  | 12 | 10 | 10 | ANTHOPHYLLITE AL-FE    | 11-0253  |
| 35.01            | 16.75 | 70.56 | 33.72  | 42.05  | 49.35  | 12                 | 100 | 14  | 8  | 8  | 8  | ERYTHRITE              | 11-0626  |
| 35.01            | 24.98 | 11.47 | 23.04  | 43.92  | 45.59  | 80                 | 100 | 60  | 60 | 60 | 60 | MONTMORILLONITE (ANHY) | 7-0304   |
| 35.01            | 34.14 | 29.78 | 37.93  | 44.24  | 65.28  | 100                | 90  | 80  | 80 | 80 | 80 | HYALOPHANE             | 11-0417  |
| 35.01            | 62.81 | 39.45 | 68.05  | 75.06  | 128.59 | 100                | 90  | 80  | 60 | 50 | 50 | ENARGITE               | 10-0436  |
| 35.02            | 34.59 | 29.94 | 26.98  | 32.57  | 37.98  | 90                 | 100 | 70  | 45 | 40 | 35 | SANIDINE               | 13-0456  |
| 35.09            | 20.32 | 34.55 | 36.26  | 23.41  | 29.27  | 75                 | 100 | 60  | 60 | 45 | 40 | MIRABILITE             | 11-0647  |
| 35.09            | 58.83 | 40.60 | 69.86  | 116.18 | 52.97  | 40                 | 100 | 40  | 30 | 20 | 10 | DIGENITE               | 9-0064   |
| 35.10            | 34.74 | 29.97 | 27.21  | 17.19  | 53.26  | 40                 | 100 | 35  | 25 | 20 | 20 | SANIDINE (HIGH) SYN    | 10-0357  |
| 35.11            | 34.75 | 27.29 | 53.24  | 17.16  | 29.79  | 100                | 90  | 15  | 15 | 13 | 13 | ANORTHOCLASE           | 9-0478   |
| 35.11            | 35.52 | 29.92 | 27.74  | 28.90  | 30.87  | 30                 | 100 | 30  | 15 | 11 | 11 | ALBITE (HIGH)          | 10-0393  |
| 35.12            | 16.65 | 37.80 | 25.61  | 71.39  | 41.73  | 75                 | 100 | 75  | 63 | 63 | 50 | ERYTHRITE              | 10-0480  |
| 35.12            | 35.36 | 27.68 | 29.70  | 31.04  | 34.46  | 100                | 90  | 80  | 80 | 80 | 80 | ANORTHITE SYN          | 10-0379  |
| 35.12            | 35.47 | 27.74 | 29.86  | 30.78  | 35.93  | 100                | 90  | 80  | 70 | 70 | 70 | ANDESINE               | 10-0359  |
| 35.12            | 37.41 | 38.97 | 38.92  | 44.14  | 73.07  | 80                 | 100 | 100 | 80 | 60 | 60 | PIGEONITE              | 13-0421  |
| 35.19            | 34.84 | 27.39 | 29.89  | 30.28  | 38.82  | 70                 | 100 | 40  | 30 | 15 | 15 | ANORTHOCLASE SYN       | 10-0361  |
| 35.20            | 45.18 | 25.50 | 48.82  | 11.58  | 44.65  | 80                 | 100 | 90  | 80 | 70 | 70 | PARAGONITE             | 12-0187  |
| 35.21            | 10.89 | 22.22 | 56.64  | 16.81  | 33.35  | 50                 | 100 | 90  | 40 | 30 | 30 | TUYAMUNITE             | 6-0017   |
| 35.21            | 13.24 | 32.68 | 44.43  | 19.76  | 38.30  | 80                 | 100 | 80  | 80 | 60 | 60 | WAVELLITE              | 2-0075   |
| 35.21            | 36.37 | 37.37 | 48.63  | 53.24  | 62.70  | 90                 | 100 | 100 | 40 | 40 | 30 | EMPLECTITE             | 3-0581   |
| 35.21            | 40.89 | 59.18 | 70.82  | 74.42  | 102.61 | 50                 | 100 | 50  | 16 | 16 | 12 | CERARGYRITE            | 6-0480   |
| 35.24            | 15.57 | 27.20 | 34.79  | 35.93  | 38.61  | 100                | 100 | 80  | 80 | 80 | 80 | PHILLIPSITE            | 12-0455  |
| 35.24            | 27.54 | 45.02 | 29.78  | 30.86  | 37.67  | 100                | 40  | 27  | 13 | 11 | 11 | LABRADORITE            | 3-0499   |
| 35.24            | 27.68 | 30.70 | 38.20  | 63.92  | 29.54  | 100                | 35  | 25  | 25 | 18 | 16 | ALBITE (LOW)           | 1-0739   |
| 35.24            | 27.82 | 29.94 | 35.59  | 30.95  | 38.47  | 100                | 80  | 80  | 80 | 70 | 70 | PLAGIOCLASE SYN        | 10-0360  |
| 35.24            | 27.82 | 30.20 | 35.59  | 31.04  | 38.47  | 100                | 80  | 80  | 80 | 70 | 70 | BYTOWNITE              | 9-0467   |
| 35.24            | 27.88 | 30.02 | 35.59  | 30.95  | 36.17  | 100                | 80  | 80  | 80 | 70 | 70 | PLAGIOCLASE            | 9-0456   |
| 35.24            | 34.57 | 35.59 | 27.74  | 29.70  | 31.04  | 100                | 80  | 80  | 70 | 70 | 70 | ANORTHITE              | 9-0464   |
| 35.24            | 35.47 | 27.74 | 34.57  | 36.17  | 35.12  | 100                | 75  | 60  | 55 | 45 | 35 | ANORTHITE              | 12-0301  |
| 35.24            | 35.47 | 27.74 | 29.94  | 34.91  | 30.86  | 100                | 90  | 80  | 80 | 80 | 70 | LABRADORITE            | 9-0465   |

| TWO-THETA (IRON) |       |       |        |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|--------|--------|--------|--------------------|-----|-----|----|----|----|--------------------------|----------|
| 35.24            | 35.47 | 27.82 | 29.86  | 38.61  | 17.47  | 80                 | 100 | 80  | 70 | 70 | 60 | OLIGOCLASE               | 9-0457   |
| 35.24            | 39.16 | 81.09 | 74.52  | 88.36  | 44.65  | 100                | 80  | 80  | 60 | 60 | 50 | HYPERSTHENE              | 2-0520   |
| 35.24            | 45.40 | 25.43 | 33.21  | 47.19  | 75.06  | 90                 | 100 | 80  | 80 | 80 | 80 | MARGARITE                | 12-0188  |
| 35.29            | 29.70 | 17.44 | 30.49  | 27.82  | 30.67  | 100                | 25  | 20  | 20 | 15 | 15 | ALBITE                   | 9-0466   |
| 35.29            | 38.51 | 30.42 | 48.44  | 54.80  | 37.20  | 65                 | 100 | 60  | 45 | 45 | 35 | TOPAZ                    | 12-0765  |
| 35.32            | 24.50 | 26.32 | 29.04  | 49.99  | 56.34  | 35                 | 100 | 35  | 30 | 30 | 30 | RUTHERFORDINE SYN        | 9-0163   |
| 35.32            | 33.17 | 74.95 | 31.36  | 47.36  | 37.37  | 100                | 50  | 50  | 40 | 40 | 30 | ROCKBRIDGEITE            | 8-0159   |
| 35.32            | 37.62 | 39.27 | 44.97  | 61.60  | 42.00  | 90                 | 100 | 80  | 60 | 60 | 50 | POLYBASITE               | 8-0123   |
| 35.36            | 20.67 | 38.47 | 41.56  | 62.81  | 45.79  | 90                 | 100 | 80  | 80 | 60 | 50 | REALGAR                  | 9-0441   |
| 35.36            | 24.26 | 31.13 | 25.74  | 39.88  | 44.10  | 100                | 67  | 40  | 27 | 20 | 15 | CANCRINITE               | 3-0503   |
| 35.36            | 35.12 | 27.68 | 29.70  | 31.04  | 34.46  | 90                 | 100 | 80  | 80 | 80 | 80 | ANORTHITE SYN            | 10-0379  |
| 35.47            | 16.94 | 37.93 | 14.22  | 25.85  | 41.88  | 26                 | 100 | 30  | 25 | 20 | 18 | ANNABERGITE              | 11-0625  |
| 35.47            | 27.82 | 35.24 | 29.86  | 38.61  | 17.47  | 100                | 80  | 80  | 70 | 70 | 60 | OLIGOCLASE               | 9-0457   |
| 35.47            | 27.88 | 29.54 | 83.82  | 33.82  | 37.67  | 100                | 90  | 80  | 80 | 70 | 70 | ORTHOCLASE               | 9-0462   |
| 35.47            | 35.12 | 27.74 | 29.86  | 30.78  | 35.93  | 90                 | 100 | 80  | 70 | 70 | 70 | ANDESINE                 | 10-0359  |
| 35.47            | 35.24 | 27.74 | 29.94  | 34.91  | 30.86  | 90                 | 100 | 80  | 80 | 80 | 70 | LABRADORITE              | 9-0465   |
| 35.47            | 35.24 | 27.74 | 34.57  | 36.17  | 35.12  | 75                 | 100 | 60  | 55 | 45 | 35 | ANORTHITE                | 12-0301  |
| 35.47            | 60.00 | 41.40 | 100.70 | 119.91 | 34.04  | 60                 | 100 | 50  | 50 | 50 | 40 | BORNITE                  | 14-0323  |
| 35.47            | 81.76 | 45.40 | 25.50  | 11.71  | 47.40  | 70                 | 100 | 90  | 60 | 50 | 50 | PARAGONITE SYN           | 10-0420  |
| 35.47            | 89.41 | 33.62 | 59.17  | 60.08  | 60.26  | 100                | 75  | 65  | 55 | 50 | 50 | KYANITE (DISTHENE)       | 11-0046  |
| 35.47            | 90.00 | 60.26 | 45.22  | 48.69  | 59.23  | 100                | 75  | 50  | 40 | 40 | 40 | KYANITE                  | 3-0513   |
| 35.52            | 29.92 | 35.11 | 27.74  | 28.90  | 30.87  | 100                | 30  | 30  | 15 | 11 | 11 | ALBITE (HIGH)            | 10-0393  |
| 35.52            | 38.86 | 39.16 | 39.79  | 18.58  | 33.04  | 70                 | 100 | 100 | 16 | 12 | 12 | POLYHALITE               | 13-0526  |
| 35.53            | 39.33 | 37.93 | 46.38  | 34.28  | 54.41  | 60                 | 100 | 95  | 60 | 50 | 45 | CLINOENSTATITE SYN       | 13-0415  |
| 35.55            | 22.09 | 32.89 | 34.75  | 39.27  | 46.73  | 100                | 90  | 90  | 80 | 50 | 50 | DUFRENITE                | 8-0155   |
| 35.59            | 10.01 | 20.65 | 25.08  | 58.22  | 62.21  | 37                 | 100 | 3   | 3  | 2  | 1  | MONTMORILLONITE (AL) SYN | 11-0303  |
| 35.59            | 35.24 | 34.57 | 27.74  | 29.70  | 31.04  | 80                 | 100 | 80  | 70 | 70 | 70 | ANORTHITE                | 9-0464   |
| 35.62            | 39.42 | 45.71 | 38.46  | 44.94  | 34.10  | 100                | 87  | 51  | 44 | 43 | 35 | ENSTATITE                | 7-0216   |
| 35.68            | 20.04 | 25.18 | 44.06  | 37.01  | 22.55  | 100                | 100 | 100 | 90 | 80 | 60 | SCORODITE                | 5-0216   |
| 35.68            | 31.36 | 33.48 | 55.74  | 66.71  | 61.26  | 100                | 75  | 60  | 55 | 45 | 40 | GREENOCKITE              | 6-0314   |
| 35.68            | 37.37 | 41.53 | 55.16  | 77.28  | 52.71  | 100                | 70  | 30  | 30 | 30 | 20 | KAINITE                  | 14-0591  |
| 35.68            | 60.19 | 41.35 | 71.83  | 101.48 | 104.99 | 100                | 49  | 48  | 47 | 18 | 15 | URANINITE SYN            | 5-0550   |
| 35.69            | 41.53 | 13.07 | 32.88  | 43.68  | 52.63  | 100                | 80  | 70  | 45 | 35 | 35 | ARFVEDSONITE             | 14-0633  |
| 35.70            | 40.30 | 32.52 | 17.69  | 30.52  | 34.36  | 90                 | 100 | 80  | 70 | 60 | 60 | AXINITE                  | 6-0448   |
| 35.78            | 22.44 | 31.28 | 37.01  | 34.98  | 45.93  | 80                 | 100 | 60  | 60 | 40 | 40 | BUTLERITE                | 16-0819  |
| 35.78            | 36.14 | 52.71 | 47.36  | 53.24  | 77.28  | 100                | 100 | 70  | 60 | 60 | 60 | HOLLANDITE               | 12-0514  |
| 35.78            | 60.22 | 72.05 | 120.63 | 90.32  | 101.26 | 94                 | 100 | 35  | 16 | 12 | 10 | FLUORITE SYN             | 4-0864   |
| 35.80            | 24.10 | 38.68 | 47.90  | 54.76  | 59.78  | 100                | 100 | 100 | 50 | 40 | 40 | AMBLYGONITE              | 8-0102   |
| 35.87            | 51.64 | 64.47 | 87.02  | 97.95  | 76.02  | 100                | 59  | 23  | 20 | 13 | 8  | SYLVITE                  | 4-0587   |
| 35.91            | 31.28 | 15.42 | 36.88  | 51.19  | 18.07  | 25                 | 100 | 20  | 15 | 15 | 13 | CLINOCLASITE             | 12-0297  |
| 35.91            | 36.03 | 27.87 | 25.76  | 53.24  | 45.36  | 90                 | 100 | 40  | 25 | 25 | 20 | BARYTOCALCITE            | 15-0285  |
| 35.91            | 36.26 | 31.82 | 32.38  | 35.44  | 36.62  | 100                | 100 | 90  | 90 | 90 | 90 | HOLLANDITE               | 4-0590   |
| 35.91            | 37.65 | 40.14 | 54.05  | 20.27  | 27.87  | 30                 | 100 | 60  | 30 | 20 | 20 | XANTHOCONITE             | 8-0134   |
| 35.93            | 47.40 | 72.92 | 54.10  | 76.77  | 95.37  | 100                | 50  | 50  | 25 | 25 | 20 | PYROLUSITE               | 12-0716  |
| 35.96            | 13.12 | 37.33 | 33.32  | 27.38  | 22.85  | 65                 | 100 | 85  | 55 | 50 | 30 | CORDIERITE (HIGH) SYN    | 13-0293  |

| TWO-THETA (IRON) |       |       |        |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME          | FILE NO. |
|------------------|-------|-------|--------|--------|--------|--------------------|-----|-----|----|----|----|-----------------------|----------|
| 35.98            | 36.76 | 18.12 | 51.39  | 35.28  | 44.72  | 95                 | 100 | 75  | 75 | 65 | 25 | LAZULITE              | 14-0137  |
| 36.01            | 17.89 | 42.67 | 40.45  | 46.14  | 49.08  | 100                | 80  | 80  | 70 | 70 | 70 | GLAUBERITE            | 2-0556   |
| 36.01            | 27.72 | 42.85 | 37.75  | 47.57  | 41.35  | 100                | 30  | 30  | 16 | 16 | 14 | LANGBEINITE           | 17-0740  |
| 36.03            | 19.76 | 29.12 | 44.61  | 57.56  | 28.00  | 100                | 50  | 50  | 50 | 50 | 35 | COLEMANITE            | 6-0331   |
| 36.03            | 35.91 | 27.87 | 25.76  | 53.24  | 45.36  | 100                | 90  | 40  | 25 | 25 | 20 | BARYTOCALCITE         | 15-0285  |
| 36.03            | 37.01 | 34.88 | 15.07  | 52.97  | 62.70  | 70                 | 100 | 90  | 50 | 40 | 30 | EMPLECTITE            | 10-0474  |
| 36.03            | 37.65 | 66.71 | 49.55  | 54.33  | 61.42  | 100                | 90  | 50  | 40 | 30 | 30 | CHALCOSTILBITE        | 9-0143   |
| 36.03            | 39.55 | 45.36 | 30.42  | 42.51  | 65.04  | 100                | 90  | 90  | 80 | 80 | 80 | EMMONSITE             | 7-0404   |
| 36.03            | 52.19 | 36.26 | 47.57  | 52.97  | 53.50  | 90                 | 100 | 90  | 90 | 90 | 90 | HOLLANDITE            | 4-0813   |
| 36.03            | 72.33 | 39.55 | 44.06  | 22.49  | 42.67  | 80                 | 100 | 80  | 80 | 60 | 60 | CUPRODESCLOIZITE      | 13-0240  |
| 36.06            | 13.03 | 13.17 | 27.40  | 33.21  | 37.08  | 100                | 80  | 80  | 75 | 70 | 65 | CORDIERITE            | 12-0303  |
| 36.06            | 16.14 | 47.60 | 22.80  | 53.83  | 77.96  | 90                 | 100 | 100 | 70 | 40 | 30 | CRYPTOMELANE          | 12-0706  |
| 36.14            | 16.96 | 31.82 | 26.32  | 34.65  | 53.24  | 70                 | 100 | 50  | 30 | 30 | 30 | CARNOTITE             | 8-0317   |
| 36.14            | 22.04 | 36.88 | 51.19  | 58.52  | 20.02  | 70                 | 100 | 80  | 60 | 60 | 50 | NATROJAROSITE         | 11-0302  |
| 36.14            | 30.67 | 45.18 | 48.42  | 52.45  | 55.45  | 100                | 80  | 75  | 70 | 60 | 50 | PHENAKITE             | 9-0431   |
| 36.14            | 31.82 | 65.44 | 24.95  | 53.24  | 55.16  | 100                | 70  | 60  | 40 | 40 | 40 | LANARITE              | 4-0598   |
| 36.14            | 35.78 | 52.71 | 47.36  | 53.24  | 77.28  | 100                | 100 | 70  | 60 | 60 | 60 | HOLLANDITE            | 12-0514  |
| 36.14            | 38.16 | 61.23 | 41.35  | 63.08  | 43.00  | 100                | 90  | 50  | 40 | 30 | 20 | FERGUSONITE           | 9-0443   |
| 36.14            | 60.88 | 72.77 | 41.97  | 102.74 | 122.85 | 100                | 51  | 30  | 10 | 9  | 9  | SPHALERITE SYN        | 5-0566   |
| 36.16            | 13.28 | 41.97 | 34.49  | 61.59  | 40.40  | 100                | 100 | 90  | 75 | 50 | 45 | TREMOLITE             | 13-0437  |
| 36.17            | 42.05 | 42.54 | 13.81  | 17.58  | 27.54  | 100                | 100 | 100 | 80 | 80 | 80 | HARMOTOME             | 13-0494  |
| 36.17            | 60.52 | 72.30 | 41.88  | 73.13  | 102.17 | 100                | 70  | 40  | 30 | 30 | 30 | STANNITE              | 11-0062  |
| 36.17            | 61.16 | 73.13 | 34.57  | 38.61  | 122.85 | 100                | 50  | 35  | 6  | 6  | 6  | WURTZITE              | 12-0688  |
| 36.20            | 31.57 | 40.31 | 31.86  | 59.47  | 28.24  | 100                | 94  | 63  | 60 | 55 | 38 | BISMUTHINITE SYN      | 6-0333   |
| 36.23            | 11.91 | 23.99 | 46.06  | 62.39  | 78.74  | 100                | 100 | 90  | 65 | 40 | 40 | TALC                  | 13-0558  |
| 36.25            | 39.67 | 52.53 | 29.83  | 62.21  | 72.20  | 100                | 65  | 60  | 45 | 40 | 40 | DATOLITE              | 11-0070  |
| 36.26            | 32.15 | 39.76 | 52.04  | 62.43  | 72.00  | 22                 | 100 | 33  | 20 | 15 | 14 | ANHYDRITE             | 6-0226   |
| 36.26            | 34.98 | 37.14 | 48.87  | 53.24  | 65.04  | 90                 | 100 | 100 | 90 | 90 | 80 | EMPLECTITE            | 2-0516   |
| 36.26            | 35.91 | 31.82 | 32.38  | 35.44  | 36.62  | 100                | 100 | 90  | 90 | 90 | 90 | HOLLANDITE            | 4-0590   |
| 36.26            | 36.62 | 49.99 | 58.52  | 64.23  | 21.91  | 60                 | 100 | 50  | 50 | 50 | 40 | JAROSITE              | 10-0443  |
| 36.26            | 37.62 | 39.86 | 49.31  | 63.08  | 45.75  | 50                 | 100 | 90  | 50 | 50 | 40 | PEARCEITE             | 8-0132   |
| 36.26            | 37.93 | 37.37 | 42.00  | 20.34  | 25.23  | 35                 | 100 | 80  | 30 | 25 | 25 | ESCHYNITE             | 15-0864  |
| 36.26            | 50.02 | 71.83 | 96.22  | 106.23 | 54.60  | 100                | 40  | 40  | 40 | 40 | 30 | TETRADYMITE           | 9-0447   |
| 36.26            | 51.45 | 89.64 | 86.22  | 53.45  | 100.26 | 100                | 70  | 67  | 63 | 56 | 40 | ANTIMONY              | 5-0562   |
| 36.26            | 52.19 | 36.03 | 47.57  | 52.97  | 53.50  | 90                 | 100 | 90  | 90 | 90 | 90 | HOLLANDITE            | 4-0813   |
| 36.29            | 41.88 | 13.22 | 33.31  | 34.46  | 38.47  | 80                 | 100 | 70  | 70 | 60 | 60 | ACTINOLITE            | 7-0336   |
| 36.29            | 47.60 | 63.53 | 77.96  | 91.71  | 22.41  | 60                 | 100 | 60  | 60 | 60 | 20 | CRYPTOMELANE          | 6-0547   |
| 36.29            | 47.63 | 71.70 | 73.62  | 23.09  | 64.31  | 80                 | 100 | 80  | 70 | 50 | 50 | CRYPTOMELANE          | 4-0778   |
| 36.29            | 74.74 | 59.91 | 101.48 | 23.43  | 69.89  | 100                | 90  | 80  | 80 | 70 | 70 | SCHEELITE             | 8-0145   |
| 36.32            | 13.24 | 41.58 | 44.97  | 24.81  | 37.92  | 55                 | 100 | 50  | 45 | 20 | 20 | RIEBECKITE SYN        | 15-0516  |
| 36.34            | 13.29 | 40.60 | 28.01  | 34.55  | 72.15  | 85                 | 100 | 21  | 20 | 18 | 15 | TREMOLITE (FLOUR) SYN | 9-0330   |
| 36.34            | 40.73 | 23.96 | 42.85  | 36.75  | 62.70  | 51                 | 100 | 73  | 48 | 47 | 31 | THEMARDITE            | 5-0631   |
| 36.37            | 16.86 | 34.22 | 34.11  | 20.80  | 47.57  | 100                | 86  | 75  | 73 | 55 | 54 | HEMIMORPHITE          | 5-0555   |
| 36.37            | 37.37 | 35.21 | 48.63  | 53.24  | 62.70  | 100                | 100 | 90  | 40 | 40 | 30 | EMPLECTITE            | 3-0581   |
| 36.37            | 37.52 | 61.26 | 37.91  | 40.45  | 35.32  | 60                 | 100 | 45  | 40 | 40 | 30 | TILLEYITE             | 13-0416  |



| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME         | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|----------------------|----------|
| 36.37            | 40.58 | 44.79  | 48.87  | 23.71  | 32.38  | 100                | 100 | 100 | 70  | 50  | 50  | GADOLINITE           | 8-0190   |
| 36.39            | 32.38 | 77.87  | 47.57  | 52.19  | 53.50  | 100                | 60  | 50  | 40  | 40  | 20  | CORONADITE           | 7-0361   |
| 36.41            | 32.68 | 54.38  | 54.83  | 33.96  | 28.76  | 97                 | 100 | 80  | 76  | 67  | 57  | BARITE SYN           | 5-0448   |
| 36.42            | 23.48 | 36.76  | 74.95  | 60.32  | 43.37  | 100                | 53  | 31  | 30  | 28  | 23  | SCHEELITE            | 7-0210   |
| 36.42            | 38.74 | 28.76  | 33.82  | 34.36  | 41.42  | 80                 | 100 | 60  | 60  | 60  | 60  | PECTOLITE            | 12-0238  |
| 36.42            | 60.28 | 23.48  | 75.17  | 43.57  | 69.75  | 100                | 30  | 28  | 22  | 16  | 14  | POWELLITE            | 7-0212   |
| 36.49            | 14.06 | 31.18  | 24.14  | 34.88  | 42.51  | 160                | 100 | 80  | 50  | 50  | 50  | DUNDASITE            | 21-0936  |
| 36.49            | 39.42 | 34.11  | 26.83  | 32.02  | 53.50  | 100                | 70  | 50  | 25  | 25  | 25  | MONAZITE             | 11-0556  |
| 36.49            | 42.18 | 61.26  | 73.37  | 77.87  | 93.39  | 100                | 50  | 50  | 40  | 20  | 20  | URANINITE            | 13-0225  |
| 36.49            | 63.08 | 24.29  | 71.34  | 50.69  | 51.92  | 80                 | 100 | 80  | 70  | 60  | 60  | CALEDONITE           | 8-0153   |
| 36.53            | 13.22 | 41.74  | 32.81  | 45.02  | 24.75  | 80                 | 100 | 100 | 60  | 60  | 50  | RIEBECKITE           | 14-0230  |
| 36.53            | 15.91 | 38.20  | 63.92  | 70.42  | 43.22  | 80                 | 100 | 100 | 70  | 70  | 60  | NATROLITE (K) SYN    | 3-0062   |
| 36.53            | 39.45 | 66.62  | 56.73  | 45.83  | 30.11  | 30                 | 100 | 30  | 20  | 17  | 13  | AKERMANITE           | 10-0391  |
| 36.53            | 42.05 | 33.31  | 34.24  | 43.92  | 44.32  | 95                 | 100 | 90  | 70  | 70  | 70  | HORNBLLENDE          | 9-0434   |
| 36.53            | 43.22 | 21.90  | 70.90  | 78.56  | 45.40  | 20                 | 100 | 80  | 20  | 18  | 15  | SPINEL (MN)          | 4-0732   |
| 36.53            | 43.87 | 54.08  | 26.28  | 29.86  | 37.42  | 100                | 30  | 25  | 15  | 12  | 12  | KALIOPHILITE         | 11-0313  |
| 36.60            | 44.61 | 32.30  | 66.28  | 34.32  | 48.22  | 100                | 100 | 90  | 70  | 60  | 40  | PREHNITE             | 7-0333   |
| 36.62            | 36.26 | 49.99  | 58.52  | 64.23  | 21.91  | 100                | 60  | 50  | 50  | 50  | 40  | JAROSITE             | 10-0443  |
| 36.62            | 44.06 | 39.14  | 54.05  | 52.45  | 63.85  | 100                | 90  | 60  | 50  | 40  | 40  | STEPHANITE           | 11-0108  |
| 36.65            | 42.67 | 11.24  | 35.09  | 46.53  | 22.68  | 80                 | 100 | 60  | 60  | 40  | 40  | TRONA                | 11-0643  |
| 36.66            | 12.07 | 24.42  | 25.43  | 26.87  | 46.79  | 100                | 60  | 50  | 20  | 15  | 15  | PYROPHYLLITE         | 12-0203  |
| 36.66            | 32.42 | 55.80  | 41.56  | 60.95  | 90.00  | 100                | 100 | 100 | 80  | 80  | 80  | SCAPOLITE            | 2-0405   |
| 36.75            | 13.34 | 40.95  | 45.41  | 32.38  | 12.06  | 80                 | 100 | 90  | 60  | 55  | 50  | GRUNERITE            | 17-0725  |
| 36.75            | 37.75 | 33.27  | 26.53  | 58.52  | 60.88  | 85                 | 100 | 60  | 40  | 40  | 35  | VANADINITE           | 13-0585  |
| 36.75            | 41.53 | 34.65  | 30.82  | 59.18  | 68.47  | 100                | 60  | 40  | 30  | 30  | 30  | CUPROBISMUTITE       | 8-0086   |
| 36.76            | 35.98 | 18.12  | 51.39  | 35.28  | 44.72  | 100                | 95  | 75  | 75  | 65  | 25  | LAZULITE             | 14-0137  |
| 36.76            | 36.42 | 23.48  | 74.95  | 60.32  | 43.37  | 31                 | 100 | 53  | 30  | 28  | 23  | SCHEELITE            | 7-0210   |
| 36.79            | 7.26  | 24.86  | 43.57  | 44.65  | 70.42  | 100                | 100 | 100 | 100 | 100 | 100 | MONTMORILLONITE      | 3-0009   |
| 36.79            | 25.26 | 47.19  | 44.47  | 11.71  | 81.09  | 100                | 86  | 72  | 57  | 46  | 40  | PYROPHYLLITE         | 3-0574   |
| 36.79            | 39.74 | 67.05  | 47.53  | 30.61  | 46.88  | 25                 | 100 | 35  | 22  | 20  | 20  | GEHLENITE SYN        | 9-0216   |
| 36.79            | 41.25 | 13.28  | 28.99  | 32.61  | 34.57  | 80                 | 100 | 70  | 60  | 60  | 60  | CUMINGTONITE         | 7-0382   |
| 36.79            | 62.03 | 74.69  | 126.87 | 104.75 | 72.71  | 100                | 90  | 70  | 70  | 60  | 55  | CHALCOPYRITE (GAMMA) | 11-0570  |
| 36.80            | 26.35 | 27.88  | 33.62  | 44.49  | 54.18  | 100                | 75  | 70  | 60  | 60  | 50  | NEPHELINE (K)        | 12-0198  |
| 36.80            | 32.48 | 29.35  | 37.33  | 42.16  | 60.88  | 70                 | 100 | 60  | 55  | 30  | 30  | SCAPOLITE            | 14-0170  |
| 36.83            | 38.39 | 41.34  | 48.10  | 68.37  | 63.14  | 100                | 31  | 28  | 20  | 15  | 14  | MASSICOT SYN         | 5-0570   |
| 36.85            | 22.77 | 58.83  | 64.23  | 51.92  | 41.20  | 100                | 70  | 70  | 70  | 60  | 50  | CARPHOSIDERITE       | 2-0597   |
| 36.88            | 10.59 | 32.79  | 41.69  | 16.20  | 26.98  | 40                 | 100 | 40  | 40  | 30  | 30  | COPIAPITE            | 11-0395  |
| 36.88            | 22.04 | 36.14  | 51.19  | 58.52  | 20.02  | 80                 | 100 | 70  | 60  | 60  | 50  | NATROJAROSITE        | 11-0302  |
| 36.90            | 13.36 | 34.91  | 24.91  | 80.44  | 23.94  | 100                | 70  | 50  | 35  | 25  | 20  | ANTHOPHYLLITE MG SYN | 16-0401  |
| 36.90            | 41.56 | 13.48  | 45.40  | 87.17  | 53.03  | 100                | 90  | 80  | 80  | 80  | 60  | CUMINGTONITE (MN)    | 13-0376  |
| 36.90            | 62.25 | 127.07 | 74.52  | 105.62 | 143.49 | 100                | 97  | 75  | 70  | 60  | 60  | CHALCOPYRITE (BETA)  | 11-0515  |
| 36.92            | 14.73 | 26.22  | 42.40  | 39.50  | 29.61  | 57                 | 100 | 51  | 28  | 27  | 21  | GYPSUM               | 6-0046   |
| 37.01            | 34.88 | 36.03  | 15.07  | 52.97  | 62.70  | 100                | 90  | 70  | 50  | 40  | 30  | EMPLECTITE           | 10-0474  |
| 37.01            | 37.62 | 55.16  | 76.70  | 77.87  | 61.26  | 100                | 100 | 100 | 90  | 90  | 80  | MIMETITE             | 13-0056  |
| 37.01            | 40.30 | 61.23  | 41.69  | 68.04  | 76.70  | 65                 | 100 | 75  | 55  | 35  | 35  | COVELLITE            | 6-0464   |

| TWO-THETA (IRON) |       |       |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME          | FILE NO. |
|------------------|-------|-------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|-----------------------|----------|
| 37.01            | 41.04 | 31.56 | 31.46  | 22.09  | 42.33  | 95                 | 100 | 70  | 65  | 55  | 50  | STIBNITE SYN          | 6-0474   |
| 37.01            | 53.79 | 50.96 | 58.20  | 37.91  | 65.04  | 100                | 50  | 30  | 30  | 20  | 20  | SYLVANITE             | 9-0477   |
| 37.03            | 34.79 | 13.47 | 39.88  | 44.84  | 30.78  | 100                | 60  | 55  | 40  | 40  | 35  | ANTHOPHYLLITE         | 9-0455   |
| 37.08            | 30.00 | 59.53 | 94.50  | 81.42  | 104.51 | 90                 | 100 | 70  | 40  | 30  | 30  | COLORADOITE           | 8-0026   |
| 37.12            | 13.52 | 35.00 | 12.42  | 24.14  | 42.40  | 75                 | 100 | 20  | 12  | 10  | 10  | ANTHOPHYLLITE AL-FE   | 11-0253  |
| 37.14            | 34.98 | 36.26 | 48.87  | 53.24  | 65.04  | 100                | 100 | 90  | 90  | 90  | 80  | EMPLECTITE            | 2-0516   |
| 37.14            | 56.03 | 41.69 | 102.85 | 66.59  | 53.66  | 70                 | 100 | 50  | 50  | 45  | 40  | BORACITE              | 5-0710   |
| 37.14            | 61.31 | 37.42 | 45.64  | 51.19  | 24.51  | 100                | 60  | 50  | 50  | 50  | 40  | SCAWTITE              | 10-0400  |
| 37.16            | 12.96 | 33.31 | 27.26  | 35.47  | 69.85  | 90                 | 100 | 90  | 80  | 80  | 70  | CORDIERITE            | 9-0472   |
| 37.16            | 24.47 | 12.17 | 47.60  | 63.92  | 89.16  | 100                | 50  | 40  | 40  | 40  | 40  | PYROPHYLLITE          | 2-0613   |
| 37.17            | 13.17 | 13.05 | 37.23  | 36.03  | 37.52  | 65                 | 100 | 95  | 65  | 55  | 55  | CORDIERITE (LOW) SYN  | 13-0294  |
| 37.23            | 50.16 | 55.08 | 60.84  | 62.21  | 45.70  | 100                | 18  | 18  | 17  | 17  | 14  | CALCITE SYN           | 5-0586   |
| 37.24            | 19.03 | 50.22 | 31.28  | 34.01  | 59.50  | 95                 | 100 | 45  | 40  | 35  | 30  | BEAVERITE             | 17-0476  |
| 37.25            | 29.70 | 30.11 | 42.93  | 42.68  | 52.45  | 55                 | 100 | 56  | 55  | 41  | 41  | NITER SYN             | 5-0377   |
| 37.26            | 37.75 | 18.60 | 24.72  | 26.70  | 29.51  | 100                | 100 | 60  | 60  | 60  | 60  | SCAWTITE              | 12-0777  |
| 37.26            | 49.55 | 61.26 | 40.30  | 44.97  | 53.50  | 100                | 25  | 16  | 16  | 10  | 10  | SODA-NITER SYN        | 7-0271   |
| 37.29            | 32.71 | 29.70 | 42.37  | 61.30  | 26.41  | 100                | 100 | 90  | 90  | 90  | 70  | SCAPOLITE             | 2-0412   |
| 37.29            | 49.56 | 61.38 | 40.33  | 45.02  | 54.24  | 100                | 24  | 16  | 9   | 9   | 9   | NITER (NA) SYN        | 7-0271   |
| 37.29            | 63.00 | 75.00 | 128.17 | 62.58  | 129.96 | 100                | 80  | 60  | 60  | 40  | 30  | CHALCOPYRITE          | 9-0423   |
| 37.29            | 66.14 | 60.22 | 39.02  | 19.30  | 49.82  | 80                 | 100 | 50  | 40  | 30  | 30  | PENTLANDITE           | 8-0090   |
| 37.33            | 13.12 | 35.96 | 33.32  | 27.38  | 22.85  | 85                 | 100 | 65  | 55  | 50  | 30  | CORDIERITE (HIGH) SYN | 13-0293  |
| 37.33            | 28.99 | 34.20 | 26.60  | 38.96  | 48.49  | 100                | 60  | 40  | 35  | 35  | 30  | NEPHELINE SYN         | 9-0338   |
| 37.37            | 29.75 | 33.17 | 31.55  | 38.16  | 53.79  | 60                 | 100 | 70  | 40  | 40  | 40  | CHALCOSIDERITE        | 8-0127   |
| 37.37            | 35.68 | 41.53 | 55.16  | 77.28  | 52.71  | 70                 | 100 | 30  | 30  | 30  | 20  | KAINITE               | 14-0591  |
| 37.37            | 36.37 | 35.21 | 48.63  | 53.24  | 62.70  | 100                | 100 | 90  | 40  | 40  | 30  | EMPLECTITE            | 3-0581   |
| 37.37            | 37.93 | 36.26 | 42.00  | 20.34  | 25.23  | 80                 | 100 | 35  | 30  | 25  | 25  | ESCHYNITE             | 15-0864  |
| 37.37            | 40.30 | 79.72 | 46.94  | 55.45  | 64.23  | 100                | 60  | 60  | 40  | 30  | 30  | NAGYAGITE             | 8-0003   |
| 37.37            | 43.52 | 62.70 | 75.53  | 107.51 | 111.62 | 100                | 70  | 70  | 70  | 50  | 40  | STETEFELDITE          | 8-0012   |
| 37.39            | 7.34  | 25.10 | 43.70  | 45.75  | 71.83  | 100                | 100 | 100 | 100 | 100 | 100 | BEIDELLITE            | 3-0013   |
| 37.41            | 38.97 | 35.12 | 38.92  | 44.14  | 73.07  | 100                | 100 | 80  | 80  | 60  | 60  | PIGEONITE             | 13-0421  |
| 37.42            | 37.14 | 61.31 | 45.64  | 51.19  | 24.51  | 50                 | 100 | 60  | 50  | 50  | 40  | SCAWTITE              | 10-0400  |
| 37.43            | 42.04 | 43.13 | 42.66  | 53.03  | 29.46  | 65                 | 100 | 70  | 50  | 40  | 30  | SPURRITE              | 13-0496  |
| 37.48            | 42.11 | 73.93 | 46.33  | 59.37  | 70.76  | 60                 | 100 | 60  | 45  | 25  | 25  | ANDRADITE SYN         | 10-0288  |
| 37.49            | 65.04 | 50.22 | 86.69  | 40.14  | 42.67  | 50                 | 100 | 70  | 30  | 20  | 20  | CORVUSITE             | 15-0247  |
| 37.52            | 36.37 | 61.26 | 37.91  | 40.45  | 35.32  | 100                | 60  | 45  | 40  | 40  | 30  | TILLEYITE             | 13-0416  |
| 37.52            | 42.16 | 48.20 | 31.59  | 47.60  | 79.48  | 100                | 100 | 80  | 60  | 60  | 60  | STAUROLITE            | 15-0397  |
| 37.52            | 44.97 | 32.38 | 67.14  | 26.27  | 79.72  | 90                 | 100 | 80  | 80  | 70  | 70  | LITHIOPHILITE         | 13-0336  |
| 37.62            | 35.32 | 39.27 | 44.97  | 61.60  | 42.00  | 100                | 90  | 80  | 60  | 60  | 50  | POLYBASITE            | 8-0123   |
| 37.62            | 37.01 | 55.16 | 76.70  | 77.87  | 61.26  | 100                | 100 | 100 | 90  | 90  | 80  | MIMETITE              | 13-0056  |
| 37.62            | 39.86 | 36.26 | 49.31  | 63.08  | 45.75  | 100                | 90  | 50  | 50  | 50  | 40  | PEARCEITE             | 8-0132   |
| 37.62            | 42.33 | 74.45 | 46.53  | 48.63  | 71.34  | 70                 | 100 | 60  | 55  | 25  | 25  | UVAROVITE             | 11-0696  |
| 37.62            | 76.09 | 63.45 | 108.82 | 90.75  | 113.07 | 68                 | 100 | 84  | 68  | 63  | 63  | MICROLITE             | 3-1139   |
| 37.65            | 18.53 | 40.45 | 32.48  | 63.45  | 54.05  | 100                | 95  | 50  | 45  | 12  | 10  | BASSANITE             | 14-0453  |
| 37.65            | 26.27 | 33.78 | 55.74  | 34.98  | 29.42  | 100                | 87  | 86  | 76  | 71  | 57  | ANGLESITE             | 5-0577   |
| 37.65            | 36.03 | 66.71 | 49.55  | 54.33  | 61.42  | 50                 | 100 | 90  | 40  | 30  | 30  | CHALCOSTILBITE        | 9-0143   |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 37.65            | 40.14 | 35.91  | 54.05  | 20.27  | 27.87  | 100                | 60  | 30  | 30  | 20  | 20  | XANTHOCONITE           | 8-0134   |
| 37.67            | 26.80 | 34.46  | 39.31  | 48.91  | 76.77  | 100                | 70  | 70  | 70  | 60  | 60  | NEPHELINE              | 9-0458   |
| 37.67            | 45.02 | 73.44  | 39.02  | 86.02  | 34.91  | 80                 | 100 | 60  | 40  | 40  | 20  | DIOPHASE SYN           | 3-0860   |
| 37.67            | 45.22 | 73.44  | 129.73 | 86.02  | 94.42  | 100                | 100 | 100 | 100 | 90  | 80  | DIOPHASE               | 2-0656   |
| 37.67            | 63.61 | 76.31  | 18.64  | 36.06  | 43.75  | 100                | 60  | 50  | 25  | 20  | 20  | PYROCHLORE             | 13-0254  |
| 37.67            | 63.88 | 76.59  | 43.57  | 133.07 | 30.44  | 100                | 60  | 30  | 20  | 20  | 10  | TETRAHEDRITE           | 11-0107  |
| 37.73            | 38.29 | 23.09  | 29.70  | 30.35  | 45.66  | 100                | 95  | 65  | 60  | 55  | 55  | HUEBNERITE SYN         | 13-0434  |
| 37.75            | 14.11 | 28.43  | 38.86  | 58.85  | 23.46  | 80                 | 100 | 90  | 80  | 70  | 50  | URANOPHANE             | 8-0442   |
| 37.75            | 36.75 | 33.27  | 26.53  | 58.52  | 60.88  | 100                | 85  | 60  | 40  | 40  | 35  | VANADINITE             | 13-0585  |
| 37.75            | 37.26 | 18.60  | 24.72  | 26.70  | 29.51  | 100                | 100 | 60  | 60  | 60  | 60  | SCAWTITE               | 12-0777  |
| 37.75            | 55.16 | 38.86  | 56.03  | 52.45  | 80.37  | 100                | 90  | 70  | 60  | 50  | 50  | CALAVERITE             | 7-0344   |
| 37.78            | 38.16 | 55.74  | 38.98  | 26.65  | 34.32  | 80                 | 100 | 70  | 60  | 40  | 35  | PYROMORPHITE           | 12-0704  |
| 37.78            | 44.61 | 80.37  | 72.85  | 123.23 | 161.92 | 70                 | 100 | 80  | 70  | 50  | 50  | FRANKLINITE            | 10-0467  |
| 37.79            | 45.06 | 39.13  | 45.26  | 34.91  | 38.32  | 100                | 40  | 30  | 30  | 25  | 25  | DIOPHASE               | 11-0654  |
| 37.80            | 16.65 | 35.12  | 25.61  | 71.39  | 41.73  | 75                 | 100 | 75  | 63  | 63  | 50  | ERYTHRITE              | 10-0480  |
| 37.80            | 30.70 | 38.34  | 43.75  | 63.92  | 68.23  | 100                | 40  | 40  | 30  | 30  | 27  | EUXENITE               | 9-0442   |
| 37.80            | 39.16 | 49.98  | 60.39  | 22.52  | 80.26  | 100                | 100 | 80  | 70  | 55  | 35  | ALUNITE                | 14-0136  |
| 37.80            | 44.84 | 17.14  | 25.26  | 38.88  | 52.24  | 100                | 60  | 40  | 40  | 40  | 20  | ACMITE (AEGIRINE)      | 3-0621   |
| 37.80            | 73.44 | 85.27  | 127.51 | 129.73 | 129.73 | 100                | 100 | 100 | 100 | 100 | 100 | AUGITE                 | 3-0623   |
| 37.82            | 34.87 | 43.83  | 56.16  | 72.26  | 80.84  | 90                 | 100 | 90  | 40  | 40  | 40  | SPHENE                 | 11-0142  |
| 37.89            | 39.04 | 17.49  | 25.43  | 46.42  | 44.76  | 90                 | 100 | 90  | 45  | 45  | 30  | ACMITE SYN             | 15-0787  |
| 37.91            | 65.04 | 114.62 | 54.60  | 37.89  | 93.39  | 60                 | 100 | 70  | 50  | 40  | 40  | SPERRYLLITE            | 9-0452   |
| 37.93            | 16.94 | 35.47  | 14.22  | 25.85  | 41.88  | 30                 | 100 | 26  | 25  | 20  | 18  | ANNABERGITE            | 11-0625  |
| 37.93            | 23.19 | 18.87  | 46.18  | 47.81  | 26.73  | 100                | 90  | 70  | 70  | 70  | 60  | OLIVENITE              | 4-0657   |
| 37.93            | 37.37 | 36.26  | 42.00  | 20.34  | 25.23  | 100                | 80  | 35  | 30  | 25  | 25  | ESCHYNITE              | 15-0864  |
| 37.93            | 39.33 | 35.53  | 46.38  | 34.28  | 54.41  | 95                 | 100 | 60  | 60  | 50  | 45  | CLINOENSTATITE SYN     | 13-0415  |
| 37.93            | 40.90 | 38.69  | 35.93  | 33.72  | 36.42  | 65                 | 100 | 65  | 30  | 25  | 25  | RHODONITE              | 13-0138  |
| 37.93            | 55.22 | 42.54  | 68.56  | 93.49  | 60.60  | 90                 | 100 | 90  | 90  | 80  | 60  | TROILITE (PYRRHO.) SYN | 4-0832   |
| 37.98            | 14.24 | 45.77  | 31.38  | 24.72  | 28.58  | 100                | 100 | 100 | 80  | 65  | 65  | APOPHYLLITE            | 7-0170   |
| 38.03            | 13.58 | 27.36  | 23.15  | 18.25  | 31.92  | 80                 | 100 | 90  | 70  | 60  | 60  | CUPROSKLODOWSKITE      | 8-0290   |
| 38.03            | 28.23 | 12.49  | 32.86  | 21.89  | 40.45  | 70                 | 100 | 70  | 50  | 40  | 40  | HEULANDITE             | 13-0196  |
| 38.03            | 39.70 | 55.16  | 27.31  | 46.34  | 30.42  | 90                 | 100 | 90  | 60  | 60  | 50  | APHTHALITE             | 6-0429   |
| 38.03            | 40.45 | 46.14  | 49.75  | 63.85  | 48.82  | 100                | 90  | 60  | 60  | 60  | 50  | PEARCEITE              | 8-0130   |
| 38.03            | 44.97 | 44.43  | 54.05  | 66.71  | 72.85  | 100                | 50  | 30  | 30  | 30  | 30  | HEDENBERGITE           | 16-0701  |
| 38.05            | 34.19 | 41.55  | 35.51  | 56.66  | 56.54  | 100                | 98  | 63  | 59  | 57  | 55  | CELESTITE SYN          | 5-0593   |
| 38.07            | 16.38 | 41.88  | 35.24  | 22.76  | 29.22  | 67                 | 100 | 67  | 53  | 40  | 40  | VIVIANITE SYN          | 3-0070   |
| 38.07            | 25.21 | 75.63  | 22.80  | 48.46  | 49.58  | 60                 | 100 | 60  | 50  | 50  | 50  | CHLORITOID             | 7-0398   |
| 38.07            | 29.30 | 31.94  | 34.04  | 46.18  | 52.76  | 100                | 80  | 80  | 80  | 60  | 60  | WOLLASTONITE           | 10-0487  |
| 38.07            | 56.09 | 42.87  | 69.00  | 94.42  | 121.55 | 33                 | 100 | 33  | 33  | 13  | 13  | PYRRHONITE SYN         | 1-1247   |
| 38.07            | 56.09 | 42.87  | 69.00  | 94.42  | 121.55 | 33                 | 100 | 33  | 33  | 13  | 13  | TROILITE (PYRRHO.) SYN | 1-1247   |
| 38.09            | 32.81 | 54.96  | 65.52  | 93.76  | 68.83  | 100                | 84  | 57  | 35  | 17  | 16  | GALENA SYN             | 5-0592   |
| 38.10            | 38.39 | 23.38  | 29.86  | 30.70  | 45.83  | 100                | 90  | 60  | 55  | 55  | 45  | WOLFRAMITE SYN         | 12-0727  |
| 38.16            | 12.47 | 39.99  | 31.28  | 36.49  | 37.78  | 80                 | 100 | 80  | 60  | 60  | 60  | OKENITE                | 3-0029   |
| 38.16            | 18.78 | 64.63  | 36.49  | 77.28  | 44.24  | 100                | 90  | 80  | 70  | 60  | 40  | STIBICONITE            | 10-0388  |
| 38.16            | 24.88 | 25.17  | 75.57  | 48.31  | 49.68  | 90                 | 100 | 100 | 80  | 70  | 70  | CHLORITOID             | 14-0062  |

| TWO-THETA (IRON) |       |       |       |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 38.16            | 36.14 | 61.23 | 41.35 | 63.08  | 43.00  | 90                 | 100 | 50  | 40  | 30  | 20  | FERGUSONITE              | 9-0443   |
| 38.16            | 37.78 | 55.74 | 38.98 | 26.65  | 34.32  | 100                | 80  | 70  | 60  | 40  | 35  | PYROMORPHITE             | 12-0704  |
| 38.16            | 42.85 | 75.53 | 71.83 | 60.54  | 53.24  | 80                 | 100 | 90  | 80  | 70  | 60  | GROSSULARITE             | 3-0826   |
| 38.16            | 45.07 | 81.62 | 73.80 | 55.05  | 125.21 | 40                 | 100 | 35  | 30  | 25  | 12  | MAGNESIOFERRITE          | 17-0464  |
| 38.19            | 44.18 | 28.10 | 26.54 | 32.33  | 56.70  | 85                 | 100 | 85  | 65  | 60  | 45  | TOURMALINE               | 14-0076  |
| 38.20            | 15.91 | 36.53 | 63.92 | 70.42  | 43.22  | 100                | 100 | 80  | 70  | 70  | 60  | NATROLITE (K) SYN        | 3-0062   |
| 38.20            | 25.09 | 48.46 | 49.82 | 75.57  | 43.39  | 30                 | 100 | 30  | 30  | 30  | 20  | CHLORITOID               | 6-0158   |
| 38.20            | 30.70 | 68.50 | 66.28 | 82.78  | 15.61  | 100                | 50  | 20  | 14  | 14  | 12  | COLUMBITE (TANTALITE)    | 16-0337  |
| 38.20            | 32.14 | 42.54 | 72.92 | 24.20  | 43.75  | 100                | 80  | 80  | 60  | 50  | 40  | ALLANITE (METAMICT)      | 9-0474   |
| 38.20            | 39.59 | 42.37 | 16.89 | 18.90  | 24.15  | 80                 | 100 | 80  | 70  | 70  | 70  | THOMSONITE               | 9-0490   |
| 38.20            | 40.03 | 45.78 | 17.86 | 25.09  | 26.16  | 100                | 100 | 70  | 60  | 60  | 60  | SPODUMENE (ALPHA) SYN    | 9-0029   |
| 38.20            | 64.55 | 77.59 | 44.47 | 110.49 | 81.63  | 100                | 45  | 40  | 20  | 20  | 15  | BETAHITE                 | 13-0197  |
| 38.29            | 37.73 | 23.09 | 29.70 | 30.35  | 45.66  | 95                 | 100 | 65  | 60  | 55  | 55  | HUEBNERITE SYN           | 13-0434  |
| 38.29            | 45.18 | 73.87 | 29.91 | 55.16  | 69.40  | 100                | 100 | 100 | 100 | 100 | 100 | MAGHEMITE SYN            | 15-0615  |
| 38.29            | 53.76 | 73.37 | 60.19 | 67.14  | 30.16  | 100                | 100 | 100 | 80  | 80  | 70  | BISMUTITE                | 4-0666   |
| 38.29            | 64.63 | 77.28 | 44.43 | 110.21 | 114.62 | 100                | 90  | 90  | 60  | 60  | 60  | YTROTANTALITE            | 11-0116  |
| 38.30            | 45.93 | 23.48 | 30.02 | 30.80  | 68.73  | 100                | 60  | 50  | 50  | 50  | 50  | WOLFRAMITE               | 11-0591  |
| 38.34            | 27.54 | 23.94 | 30.61 | 34.79  | 25.79  | 100                | 90  | 70  | 70  | 70  | 60  | NEPHELINE HYDRATE II SYN | 10-0459  |
| 38.34            | 33.11 | 25.50 | 43.75 | 46.98  | 13.41  | 90                 | 100 | 90  | 70  | 70  | 60  | NEPHELINE HYDRATE I SYN  | 10-0460  |
| 38.34            | 37.80 | 30.70 | 43.75 | 63.92  | 68.23  | 40                 | 100 | 40  | 30  | 30  | 27  | EUXENITE                 | 9-0442   |
| 38.34            | 63.14 | 64.71 | 51.24 | 147.11 | 51.24  | 100                | 80  | 70  | 50  | 50  | 40  | CALCITE (MANGANOAN)      | 2-0714   |
| 38.39            | 36.83 | 41.34 | 48.10 | 68.37  | 63.14  | 31                 | 100 | 28  | 20  | 15  | 14  | MASSICOT SYN             | 5-0570   |
| 38.39            | 38.10 | 23.38 | 29.86 | 30.70  | 45.83  | 90                 | 100 | 60  | 55  | 55  | 45  | WOLFRAMITE SYN           | 12-0727  |
| 38.41            | 45.36 | 82.23 | 55.39 | 74.89  | 69.47  | 50                 | 100 | 50  | 30  | 30  | 16  | SPINEL (LI) SYN          | 13-0207  |
| 38.44            | 23.56 | 29.91 | 30.85 | 46.14  | 68.94  | 100                | 40  | 35  | 35  | 30  | 30  | FERBERITE SYN            | 12-0729  |
| 38.44            | 68.94 | 46.14 | 23.66 | 29.98  | 52.45  | 100                | 80  | 70  | 60  | 60  | 60  | FERBERITE                | 10-0449  |
| 38.44            | 68.94 | 51.19 | 81.67 | 18.88  | 24.29  | 100                | 90  | 80  | 70  | 60  | 40  | UVANITE                  | 8-0322   |
| 38.47            | 20.67 | 35.36 | 41.56 | 62.81  | 45.79  | 80                 | 100 | 90  | 80  | 60  | 50  | REALGAR                  | 9-0441   |
| 38.47            | 65.08 | 78.25 | 44.65 | 111.92 | 137.02 | 100                | 80  | 50  | 30  | 30  | 30  | TENNANTITE               | 11-0102  |
| 38.51            | 35.29 | 30.42 | 48.44 | 54.80  | 37.20  | 100                | 65  | 60  | 45  | 45  | 35  | TOPAZ                    | 12-0765  |
| 38.61            | 25.09 | 19.93 | 13.57 | 14.64  | 23.99  | 100                | 80  | 60  | 40  | 40  | 40  | NEPHELINE III SYN        | 12-0247  |
| 38.61            | 40.48 | 76.31 | 26.60 | 46.58  | 74.19  | 100                | 80  | 70  | 60  | 60  | 60  | SPODUMENE (ALPHA)        | 9-0468   |
| 38.62            | 32.82 | 19.89 | 45.48 | 67.48  | 23.04  | 70                 | 100 | 80  | 50  | 50  | 40  | ANALCIME (ZEOLITE)       | 7-0363   |
| 38.68            | 24.10 | 35.80 | 47.90 | 54.76  | 59.78  | 100                | 100 | 100 | 50  | 40  | 40  | AMBYGONITE               | 8-0102   |
| 38.68            | 32.81 | 19.89 | 68.73 | 42.16  | 32.65  | 80                 | 100 | 80  | 60  | 50  | 50  | ANALCIME (ZEOLITE)       | 7-0340   |
| 38.69            | 40.90 | 37.93 | 35.93 | 33.72  | 36.42  | 65                 | 100 | 65  | 30  | 25  | 25  | RHODONITE                | 13-0138  |
| 38.70            | 34.11 | 24.01 | 29.75 | 31.56  | 58.83  | 70                 | 100 | 50  | 50  | 50  | 45  | CARNALLITE               | 8-0075   |
| 38.71            | 23.99 | 34.49 | 17.69 | 24.75  | 35.33  | 80                 | 100 | 40  | 30  | 30  | 30  | BREWSTERITE              | 15-0582  |
| 38.74            | 36.42 | 28.76 | 33.82 | 34.36  | 41.42  | 100                | 80  | 60  | 60  | 60  | 60  | PECTOLITE                | 12-0238  |
| 38.75            | 38.88 | 39.59 | 44.79 | 42.37  | 43.39  | 90                 | 100 | 50  | 40  | 40  | 40  | ALLANITE (NON-METAMICT)  | 10-0366  |
| 38.75            | 40.03 | 47.19 | 76.20 | 26.22  | 36.42  | 80                 | 100 | 90  | 40  | 30  | 30  | JADEITE                  | 9-0463   |
| 38.75            | 43.39 | 75.96 | 47.81 | 72.82  | *****  | 90                 | 100 | 100 | 90  | 90  | *** | GARNET (FE, MN)          | 10-0367  |
| 38.75            | 80.84 | 13.41 | 45.79 | 72.51  | 19.50  | 80                 | 100 | 60  | 45  | 45  | 30  | CHRYSOCOLLA              | 11-0322  |
| 38.78            | 40.54 | 57.35 | 55.87 | 81.42  | 106.88 | 100                | 90  | 74  | 34  | 23  | 20  | TIN (BETA)               | 4-0673   |
| 38.86            | 23.20 | 43.18 | 19.21 | 30.24  | 68.94  | 50                 | 100 | 100 | 40  |     |     |                          |          |



| TWO-THETA (IRON) |       |       |       |        |        | RELATIVE INTENSITY |     |     |    |    |    | MINERAL NAME            | FILE NO. |
|------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|----|----|----|-------------------------|----------|
| 38.86            | 30.49 | 18.05 | 32.68 | 34.32  | 23.27  | 80                 | 100 | 70  | 70 | 70 | 60 | TURQUOIS                | 6-0214   |
| 38.86            | 37.75 | 55.16 | 56.03 | 52.45  | 80.37  | 70                 | 100 | 90  | 60 | 50 | 50 | CALAVERITE              | 7-0344   |
| 38.86            | 39.16 | 35.52 | 39.79 | 18.58  | 33.04  | 100                | 100 | 70  | 16 | 12 | 12 | POLYHALITE              | 13-0526  |
| 38.86            | 41.53 | 20.19 | 32.20 | 34.65  | 22.19  | 100                | 100 | 80  | 80 | 80 | 60 | MELANOTEKITE            | 15-0633  |
| 38.88            | 32.86 | 30.73 | 47.44 | 62.90  | 67.96  | 100                | 100 | 80  | 80 | 80 | 80 | POLLUCITE               | 15-0317  |
| 38.88            | 38.75 | 39.59 | 44.79 | 42.37  | 43.39  | 100                | 90  | 50  | 40 | 40 | 40 | ALLANITE (NON-METAMICT) | 10-0366  |
| 38.97            | 37.41 | 35.12 | 38.92 | 44.14  | 73.07  | 100                | 100 | 80  | 80 | 60 | 60 | PIGEONITE               | 13-0421  |
| 38.98            | 29.59 | 41.30 | 46.53 | 43.00  | 51.95  | 100                | 50  | 50  | 40 | 30 | 30 | PUMPELLYITE             | 10-0447  |
| 38.98            | 33.31 | 40.68 | 43.18 | 67.00  | 61.19  | 48                 | 100 | 45  | 30 | 30 | 22 | MINIUM SYN              | 8-0019   |
| 38.98            | 34.86 | 21.79 | 71.83 | 26.32  | 49.75  | 80                 | 100 | 80  | 80 | 60 | 60 | DESCLOIZITE             | 12-0537  |
| 39.02            | 19.26 | 53.55 | 12.11 | 17.30  | 34.04  | 90                 | 100 | 50  | 40 | 40 | 30 | HYDROMAGNESITE          | 8-0179   |
| 39.02            | 32.03 | 32.42 | 61.55 | 71.30  | 46.06  | 90                 | 100 | 80  | 30 | 30 | 25 | BROOKITE                | 16-0617  |
| 39.02            | 46.18 | 75.63 | 83.82 | 56.40  | 70.90  | 60                 | 100 | 60  | 60 | 30 | 10 | GALAXITE                | 12-0431  |
| 39.02            | 47.70 | 72.66 | 42.42 | 62.43  | 43.87  | 100                | 70  | 65  | 60 | 60 | 55 | EPIDOTE                 | 7-0438   |
| 39.04            | 17.49 | 37.89 | 25.43 | 46.42  | 44.76  | 100                | 90  | 90  | 45 | 45 | 30 | ACMITE SYN              | 15-0787  |
| 39.04            | 52.27 | 64.63 | 65.44 | 30.35  | 42.29  | 100                | 6   | 6   | 6  | 3  | 3  | DOLOMITE (FERROAN)      | 12-0088  |
| 39.13            | 37.79 | 45.06 | 45.26 | 34.91  | 38.32  | 30                 | 100 | 40  | 30 | 25 | 25 | DIOPSIDE                | 11-0654  |
| 39.14            | 32.58 | 41.20 | 57.56 | 59.18  | 60.88  | 100                | 90  | 80  | 40 | 40 | 30 | MIARGYRITE              | 4-0675   |
| 39.14            | 36.62 | 44.06 | 54.05 | 52.45  | 63.85  | 60                 | 100 | 90  | 50 | 40 | 40 | STEPHANITE              | 11-0108  |
| 39.14            | 56.64 | 70.82 | 97.22 | 110.21 | 33.78  | 100                | 55  | 16  | 14 | 10 | 8  | BROMYRITE               | 6-0438   |
| 39.16            | 35.24 | 81.09 | 74.52 | 88.36  | 44.65  | 80                 | 100 | 80  | 60 | 60 | 50 | HYPERSTHENE             | 2-0520   |
| 39.16            | 37.80 | 49.98 | 60.39 | 22.52  | 80.26  | 100                | 100 | 80  | 70 | 55 | 35 | ALUNITE                 | 14-0136  |
| 39.16            | 38.86 | 35.52 | 39.79 | 18.58  | 33.04  | 100                | 100 | 70  | 16 | 12 | 12 | POLYHALITE              | 13-0526  |
| 39.23            | 52.45 | 65.68 | 65.90 | 64.96  | 57.47  | 100                | 30  | 30  | 30 | 20 | 15 | DOLOMITE                | 11-0078  |
| 39.27            | 31.54 | 22.87 | 56.03 | 57.24  | 61.26  | 100                | 70  | 40  | 40 | 40 | 40 | BASTNAESITE             | 11-0340  |
| 39.27            | 37.62 | 35.32 | 44.97 | 61.60  | 42.00  | 80                 | 100 | 90  | 60 | 60 | 50 | POLYBASITE              | 8-0123   |
| 39.33            | 37.93 | 35.53 | 46.38 | 34.28  | 54.41  | 100                | 95  | 60  | 60 | 50 | 45 | CLINOENSTATITE SYN      | 13-0415  |
| 39.40            | 42.16 | 27.82 | 13.76 | 57.34  | 74.46  | 65                 | 100 | 50  | 40 | 35 | 35 | ZOISITE SYN             | 13-0562  |
| 39.41            | 44.30 | 77.96 | 74.57 | 27.74  | 62.54  | 40                 | 100 | 50  | 40 | 30 | 30 | ALMANDITE               | 9-0427   |
| 39.42            | 34.75 | 22.01 | 42.33 | 42.67  | 43.88  | 80                 | 100 | 80  | 80 | 80 | 80 | MOTTRAMITE              | 12-0538  |
| 39.42            | 35.62 | 45.71 | 38.46 | 44.94  | 34.10  | 87                 | 100 | 51  | 44 | 43 | 35 | ENSTATITE               | 7-0216   |
| 39.42            | 36.49 | 34.11 | 26.83 | 32.02  | 53.50  | 70                 | 100 | 50  | 25 | 25 | 25 | MONAZITE                | 11-0556  |
| 39.42            | 49.55 | 50.96 | 34.10 | 53.79  | 88.26  | 80                 | 100 | 70  | 60 | 60 | 40 | HESSITE                 | 12-0695  |
| 39.45            | 15.49 | 19.44 | 25.79 | 37.80  | 17.19  | 80                 | 100 | 80  | 70 | 70 | 60 | EUDIALYTE               | 8-0355   |
| 39.45            | 35.01 | 62.81 | 68.05 | 75.06  | 128.59 | 80                 | 100 | 90  | 60 | 50 | 50 | ENARGITE                | 10-0436  |
| 39.45            | 36.53 | 66.62 | 56.73 | 45.83  | 30.11  | 100                | 30  | 30  | 20 | 17 | 13 | AKERMANITE              | 10-0391  |
| 39.45            | 40.94 | 62.77 | 73.44 | 32.61  | 35.47  | 100                | 50  | 50  | 50 | 40 | 40 | CLINOZOISITE            | 16-0705  |
| 39.45            | 46.79 | 85.27 | 57.01 | 76.77  | 71.90  | 80                 | 100 | 100 | 80 | 80 | 60 | SINEL SYN               | 2-0175   |
| 39.46            | 42.00 | 73.70 | 55.97 | 31.09  | 49.02  | 100                | 100 | 75  | 65 | 60 | 60 | ZOISITE                 | 11-0665  |
| 39.50            | 34.64 | 13.95 | 24.32 | 28.10  | 37.48  | 100                | 95  | 90  | 50 | 45 | 35 | BERYL                   | 9-0430   |
| 39.52            | 44.43 | 78.50 | 46.72 | 75.11  | 51.07  | 60                 | 100 | 50  | 40 | 30 | 25 | PYROPE SYN              | 15-0742  |
| 39.55            | 33.53 | 58.58 | 35.64 | 67.88  | 55.68  | 94                 | 100 | 29  | 28 | 27 | 26 | CINNABAR SYN            | 6-0256   |
| 39.55            | 36.03 | 45.36 | 30.42 | 42.51  | 65.04  | 90                 | 100 | 90  | 80 | 80 | 80 | EMMONSITE               | 7-0404   |
| 39.55            | 46.73 | 85.20 | 77.06 | 71.94  | 103.32 | 90                 | 100 | 50  | 40 | 30 | 30 | GAHNITE (FE)            | 12-0267  |
| 39.55            | 56.34 | 58.83 | 73.37 | 95.25  | 85.94  | 100                | 40  | 40  | 20 | 20 | 20 | BREITHAUPITTE           | 2-0783   |

| TWO-THETA (IRON) |       |       |       |        |        | RELATIVE INTENSITY |     |     |     |     |    | MINERAL NAME                | FILE NO. |
|------------------|-------|-------|-------|--------|--------|--------------------|-----|-----|-----|-----|----|-----------------------------|----------|
| 39.55            | 72.33 | 36.03 | 44.06 | 22.49  | 42.67  | 80                 | 100 | 80  | 80  | 60  | 60 | CUPRODESCLOIZITE            | 13-0240  |
| 39.58            | 40.80 | 63.68 | 59.14 | 33.21  | 13.37  | 60                 | 100 | 20  | 18  | 14  | 10 | CHLORAPATITE SYN            | 12-0263  |
| 39.58            | 46.82 | 85.35 | 77.01 | 71.90  | 133.83 | 84                 | 100 | 43  | 40  | 24  | 12 | GAHNITE SYN                 | 5-0669   |
| 39.59            | 18.90 | 25.55 | 16.89 | 35.70  | 38.47  | 100                | 64  | 64  | 48  | 48  | 48 | NATROLITE                   | 3-0705   |
| 39.59            | 38.20 | 42.37 | 16.89 | 18.90  | 24.15  | 100                | 80  | 80  | 70  | 70  | 70 | THOMSONITE                  | 9-0490   |
| 39.59            | 38.88 | 38.75 | 44.79 | 42.37  | 43.39  | 50                 | 100 | 90  | 40  | 40  | 40 | ALLANITE (NON-METAMICT)     | 10-0366  |
| 39.64            | 30.42 | 22.09 | 18.60 | 45.22  | 40.81  | 100                | 85  | 75  | 55  | 55  | 45 | MALACHITE SYN               | 10-0399  |
| 39.67            | 36.25 | 52.53 | 29.83 | 62.21  | 72.20  | 65                 | 100 | 60  | 45  | 40  | 40 | DATOLITE                    | 11-0070  |
| 39.67            | 46.08 | 80.90 | 67.21 | 117.01 | 85.35  | 100                | 50  | 32  | 31  | 10  | 9  | LEAD SYN                    | 4-0686   |
| 39.70            | 38.03 | 55.16 | 27.31 | 46.34  | 30.42  | 100                | 90  | 90  | 60  | 60  | 50 | APHTHALITE                  | 6-0429   |
| 39.70            | 42.51 | 46.94 | 51.69 | 77.28  | 84.47  | 35                 | 100 | 95  | 30  | 30  | 30 | CREDNERITE                  | 14-0623  |
| 39.70            | 42.85 | 47.15 | 61.60 | 34.88  | 36.14  | 100                | 50  | 50  | 50  | 40  | 20 | PYROSTILPNITE               | 8-0129   |
| 39.74            | 33.82 | 44.10 | 11.09 | 22.22  | 24.77  | 100                | 80  | 80  | 60  | 60  | 60 | MUSCOVITE (LI)              | 10-0482  |
| 39.74            | 40.94 | 59.57 | 63.53 | 49.58  | 32.81  | 90                 | 100 | 50  | 50  | 30  | 20 | CHLORAPATITE                | 2-0851   |
| 39.74            | 66.78 | 67.21 | 46.98 | 47.40  | 47.60  | 100                | 100 | 100 | 70  | 70  | 70 | GEHLENITE SYN               | 4-0690   |
| 39.74            | 67.05 | 36.79 | 47.53 | 30.61  | 46.88  | 100                | 35  | 25  | 22  | 20  | 20 | GEHLENITE SYN               | 9-0216   |
| 39.76            | 32.15 | 36.26 | 52.04 | 62.43  | 72.00  | 33                 | 100 | 22  | 20  | 15  | 14 | ANHYDRITE                   | 6-0226   |
| 39.86            | 37.62 | 36.26 | 49.31 | 63.08  | 45.75  | 90                 | 100 | 50  | 50  | 50  | 40 | PEARCEITE                   | 8-0132   |
| 39.86            | 41.84 | 15.27 | 42.51 | 46.73  | 52.97  | 85                 | 100 | 70  | 50  | 50  | 35 | ILVAITE                     | 14-0067  |
| 39.86            | 44.61 | 45.96 | 62.33 | 69.40  | 66.28  | 65                 | 100 | 90  | 55  | 30  | 25 | RAMMELSBERGITE SYN          | 11-0014  |
| 39.86            | 53.76 | 67.14 | 70.35 | 31.00  | 33.68  | 100                | 80  | 80  | 80  | 70  | 70 | BEYERITE                    | 4-0693   |
| 39.87            | 27.68 | 45.89 | 36.00 | 62.39  | 46.28  | 13                 | 100 | 20  | 11  | 7   | 5  | CRISTOBALITE LOW SYN        | 11-0695  |
| 39.88            | 7.82  | 23.69 | 31.77 | 15.70  | 46.38  | 90                 | 100 | 60  | 60  | 40  | 30 | PENNINITE                   | 10-0412  |
| 39.88            | 30.70 | 66.66 | 66.36 | 52.97  | 57.93  | 100                | 35  | 33  | 30  | 27  | 23 | RHODOCHROSITE SYN           | 7-0268   |
| 39.88            | 44.28 | 22.99 | 28.32 | 19.57  | 38.07  | 53                 | 100 | 47  | 40  | 20  | 20 | BORAX                       | 1-1097   |
| 39.99            | 12.47 | 38.16 | 31.28 | 36.49  | 37.78  | 80                 | 100 | 80  | 60  | 60  | 60 | OKENITE                     | 3-0029   |
| 39.99            | 43.18 | 32.20 | 49.31 | 27.80  | 62.70  | 95                 | 100 | 80  | 45  | 35  | 35 | WILLEMITE                   | 8-0492   |
| 40.01            | 45.57 | 44.36 | 31.60 | 49.74  | 66.02  | 100                | 70  | 50  | 30  | 30  | 30 | FAYALITE                    | 7-0164   |
| 40.03            | 38.20 | 45.98 | 17.86 | 25.09  | 26.16  | 100                | 100 | 70  | 60  | 60  | 60 | SPODUMENE (ALPHA) SYN       | 9-0029   |
| 40.03            | 47.19 | 38.75 | 76.20 | 26.22  | 36.42  | 100                | 90  | 80  | 40  | 30  | 30 | JADEITE                     | 9-0463   |
| 40.05            | 45.59 | 31.57 | 44.37 | 47.44  | 49.70  | 100                | 80  | 75  | 60  | 35  | 35 | FAYALITE SYN                | 11-0262  |
| 40.14            | 20.65 | 22.32 | 41.20 | 50.69  | 64.26  | 100                | 100 | 100 | 100 | 100 | 80 | ATACAMITE                   | 2-0146   |
| 40.14            | 37.65 | 35.91 | 54.05 | 20.27  | 27.87  | 60                 | 100 | 30  | 30  | 20  | 20 | XANTHICONITE                | 8-0134   |
| 40.14            | 45.93 | 43.70 | 72.85 | 81.67  | 60.88  | 71                 | 100 | 56  | 40  | 35  | 29 | ZINCITE SYN                 | 5-0664   |
| 40.15            | 41.69 | 32.61 | 50.50 | 62.14  | 68.46  | 100                | 90  | 70  | 70  | 70  | 60 | DAHLITE (CARBONATE-APATITE) | 15-0100  |
| 40.17            | 58.13 | 73.03 | 34.59 | 100.37 | 114.46 | 100                | 55  | 15  | 13  | 11  | 7  | HALITE SYN                  | 5-0628   |
| 40.18            | 45.59 | 66.10 | 31.66 | 44.28  | 79.30  | 100                | 100 | 100 | 80  | 80  | 60 | FAYALITE                    | 9-0484   |
| 40.18            | 45.79 | 31.77 | 44.65 | 65.94  | 79.18  | 95                 | 100 | 75  | 70  | 70  | 70 | FAYALITE SYN                | 9-0307   |
| 40.27            | 40.81 | 41.73 | 32.71 | 63.49  | 59.80  | 100                | 60  | 60  | 40  | 40  | 30 | HYDROXYLAPATITE SYN         | 9-0432   |
| 40.28            | 32.81 | 30.35 | 41.82 | 29.38  | 36.66  | 35                 | 100 | 35  | 35  | 30  | 30 | JAMESONITE                  | 13-0461  |
| 40.30            | 21.46 | 14.26 | 49.31 | 56.95  | 36.11  | 40                 | 100 | 45  | 40  | 40  | 35 | NITROCALCITE                | 1-0229   |
| 40.30            | 32.52 | 17.69 | 35.93 | 38.01  | 53.50  | 100                | 80  | 70  | 70  | 70  | 70 | AXINITE (TINZENITE)         | 6-3444   |
| 40.30            | 32.68 | 33.37 | 38.16 | 60.88  | 30.16  | 30                 | 100 | 25  | 20  | 16  | 14 | COSALITE                    | 13-0502  |
| 40.30            | 35.70 | 32.52 | 17.69 | 30.52  | 34.36  | 100                | 90  | 80  | 70  | 60  | 60 | AXINITE                     | 6-0448   |
| 40.30            | 37.37 | 79.72 | 46.94 | 55.45  | 64.23  | 60                 | 100 | 60  | 40  | 30  | 30 | NAGYAGITE                   | 8-0003   |

| TWO-THETA (IRON) |       |        |       |        |        | RELATIVE INTENSITY |     |     |    |    |     | MINERAL NAME                | FILE NO. |
|------------------|-------|--------|-------|--------|--------|--------------------|-----|-----|----|----|-----|-----------------------------|----------|
| 40.30            | 61.23 | 37.01  | 41.69 | 68.04  | 76.70  | 100                | 75  | 65  | 55 | 35 | 35  | COVELLITE                   | 6-0464   |
| 40.31            | 36.20 | 31.57  | 31.86 | 59.47  | 28.24  | 63                 | 100 | 94  | 60 | 55 | 38  | BISMUTHINITE SYN            | 6-0333   |
| 40.31            | 41.56 | 32.65  | 36.47 | 50.52  | 59.67  | 100                | 80  | 30  | 30 | 30 | 30  | DAHLITE (CARBONATE-APATITE) | 12-0529  |
| 40.33            | 30.19 | 62.81  | 67.13 | 35.12  | 37.55  | 90                 | 100 | 80  | 50 | 40 | 40  | BOULANGERITE                | 9-0470   |
| 40.42            | 32.10 | 62.70  | 45.93 | 78.49  | 81.02  | 100                | 100 | 100 | 70 | 70 | 70  | PLATTNERITE                 | 8-0185   |
| 40.45            | 37.65 | 18.53  | 32.48 | 63.45  | 54.05  | 50                 | 100 | 95  | 45 | 12 | 10  | BASSANITE                   | 14-0453  |
| 40.45            | 38.03 | 46.14  | 49.75 | 63.85  | 48.82  | 90                 | 100 | 60  | 60 | 60 | 50  | PEARCEITE                   | 8-0130   |
| 40.45            | 58.20 | 100.36 | 73.37 | 114.62 | 34.75  | 100                | 60  | 40  | 30 | 30 | 20  | EMBOLITE                    | 14-0255  |
| 40.48            | 38.61 | 76.31  | 26.60 | 46.58  | 74.19  | 80                 | 100 | 70  | 60 | 60 | 60  | SPODUMENE (ALPHA)           | 9-0468   |
| 40.48            | 42.01 | 40.90  | 46.73 | 43.33  | 63.65  | 100                | 60  | 55  | 40 | 30 | 30  | FLUORAPATITE SYN            | 15-0876  |
| 40.54            | 38.78 | 57.35  | 55.87 | 81.42  | 106.88 | 90                 | 100 | 74  | 34 | 23 | 20  | TIN (BETA)                  | 4-0673   |
| 40.55            | 41.34 | 40.79  | 43.61 | 52.55  | 41.55  | 100                | 95  | 90  | 65 | 65 | 40  | LARNITE                     | 9-0351   |
| 40.58            | 10.18 | 51.19  | 37.26 | 20.17  | 62.70  | 100                | 85  | 25  | 14 | 10 | 8   | PLUMBOJAROSITE              | 15-0648  |
| 40.58            | 26.07 | 34.98  | 65.44 | 43.18  | 59.84  | 70                 | 100 | 50  | 50 | 40 | 30  | STERNBERGITE                | 11-0061  |
| 40.58            | 36.37 | 44.79  | 48.87 | 23.71  | 32.38  | 100                | 100 | 100 | 70 | 50 | 50  | GADOLINITE                  | 8-0190   |
| 40.60            | 13.29 | 36.34  | 28.01 | 34.55  | 72.15  | 21                 | 100 | 85  | 20 | 18 | 15  | TREMOLITE (FLUOR) SYN       | 9-0330   |
| 40.60            | 31.10 | 44.43  | 25.41 | 27.72  | 51.92  | 100                | 80  | 80  | 60 | 50 | 40  | PHOSGENITE                  | 12-0218  |
| 40.60            | 58.83 | 35.09  | 69.86 | 116.18 | 52.97  | 40                 | 100 | 40  | 30 | 20 | 10  | DIGENITE                    | 9-0064   |
| 40.60            | 58.83 | 70.35  | 34.98 | 116.18 | ****   | 80                 | 100 | 90  | 70 | 70 | *** | DIGENITE SYN                | 4-0861   |
| 40.63            | 19.99 | 28.32  | 31.94 | 48.49  | 51.55  | 60                 | 100 | 35  | 15 | 15 | 15  | ANDALUSITE X SYN            | 13-0231  |
| 40.63            | 67.92 | *****  | 31.31 | 54.10  | 59.14  | 100                | 80  | *** | 60 | 60 | 60  | SIDERITE                    | 8-0133   |
| 40.64            | 68.09 | 67.88  | 59.17 | 31.31  | 54.08  | 100                | 45  | 35  | 30 | 25 | 25  | SIDERITE SYN                | 12-0531  |
| 40.68            | 33.31 | 38.98  | 43.18 | 67.00  | 61.19  | 45                 | 100 | 48  | 30 | 30 | 22  | MINIUM SYN                  | 8-0019   |
| 40.73            | 18.02 | 51.01  | 51.19 | 47.36  | 61.26  | 65                 | 100 | 30  | 25 | 16 | 16  | WEDDELLITE                  | 17-0541  |
| 40.73            | 23.96 | 36.34  | 42.85 | 36.75  | 62.70  | 100                | 73  | 51  | 48 | 47 | 31  | THENARDITE                  | 5-0631   |
| 40.73            | 70.35 | 45.75  | 50.47 | 58.83  | 34.98  | 100                | 75  | 50  | 25 | 25 | 10  | BRAVOITE                    | 2-0850   |
| 40.75            | 44.24 | 34.98  | 44.97 | 33.68  | 35.44  | 100                | 95  | 90  | 90 | 80 | 70  | PYRRARGYRITE SYN            | 14-0280  |
| 40.79            | 40.55 | 41.34  | 43.61 | 52.55  | 41.55  | 95                 | 100 | 90  | 65 | 65 | 40  | LARNITE                     | 9-0351   |
| 40.80            | 39.58 | 63.68  | 59.14 | 33.21  | 13.37  | 100                | 60  | 20  | 18 | 14 | 10  | CHLORAPATITE SYN            | 12-0263  |
| 40.81            | 40.27 | 41.73  | 32.71 | 63.49  | 59.80  | 60                 | 100 | 60  | 40 | 40 | 30  | HYDROXYLAPATITE SYN         | 9-0432   |
| 40.82            | 62.66 | 45.35  | 23.24 | 51.55  | 64.39  | 100                | 95  | 65  | 60 | 55 | 45  | MILLERITE                   | 12-0041  |
| 40.89            | 31.92 | 61.95  | 56.34 | 76.70  | 66.31  | 100                | 26  | 26  | 24 | 11 | 10  | ARSENIC                     | 5-0632   |
| 40.89            | 54.31 | 56.95  | 46.73 | 49.31  | 15.22  | 100                | 80  | 70  | 60 | 60 | 50  | PETZITE                     | 12-0424  |
| 40.89            | 59.18 | 35.21  | 70.82 | 74.42  | 102.61 | 100                | 50  | 50  | 16 | 16 | 12  | CERARGYRITE                 | 6-0480   |
| 40.90            | 37.93 | 38.69  | 35.93 | 33.72  | 36.42  | 100                | 65  | 65  | 30 | 25 | 25  | RHODONITE                   | 13-0138  |
| 40.90            | 40.48 | 42.01  | 46.73 | 43.33  | 63.65  | 55                 | 100 | 60  | 40 | 30 | 30  | FLUORAPATITE SYN            | 15-0876  |
| 40.93            | 45.31 | 28.82  | 46.36 | 21.85  | 67.17  | 100                | 80  | 60  | 60 | 50 | 50  | FORSTERITE (OLIVINE)        | 7-0075   |
| 40.93            | 45.31 | 46.36  | 67.17 | 21.77  | 28.85  | 100                | 60  | 60  | 50 | 40 | 40  | CHRYSOLITE (OLIVINE)        | 7-0156   |
| 40.94            | 20.14 | 24.70  | 53.03 | 28.61  | 31.94  | 90                 | 100 | 90  | 90 | 70 | 60  | ANDALUSITE                  | 13-0122  |
| 40.94            | 39.45 | 62.77  | 73.44 | 32.61  | 35.47  | 50                 | 100 | 50  | 50 | 40 | 40  | CLINDZOISITE                | 16-0705  |
| 40.94            | 39.74 | 59.57  | 63.53 | 49.58  | 32.81  | 100                | 90  | 50  | 50 | 30 | 20  | CHLORAPATITE                | 2-0851   |
| 40.94            | 45.32 | 46.38  | 28.89 | 21.90  | 46.59  | 100                | 100 | 80  | 60 | 50 | 40  | FORSTERITE (OLIVINE)        | 7-0079   |
| 40.95            | 13.34 | 36.75  | 45.41 | 32.38  | 12.06  | 90                 | 100 | 80  | 60 | 55 | 50  | GRUNERITE                   | 17-0725  |
| 40.97            | 33.08 | 42.25  | 43.62 | 60.22  | 63.76  | 100                | 70  | 70  | 70 | 70 | 70  | APATITE SYN (CARBONATE)     | 13-0001  |
| 40.97            | 50.83 | 67.61  | 44.88 | 45.36  | 30.39  | 60                 | 100 | 80  | 60 | 60 | 45  | CLINOHUMITE SYN             | 14-0009  |

| TWO-THETA (IRON) |       |       |        |        |        | RELATIVE INTENSITY |     |    |    |     |     | MINERAL NAME                | FILE NO. |
|------------------|-------|-------|--------|--------|--------|--------------------|-----|----|----|-----|-----|-----------------------------|----------|
| 41.04            | 37.01 | 31.56 | 31.46  | 22.09  | 42.33  | 100                | 95  | 70 | 65 | 55  | 50  | STIBNITE SYN                | 6-0474   |
| 41.17            | 43.83 | 73.32 | 46.50  | 38.35  | 54.31  | 100                | 80  | 60 | 50 | 40  | 30  | VESUVIANITE                 | 11-0145  |
| 41.20            | 31.64 | 69.40 | 49.08  | 59.50  | 54.60  | 100                | 50  | 45 | 25 | 25  | 18  | SMITHSONITE                 | 8-0449   |
| 41.20            | 32.30 | 22.60 | 77.87  | 62.70  | 47.57  | 80                 | 100 | 45 | 35 | 30  | 25  | PSEUDOBROOKITE SYN          | 9-0182   |
| 41.20            | 39.14 | 32.58 | 57.56  | 59.18  | 60.88  | 80                 | 100 | 90 | 40 | 40  | 30  | MIARGYRITE                  | 4-0675   |
| 41.20            | 59.84 | 76.11 | 49.08  | 24.79  | 28.89  | 67                 | 100 | 53 | 40 | 20  | 20  | CRYOLITE                    | 1-1273   |
| 41.22            | 43.87 | 73.39 | 46.54  | 38.39  | 54.31  | 100                | 80  | 60 | 50 | 40  | 30  | IDOCRASE                    | 11-0145  |
| 41.25            | 36.79 | 13.28 | 28.99  | 32.61  | 34.57  | 100                | 80  | 70 | 60 | 60  | 60  | CUMINGTONITE                | 7-0382   |
| 41.25            | 45.98 | 76.20 | 77.96  | 36.66  | 22.71  | 63                 | 100 | 50 | 50 | 31  | 20  | HAUSMANNITE                 | 1-1127   |
| 41.30            | 38.98 | 29.59 | 46.53  | 43.00  | 51.95  | 50                 | 100 | 50 | 40 | 30  | 30  | PUMPELLYITE                 | 10-0447  |
| 41.30            | 59.87 | 28.89 | 49.34  | 49.09  | 76.31  | 95                 | 100 | 60 | 50 | 45  | 45  | CRYOLITE                    | 12-0257  |
| 41.34            | 36.83 | 38.39 | 48.10  | 68.37  | 63.14  | 28                 | 100 | 31 | 20 | 15  | 14  | MASSICOT SYN                | 5-0570   |
| 41.34            | 40.55 | 40.79 | 43.61  | 52.55  | 41.55  | 95                 | 100 | 90 | 65 | 65  | 40  | LARNITE                     | 9-0351   |
| 41.35            | 35.68 | 60.19 | 71.83  | 101.48 | 104.99 | 48                 | 100 | 49 | 47 | 18  | 15  | URANINITE SYN               | 5-0550   |
| 41.38            | 45.93 | 34.42 | 44.61  | 35.55  | 36.26  | 100                | 90  | 80 | 80 | 70  | 70  | PROUSTITE SYN               | 11-0470  |
| 41.38            | 51.45 | 83.04 | 89.89  | *****  | *****  | 100                | 80  | 60 | 50 | *** | *** | MERCURY                     | 9-0253   |
| 41.38            | 54.88 | 69.47 | 45.54  | 59.94  | 92.76  | 100                | 43  | 34 | 17 | 12  | 8   | MAGNESITE SYN               | 8-0479   |
| 41.40            | 28.32 | 33.42 | 44.72  | 16.53  | 28.84  | 80                 | 100 | 95 | 60 | 55  | 35  | EUCRYPTITE                  | 14-0667  |
| 41.40            | 60.00 | 35.47 | 100.70 | 119.91 | 34.04  | 50                 | 100 | 60 | 50 | 50  | 40  | BORNITE                     | 14-0323  |
| 41.40            | 66.44 | 42.29 | 29.22  | 28.72  | 62.38  | 100                | 50  | 45 | 35 | 30  | 30  | BOURNONITE                  | 12-0094  |
| 41.40            | 68.56 | 44.84 | 62.77  | 80.44  | 82.44  | 100                | 100 | 85 | 85 | 85  | 85  | ILMENITE                    | 3-0791   |
| 41.53            | 35.68 | 37.37 | 55.16  | 77.28  | 52.71  | 30                 | 100 | 70 | 30 | 30  | 20  | KAINITE                     | 14-0581  |
| 41.53            | 35.69 | 13.07 | 32.88  | 43.68  | 52.63  | 80                 | 100 | 70 | 45 | 35  | 35  | ARFVEDSONITE                | 14-0633  |
| 41.53            | 36.75 | 34.65 | 30.82  | 59.18  | 68.47  | 60                 | 100 | 40 | 30 | 30  | 30  | CUPROBISMUTITE              | 8-0086   |
| 41.53            | 38.86 | 20.19 | 32.20  | 34.65  | 22.19  | 100                | 100 | 80 | 80 | 80  | 60  | MELANOTEKITE                | 15-0633  |
| 41.55            | 38.05 | 34.19 | 35.51  | 56.66  | 56.54  | 63                 | 100 | 98 | 59 | 57  | 55  | CELESTITE SYN               | 5-0593   |
| 41.56            | 36.90 | 13.48 | 45.40  | 87.17  | 53.03  | 90                 | 100 | 80 | 80 | 80  | 60  | CUMINGTONITE (MN)           | 13-0376  |
| 41.56            | 40.31 | 32.65 | 36.47  | 50.52  | 59.67  | 80                 | 100 | 30 | 30 | 30  | 30  | DAHLITE (CARBONATE-APATITE) | 12-0529  |
| 41.58            | 13.24 | 36.32 | 44.97  | 24.81  | 37.92  | 50                 | 100 | 55 | 45 | 20  | 20  | RIEBECKITE SYN              | 15-0516  |
| 41.58            | 43.29 | 77.28 | 23.06  | 30.67  | 46.68  | 70                 | 100 | 80 | 60 | 60  | 60  | LAWSONITE                   | 13-0533  |
| 41.69            | 40.15 | 32.61 | 50.50  | 62.14  | 68.46  | 90                 | 100 | 70 | 70 | 70  | 60  | DAHLITE (CARBONATE-APATITE) | 15-0100  |
| 41.69            | 56.03 | 37.14 | 102.85 | 66.59  | 53.66  | 50                 | 100 | 70 | 50 | 45  | 40  | BORACITE                    | 5-0710   |
| 41.69            | 65.04 | 46.34 | 119.39 | 47.98  | 131.14 | 100                | 100 | 90 | 90 | 80  | 80  | COBALTITE                   | 16-0624  |
| 41.73            | 40.27 | 40.81 | 32.71  | 63.49  | 59.80  | 60                 | 100 | 60 | 40 | 40  | 30  | HYDROXYLAPATITE SYN         | 9-0432   |
| 41.73            | 71.55 | 85.95 | 127.73 | 29.30  | 134.07 | 100                | 90  | 80 | 70 | 60  | 60  | BIXBYITE                    | 8-0010   |
| 41.73            | 71.60 | 53.83 | 133.83 | 48.69  | 86.02  | 100                | 70  | 50 | 50 | 40  | 40  | BRAUNITE                    | 8-0078   |
| 41.74            | 13.22 | 36.53 | 32.81  | 45.02  | 24.75  | 100                | 100 | 80 | 60 | 60  | 50  | RIEBECKITE                  | 14-0230  |
| 41.84            | 18.27 | 75.53 | 78.46  | 43.18  | 48.87  | 70                 | 100 | 70 | 70 | 60  | 60  | MOLYBDENITE (3R)            | 17-0744  |
| 41.84            | 34.65 | 24.67 | 43.18  | 38.16  | 44.24  | 40                 | 100 | 80 | 40 | 30  | 30  | BLYDITE                     | 4-0549   |
| 41.84            | 34.65 | 42.18 | 34.01  | 35.44  | 59.18  | 40                 | 100 | 45 | 35 | 25  | 25  | BISMITE                     | 14-0699  |
| 41.84            | 39.86 | 15.27 | 42.51  | 46.73  | 52.97  | 100                | 85  | 70 | 50 | 50  | 35  | ILVAITE                     | 14-0067  |
| 41.88            | 16.38 | 38.07 | 35.24  | 22.76  | 29.22  | 67                 | 100 | 67 | 53 | 40  | 40  | VIVIANITE SYN               | 3-0070   |
| 41.88            | 36.29 | 13.22 | 33.31  | 34.46  | 38.47  | 100                | 80  | 70 | 70 | 60  | 60  | ACTINOLITE                  | 7-0336   |
| 41.88            | 66.78 | 32.71 | 60.95  | 47.40  | 49.35  | 100                | 63  | 40 | 30 | 25  | 25  | MARCASITE                   | 3-0799   |
| 41.91            | 72.77 | 47.12 | 51.94  | 60.74  | 36.08  | 84                 | 100 | 66 | 52 | 40  | 36  | PYRITE SYN                  | 6-0710   |



| TWO-THETA (IRON) |       |       |        |       |        | RELATIVE INTENSITY |     |     |     |    |    | MINERAL NAME            | FILE NO. |
|------------------|-------|-------|--------|-------|--------|--------------------|-----|-----|-----|----|----|-------------------------|----------|
| 41.97            | 13.28 | 36.16 | 34.49  | 61.59 | 40.40  | 90                 | 100 | 100 | 75  | 50 | 45 | TREMOLITE               | 13-0437  |
| 42.00            | 7.44  | 14.89 | 40.60  | 70.82 | 30.67  | 50                 | 100 | 50  | 40  | 40 | 30 | SANTAFITE               | 11-0169  |
| 42.00            | 23.15 | 28.00 | 23.15  | 39.70 | 46.53  | 53                 | 100 | 47  | 47  | 47 | 47 | ORPIMENT                | 1-0273   |
| 42.00            | 39.46 | 73.70 | 55.97  | 31.09 | 49.02  | 100                | 100 | 75  | 65  | 60 | 60 | ZOISITE                 | 11-0665  |
| 42.01            | 40.48 | 40.90 | 46.73  | 43.33 | 63.65  | 60                 | 100 | 55  | 40  | 30 | 30 | FLUORAPATITE SYN        | 15-0876  |
| 42.04            | 43.13 | 37.43 | 42.66  | 53.03 | 29.46  | 100                | 70  | 65  | 50  | 40 | 30 | SPURRITE                | 13-0496  |
| 42.05            | 36.17 | 42.54 | 13.81  | 17.58 | 27.54  | 100                | 100 | 100 | 80  | 80 | 80 | HARMOTOME               | 13-0494  |
| 42.05            | 36.53 | 33.31 | 34.24  | 43.92 | 44.32  | 100                | 95  | 90  | 70  | 70 | 70 | HORNBLLENDE             | 9-0434   |
| 42.05            | 60.95 | 76.77 | 77.35  | 91.78 | 106.36 | 100                | 90  | 70  | 70  | 60 | 50 | PEROVSKITE              | 8-0091   |
| 42.05            | 60.98 | 76.59 | 77.12  | 41.73 | 42.22  | 100                | 100 | 100 | 100 | 80 | 80 | PEROVSKITE SYN          | 9-0365   |
| 42.11            | 37.48 | 73.93 | 46.33  | 59.37 | 70.76  | 100                | 60  | 60  | 45  | 25 | 25 | ANDRADITE SYN           | 10-0288  |
| 42.16            | 37.52 | 48.20 | 31.59  | 47.60 | 79.48  | 100                | 100 | 80  | 60  | 60 | 60 | STAUROLITE              | 15-0397  |
| 42.16            | 39.40 | 27.82 | 13.76  | 57.34 | 74.46  | 100                | 65  | 50  | 40  | 35 | 35 | ZOISITE SYN             | 13-0562  |
| 42.18            | 34.65 | 41.84 | 34.01  | 35.44 | 59.18  | 45                 | 100 | 40  | 35  | 25 | 25 | BISMITE                 | 14-0699  |
| 42.18            | 36.49 | 61.26 | 73.37  | 77.87 | 93.39  | 50                 | 100 | 50  | 40  | 20 | 20 | URANINITE               | 13-0225  |
| 42.22            | 26.60 | 46.79 | 68.60  | 52.76 | 76.59  | 80                 | 100 | 70  | 50  | 40 | 30 | GOETHITE                | 8-0097   |
| 42.22            | 26.80 | 46.79 | 68.56  | 22.48 | 33.51  | 70                 | 100 | 80  | 70  | 60 | 60 | GOETHITE                | 3-0249   |
| 42.22            | 69.94 | 45.40 | 63.61  | 81.49 | 83.70  | 100                | 60  | 50  | 40  | 35 | 35 | HEMATITE                | 13-0534  |
| 42.25            | 40.97 | 33.08 | 43.62  | 60.22 | 63.76  | 70                 | 100 | 70  | 70  | 70 | 70 | APATITE SYN (CARBONATE) | 13-0001  |
| 42.29            | 41.40 | 66.44 | 29.22  | 28.72 | 62.38  | 45                 | 100 | 50  | 35  | 30 | 30 | BOURNONITE              | 12-0094  |
| 42.33            | 26.58 | 20.83 | 18.60  | 40.73 | 42.67  | 25                 | 100 | 25  | 20  | 20 | 20 | EPSOMITE                | 8-0467   |
| 42.33            | 37.62 | 74.45 | 46.53  | 48.63 | 71.34  | 100                | 70  | 60  | 55  | 25 | 25 | UVAROVITE               | 11-0696  |
| 42.33            | 45.18 | 28.74 | 17.44  | 20.80 | 35.32  | 50                 | 100 | 85  | 40  | 40 | 40 | BROCHANTITE             | 13-0398  |
| 42.35            | 13.77 | 26.58 | 72.33  | 27.87 | 39.86  | 90                 | 100 | 100 | 90  | 60 | 50 | ZUNYITE                 | 14-0698  |
| 42.37            | 39.59 | 38.20 | 16.89  | 18.90 | 24.15  | 80                 | 100 | 80  | 70  | 70 | 70 | THOMSONITE              | 9-0490   |
| 42.37            | 44.65 | 84.54 | 36.42  | 72.45 | 40.63  | 90                 | 100 | 100 | 80  | 80 | 70 | HORNBLLENDE             | 11-0493  |
| 42.45            | 30.86 | 43.78 | 35.33  | 38.48 | 26.73  | 100                | 80  | 60  | 40  | 40 | 30 | MONTICELLITE SYN        | 11-0129  |
| 42.45            | 31.66 | 23.69 | 63.76  | 39.86 | 45.28  | 75                 | 100 | 85  | 65  | 45 | 30 | THORITE SYN             | 11-0419  |
| 42.51            | 46.94 | 39.70 | 51.69  | 77.28 | 84.47  | 100                | 95  | 35  | 30  | 30 | 30 | CREONERITE              | 14-0623  |
| 42.54            | 9.04  | 45.79 | 24.86  | 26.04 | 41.31  | 60                 | 100 | 60  | 35  | 35 | 35 | SEPIOLITE               | 14-0001  |
| 42.54            | 36.17 | 42.05 | 13.81  | 17.58 | 27.54  | 100                | 100 | 100 | 80  | 80 | 80 | HARMOTOME               | 13-0494  |
| 42.54            | 38.20 | 32.14 | 72.92  | 24.20 | 43.75  | 80                 | 100 | 80  | 60  | 50 | 40 | ALLANITE (METAMICT)     | 9-0474   |
| 42.54            | 55.22 | 37.93 | 68.56  | 93.49 | 60.60  | 90                 | 100 | 90  | 90  | 80 | 60 | TROILITE (PYRRHO.) SYN  | 4-0832   |
| 42.62            | 30.89 | 44.00 | 26.73  | 38.55 | 44.78  | 100                | 40  | 40  | 35  | 35 | 30 | MONTICELLITE            | 11-0353  |
| 42.67            | 21.05 | 72.85 | 49.75  | 54.60 | 34.65  | 100                | 100 | 100 | 90  | 90 | 80 | MURDOCHITE              | 7-0028   |
| 42.67            | 36.01 | 17.89 | 40.45  | 46.14 | 49.08  | 80                 | 100 | 80  | 70  | 70 | 70 | GLAUBERITE              | 2-0556   |
| 42.67            | 36.65 | 11.24 | 35.09  | 46.53 | 22.68  | 100                | 80  | 60  | 60  | 60 | 40 | TRONA                   | 11-0643  |
| 42.67            | 61.26 | 78.46 | 62.33  | 39.86 | 41.35  | 100                | 70  | 70  | 60  | 50 | 50 | MERWINITE               | 4-0728   |
| 42.71            | 11.00 | 33.41 | 46.58  | 52.76 | 57.93  | 80                 | 100 | 100 | 80  | 80 | 80 | BIOTITE                 | 2-0045   |
| 42.71            | 46.98 | 64.31 | 72.71  | 91.87 | 30.78  | 90                 | 100 | 80  | 40  | 40 | 30 | ARSENOPYRITE            | 11-0154  |
| 42.71            | 55.22 | 68.60 | 37.93  | 93.40 | 119.91 | 60                 | 100 | 50  | 40  | 40 | 40 | TROILITE                | 11-0151  |
| 42.71            | 59.21 | 64.67 | 129.51 | 93.67 | 139.35 | 100                | 90  | 80  | 40  | 30 | 30 | NICCOLITE               | 9-0001   |
| 42.85            | 31.74 | 26.83 | 43.37  | 46.53 | 31.00  | 75                 | 100 | 80  | 70  | 60 | 50 | ZINKOSITE SYN           | 8-0491   |
| 42.85            | 36.01 | 27.72 | 37.75  | 47.57 | 41.35  | 30                 | 100 | 30  | 16  | 16 | 14 | LANGBEINITE             | 17-0740  |
| 42.85            | 39.70 | 47.15 | 61.60  | 34.88 | 36.14  | 50                 | 100 | 50  | 50  | 40 | 20 | PYROSTILPNITE           | 8-0129   |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |    |     | MINERAL NAME           | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|----|-----|------------------------|----------|
| 42.85            | 75.53 | 38.16  | 71.83  | 60.54  | 53.24  | 100                | 90  | 80  | 80  | 70 | 60  | GROSSULARITE           | 3-0826   |
| 42.87            | 11.34 | 79.18  | 47.60  | 70.42  | 95.37  | 60                 | 100 | 80  | 60  | 50 | 50  | GARNIERITE             | 2-0060   |
| 42.87            | 23.89 | 31.66  | 64.11  | 39.88  | 40.18  | 60                 | 100 | 100 | 30  | 20 | 20  | THORITE                | 11-0172  |
| 42.87            | 56.09 | 38.07  | 69.00  | 94.42  | 121.55 | 33                 | 100 | 33  | 33  | 13 | 13  | TROILITE (PYRRHO.) SYN | 1-1247   |
| 42.87            | 56.09 | 38.07  | 69.00  | 94.42  | 121.55 | 33                 | 100 | 33  | 33  | 13 | 13  | PYRRHOTITE SYN         | 1-1247   |
| 42.98            | 33.60 | 66.58  | 70.67  | 48.27  | 84.63  | 81                 | 100 | 63  | 63  | 24 | 17  | CASSITERITE SYN        | 5-0467   |
| 43.00            | 23.96 | 32.39  | 65.04  | 40.73  | 52.71  | 70                 | 100 | 100 | 70  | 40 | 40  | COFFINITE              | 8-0304   |
| 43.00            | 32.30 | 24.07  | 65.04  | 40.60  | 63.08  | 95                 | 100 | 95  | 70  | 45 | 35  | COFFINITE SYN          | 11-0420  |
| 43.06            | 33.11 | 50.28  | 69.10  | 72.62  | 116.52 | 65                 | 100 | 50  | 40  | 40 | 40  | MANGANITE              | 8-0099   |
| 43.13            | 42.04 | 37.43  | 42.66  | 53.03  | 29.46  | 70                 | 100 | 65  | 50  | 40 | 30  | SPURRITE               | 13-0496  |
| 43.18            | 23.20 | 19.03  | 38.70  | 30.42  | 68.94  | 100                | 100 | 90  | 90  | 70 | 70  | LIBETHENITE            | 8-0107   |
| 43.18            | 23.20 | 38.86  | 19.21  | 30.24  | 68.94  | 100                | 100 | 50  | 40  | 28 | 20  | LIBETHENITE SYN        | 1-0274   |
| 43.18            | 39.99 | 32.20  | 49.31  | 27.80  | 62.70  | 100                | 95  | 80  | 45  | 35 | 35  | WILLEMITE              | 8-0492   |
| 43.22            | 21.90 | 36.53  | 70.90  | 78.56  | 45.40  | 100                | 80  | 20  | 20  | 18 | 15  | SPINEL (MN)            | 4-0732   |
| 43.22            | 30.19 | 17.28  | 39.31  | 53.55  | 65.52  | 50                 | 100 | 30  | 30  | 30 | 30  | HAUYNITE               | 2-0331   |
| 43.29            | 77.28 | 41.58  | 23.06  | 30.67  | 46.68  | 100                | 80  | 70  | 60  | 60 | 60  | LAWSONITE              | 13-0533  |
| 43.33            | 10.98 | 33.49  | 57.40  | 78.07  | 52.76  | 100                | 100 | 100 | 65  | 50 | 45  | PHLOGOPITE             | 10-0493  |
| 43.37            | 16.10 | 49.55  | 75.53  | 43.88  | 32.58  | 80                 | 100 | 80  | 80  | 70 | 60  | GERHARDTITE            | 14-0687  |
| 43.39            | 75.96 | 38.75  | 47.81  | 72.82  | ****   | 100                | 100 | 90  | 90  | 90 | *** | GARNET (FE,MN)         | 10-0367  |
| 43.42            | 10.90 | 33.34  | 46.90  | 78.68  | 24.47  | 60                 | 100 | 100 | 30  | 30 | 25  | PHLOGOPITE (BORON SYN) | 14-0466  |
| 43.49            | 11.19 | 33.63  | 57.59  | 33.21  | 45.35  | 30                 | 100 | 100 | 30  | 20 | 15  | PHLOGOPITE (1M)        | 10-0495  |
| 43.52            | 16.41 | 30.49  | 39.14  | 41.69  | 34.65  | 80                 | 100 | 70  | 40  | 40 | 30  | AURICHALCITE           | 17-0743  |
| 43.52            | 24.72 | 44.61  | 80.37  | 7.29   | 69.40  | 100                | 100 | 100 | 100 | 60 | 60  | BEIDELLITE             | 3-0178   |
| 43.52            | 33.78 | 55.74  | 32.48  | 58.20  | 36.75  | 100                | 80  | 80  | 70  | 70 | 60  | STROMEYERITE           | 9-0499   |
| 43.52            | 37.37 | 62.70  | 75.53  | 107.51 | 111.62 | 70                 | 100 | 70  | 70  | 50 | 40  | STETEFELDITE           | 8-0012   |
| 43.52            | 49.08 | 43.70  | 44.97  | 72.99  | 63.08  | 100                | 65  | 60  | 60  | 35 | 30  | LOELLINGITE SYN        | 11-0699  |
| 43.52            | 63.08 | 79.72  | 111.62 | 129.51 | 95.25  | 100                | 50  | 20  | 20  | 16 | 8   | ALABANDITE             | 6-0518   |
| 43.52            | 63.45 | 80.37  | 111.89 | 130.39 | 37.44  | 100                | 50  | 20  | 20  | 16 | 14  | ALABANDITE             | 6-0518   |
| 43.57            | 5.91  | 78.19  | 12.22  | 24.58  | 31.13  | 60                 | 100 | 70  | 50  | 50 | 50  | SAPONITE               | 6-0002   |
| 43.57            | 11.20 | 33.82  | 22.85  | 24.58  | 31.49  | 80                 | 100 | 100 | 60  | 60 | 60  | LEPIDOLITE             | 10-0483  |
| 43.57            | 63.49 | 73.65  | 52.24  | 70.37  | 86.79  | 100                | 90  | 90  | 80  | 70 | 70  | SKUTTERUDITE           | 10-0497  |
| 43.60            | 46.73 | 47.93  | 44.01  | 46.42  | 36.62  | 100                | 80  | 75  | 70  | 70 | 60  | ACANTHITE              | 14-0072  |
| 43.61            | 30.47 | 17.41  | 39.59  | 54.18  | 66.32  | 75                 | 100 | 40  | 40  | 40 | 20  | NOSEAN SYN             | 15-0470  |
| 43.70            | 43.52 | 49.08  | 44.97  | 72.99  | 63.08  | 60                 | 100 | 65  | 60  | 35 | 30  | LOELLINGITE SYN        | 11-0699  |
| 43.70            | 45.93 | 40.14  | 72.85  | 81.67  | 60.88  | 56                 | 100 | 71  | 40  | 35 | 29  | ZINCITE SYN            | 5-0664   |
| 43.75            | 15.30 | 54.49  | 27.59  | 22.85  | 41.87  | 200                | 100 | 80  | 70  | 60 | 55  | DIOPTASE               | 7-0172   |
| 43.75            | 33.62 | 58.25  | 11.11  | 22.20  | 30.95  | 100                | 100 | 100 | 80  | 80 | 80  | HYDROMUSCOVITE         | 2-0462   |
| 43.75            | 76.95 | 73.76  | 38.88  | 61.80  | 70.37  | 100                | 40  | 30  | 25  | 20 | 20  | SPESSARTITE SYN        | 10-0354  |
| 43.75            | 77.35 | 127.51 | 73.98  | 99.41  | 132.09 | 100                | 80  | 70  | 60  | 60 | 60  | SPESSARTITE            | 2-0992   |
| 43.78            | 42.45 | 30.86  | 35.33  | 38.48  | 26.73  | 60                 | 100 | 80  | 40  | 40 | 30  | MONTICELLITE SYN       | 11-0129  |
| 43.83            | 34.87 | 37.82  | 56.16  | 72.26  | 80.84  | 90                 | 100 | 90  | 40  | 40 | 40  | SPHENE                 | 11-0142  |
| 43.83            | 41.17 | 73.32  | 46.50  | 38.35  | 54.31  | 80                 | 100 | 60  | 50  | 40 | 30  | VESUVIANITE            | 11-0145  |
| 43.87            | 36.53 | 54.08  | 26.28  | 29.86  | 37.42  | 30                 | 100 | 25  | 15  | 12 | 12  | KALIOPHILITE           | 11-0313  |
| 43.87            | 41.22 | 73.39  | 46.54  | 38.39  | 54.31  | 80                 | 100 | 60  | 50  | 40 | 30  | IDOCRASE               | 11-0145  |
| 43.88            | 30.49 | 22.14  | 18.53  | 44.97  | 38.32  | 100                | 100 | 80  | 70  | 60 | 50  | ROSASITE               | 17-0216  |

| TWO-THETA (IRON) |       |        |       |        |        | RELATIVE INTENSITY |     |     |     |    |     | MINERAL NAME             | FILE NO. |
|------------------|-------|--------|-------|--------|--------|--------------------|-----|-----|-----|----|-----|--------------------------|----------|
| 43.88            | 52.42 | 63.72  | 74.04 | 70.67  | *****  | 100                | 35  | 35  | 30  | 20 | *** | SKUTTERUDITE SYN         | 10-0328  |
| 43.92            | 34.04 | 58.52  | 11.19 | 22.43  | 35.70  | 100                | 100 | 100 | 80  | 80 | 80  | LEPIDOLITE (120)         | 15-0062  |
| 43.97            | 11.00 | 24.70  | 33.82 | 47.70  | 79.74  | 100                | 100 | 80  | 60  | 60 | 60  | GLAUCONITE               | 9-0439   |
| 44.00            | 42.62 | 30.89  | 26.73 | 38.55  | 44.78  | 40                 | 100 | 40  | 35  | 35 | 30  | MONTICELLITE             | 11-0353  |
| 44.01            | 44.24 | 48.42  | 62.66 | 47.70  | 62.89  | 100                | 95  | 90  | 50  | 40 | 40  | SAFFLORITE               | 11-0140  |
| 44.06            | 24.67 | 30.85  | 36.49 | 42.33  | 33.88  | 100                | 85  | 80  | 80  | 75 | 70  | CELADONITE               | 17-0521  |
| 44.06            | 36.62 | 39.14  | 54.05 | 52.45  | 63.85  | 90                 | 100 | 60  | 50  | 40 | 40  | STEPHANITE               | 11-0108  |
| 44.10            | 39.74 | 33.82  | 11.09 | 22.22  | 24.77  | 80                 | 100 | 80  | 60  | 60 | 60  | MUSCOVITE (LI)           | 10-0482  |
| 44.10            | 77.96 | 129.73 | 39.31 | 74.52  | 100.48 | 100                | 100 | 70  | 60  | 60 | 60  | PYROPE                   | 2-1008   |
| 44.15            | 58.29 | 11.11  | 22.34 | 24.86  | 31.04  | 100                | 80  | 60  | 50  | 50 | 50  | LEPIDOLITE (2M2)         | 14-0011  |
| 44.18            | 28.10 | 38.19  | 26.54 | 32.33  | 56.70  | 100                | 85  | 85  | 65  | 60 | 45  | TOURMALINE               | 14-0076  |
| 44.18            | 33.92 | 11.11  | 22.43 | 25.03  | 29.14  | 75                 | 100 | 50  | 50  | 50 | 50  | LEPIDOLITE (3M)          | 10-0484  |
| 44.24            | 22.98 | 31.18  | 42.33 | 18.53  | 20.65  | 85                 | 100 | 75  | 75  | 25 | 25  | ANTLERITE                | 7-0407   |
| 44.24            | 40.75 | 34.98  | 44.97 | 33.68  | 35.44  | 95                 | 100 | 90  | 90  | 80 | 70  | PYRARGYRITE SYN          | 14-0280  |
| 44.24            | 44.01 | 48.42  | 62.66 | 47.70  | 62.89  | 95                 | 100 | 90  | 50  | 40 | 40  | SAFFLORITE               | 11-0140  |
| 44.24            | 51.69 | 76.09  | 92.46 | 155.70 | *****  | 60                 | 100 | 60  | 20  | 18 | *** | MANGANOSITE SYN          | 7-0230   |
| 44.28            | 25.09 | 33.51  | 11.23 | 80.44  | 22.80  | 100                | 100 | 100 | 80  | 80 | 60  | ILLITE                   | 9-0334   |
| 44.28            | 39.88 | 22.99  | 28.32 | 19.57  | 38.07  | 100                | 53  | 47  | 40  | 20 | 20  | BORAX                    | 1-1097   |
| 44.30            | 77.96 | 39.41  | 74.57 | 27.74  | 62.54  | 100                | 50  | 40  | 40  | 30 | 30  | ALMANDITE                | 9-0427   |
| 44.36            | 33.92 | 11.18  | 58.16 | 37.84  | 22.48  | 54                 | 100 | 95  | 46  | 34 | 31  | MUSCOVITE                | 6-0263   |
| 44.36            | 40.01 | 45.57  | 31.60 | 49.74  | 66.02  | 50                 | 100 | 70  | 30  | 30 | 30  | FAYALITE                 | 7-0164   |
| 44.43            | 11.10 | 33.60  | 57.63 | 25.09  | 22.25  | 90                 | 100 | 100 | 75  | 65 | 55  | MUSCOVITE (SYN 2M)       | 7-0032   |
| 44.43            | 38.03 | 44.97  | 54.05 | 66.71  | 72.85  | 30                 | 100 | 50  | 30  | 30 | 30  | HEDENBERGITE             | 16-0701  |
| 44.43            | 39.52 | 78.50  | 46.72 | 75.11  | 51.07  | 100                | 60  | 50  | 40  | 30 | 25  | PYROPE SYN               | 15-0742  |
| 44.43            | 40.60 | 31.10  | 25.41 | 27.72  | 51.92  | 80                 | 100 | 80  | 60  | 50 | 40  | PHOSGENITE               | 12-0218  |
| 44.47            | 9.19  | 26.00  | 35.29 | 29.94  | 33.45  | 55                 | 100 | 40  | 35  | 30 | 30  | SEPIOLITE                | 13-0595  |
| 44.47            | 9.34  | 25.14  | 81.09 | 38.07  | 69.94  | 80                 | 100 | 90  | 80  | 60 | 60  | MONTMORILLONITE          | 2-0037   |
| 44.47            | 11.14 | 24.98  | 34.04 | 80.44  | 31.04  | 100                | 80  | 80  | 80  | 80 | 60  | MUSCOVITE (BA)           | 10-0490  |
| 44.47            | 24.86 | 10.69  | 30.35 | 80.44  | 21.60  | 80                 | 100 | 80  | 60  | 60 | 40  | MUSCOVITE (AMMONIUM) SYN | 13-0573  |
| 44.47            | 32.61 | 66.44  | 24.58 | 68.32  | 46.79  | 50                 | 100 | 50  | 25  | 18 | 13  | XENOTIME                 | 11-0254  |
| 44.61            | 18.90 | 21.91  | 38.57 | 34.88  | 32.58  | 100                | 90  | 90  | 90  | 85 | 75  | DUMORTIERITE             | 7-0071   |
| 44.61            | 24.72 | 43.52  | 80.37 | 7.29   | 69.40  | 100                | 100 | 100 | 100 | 60 | 60  | BEIDELLITE               | 3-0178   |
| 44.61            | 27.52 | 71.31  | 73.37 | 82.36  | 90.75  | 100                | 100 | 80  | 80  | 80 | 80  | RAMSDELLITE              | 7-0222   |
| 44.61            | 27.57 | 49.31  | 24.07 | 56.03  | 73.37  | 60                 | 100 | 65  | 50  | 13 | 11  | RAMSDELLITE              | 11-0055  |
| 44.61            | 33.27 | 23.15  | 36.75 | 56.34  | 70.82  | 40                 | 100 | 40  | 20  | 17 | 17  | KIESERITE SYN            | 1-0638   |
| 44.61            | 36.60 | 32.30  | 66.28 | 34.32  | 48.22  | 100                | 100 | 90  | 70  | 60 | 40  | PREHNITE                 | 7-0333   |
| 44.61            | 45.96 | 39.86  | 62.33 | 69.40  | 66.28  | 100                | 90  | 65  | 55  | 30 | 25  | RAMMELSBERGITE SYN       | 11-0014  |
| 44.61            | 55.37 | 74.46  | 32.33 | 89.66  | 67.66  | 90                 | 100 | 80  | 75  | 50 | 45  | CORUNDUM (ALPHA ALUMINA) | 10-0173  |
| 44.61            | 55.74 | 33.58  | 58.20 | 113.07 | 40.30  | 40                 | 100 | 60  | 40  | 30 | 20  | RICKARDITE               | 6-0661   |
| 44.61            | 80.37 | 37.78  | 72.85 | 123.23 | 161.92 | 100                | 80  | 70  | 70  | 50 | 50  | FRANKLINITE              | 10-0467  |
| 44.65            | 84.54 | 42.37  | 36.42 | 72.45  | 40.63  | 100                | 100 | 90  | 80  | 80 | 70  | HORNBLLENDE              | 11-0493  |
| 44.79            | 15.66 | 31.28  | 65.04 | 58.52  | 48.42  | 70                 | 100 | 80  | 70  | 60 | 50  | SPANGOLITE               | 5-0142   |
| 44.79            | 36.37 | 40.58  | 48.87 | 23.71  | 32.38  | 100                | 100 | 100 | 70  | 50 | 50  | GADOLINITE               | 8-0190   |
| 44.84            | 37.80 | 17.14  | 25.26 | 38.88  | 52.24  | 60                 | 100 | 40  | 40  | 40 | 20  | ACMITE (AEGIRINE)        | 3-0621   |
| 44.84            | 41.40 | 68.56  | 62.77 | 80.44  | 82.44  | 85                 | 100 | 100 | 85  | 85 | 85  | ILMENITE                 | 3-0781   |

| TWO-THETA (IRON) |       |       |        |       |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME            | FILE NO. |
|------------------|-------|-------|--------|-------|--------|--------------------|-----|-----|-----|-----|-----|-------------------------|----------|
| 44.91            | 25.21 | 11.47 | 46.98  | 81.36 | 38.74  | 90                 | 100 | 80  | 80  | 80  | 70  | PARAGONITE              | 12-0165  |
| 44.97            | 28.66 | 17.12 | 20.65  | 42.18 | 35.21  | 67                 | 100 | 67  | 58  | 50  | 42  | BROCHANTITE             | 3-0282   |
| 44.97            | 37.52 | 32.38 | 67.14  | 26.27 | 79.72  | 100                | 90  | 80  | 80  | 70  | 70  | LITHIOPHILITE           | 13-0336  |
| 44.97            | 38.03 | 44.43 | 54.05  | 66.71 | 72.85  | 50                 | 100 | 30  | 30  | 30  | 30  | HEDENBERGITE            | 16-0701  |
| 44.97            | 45.18 | 49.31 | 49.55  | 62.33 | 80.37  | 49                 | 100 | 96  | 30  | 25  | 20  | TENORITE                | 5-0661   |
| 45.02            | 15.64 | 31.66 | 53.55  | 76.59 | 65.98  | 100                | 100 | 100 | 70  | 70  | 60  | CHAMOSITE FE(II)        | 7-0339   |
| 45.02            | 26.99 | 72.35 | 83.12  | 55.80 | 99.83  | 80                 | 100 | 60  | 50  | 30  | 30  | CRISTOBALITE BETA HIGH  | 4-0359   |
| 45.02            | 35.24 | 27.54 | 29.78  | 30.86 | 37.67  | 27                 | 100 | 40  | 13  | 11  | 11  | LABRADORITE             | 3-0499   |
| 45.02            | 37.67 | 73.44 | 39.02  | 86.02 | 34.91  | 100                | 80  | 60  | 40  | 40  | 20  | DIOPSIDE SYN            | 3-0860   |
| 45.02            | 73.76 | 81.56 | 38.12  | 55.05 | 68.91  | 100                | 85  | 85  | 70  | 70  | 60  | MAGNETITE               | 11-0614  |
| 45.02            | 81.76 | 55.22 | 73.98  | 38.07 | 47.40  | 100                | 60  | 50  | 40  | 30  | 25  | SPINEL (MN,NI)          | 1-1110   |
| 45.06            | 37.79 | 39.13 | 45.26  | 34.91 | 38.32  | 40                 | 100 | 30  | 30  | 25  | 25  | DIOPSIDE                | 11-0654  |
| 45.07            | 38.16 | 81.62 | 73.80  | 55.05 | 125.21 | 100                | 40  | 35  | 30  | 25  | 12  | MAGNESIOFERRITE         | 17-0464  |
| 45.18            | 25.50 | 35.20 | 48.82  | 11.58 | 44.65  | 100                | 90  | 80  | 80  | 70  | 70  | PARAGONITE              | 12-0187  |
| 45.18            | 25.74 | 81.49 | 35.12  | 11.57 | 47.64  | 90                 | 100 | 90  | 80  | 70  | 60  | PARAGONITE              | 9-0428   |
| 45.18            | 28.74 | 42.33 | 17.44  | 20.80 | 35.32  | 100                | 85  | 50  | 40  | 40  | 40  | BROCHANTITE             | 13-0398  |
| 45.18            | 36.14 | 30.67 | 48.42  | 52.45 | 55.45  | 75                 | 100 | 80  | 70  | 60  | 50  | PHENAKITE               | 9-0431   |
| 45.18            | 38.29 | 73.87 | 29.91  | 55.16 | 69.40  | 100                | 100 | 100 | 100 | 100 | 100 | MAGHEMITE SYN           | 15-0615  |
| 45.18            | 49.31 | 44.97 | 49.55  | 62.33 | 80.37  | 100                | 96  | 49  | 30  | 25  | 20  | TENORITE                | 5-0661   |
| 45.22            | 15.25 | 30.95 | 47.19  | 16.03 | 32.03  | 70                 | 400 | 300 | 38  | 24  | 24  | ANTIGORITE (SERPENTINE) | 7-0417   |
| 45.22            | 15.55 | 31.57 | 24.20  | 42.37 | 77.24  | 60                 | 100 | 100 | 40  | 20  | 20  | CHAMOSITE               | 10-0404  |
| 45.22            | 15.80 | 31.86 | 7.88   | 23.74 | 53.55  | 50                 | 100 | 80  | 40  | 40  | 40  | CHLORITE (THURINGITE)   | 13-0029  |
| 45.22            | 15.80 | 31.94 | 77.06  | 53.83 | 42.37  | 90                 | 100 | 100 | 70  | 60  | 40  | CHAMOSITE               | 7-0315   |
| 45.22            | 37.67 | 73.44 | 129.73 | 86.02 | 94.42  | 100                | 100 | 100 | 100 | 90  | 80  | DIOPSIDE                | 2-0656   |
| 45.22            | 74.52 | 83.12 | 55.80  | 38.34 | 123.44 | 100                | 90  | 90  | 70  | 60  | 60  | CHROMITE                | 3-0873   |
| 45.26            | 34.11 | 25.23 | 68.91  | 55.92 | 71.85  | 45                 | 100 | 45  | 40  | 20  | 14  | ZIRCON                  | 6-0266   |
| 45.28            | 31.88 | 21.69 | 30.67  | 49.00 | 50.12  | 60                 | 100 | 70  | 40  | 30  | 30  | AZURITE                 | 11-0136  |
| 45.31            | 40.93 | 28.82 | 46.36  | 21.85 | 67.17  | 80                 | 100 | 60  | 60  | 50  | 50  | FORSTERITE (OLIVINE)    | 7-0075   |
| 45.31            | 40.93 | 46.36 | 67.17  | 21.77 | 28.85  | 60                 | 100 | 60  | 50  | 40  | 40  | CHRYSOLITE (OLIVINE)    | 7-0156   |
| 45.32            | 40.94 | 46.38 | 28.89  | 21.90 | 46.59  | 100                | 100 | 80  | 60  | 50  | 40  | FORSTERITE (OLIVINE)    | 7-0079   |
| 45.35            | 40.82 | 62.66 | 23.24  | 51.55 | 64.39  | 65                 | 100 | 95  | 60  | 55  | 45  | MILLERITE               | 12-0041  |
| 45.35            | 46.42 | 28.91 | 67.31  | 50.56 | 40.97  | 73                 | 100 | 69  | 60  | 59  | 53  | FORSTERITE SYN          | 4-0768   |
| 45.36            | 23.22 | 55.42 | 82.23  | 74.35 | 38.41  | 100                | 65  | 55  | 55  | 40  | 13  | PICROCHROMITE SYN       | 10-0351  |
| 45.36            | 36.03 | 39.55 | 30.42  | 42.51 | 65.04  | 90                 | 100 | 90  | 80  | 80  | 80  | EMMONSITE               | 7-0404   |
| 45.36            | 38.41 | 82.23 | 55.39  | 74.89 | 69.47  | 100                | 50  | 50  | 30  | 30  | 16  | SPINEL (LI) SYN         | 13-0207  |
| 45.36            | 46.42 | 28.89 | 40.97  | 21.90 | 50.54  | 70                 | 100 | 70  | 60  | 50  | 40  | FORSTERITE (OLIVINE)    | 7-0074   |
| 45.40            | 7.93  | 25.37 | 81.09  | 36.53 | 71.90  | 80                 | 100 | 100 | 80  | 60  | 60  | MONTMORILLONITE SYN     | 3-0016   |
| 45.40            | 15.30 | 31.22 | 53.03  | 77.12 | 78.38  | 100                | 90  | 80  | 50  | 50  | 40  | ANTIGORITE              | 10-0402  |
| 45.40            | 35.24 | 25.43 | 33.21  | 47.19 | 75.06  | 100                | 90  | 80  | 80  | 80  | 80  | MARGARITE               | 12-0188  |
| 45.40            | 42.22 | 69.94 | 63.61  | 81.49 | 83.70  | 50                 | 100 | 60  | 40  | 35  | 35  | HEMATITE                | 13-0534  |
| 45.40            | 60.95 | 73.98 | 81.09  | 23.14 | 38.34  | 100                | 75  | 75  | 75  | 50  | 50  | CHROMITE SYN            | 4-0759   |
| 45.40            | 81.76 | 35.47 | 25.50  | 11.71 | 47.40  | 90                 | 100 | 70  | 60  | 50  | 50  | PARAGONITE SYN          | 10-0420  |
| 45.54            | 15.36 | 31.04 | 53.60  | 65.60 | 24.26  | 100                | 60  | 60  | 35  | 25  | 20  | SERPENTINE SYN          | 11-0386  |
| 45.55            | 15.18 | 30.70 | 78.25  | 49.02 | 59.14  | 100                | 100 | 100 | 80  | 70  | 70  | SERPENTINE              | 9-0444   |
| 45.57            | 40.01 | 44.36 | 31.60  | 49.74 | 66.02  | 70                 | 100 | 50  | 30  | 30  | 30  | FAYALITE                | 7-0      |



| TWO-THETA (IRON) |       |       |        |        |        | RELATIVE INTENSITY |     |     |    |     |     | MINERAL NAME          | FILE NO. |
|------------------|-------|-------|--------|--------|--------|--------------------|-----|-----|----|-----|-----|-----------------------|----------|
| 45.59            | 40.05 | 31.57 | 44.37  | 47.44  | 49.70  | 80                 | 100 | 75  | 60 | 35  | 35  | FAYALITE SYN          | 11-0262  |
| 45.59            | 40.18 | 66.10 | 31.66  | 44.28  | 79.30  | 100                | 100 | 100 | 80 | 80  | 60  | FAYALITE              | 9-0484   |
| 45.71            | 35.62 | 39.42 | 38.46  | 44.94  | 34.10  | 51                 | 100 | 87  | 44 | 43  | 35  | ENSTATITE             | 7-0216   |
| 45.75            | 15.70 | 31.63 | 78.38  | 59.98  | 24.32  | 80                 | 100 | 70  | 50 | 45  | 40  | SERPENTINE (AL)       | 13-0004  |
| 45.75            | 31.28 | 32.10 | 55.45  | 36.75  | 62.70  | 32                 | 100 | 43  | 27 | 24  | 21  | CERUSSITE             | 5-0417   |
| 45.75            | 40.73 | 70.35 | 50.47  | 58.83  | 34.98  | 50                 | 100 | 75  | 25 | 25  | 10  | BRAVOITE              | 2-0850   |
| 45.77            | 14.24 | 37.98 | 31.38  | 24.72  | 28.58  | 100                | 100 | 100 | 80 | 65  | 65  | APOPHYLLITE           | 7-0170   |
| 45.79            | 9.04  | 42.54 | 24.86  | 26.04  | 41.31  | 60                 | 100 | 60  | 35 | 35  | 35  | SEPIOLITE             | 14-0001  |
| 45.79            | 24.42 | 78.56 | 11.96  | 36.06  | 43.39  | 100                | 64  | 64  | 48 | 40  | 32  | TALC                  | 3-0881   |
| 45.79            | 40.18 | 31.77 | 44.65  | 65.94  | 79.18  | 100                | 95  | 75  | 70 | 70  | 70  | FAYALITE SYN          | 9-0307   |
| 45.81            | 34.74 | 70.08 | 52.55  | 73.24  | 90.84  | 41                 | 100 | 50  | 22 | 16  | 16  | RUTILE                | 4-0551   |
| 45.89            | 27.68 | 39.87 | 36.00  | 62.39  | 46.28  | 20                 | 100 | 13  | 11 | 7   | 5   | CRISTOBALITE LOW SYN  | 11-0695  |
| 45.93            | 38.30 | 23.48 | 30.02  | 30.80  | 68.73  | 60                 | 100 | 50  | 50 | 50  | 50  | WOLFRAMITE            | 11-0591  |
| 45.93            | 40.14 | 43.70 | 72.85  | 81.67  | 60.88  | 100                | 71  | 56  | 40 | 35  | 29  | ZINCITE SYN           | 5-0664   |
| 45.93            | 41.38 | 34.42 | 44.61  | 35.55  | 36.26  | 90                 | 100 | 80  | 80 | 70  | 70  | PROUSTITE SYN         | 11-0470  |
| 45.96            | 44.61 | 39.86 | 62.33  | 69.40  | 66.28  | 90                 | 100 | 65  | 55 | 30  | 25  | RAMMELSBERGITE SYN    | 11-0014  |
| 45.98            | 38.20 | 40.03 | 17.86  | 25.09  | 26.16  | 70                 | 100 | 100 | 60 | 60  | 60  | SPODUMENE (ALPHA) SYN | 9-0029   |
| 45.98            | 41.25 | 76.20 | 77.96  | 36.66  | 22.71  | 100                | 63  | 50  | 50 | 31  | 20  | HAUSMANNITE           | 1-1127   |
| 46.07            | 55.14 | 49.58 | 70.03  | 92.32  | 111.21 | 53                 | 100 | 40  | 28 | 25  | 23  | ZINC                  | 4-0831   |
| 46.08            | 39.67 | 80.90 | 67.21  | 117.01 | 85.35  | 50                 | 100 | 32  | 31 | 10  | 9   | LEAD SYN              | 4-0686   |
| 46.14            | 17.79 | 34.22 | 59.84  | 68.04  | 129.51 | 80                 | 100 | 90  | 70 | 40  | 40  | LEPIDOCROCITE         | 8-0098   |
| 46.14            | 38.03 | 40.45 | 49.75  | 63.85  | 48.82  | 60                 | 100 | 90  | 60 | 60  | 50  | PEARCEITE             | 8-0130   |
| 46.14            | 38.44 | 68.94 | 23.66  | 29.98  | 52.45  | 70                 | 100 | 80  | 60 | 60  | 60  | FERBERITE             | 10-0449  |
| 46.18            | 39.02 | 75.63 | 83.82  | 56.40  | 70.90  | 100                | 60  | 60  | 60 | 30  | 10  | GALAXITE              | 12-0431  |
| 46.28            | 53.96 | 79.81 | 97.65  | 37.42  | 103.56 | 100                | 37  | 27  | 17 | 9   | 4   | CUPRITE SYN           | 5-0667   |
| 46.34            | 32.89 | 61.23 | 50.22  | 33.88  | 62.70  | 70                 | 100 | 80  | 70 | 60  | 60  | BRANNERITE            | 8-0002   |
| 46.34            | 41.69 | 65.04 | 119.39 | 47.98  | 131.14 | 90                 | 100 | 100 | 90 | 80  | 80  | COBALTITE             | 16-0624  |
| 46.36            | 40.93 | 45.31 | 67.17  | 21.77  | 28.85  | 60                 | 100 | 60  | 50 | 40  | 40  | CHRYSLITE (OLIVINE)   | 7-0156   |
| 46.38            | 15.78 | 31.86 | 43.22  | 79.36  | 24.64  | 80                 | 100 | 100 | 70 | 70  | 60  | CHAMOSITE FE(III)     | 7-0329   |
| 46.38            | 40.94 | 45.32 | 28.89  | 21.90  | 46.59  | 80                 | 100 | 100 | 60 | 50  | 40  | FORSTERITE (OLIVINE)  | 7-0079   |
| 46.42            | 28.89 | 45.36 | 40.97  | 21.90  | 50.54  | 100                | 70  | 70  | 60 | 50  | 40  | FORSTERITE (OLIVINE)  | 7-0074   |
| 46.42            | 45.35 | 28.91 | 67.31  | 50.56  | 40.97  | 100                | 73  | 69  | 60 | 59  | 53  | FORSTERITE SYN        | 4-0768   |
| 46.53            | 22.01 | 12.49 | 41.53  | 57.88  | 60.88  | 70                 | 100 | 70  | 50 | 35  | 20  | ZARATITE              | 16-0164  |
| 46.58            | 76.66 | 84.99 | 39.45  | 57.01  | 23.79  | 100                | 90  | 90  | 70 | 70  | 50  | HERCYNITE             | 7-0068   |
| 46.73            | 39.55 | 85.20 | 77.06  | 71.94  | 103.32 | 100                | 90  | 50  | 40 | 30  | 30  | GAHNITE (FE)          | 12-0267  |
| 46.73            | 43.60 | 47.93 | 44.01  | 46.42  | 36.62  | 80                 | 100 | 75  | 70 | 70  | 60  | ACANTHITE             | 14-0072  |
| 46.73            | 57.88 | 32.48 | 68.04  | *****  | *****  | 100                | 85  | 70  | 50 | *** | *** | ARGENTITE             | 4-0774   |
| 46.79            | 26.60 | 42.22 | 68.60  | 52.76  | 76.59  | 70                 | 100 | 80  | 50 | 40  | 30  | GOETHITE              | 8-0097   |
| 46.79            | 26.80 | 42.22 | 68.56  | 22.48  | 33.51  | 80                 | 100 | 70  | 70 | 60  | 60  | GOETHITE              | 3-0249   |
| 46.79            | 85.27 | 39.45 | 57.01  | 76.77  | 71.90  | 100                | 100 | 80  | 80 | 80  | 60  | SPINEL SYN            | 2-0175   |
| 46.82            | 39.58 | 85.35 | 77.01  | 71.90  | 133.83 | 100                | 84  | 43  | 40 | 24  | 12  | GAHNITE SYN           | 5-0669   |
| 46.82            | 50.85 | 81.83 | 67.70  | 30.86  | 42.19  | 70                 | 100 | 70  | 65 | 50  | 50  | HUMITE                | 12-0755  |
| 46.86            | 57.28 | 85.35 | 77.06  | 39.63  | *****  | 100                | 58  | 58  | 45 | 40  | *** | SPINEL SYN            | 5-0672   |
| 46.94            | 42.51 | 39.70 | 51.69  | 77.28  | 84.47  | 95                 | 100 | 35  | 30 | 30  | 30  | CREDNERITE            | 14-0623  |
| 46.98            | 42.71 | 64.31 | 72.71  | 91.87  | 30.78  | 100                | 90  | 80  | 40 | 40  | 30  | ARSENOPYRITE          | 11-0154  |

| TWO-THETA (IRON) |       |        |       |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME          | FILE NO. |
|------------------|-------|--------|-------|--------|--------|--------------------|-----|-----|-----|-----|-----|-----------------------|----------|
| 47.12            | 72.77 | 41.91  | 51.94 | 60.74  | 36.08  | 66                 | 100 | 84  | 52  | 40  | 36  | PYRITE SYN            | 6-0710   |
| 47.15            | 39.70 | 42.85  | 61.60 | 34.88  | 36.14  | 50                 | 100 | 50  | 50  | 40  | 20  | PYROSTILPNITE         | 8-0129   |
| 47.15            | 49.99 | 89.89  | 43.52 | 66.28  | 79.72  | 40                 | 100 | 40  | 30  | 30  | 30  | DYSCRASITE            | 10-0452  |
| 47.19            | 36.79 | 25.26  | 44.47 | 11.71  | 81.09  | 72                 | 100 | 86  | 57  | 46  | 40  | PYROPHYLLITE          | 3-0574   |
| 47.19            | 40.03 | 38.75  | 76.20 | 26.22  | 36.42  | 90                 | 100 | 80  | 40  | 30  | 30  | JADEITE               | 9-0463   |
| 47.36            | 52.45 | 32.30  | 15.98 | 48.19  | 39.27  | 100                | 85  | 60  | 55  | 50  | 40  | PSILOMELANE           | 14-0627  |
| 47.40            | 33.11 | 70.42  | 43.22 | 66.36  | 45.02  | 70                 | 100 | 70  | 60  | 50  | 40  | MANGANITE SYN         | 8-0016   |
| 47.40            | 35.93 | 72.92  | 54.10 | 76.77  | 95.37  | 50                 | 100 | 50  | 25  | 25  | 20  | PYROLUSITE            | 12-0716  |
| 47.59            | 47.64 | 58.83  | 62.06 | 30.11  | 31.29  | 100                | 100 | 100 | 100 | 75  | 75  | CHALCOCLITE SYN       | 12-0227  |
| 47.60            | 16.14 | 36.06  | 22.80 | 53.83  | 77.96  | 100                | 100 | 90  | 70  | 40  | 30  | CRYPTOMELANE          | 12-0706  |
| 47.60            | 36.29 | 63.53  | 77.96 | 91.71  | 22.41  | 100                | 60  | 60  | 60  | 60  | 20  | CRYPTOMELANE          | 6-0547   |
| 47.60            | 62.39 | 58.94  | 69.71 | 33.21  | 98.57  | 70                 | 100 | 80  | 40  | 30  | 30  | CHALCOCLITE ALPHA LOW | 9-0328   |
| 47.63            | 36.29 | 71.70  | 73.61 | 23.09  | 64.31  | 100                | 80  | 80  | 70  | 50  | 50  | CRYPTOMELANE          | 4-0778   |
| 47.64            | 47.59 | 58.83  | 62.06 | 30.11  | 31.29  | 100                | 100 | 100 | 100 | 75  | 75  | CHALCOCLITE SYN       | 12-0227  |
| 47.70            | 39.02 | 72.66  | 42.42 | 62.43  | 43.87  | 70                 | 100 | 65  | 60  | 60  | 55  | EPIDOTE               | 9-0438   |
| 47.77            | 34.32 | 50.46  | 62.33 | 84.47  | 81.02  | 40                 | 100 | 41  | 23  | 16  | 13  | BISMUTH               | 5-0519   |
| 47.81            | 87.56 | 58.58  | 78.56 | 40.33  | 73.44  | 100                | 100 | 70  | 60  | 50  | 40  | SPINEL (LI)           | 3-0911   |
| 47.93            | 43.60 | 46.73  | 44.01 | 46.42  | 36.62  | 75                 | 100 | 80  | 70  | 70  | 60  | ACANTHITE             | 14-0072  |
| 47.98            | 34.98 | 52.45  | 21.96 | 64.63  | 81.02  | 25                 | 100 | 25  | 8   | 8   | 8   | TELLUROBISMUTHITE     | 15-0863  |
| 48.06            | 15.64 | 31.57  | 78.43 | 43.21  | 57.91  | 90                 | 100 | 80  | 55  | 40  | 40  | SERPENTINE (AL)       | 12-0583  |
| 48.06            | 32.03 | 61.63  | 69.52 | 71.15  | 81.76  | 22                 | 100 | 33  | 21  | 19  | 13  | ANATASE SYN           | 4-0477   |
| 48.10            | 15.70 | 31.66  | 78.32 | 43.13  | 44.18  | 80                 | 100 | 100 | 65  | 55  | 40  | SERPENTINE            | 11-0388  |
| 48.20            | 37.52 | 42.16  | 31.59 | 47.60  | 79.48  | 80                 | 100 | 100 | 60  | 60  | 60  | STAUROLITE            | 15-0397  |
| 48.22            | 18.98 | 59.50  | 32.86 | 37.14  | 32.20  | 50                 | 100 | 45  | 35  | 30  | 20  | LEONITE SYN           | 17-0134  |
| 48.36            | 23.43 | 65.36  | 76.02 | 80.84  | 89.75  | 100                | 90  | 56  | 36  | 18  | 16  | BRUCITE SYN           | 7-0239   |
| 48.42            | 44.01 | 44.24  | 62.66 | 47.70  | 62.89  | 90                 | 100 | 95  | 50  | 40  | 40  | SAFFLORITE            | 11-0140  |
| 48.46            | 25.09 | 38.20  | 49.82 | 75.57  | 43.39  | 30                 | 100 | 30  | 30  | 30  | 20  | CHLORITOID            | 6-0158   |
| 48.49            | 56.57 | 103.80 | 84.18 | *****  | *****  | 100                | 40  | 26  | 25  | *** | *** | SILVER                | 4-0783   |
| 48.58            | 56.73 | 103.91 | 84.40 | *****  | *****  | 100                | 52  | 36  | 32  | *** | *** | GOLD                  | 4-0784   |
| 48.63            | 34.88 | 51.19  | 29.04 | 63.85  | 81.67  | 37                 | 100 | 31  | 20  | 20  | 13  | TELLURIUM             | 4-0554   |
| 48.87            | 56.34 | 57.88  | 30.75 | 58.20  | 65.44  | 80                 | 100 | 100 | 60  | 60  | 60  | BETA DOMEYKITE SYN    | 2-1251   |
| 49.08            | 43.52 | 43.70  | 44.97 | 72.99  | 63.08  | 65                 | 100 | 60  | 60  | 35  | 30  | LOELLINGITE SYN       | 11-0699  |
| 49.08            | 91.60 | *****  | 71.67 | 135.60 | 111.82 | 100                | 38  | *** | 21  | 19  | 13  | TANTALUM              | 4-0788   |
| 49.09            | 81.56 | 25.79  | 44.59 | 45.90  | 25.09  | 95                 | 100 | 85  | 85  | 85  | 75  | KAOLINITE             | 12-0447  |
| 49.22            | 15.57 | 31.40  | 27.17 | 29.55  | 45.40  | 90                 | 100 | 100 | 70  | 60  | 50  | DICKITE               | 10-0446  |
| 49.31            | 27.57 | 44.61  | 24.07 | 56.03  | 73.37  | 65                 | 100 | 60  | 50  | 13  | 11  | RAMSDELLITE           | 11-0055  |
| 49.31            | 31.41 | 15.56  | 27.21 | 45.54  | 25.14  | 90                 | 100 | 90  | 80  | 80  | 70  | DICKITE               | 10-0430  |
| 49.31            | 45.18 | 44.97  | 49.55 | 62.33  | 80.37  | 96                 | 100 | 49  | 30  | 25  | 20  | TENORITE              | 5-0661   |
| 49.43            | 28.10 | 54.08  | 55.59 | 72.77  | 44.50  | 56                 | 100 | 52  | 49  | 43  | 30  | DIASPORE              | 5-0355   |
| 49.55            | 16.10 | 43.37  | 75.53 | 43.88  | 32.58  | 80                 | 100 | 80  | 80  | 70  | 60  | GERHARDTITE           | 14-0687  |
| 49.55            | 37.26 | 61.26  | 40.30 | 44.97  | 53.50  | 25                 | 100 | 16  | 16  | 10  | 10  | SODA-NITER SYN        | 7-0271   |
| 49.55            | 39.42 | 50.96  | 34.10 | 53.79  | 88.26  | 100                | 80  | 70  | 60  | 60  | 40  | HESSITE               | 12-0695  |
| 49.56            | 37.29 | 61.38  | 40.33 | 45.02  | 54.24  | 24                 | 100 | 16  | 9   | 9   | 9   | NITER (NA) SYN        | 7-0271   |
| 49.58            | 55.14 | 46.07  | 70.03 | 92.32  | 111.21 | 40                 | 100 | 53  | 28  | 25  | 23  | ZINC                  | 4-0831   |
| 49.75            | 29.91 | 28.15  | 59.18 | 32.02  | 54.31  | 85                 | 100 | 60  | 50  | 40  | 30  | IODYRITE              | 9-0374   |

| TWO-THETA (IRON) |        |        |        |        |        | RELATIVE INTENSITY |     |     |    |     |     | MINERAL NAME         | FILE NO. |
|------------------|--------|--------|--------|--------|--------|--------------------|-----|-----|----|-----|-----|----------------------|----------|
| 49.98            | 37.80  | 39.16  | 60.39  | 22.52  | 80.26  | 80                 | 100 | 100 | 70 | 55  | 35  | ALUNITE              | 14-0136  |
| 49.99            | 36.62  | 36.26  | 58.52  | 64.23  | 21.91  | 50                 | 100 | 60  | 50 | 50  | 40  | JAROSITE             | 10-0443  |
| 49.99            | 47.15  | 89.89  | 43.52  | 66.28  | 79.72  | 100                | 40  | 40  | 30 | 30  | 30  | DYSCRASITE           | 10-0452  |
| 50.02            | 15.03  | 33.78  | 41.84  | 13.38  | 16.43  | 60                 | 100 | 50  | 40 | 30  | 30  | FERRIMOLYBDITE       | 15-0290  |
| 50.02            | 36.26  | 71.83  | 96.22  | 106.23 | 54.60  | 40                 | 100 | 40  | 40 | 40  | 30  | TETRADYMIT           | 9-0447   |
| 50.16            | 37.23  | 55.08  | 60.84  | 62.21  | 45.70  | 18                 | 100 | 18  | 17 | 17  | 14  | CALCITE SYN          | 5-0586   |
| 50.22            | 18.10  | 63.83  | 41.35  | 75.53  | 77.87  | 45                 | 100 | 25  | 16 | 12  | 12  | MOLYBDENITE (2H) SYN | 6-0097   |
| 50.22            | 19.03  | 37.24  | 31.28  | 34.01  | 59.50  | 45                 | 100 | 95  | 40 | 35  | 30  | BEAVERITE            | 17-0476  |
| 50.22            | 34.86  | 84.47  | 95.25  | 62.70  | 129.51 | 80                 | 100 | 50  | 40 | 30  | 20  | ALTAITE              | 8-0028   |
| 50.22            | 65.04  | 37.49  | 86.69  | 40.14  | 42.67  | 70                 | 100 | 50  | 30 | 20  | 20  | CORVUSITE            | 15-0247  |
| 50.28            | 33.11  | 43.06  | 69.10  | 72.62  | 116.52 | 50                 | 100 | 65  | 40 | 40  | 40  | MANGANITE            | 8-0099   |
| 50.46            | 34.32  | 47.77  | 62.33  | 84.47  | 81.02  | 41                 | 100 | 40  | 23 | 16  | 13  | BISMUTH              | 5-0519   |
| 50.47            | 10.94  | 33.23  | 43.42  | 56.94  | 33.02  | 60                 | 100 | 100 | 55 | 50  | 40  | PHLOGOPITE (3T SYN)  | 10-0481  |
| 50.47            | 50.96  | 67.78  | 43.66  | 37.58  | 42.51  | 100                | 100 | 95  | 55 | 45  | 45  | CHONDROTITE          | 14-0010  |
| 50.64            | 59.17  | 109.93 | 88.59  | *****  | *****  | 100                | 53  | 33  | 31 | *** | *** | PLATINUM             | 4-0802   |
| 50.83            | 67.61  | 40.97  | 44.88  | 45.36  | 30.39  | 100                | 80  | 60  | 60 | 60  | 45  | CLINOHUMITE SYN      | 14-0009  |
| 50.85            | 46.82  | 81.83  | 67.70  | 30.86  | 42.19  | 100                | 70  | 70  | 65 | 50  | 50  | HUMITE               | 12-0755  |
| 50.96            | 37.01  | 53.79  | 58.20  | 37.91  | 65.04  | 30                 | 100 | 50  | 30 | 20  | 20  | SYLVANITE            | 9-0477   |
| 50.96            | 49.55  | 39.42  | 34.10  | 53.79  | 88.26  | 70                 | 100 | 80  | 60 | 60  | 40  | HESSITE              | 12-0695  |
| 50.96            | 50.47  | 67.78  | 43.66  | 37.58  | 42.51  | 100                | 100 | 95  | 55 | 45  | 45  | CHONDROTITE          | 14-0010  |
| 51.01            | 18.02  | 40.73  | 51.19  | 47.36  | 61.26  | 30                 | 100 | 65  | 25 | 16  | 16  | WEDDELLITE           | 17-0541  |
| 51.19            | 34.88  | 48.63  | 29.04  | 63.85  | 81.67  | 31                 | 100 | 37  | 20 | 20  | 13  | TELLURIUM            | 4-0554   |
| 51.19            | 38.44  | 68.94  | 81.67  | 18.88  | 24.29  | 80                 | 100 | 90  | 70 | 60  | 40  | UVANITE              | 8-0322   |
| 51.19            | 40.58  | 10.18  | 37.26  | 20.17  | 62.70  | 25                 | 100 | 85  | 14 | 10  | 8   | PLUMBOJAROSITE       | 15-0648  |
| 51.19            | 59.68  | 89.40  | 111.20 | *****  | *****  | 100                | 42  | 25  | 24 | *** | *** | PALLADIUM            | 5-0681   |
| 51.43            | 111.62 | 60.19  | 89.89  | 119.57 | *****  | 100                | 70  | 50  | 40 | 20  | *** | IRIDOSMINE           | 17-0213  |
| 51.45            | 36.26  | 89.64  | 86.22  | 53.45  | 100.26 | 70                 | 100 | 67  | 63 | 56  | 40  | ANTIMONY             | 5-0562   |
| 51.45            | 41.38  | 83.04  | 89.89  | *****  | *****  | 80                 | 100 | 60  | 60 | *** | *** | MERCURY              | 9-0253   |
| 51.64            | 31.98  | 21.69  | 30.57  | 45.40  | 50.12  | 70                 | 100 | 55  | 50 | 35  | 35  | AZURITE              | 11-0682  |
| 51.64            | 35.87  | 64.47  | 87.02  | 97.95  | 76.02  | 59                 | 100 | 23  | 20 | 13  | 8   | SYLVITE              | 4-0587   |
| 51.69            | 44.24  | 76.09  | 92.46  | 155.70 | *****  | 100                | 60  | 60  | 20 | 18  | *** | MANGANOSITE SYN      | 7-0230   |
| 51.99            | 33.41  | 59.67  | 43.57  | 83.12  | 86.18  | 70                 | 100 | 90  | 50 | 50  | 50  | HELVITE              | 15-0253  |
| 52.10            | 33.21  | 32.82  | 20.71  | 44.80  | 42.15  | 60                 | 100 | 95  | 50 | 50  | 40  | MULLITE              | 15-0776  |
| 52.19            | 36.03  | 36.26  | 47.57  | 52.97  | 53.50  | 100                | 90  | 90  | 90 | 90  | 90  | HOLLANDITE           | 4-0813   |
| 52.24            | 10.11  | 34.14  | 87.56  | 107.64 | *****  | 60                 | 100 | 80  | 40 | 20  | *** | ALLOPHANE            | 2-0039   |
| 52.24            | 33.51  | 33.00  | 45.02  | 79.43  | 42.54  | 100                | 100 | 90  | 90 | 90  | 80  | SILLIMANITE          | 10-0369  |
| 52.27            | 39.04  | 64.63  | 65.44  | 30.35  | 42.29  | 6                  | 100 | 6   | 6  | 3   | 3   | DOLOMITE (FERROAN)   | 12-0088  |
| 52.42            | 43.88  | 63.72  | 74.04  | 70.67  | *****  | 35                 | 100 | 35  | 30 | 20  | *** | SKUTTERUDITE SYN     | 10-0328  |
| 52.45            | 33.58  | 60.19  | 119.57 | 137.04 | 30.49  | 50                 | 100 | 70  | 50 | 50  | 40  | DANALITE             | 11-0491  |
| 52.45            | 34.98  | 47.98  | 21.96  | 64.63  | 81.02  | 25                 | 100 | 25  | 8  | 8   | 8   | TELLUROBISMUTHITE    | 15-0863  |
| 52.45            | 39.23  | 65.68  | 65.90  | 64.96  | 57.47  | 30                 | 100 | 30  | 30 | 20  | 15  | DOLOMITE             | 11-0078  |
| 52.45            | 47.36  | 32.30  | 15.98  | 48.19  | 39.27  | 85                 | 100 | 60  | 55 | 50  | 40  | PSILOMELANE          | 14-0627  |
| 52.45            | 54.60  | 58.83  | 54.05  | 63.85  | 66.71  | 100                | 70  | 70  | 50 | 35  | 35  | SCHREIBERSITE        | 16-0707  |
| 52.53            | 36.25  | 39.67  | 29.83  | 62.21  | 72.20  | 60                 | 100 | 65  | 45 | 40  | 40  | DATOLITE             | 11-0070  |
| 52.71            | 35.78  | 36.14  | 47.36  | 53.24  | 77.28  | 70                 | 100 | 100 | 60 | 60  | 60  | HOLLANDITE           | 12-0514  |

| TWO-THETA (IRON) |        |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|------------------|--------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 53.29            | 34.57  | 26.35  | 65.12  | 27.68  | 29.22  | 25                 | 100 | 40  | 25  | 13  | 13  | MICROCLINE               | 12-0703  |
| 53.55            | 19.26  | 39.02  | 12.11  | 17.30  | 34.04  | 50                 | 100 | 90  | 40  | 40  | 30  | HYDROMAGNESITE           | 8-0179   |
| 53.55            | 30.19  | 30.52  | 43.26  | 43.92  | 57.34  | 28                 | 100 | 53  | 24  | 23  | 21  | WITHERITE SYN            | 5-0378   |
| 53.76            | 38.29  | 73.37  | 60.19  | 67.14  | 30.16  | 100                | 100 | 100 | 80  | 80  | 70  | BISMUTHITE               | 4-0666   |
| 53.76            | 39.86  | 67.14  | 70.35  | 31.00  | 33.68  | 80                 | 100 | 80  | 80  | 70  | 70  | BEYERITE                 | 4-0693   |
| 53.79            | 37.01  | 50.96  | 58.20  | 37.91  | 65.04  | 50                 | 100 | 30  | 30  | 20  | 20  | SYLVANITE                | 9-0477   |
| 53.83            | 41.73  | 71.60  | 133.83 | 48.69  | 86.02  | 50                 | 100 | 70  | 50  | 40  | 40  | BRAUNITE                 | 8-0078   |
| 53.96            | 46.28  | 79.81  | 97.65  | 37.42  | 103.56 | 37                 | 100 | 27  | 17  | 9   | 4   | CUPRITE SYN              | 5-0667   |
| 54.08            | 28.10  | 49.43  | 55.59  | 72.77  | 44.50  | 52                 | 100 | 56  | 49  | 43  | 30  | DIASPORE                 | 5-0355   |
| 54.08            | 36.53  | 43.87  | 26.28  | 29.86  | 37.42  | 2                  | *** | 30  | 15  | 12  | 12  | KALIOPHILITE             | 11-0313  |
| 54.31            | 40.89  | 56.95  | 46.73  | 49.31  | 15.22  | 80                 | 100 | 70  | 60  | 60  | 50  | PETZITE                  | 12-0424  |
| 54.38            | 32.68  | 36.41  | 54.83  | 33.96  | 28.76  | 80                 | 100 | 97  | 76  | 67  | 57  | BARITE SYN               | 5-0448   |
| 54.49            | 43.75  | 15.30  | 27.59  | 22.85  | 41.87  | 80                 | 200 | 100 | 70  | 60  | 55  | DIOPHASE                 | 7-0172   |
| 54.60            | 13.13  | 31.10  | 26.45  | 20.77  | 43.52  | 70                 | 100 | 85  | 65  | 45  | 35  | META-AUTUNITE I          | 12-0423  |
| 54.60            | 52.45  | 58.83  | 54.05  | 63.85  | 66.71  | 70                 | 100 | 70  | 50  | 35  | 35  | SCHREIBERSITE            | 16-0707  |
| 54.76            | 81.16  | *****  | *****  | 105.62 | 46.97  | 100                | 52  | *** | *** | 12  | 10  | PERICLASE                | 4-0829   |
| 54.88            | 41.38  | 69.47  | 45.54  | 59.94  | 92.76  | 43                 | 100 | 34  | 17  | 12  | 8   | MAGNESITE SYN            | 8-0479   |
| 54.96            | 38.09  | 32.81  | 65.52  | 93.76  | 68.83  | 57                 | 100 | 84  | 35  | 17  | 16  | GALENA SYN               | 5-0592   |
| 55.08            | 37.23  | 50.16  | 60.84  | 62.21  | 45.70  | 18                 | 100 | 18  | 17  | 17  | 14  | CALCITE SYN              | 5-0586   |
| 55.14            | 46.07  | 49.58  | 70.03  | 92.32  | 111.21 | 100                | 53  | 40  | 28  | 25  | 23  | ZINC                     | 4-0831   |
| 55.16            | 31.28  | 57.56  | 34.75  | 65.04  | 44.61  | 100                | 70  | 70  | 60  | 50  | 30  | WEISSITE                 | 10-0421  |
| 55.16            | 37.01  | 37.62  | 76.70  | 77.87  | 61.26  | 100                | 100 | 100 | 90  | 90  | 80  | MIMETITE                 | 13-0056  |
| 55.16            | 37.75  | 38.86  | 56.03  | 52.45  | 80.37  | 90                 | 100 | 70  | 60  | 50  | 50  | CALAVERTITE              | 7-0344   |
| 55.16            | 39.70  | 38.03  | 27.31  | 46.34  | 30.42  | 90                 | 100 | 90  | 60  | 60  | 50  | APHTHITALITE             | 6-0429   |
| 55.20            | 34.79  | 73.50  | 27.96  | 44.41  | 50.64  | 90                 | 100 | 80  | 50  | 50  | 45  | CHRYSOBERYL              | 11-0448  |
| 55.22            | 37.93  | 42.54  | 68.56  | 93.49  | 60.60  | 100                | 90  | 90  | 90  | 80  | 60  | TROILITE (PYRRHO.) SYN   | 4-0832   |
| 55.22            | 42.71  | 68.60  | 37.93  | 93.40  | 119.91 | 100                | 60  | 50  | 40  | 40  | 40  | TROILITE                 | 11-0151  |
| 55.22            | 45.02  | 81.76  | 73.98  | 38.07  | 47.40  | 50                 | 100 | 60  | 40  | 30  | 25  | SPINEL (MN,NI)           | 1-1110   |
| 55.28            | 64.80  | 98.57  | 125.41 | *****  | *****  | 100                | 46  | 20  | 17  | *** | *** | COPPER                   | 4-0836   |
| 55.32            | 73.61  | 34.88  | 73.81  | 55.57  | 27.96  | 100                | 90  | 85  | 75  | 60  | 50  | CHRYSOBERYL SYN          | 10-0082  |
| 55.37            | 44.61  | 74.46  | 32.33  | 89.66  | 67.66  | 100                | 90  | 80  | 75  | 50  | 45  | CORUNDUM (ALPHA ALUMINA) | 10-0173  |
| 55.42            | 45.36  | 23.22  | 82.23  | 74.35  | 38.41  | 55                 | 100 | 65  | 55  | 40  | 13  | PICROCHROMITE SYN        | 10-0351  |
| 55.45            | 57.24  | 83.75  | 84.47  | 30.92  | 93.39  | 100                | 100 | 50  | 50  | 40  | 40  | BETA DOMEYKITE           | 14-0454  |
| 55.51            | 30.95  | 17.69  | 48.24  | 44.47  | 76.77  | 33                 | 100 | 17  | 17  | 13  | 10  | SODALITE                 | 3-0338   |
| 55.74            | 33.58  | 44.61  | 58.20  | 113.07 | 40.30  | 100                | 60  | 40  | 40  | 30  | 20  | RICKARDITE               | 6-0661   |
| 55.74            | 38.16  | 37.78  | 38.98  | 26.65  | 34.32  | 70                 | 100 | 80  | 60  | 40  | 35  | PYROMORPHITE             | 12-0704  |
| 55.74            | 43.52  | 33.78  | 32.48  | 58.20  | 36.75  | 80                 | 100 | 80  | 70  | 70  | 60  | STROMEYERITE             | 9-0499   |
| 55.80            | 32.42  | 36.66  | 41.56  | 80.95  | 90.00  | 100                | 100 | 100 | 80  | 80  | 80  | SCAPOLITE                | 2-0405   |
| 55.82            | 33.71  | 66.54  | 38.62  | 92.27  | 69.92  | 55                 | 100 | 45  | 35  | 12  | 10  | METACINNABAR             | 6-0261   |
| 56.03            | 37.14  | 41.69  | 102.85 | 66.59  | 53.66  | 100                | 70  | 50  | 50  | 45  | 40  | BORACITE                 | 5-0710   |
| 56.09            | 38.07  | 42.87  | 69.00  | 94.42  | 121.55 | 100                | 33  | 33  | 33  | 13  | 13  | TROILITE (PYRRHO.) SYN   | 1-1247   |
| 56.09            | 38.07  | 42.87  | 69.00  | 94.42  | 121.55 | 100                | 33  | 33  | 33  | 13  | 13  | PYRRHOTITE SYN           | 1-1247   |
| 56.09            | 100.37 | 128.59 | *****  | *****  | *****  | 100                | 27  | 16  | *** | *** | *** | DIAMOND                  | 6-0675   |
| 56.30            | 31.80  | 32.61  | 46.42  | 61.12  | 45.97  | 50                 | 100 | 70  | 40  | 35  | 34  | BRENTIANITE SYN          | 5-0418   |
| 56.34            | 39.55  | 58.83  | 73.37  | 95.25  | 85.94  | 40                 | 100 | 40  | 20  | 20  | 20  | BREITHAUPHITE            | 2-0783   |



| TWO-THETA (IRON) |        |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME         | FILE NO. |
|------------------|--------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|----------------------|----------|
| 56.34            | 57.88  | 48.87  | 30.75  | 58.20  | 65.44  | 100                | 100 | 80  | 60  | 60  | 60  | BETA DOMEYKITE SYN   | 2-1251   |
| 56.34            | 61.60  | 58.83  | 95.25  | 28.35  | 37.01  | 100                | 70  | 50  | 50  | 40  | 40  | DOMEYKITE            | 9-0333   |
| 56.57            | 48.49  | 103.80 | 84.18  | *****  | *****  | 40                 | 100 | 26  | 25  | *** | *** | SILVER               | 4-0783   |
| 56.64            | 39.14  | 70.82  | 97.22  | 110.21 | 33.78  | 55                 | 100 | 16  | 14  | 10  | 8   | BROMYRITE            | 6-0438   |
| 56.70            | 33.62  | 70.67  | 114.15 | 103.91 | 155.63 | 50                 | 100 | 80  | 40  | 30  | 30  | GRAPHITE             | 13-0148  |
| 56.73            | 48.58  | 103.91 | 84.40  | *****  | *****  | 52                 | 100 | 36  | 32  | *** | *** | GOLD                 | 4-0784   |
| 56.95            | 40.89  | 54.31  | 46.73  | 49.31  | 15.22  | 70                 | 100 | 80  | 60  | 60  | 50  | PETZITE              | 12-0424  |
| 57.10            | 111.77 | 85.06  | *****  | 145.98 | *****  | 100                | 30  | 19  | *** | 9   | *** | IRON (ALPHA)         | 6-0696   |
| 57.24            | 34.65  | 71.34  | 41.53  | 37.52  | 65.87  | 35                 | 100 | 35  | 30  | 20  | 20  | STOLZITE SYN         | 8-0476   |
| 57.24            | 34.75  | 71.34  | 41.69  | 65.87  | 73.37  | 80                 | 100 | 90  | 60  | 60  | 60  | STOLZITE             | 8-0108   |
| 57.24            | 55.45  | 83.75  | 84.47  | 30.92  | 93.39  | 100                | 100 | 50  | 50  | 40  | 40  | BETA DOMEYKITE       | 14-0454  |
| 57.28            | 46.86  | 85.35  | 77.06  | 39.63  | *****  | 58                 | 100 | 58  | 45  | 40  | *** | SPINEL SYN           | 5-0672   |
| 57.35            | 38.78  | 40.54  | 55.87  | 81.42  | 106.88 | 74                 | 100 | 90  | 34  | 23  | 20  | TIN (BETA)           | 4-0673   |
| 57.56            | 55.16  | 31.28  | 34.75  | 65.04  | 44.61  | 70                 | 100 | 70  | 60  | 50  | 30  | WEISSITE             | 10-0421  |
| 57.65            | 10.98  | 33.58  | 45.38  | 33.03  | 70.76  | 100                | 100 | 100 | 50  | 45  | 35  | PHLOGOPITE (3T)      | 10-0492  |
| 57.88            | 46.73  | 32.48  | 68.04  | *****  | *****  | 85                 | 100 | 70  | 50  | *** | *** | ARGENTITE            | 4-0774   |
| 57.88            | 56.34  | 48.87  | 30.75  | 58.20  | 65.44  | 100                | 100 | 80  | 60  | 60  | 60  | BETA DOMEYKITE SYN   | 2-1251   |
| 58.00            | 33.92  | 11.16  | 43.48  | 71.15  | 47.02  | 30                 | 100 | 70  | 20  | 20  | 18  | PHLOGOPITE SYN       | 16-0352  |
| 58.06            | 11.16  | 33.82  | 33.31  | 36.06  | 38.98  | 16                 | 100 | 65  | 10  | 10  | 8   | PHLOGOPITE SYN       | 16-0344  |
| 58.13            | 40.17  | 73.03  | 34.59  | 100.37 | 114.46 | 55                 | 100 | 15  | 13  | 11  | 7   | HALITE SYN           | 5-0628   |
| 58.20            | 40.45  | 100.36 | 73.37  | 114.62 | 34.75  | 60                 | 100 | 40  | 30  | 30  | 20  | EMBOHITE             | 14-0255  |
| 58.25            | 33.62  | 43.75  | 11.11  | 22.20  | 30.95  | 100                | 100 | 100 | 80  | 80  | 80  | HYDROMUSCOVITE       | 2-0462   |
| 58.29            | 44.15  | 11.11  | 22.34  | 24.86  | 31.04  | 80                 | 100 | 60  | 50  | 50  | 50  | LEPIDOLITE (2M2)     | 14-0011  |
| 58.52            | 34.04  | 43.92  | 11.19  | 22.43  | 35.70  | 100                | 100 | 100 | 80  | 80  | 80  | LEPIDOLITE (120)     | 15-0062  |
| 58.58            | 33.53  | 39.55  | 35.64  | 67.88  | 55.68  | 29                 | 100 | 94  | 28  | 27  | 26  | CINNABAR SYN         | 6-0256   |
| 58.58            | 34.24  | 11.34  | 36.60  | 33.72  | 39.16  | 55                 | 100 | 80  | 40  | 35  | 30  | ZINNWALDITE          | 13-0227  |
| 58.58            | 47.81  | 87.56  | 78.56  | 40.33  | 73.44  | 70                 | 100 | 100 | 60  | 50  | 40  | SPINEL (II)          | 3-0911   |
| 58.67            | 33.14  | 34.43  | 42.05  | 48.20  | 45.97  | 65                 | 100 | 52  | 46  | 38  | 33  | ARAGONITE SYN        | 5-0453   |
| 58.83            | 35.09  | 40.60  | 69.86  | 116.18 | 52.97  | 100                | 40  | 40  | 30  | 20  | 10  | DIGENITE             | 9-0064   |
| 58.83            | 36.85  | 22.77  | 64.23  | 51.92  | 41.20  | 70                 | 100 | 70  | 70  | 60  | 50  | CARPHOSIDERITE       | 2-0597   |
| 58.83            | 39.55  | 56.34  | 73.37  | 95.25  | 85.94  | 40                 | 100 | 40  | 20  | 20  | 20  | BREITHAUPITE         | 2-0783   |
| 58.83            | 47.59  | 47.64  | 62.06  | 30.11  | 31.29  | 100                | 100 | 100 | 100 | 75  | 75  | CHALCOCITE SYN       | 12-0227  |
| 58.83            | 52.45  | 54.60  | 54.05  | 63.85  | 66.71  | 70                 | 100 | 70  | 50  | 35  | 35  | SCHREIBERSITE        | 16-0707  |
| 58.83            | 56.34  | 61.60  | 95.25  | 28.35  | 37.01  | 50                 | 100 | 70  | 50  | 40  | 40  | DOMEYKITE            | 9-0333   |
| 58.83            | 70.35  | 40.60  | 34.98  | 116.18 | *****  | 100                | 90  | 80  | 70  | 70  | *** | DIGENITE SYN         | 4-0861   |
| 58.94            | 62.39  | 47.60  | 69.71  | 33.21  | 98.57  | 80                 | 100 | 70  | 40  | 30  | 30  | CHALCOCITE ALPHA LOW | 9-0328   |
| 59.17            | 50.64  | 109.93 | 88.59  | *****  | *****  | 53                 | 100 | 33  | 31  | *** | *** | PLATINUM             | 4-0802   |
| 59.18            | 40.89  | 35.21  | 70.82  | 74.42  | 102.61 | 50                 | 100 | 50  | 16  | 16  | 12  | CERARGYRITE          | 6-0480   |
| 59.21            | 42.71  | 64.67  | 129.51 | 93.67  | 139.35 | 90                 | 100 | 80  | 40  | 30  | 30  | NICCOLITE            | 9-0001   |
| 59.50            | 18.98  | 48.22  | 32.86  | 37.14  | 32.20  | 45                 | 100 | 50  | 35  | 30  | 20  | LEONITE SYN          | 17-0134  |
| 59.53            | 30.00  | 37.08  | 94.50  | 81.42  | 104.51 | 70                 | 100 | 90  | 40  | 30  | 30  | COLORADOITE          | 8-0026   |
| 59.57            | 40.94  | 39.74  | 63.53  | 49.58  | 32.81  | 50                 | 100 | 90  | 50  | 30  | 20  | CHLORAPATITE         | 2-0851   |
| 59.67            | 33.41  | 51.99  | 43.57  | 83.12  | 86.18  | 90                 | 100 | 70  | 50  | 50  | 50  | HELVITE              | 15-0253  |
| 59.68            | 51.19  | 89.40  | 111.20 | *****  | *****  | 100                | 100 | 25  | 24  | *** | *** | PALLADIUM            | 5-0681   |
| 59.84            | 41.20  | 76.11  | 49.08  | 24.79  | 28.89  | 100                | 67  | 53  | 40  | 20  | 20  | CRYOLITE             | 1-1273   |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |    |     | MINERAL NAME         | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|----|-----|----------------------|----------|
| 59.87            | 41.30 | 28.89  | 49.34  | 49.09  | 76.31  | 100                | 95  | 60  | 50  | 45 | 45  | CRYOLITE             | 12-0257  |
| 59.91            | 36.29 | 74.74  | 101.48 | 23.43  | 69.89  | 80                 | 100 | 90  | 80  | 70 | 70  | SCHEELITE            | 8-0145   |
| 60.00            | 35.47 | 41.40  | 100.70 | 119.91 | 34.04  | 100                | 60  | 50  | 50  | 50 | 40  | BORNITE              | 14-0323  |
| 60.19            | 33.58 | 52.45  | 119.57 | 137.04 | 30.49  | 70                 | 100 | 50  | 50  | 50 | 40  | DANALITE             | 11-0491  |
| 60.19            | 35.68 | 41.35  | 71.83  | 101.48 | 104.99 | 49                 | 100 | 48  | 47  | 18 | 15  | URANINITE SYN        | 5-0550   |
| 60.19            | 51.43 | 111.62 | 89.89  | 119.57 | *****  | 50                 | 100 | 70  | 40  | 20 | *** | IRIDOSMINE           | 17-0213  |
| 60.22            | 35.78 | 72.05  | 120.63 | 90.32  | 101.26 | 100                | 94  | 35  | 16  | 12 | 10  | FLUORITE SYN         | 4-0864   |
| 60.22            | 66.14 | 37.29  | 39.02  | 19.30  | 49.82  | 50                 | 100 | 80  | 40  | 30 | 30  | PENTLANDITE          | 8-0090   |
| 60.26            | 35.47 | 90.00  | 45.22  | 48.69  | 59.23  | 50                 | 100 | 75  | 40  | 40 | 40  | KYANITE              | 3-0513   |
| 60.28            | 36.42 | 23.48  | 75.17  | 43.57  | 69.75  | 30                 | 100 | 28  | 22  | 16 | 14  | POWELLITE            | 7-0212   |
| 60.52            | 36.17 | 72.30  | 41.88  | 73.13  | 102.17 | 70                 | 100 | 40  | 30  | 30 | 30  | STANNITE             | 11-0062  |
| 60.80            | 31.83 | 72.26  | 24.58  | 84.47  | 103.80 | 40                 | 100 | 25  | 20  | 16 | 14  | EUCRYPTITE (BETA)    | 13-0378  |
| 60.88            | 36.14 | 72.77  | 41.97  | 102.74 | 122.85 | 51                 | 100 | 30  | 10  | 9  | 9   | SPHALERITE SYN       | 5-0566   |
| 60.95            | 42.05 | 76.77  | 77.35  | 91.78  | 106.36 | 90                 | 100 | 70  | 70  | 60 | 50  | PEROVSKITE           | 8-0091   |
| 60.95            | 45.40 | 73.98  | 81.09  | 23.14  | 38.34  | 75                 | 100 | 75  | 75  | 50 | 50  | CHROMITE SYN         | 4-0759   |
| 60.98            | 42.05 | 76.59  | 77.12  | 41.73  | 42.22  | 100                | 100 | 100 | 100 | 80 | 80  | PEROVSKITE SYN       | 9-0365   |
| 61.16            | 36.17 | 73.13  | 34.57  | 38.61  | 122.85 | 50                 | 100 | 35  | 6   | 6  | 6   | WURTZITE             | 12-0688  |
| 61.23            | 32.89 | 46.34  | 50.22  | 33.88  | 62.70  | 80                 | 100 | 70  | 70  | 60 | 60  | BRANNERITE           | 8-0002   |
| 61.23            | 36.14 | 38.16  | 41.35  | 63.08  | 43.00  | 50                 | 100 | 90  | 40  | 30 | 20  | FERGUSONITE          | 9-0443   |
| 61.23            | 40.30 | 37.01  | 41.69  | 68.04  | 76.70  | 75                 | 100 | 65  | 55  | 35 | 35  | COVELLITE            | 6-0464   |
| 61.26            | 36.49 | 42.18  | 73.37  | 77.87  | 93.39  | 50                 | 100 | 50  | 40  | 20 | 20  | URANINITE            | 13-0225  |
| 61.26            | 37.26 | 49.55  | 40.30  | 44.97  | 53.50  | 16                 | 100 | 25  | 16  | 10 | 10  | SODA-NITER SYN       | 7-0271   |
| 61.26            | 37.52 | 36.37  | 37.91  | 40.45  | 35.32  | 45                 | 100 | 60  | 40  | 40 | 30  | TILLEYITE            | 13-0416  |
| 61.26            | 42.67 | 78.46  | 62.33  | 39.86  | 41.35  | 70                 | 100 | 70  | 60  | 50 | 50  | MERWINITE            | 4-0728   |
| 61.31            | 37.14 | 37.42  | 45.64  | 51.19  | 24.51  | 60                 | 100 | 50  | 50  | 50 | 40  | SCAWTITE             | 10-0400  |
| 61.38            | 37.29 | 49.56  | 40.33  | 45.02  | 54.24  | 16                 | 100 | 24  | 9   | 9  | 9   | NITER (NA) SYN       | 7-0271   |
| 61.60            | 56.34 | 58.83  | 95.25  | 28.35  | 37.01  | 70                 | 100 | 50  | 50  | 40 | 40  | DOMEYKITE            | 9-0333   |
| 61.63            | 32.03 | 48.06  | 69.52  | 71.15  | 81.76  | 33                 | 100 | 22  | 21  | 19 | 13  | ANATASE SYN          | 4-0477   |
| 61.95            | 32.25 | 28.61  | 62.29  | 24.26  | 35.62  | 60                 | 100 | 60  | 60  | 50 | 50  | SPODUMENE (BETA) SYN | 13-0251  |
| 61.95            | 40.89 | 31.92  | 66.34  | 76.70  | 66.31  | 26                 | 100 | 26  | 24  | 11 | 10  | ARSENIC              | 5-0632   |
| 62.03            | 36.79 | 74.69  | 126.87 | 104.75 | 72.71  | 90                 | 100 | 70  | 70  | 60 | 55  | CHALCOPYRITE (GAMMA) | 11-0570  |
| 62.25            | 36.90 | 127.07 | 74.52  | 105.62 | 143.49 | 97                 | 100 | 75  | 70  | 60 | 60  | CHALCOPYRITE (BETA)  | 11-0515  |
| 62.33            | 34.98 | 67.14  | 113.07 | 134.34 | 32.20  | 80                 | 100 | 70  | 50  | 50 | 40  | CUBANITE             | 9-0324   |
| 62.39            | 58.94 | 47.60  | 69.71  | 33.21  | 98.57  | 100                | 80  | 70  | 40  | 30 | 30  | CHALCOCITE ALPHA LOW | 9-0328   |
| 62.66            | 32.65 | 24.80  | 50.96  | 73.29  | 87.88  | 30                 | 100 | 20  | 15  | 15 | 12  | CORDIERITE MU SYN    | 14-0249  |
| 62.66            | 40.82 | 45.35  | 23.24  | 51.55  | 64.39  | 95                 | 100 | 65  | 60  | 55 | 45  | MILLERITE            | 12-0041  |
| 62.70            | 32.10 | 40.42  | 45.93  | 78.49  | 81.02  | 100                | 100 | 100 | 70  | 70 | 70  | PLATINERITE          | 8-0185   |
| 62.70            | 37.37 | 43.52  | 75.53  | 107.51 | 111.62 | 70                 | 100 | 70  | 70  | 50 | 40  | STEFELDITE           | 8-0012   |
| 62.77            | 39.45 | 40.94  | 73.44  | 32.61  | 35.47  | 50                 | 100 | 50  | 50  | 40 | 40  | CLINOZOISITE         | 16-0705  |
| 62.81            | 30.19 | 40.33  | 67.13  | 35.12  | 37.55  | 80                 | 100 | 90  | 50  | 40 | 40  | BOULANGERITE         | 9-0470   |
| 62.81            | 35.01 | 39.45  | 68.05  | 75.06  | 128.59 | 90                 | 100 | 80  | 60  | 50 | 50  | ENARGITE             | 10-0436  |
| 63.00            | 37.29 | 75.00  | 128.17 | 62.58  | 129.96 | 80                 | 100 | 60  | 60  | 40 | 30  | CHALCOPYRITE         | 9-0423   |
| 63.08            | 24.29 | 36.49  | 71.34  | 50.69  | 51.92  | 100                | 80  | 80  | 70  | 60 | 60  | CALEDONITE           | 8-0153   |
| 63.08            | 43.52 | 79.72  | 111.62 | 129.51 | 95.25  | 50                 | 100 | 20  | 20  | 16 | 8   | ALABANDITE           | 6-0518   |
| 63.14            | 32.90 | 76.20  | 85.95  | 88.11  | 25.26  | 90                 | 100 | 80  | 80  | 80 | 60  | QUARTZ (BETA)        | 7-0346   |

| TWO-THETA (IRON) |        |       |        |        |        | RELATIVE INTENSITY |     |     |    |     |     | MINERAL NAME         | FILE NO. |
|------------------|--------|-------|--------|--------|--------|--------------------|-----|-----|----|-----|-----|----------------------|----------|
| 63.14            | 38.34  | 64.71 | 51.24  | 147.11 | 51.24  | 80                 | 100 | 70  | 50 | 50  | 40  | CALCITE (MANGANOAN)  | 2-0714   |
| 63.45            | 43.52  | 80.37 | 111.89 | 130.39 | 37.44  | 50                 | 100 | 20  | 20 | 16  | 14  | ALABANDITE           | 6-0518   |
| 63.45            | 76.09  | 37.62 | 108.82 | 90.75  | 113.07 | 84                 | 100 | 68  | 68 | 63  | 63  | MICROLITE            | 3-1139   |
| 63.49            | 43.57  | 73.65 | 52.24  | 70.37  | 86.79  | 90                 | 100 | 90  | 80 | 70  | 70  | SKUTTERUDITE         | 10-0497  |
| 63.53            | 47.60  | 36.29 | 77.96  | 91.71  | 22.41  | 60                 | 100 | 60  | 60 | 60  | 20  | CRYPTOMELANE         | 6-0547   |
| 63.61            | 37.67  | 76.31 | 18.64  | 36.06  | 43.75  | 60                 | 100 | 50  | 25 | 20  | 20  | PYROCHLORE           | 13-0254  |
| 63.65            | 33.11  | 25.79 | 53.03  | 57.63  | 76.42  | 10                 | 100 | 20  | 4  | 4   | 4   | QUARTZ (BETA)        | 11-0252  |
| 63.68            | 40.80  | 39.58 | 59.14  | 33.21  | 13.37  | 20                 | 100 | 60  | 18 | 14  | 10  | CHLORAPATITE SYN     | 12-0263  |
| 63.72            | 43.88  | 52.42 | 74.04  | 70.67  | *****  | 35                 | 100 | 35  | 30 | 20  | *** | SKUTTERUDITE SYN     | 10-0328  |
| 63.83            | 18.10  | 50.22 | 41.35  | 75.53  | 77.87  | 25                 | 100 | 45  | 16 | 12  | 12  | MOLYBDENITE (2H) SYN | 6-0097   |
| 63.88            | 37.67  | 76.59 | 43.57  | 133.07 | 30.44  | 60                 | 100 | 30  | 20 | 20  | 10  | TETRAHEDRITE         | 11-0107  |
| 64.31            | 46.98  | 42.71 | 72.71  | 91.87  | 30.78  | 80                 | 100 | 90  | 40 | 40  | 30  | ARSENOPYRITE         | 11-0154  |
| 64.43            | 33.68  | 26.28 | 46.42  | 50.24  | 89.57  | 17                 | 100 | 35  | 12 | 12  | 11  | QUARTZ (ALPHA)       | 5-0490   |
| 64.47            | 35.87  | 51.64 | 87.02  | 97.95  | 76.02  | 23                 | 100 | 59  | 20 | 13  | 8   | SYLVITE              | 4-0587   |
| 64.55            | 38.20  | 77.59 | 44.47  | 110.49 | 81.63  | 45                 | 100 | 40  | 20 | 20  | 15  | BETAFITE             | 13-0197  |
| 64.63            | 38.16  | 18.78 | 36.49  | 77.28  | 44.24  | 80                 | 100 | 90  | 70 | 60  | 40  | STIBICONITE          | 10-0388  |
| 64.63            | 38.29  | 77.28 | 44.43  | 110.21 | 114.62 | 90                 | 100 | 90  | 60 | 60  | 60  | YTTROTANTALITE       | 11-0116  |
| 64.63            | 39.04  | 52.27 | 65.44  | 30.35  | 42.29  | 6                  | 100 | 6   | 6  | 3   | 3   | DOLOMITE (FERROAN)   | 12-0088  |
| 64.67            | 42.71  | 59.21 | 129.51 | 93.67  | 139.35 | 80                 | 100 | 90  | 40 | 30  | 30  | NICCOLITE            | 9-0001   |
| 64.71            | 38.34  | 63.14 | 51.24  | 147.11 | 51.24  | 70                 | 100 | 80  | 50 | 50  | 40  | CALCITE (MANGANOAN)  | 2-0714   |
| 64.80            | 55.28  | 98.57 | 125.41 | *****  | *****  | 46                 | 100 | 20  | 17 | *** | *** | COPPER               | 4-0836   |
| 65.04            | 41.69  | 46.34 | 119.39 | 47.98  | 131.14 | 100                | 100 | 90  | 90 | 80  | 80  | COBALTITE            | 16-0624  |
| 65.04            | 50.22  | 37.49 | 86.69  | 40.14  | 42.67  | 100                | 70  | 50  | 30 | 20  | 20  | CORVUSITE            | 15-0247  |
| 65.04            | 114.62 | 37.91 | 54.60  | 37.89  | 93.39  | 100                | 70  | 60  | 50 | 40  | 40  | SPERRYLITE           | 9-0452   |
| 65.08            | 38.47  | 78.25 | 44.65  | 111.92 | 137.02 | 80                 | 100 | 50  | 30 | 30  | 30  | TENNANTITE           | 11-0102  |
| 65.36            | 48.36  | 23.43 | 76.02  | 80.84  | 89.75  | 56                 | 100 | 90  | 36 | 18  | 16  | BRUCITE SYN          | 7-0239   |
| 65.44            | 36.14  | 31.82 | 24.95  | 53.24  | 55.16  | 60                 | 100 | 70  | 40 | 40  | 40  | LINARITE             | 4-0598   |
| 65.68            | 39.23  | 52.45 | 65.90  | 64.96  | 57.47  | 30                 | 100 | 30  | 30 | 20  | 15  | DOLOMITE             | 11-0078  |
| 66.10            | 40.18  | 45.59 | 31.66  | 44.28  | 79.30  | 100                | 100 | 100 | 80 | 80  | 60  | FAYALITE             | 9-0484   |
| 66.14            | 37.29  | 60.22 | 39.02  | 19.30  | 49.82  | 100                | 80  | 50  | 40 | 30  | 30  | PENTLANDITE          | 8-0090   |
| 66.44            | 32.61  | 44.47 | 24.58  | 68.32  | 46.79  | 50                 | 100 | 50  | 25 | 18  | 13  | XENOTIME             | 11-0254  |
| 66.44            | 41.40  | 42.29 | 29.22  | 28.72  | 62.38  | 50                 | 100 | 45  | 35 | 30  | 30  | BOURNONITE           | 12-0094  |
| 66.54            | 33.71  | 55.82 | 38.62  | 92.27  | 69.92  | 45                 | 100 | 55  | 35 | 12  | 10  | METACINNABAR         | 6-0261   |
| 66.58            | 33.60  | 42.98 | 70.67  | 48.27  | 84.63  | 63                 | 100 | 81  | 63 | 24  | 17  | CASSITERITE SYN      | 5-0467   |
| 66.62            | 39.45  | 36.53 | 56.73  | 45.83  | 30.11  | 30                 | 100 | 30  | 20 | 17  | 13  | AKERMANITE           | 10-0391  |
| 66.66            | 39.88  | 30.70 | 66.36  | 52.97  | 57.93  | 33                 | 100 | 35  | 30 | 27  | 23  | RHODOCHROSITE SYN    | 7-0268   |
| 66.71            | 36.03  | 37.65 | 49.55  | 54.33  | 61.42  | 50                 | 100 | 90  | 40 | 30  | 30  | CHALCOSTILBITE       | 9-0143   |
| 66.78            | 39.74  | 67.21 | 46.98  | 47.40  | 47.60  | 100                | 100 | 100 | 70 | 70  | 70  | GEHLENITE SYN        | 4-0690   |
| 66.78            | 41.88  | 32.71 | 60.95  | 47.40  | 49.35  | 63                 | 100 | 40  | 30 | 25  | 25  | MARCASITE            | 3-0799   |
| 67.05            | 39.74  | 36.79 | 47.53  | 30.61  | 46.88  | 35                 | 100 | 25  | 22 | 20  | 20  | GEHLENITE SYN        | 9-0216   |
| 67.14            | 34.98  | 62.33 | 113.07 | 134.34 | 32.20  | 70                 | 100 | 80  | 50 | 50  | 40  | CUBANITE             | 9-0324   |
| 67.14            | 39.86  | 53.76 | 70.35  | 31.00  | 33.68  | 80                 | 100 | 80  | 80 | 70  | 70  | BEYERITE             | 4-0693   |
| 67.21            | 39.74  | 66.78 | 46.98  | 47.40  | 47.60  | 100                | 100 | 100 | 70 | 70  | 70  | GEHLENITE SYN        | 10-0449  |
| 67.61            | 50.83  | 40.97 | 44.88  | 45.36  | 30.39  | 80                 | 100 | 60  | 60 | 60  | 45  | CLINOHUMITE SYN      | 14-0009  |
| 67.74            | 22.25  | 30.35 | 41.09  | 44.84  | 45.40  | 100                | 70  | 70  | 70 | 70  | 70  | CLINOHUMITE          | 14-0692  |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 67.78            | 50.47 | 50.96  | 43.66  | 37.58  | 42.51  | 95                 | 100 | 100 | 55  | 45  | 45  | CHONDROTITE            | 14-0010  |
| 67.88            | 40.64 | 68.09  | 59.17  | 31.31  | 54.08  | 35                 | 100 | 45  | 30  | 25  | 25  | SIDERITE SYN           | 12-0531  |
| 67.92            | 40.63 | *****  | 31.31  | 54.10  | 59.14  | 80                 | 100 | *** | 60  | 60  | 60  | SIDERITE               | 8-0133   |
| 68.09            | 40.64 | 67.88  | 59.17  | 31.31  | 54.08  | 45                 | 100 | 35  | 30  | 25  | 25  | SIDERITE SYN           | 12-0531  |
| 68.50            | 38.20 | 30.70  | 66.28  | 82.78  | 15.61  | 20                 | 100 | 50  | 14  | 14  | 12  | COLUMBITE (TANTALITE)  | 16-0337  |
| 68.56            | 41.40 | 44.84  | 62.77  | 80.44  | 82.44  | 100                | 100 | 85  | 85  | 85  | 85  | ILMENITE               | 3-0781   |
| 68.60            | 55.22 | 42.71  | 37.93  | 93.40  | 119.91 | 50                 | 100 | 60  | 40  | 40  | 40  | TROILITE               | 11-0151  |
| 68.94            | 38.44 | 46.14  | 23.66  | 29.98  | 52.45  | 80                 | 100 | 70  | 60  | 60  | 60  | FERBERITE              | 10-0449  |
| 68.94            | 38.44 | 51.19  | 81.67  | 18.88  | 24.29  | 90                 | 100 | 80  | 70  | 60  | 40  | UVANITE                | 8-0322   |
| 69.40            | 41.20 | 31.64  | 49.08  | 59.50  | 54.60  | 45                 | 100 | 50  | 25  | 25  | 18  | SMITHSONITE            | 8-0449   |
| 69.47            | 41.38 | 54.88  | 45.54  | 59.94  | 92.76  | 34                 | 100 | 43  | 17  | 12  | 8   | MAGNESITE SYN          | 8-0479   |
| 69.94            | 42.22 | 45.40  | 63.61  | 81.49  | 83.70  | 60                 | 100 | 50  | 40  | 35  | 35  | HEMATITE               | 13-0534  |
| 70.08            | 34.74 | 45.81  | 52.55  | 73.24  | 90.84  | 50                 | 100 | 41  | 22  | 16  | 16  | RUTILE                 | 4-0551   |
| 70.33            | 33.41 | 103.67 | 114.00 | 154.06 | 56.82  | 8                  | 100 | 6   | 6   | 4   | 3   | GRAPHITE SYN           | 12-0212  |
| 70.35            | 40.73 | 45.75  | 50.47  | 58.83  | 34.98  | 75                 | 100 | 50  | 25  | 25  | 10  | BRAVOITE               | 2-0850   |
| 70.35            | 58.83 | 40.60  | 34.98  | 116.18 | *****  | 90                 | 100 | 80  | 70  | 70  | *** | DIGENITE SYN           | 4-0861   |
| 70.42            | 33.11 | 47.40  | 43.22  | 66.36  | 45.02  | 70                 | 100 | 70  | 60  | 50  | 40  | MANGANITE SYN          | 8-0016   |
| 70.56            | 16.75 | 35.01  | 33.72  | 42.05  | 49.35  | 14                 | 100 | 12  | 8   | 8   | 8   | ERYTHRITE              | 11-0626  |
| 70.67            | 33.62 | 56.70  | 114.15 | 103.91 | 155.63 | 80                 | 100 | 50  | 40  | 30  | 30  | GRAPHITE               | 13-0148  |
| 70.82            | 39.14 | 56.64  | 97.22  | 110.21 | 33.78  | 16                 | 100 | 55  | 14  | 10  | 8   | BROMYRITE              | 6-0438   |
| 71.31            | 27.52 | 44.61  | 73.37  | 82.36  | 90.75  | 80                 | 100 | 100 | 80  | 80  | 80  | RAMSDELLITE            | 7-0222   |
| 71.34            | 34.65 | 57.24  | 41.53  | 37.52  | 65.87  | 35                 | 100 | 35  | 30  | 20  | 20  | STOLZITE SYN           | 8-0476   |
| 71.34            | 34.75 | 57.24  | 41.69  | 65.87  | 73.37  | 90                 | 100 | 80  | 60  | 60  | 60  | STOLZITE               | 8-0108   |
| 71.55            | 41.73 | 85.95  | 127.73 | 29.30  | 134.07 | 90                 | 100 | 80  | 70  | 60  | 60  | BIXBYITE               | 8-0010   |
| 71.60            | 41.73 | 53.83  | 133.83 | 48.69  | 86.02  | 70                 | 100 | 50  | 50  | 40  | 40  | BRAUNITE               | 8-0078   |
| 71.70            | 47.63 | 36.29  | 73.61  | 23.09  | 64.31  | 80                 | 100 | 80  | 70  | 50  | 50  | CRYPTOMELANE           | 4-0778   |
| 71.83            | 36.26 | 50.02  | 96.22  | 106.23 | 54.60  | 40                 | 100 | 40  | 40  | 40  | 30  | TETRADYMITTE           | 9-0447   |
| 72.05            | 60.22 | 35.78  | 120.63 | 90.32  | 101.26 | 35                 | 100 | 94  | 16  | 12  | 10  | FLUORITE SYN           | 4-0864   |
| 72.26            | 31.83 | 60.80  | 24.58  | 84.47  | 103.80 | 25                 | 100 | 40  | 20  | 16  | 14  | EUCRYPTITE (BETA)      | 13-0378  |
| 72.30            | 36.17 | 60.52  | 41.88  | 73.13  | 102.17 | 40                 | 100 | 70  | 30  | 30  | 30  | STANNITE               | 11-0062  |
| 72.33            | 36.03 | 39.55  | 44.06  | 22.49  | 42.67  | 100                | 80  | 80  | 80  | 60  | 60  | CUPRODESCLOIZITE       | 13-0240  |
| 72.35            | 26.99 | 45.02  | 83.12  | 55.80  | 99.83  | 60                 | 100 | 80  | 50  | 30  | 30  | CRISTOBALITE BETA HIGH | 4-0359   |
| 72.66            | 39.02 | 47.70  | 42.42  | 62.43  | 43.87  | 65                 | 100 | 70  | 60  | 60  | 55  | EPIDOTE                | 9-0438   |
| 72.77            | 36.14 | 60.88  | 41.97  | 102.74 | 122.85 | 30                 | 100 | 51  | 10  | 9   | 9   | SPHALERITE SYN         | 5-0566   |
| 72.77            | 41.91 | 47.12  | 51.94  | 60.74  | 36.08  | 100                | 84  | 66  | 52  | 40  | 36  | PYRITE SYN             | 6-0710   |
| 72.85            | 21.05 | 42.67  | 49.75  | 54.60  | 34.65  | 100                | 100 | 100 | 90  | 90  | 80  | MURDOCHITE             | 7-0028   |
| 72.92            | 35.93 | 47.40  | 54.10  | 76.77  | 95.37  | 50                 | 100 | 50  | 25  | 25  | 20  | PYROLUSITE             | 12-0716  |
| 73.03            | 40.17 | 58.13  | 34.59  | 100.37 | 114.46 | 15                 | 100 | 55  | 13  | 11  | 7   | HALITE SYN             | 5-0628   |
| 73.13            | 36.17 | 61.16  | 34.57  | 38.61  | 122.85 | 35                 | 100 | 50  | 6   | 6   | 6   | WURTZITE               | 12-0688  |
| 73.32            | 41.17 | 43.83  | 46.50  | 38.35  | 54.31  | 60                 | 100 | 80  | 50  | 40  | 30  | VESUVIANITE            | 11-0145  |
| 73.37            | 38.29 | 53.76  | 60.19  | 67.14  | 30.16  | 100                | 100 | 100 | 80  | 80  | 70  | BISMUTITE              | 4-0666   |
| 73.39            | 41.22 | 43.87  | 46.54  | 38.39  | 54.31  | 60                 | 100 | 80  | 50  | 40  | 30  | IDOGRASE               | 11-0145  |
| 73.44            | 37.67 | 45.22  | 129.73 | 86.02  | 94.42  | 100                | 100 | 100 | 100 | 90  | 80  | DIOPSIDE               | 2-0656   |
| 73.44            | 37.80 | 85.27  | 127.51 | 129.73 | 129.73 | 100                | 100 | 100 | 100 | 100 | 100 | AUGITE                 | 3-0623   |
| 73.44            | 45.02 | 37.67  | 39.02  | 86.02  | 34.91  | 60                 | 100 | 80  | 40  | 40  | 20  | DIOPSIDE SYN           | 3-0860   |



| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME             | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|--------------------------|----------|
| 73.50            | 34.79 | 55.20  | 27.96  | 44.41  | 50.64  | 80                 | 100 | 90  | 50  | 50  | 45  | CHRYSOBERYL              | 11-0448  |
| 73.61            | 55.32 | 34.88  | 73.81  | 55.57  | 27.96  | 90                 | 100 | 85  | 75  | 60  | 50  | CHRYSOBERYL SYN          | 10-0082  |
| 73.65            | 43.57 | 63.49  | 52.24  | 70.37  | 86.79  | 90                 | 100 | 90  | 80  | 70  | 70  | SKUTTERUDITE             | 10-0497  |
| 73.70            | 39.46 | 42.00  | 55.97  | 31.09  | 49.02  | 75                 | 100 | 100 | 65  | 60  | 60  | ZOISITE                  | 11-0665  |
| 73.76            | 43.75 | 76.95  | 38.88  | 61.80  | 70.37  | 30                 | 100 | 40  | 25  | 20  | 20  | SPESSARTITE SYN          | 10-0354  |
| 73.76            | 45.02 | 81.56  | 38.12  | 55.05  | 68.91  | 85                 | 100 | 85  | 70  | 70  | 60  | MAGNETITE                | 11-0614  |
| 73.87            | 45.18 | 38.29  | 29.91  | 55.16  | 69.40  | 100                | 100 | 100 | 100 | 100 | 100 | MAGHEMITE SYN            | 15-0615  |
| 73.93            | 42.11 | 37.48  | 46.33  | 59.37  | 70.76  | 60                 | 100 | 60  | 45  | 25  | 25  | ANDRADITE SYN            | 10-0288  |
| 73.98            | 45.40 | 60.95  | 81.09  | 23.14  | 38.34  | 75                 | 100 | 75  | 75  | 50  | 50  | CHROMITE SYN             | 4-0759   |
| 74.45            | 42.33 | 37.62  | 46.53  | 48.63  | 71.34  | 60                 | 100 | 70  | 55  | 25  | 25  | UVAROVITE                | 11-0696  |
| 74.46            | 55.37 | 44.61  | 32.33  | 89.66  | 67.66  | 80                 | 100 | 90  | 75  | 50  | 45  | CORUNDUM (ALPHA ALUMINA) | 10-0173  |
| 74.52            | 45.22 | 83.12  | 55.80  | 38.34  | 123.44 | 90                 | 100 | 90  | 70  | 60  | 60  | CHROMITE                 | 3-0873   |
| 74.69            | 36.79 | 62.03  | 126.87 | 104.75 | 72.71  | 70                 | 100 | 90  | 70  | 60  | 55  | CHALCOPYRITE (GAMMA)     | 11-0570  |
| 74.74            | 36.29 | 59.91  | 101.48 | 23.43  | 69.89  | 90                 | 100 | 80  | 80  | 70  | 70  | SCHÉELITE                | 8-0145   |
| 74.95            | 35.32 | 33.17  | 31.36  | 47.36  | 37.37  | 50                 | 100 | 50  | 40  | 40  | 30  | ROCKBRIDGEITE            | 8-0159   |
| 75.00            | 37.29 | 63.00  | 128.17 | 62.58  | 129.96 | 60                 | 100 | 80  | 60  | 40  | 30  | CHALCOPYRITE             | 9-0423   |
| 75.53            | 18.27 | 41.84  | 78.46  | 43.18  | 48.87  | 70                 | 100 | 70  | 70  | 60  | 60  | MOLYBDENITE (3R)         | 17-0744  |
| 75.53            | 42.85 | 38.16  | 71.83  | 60.54  | 53.24  | 90                 | 100 | 80  | 80  | 70  | 60  | GROSSULARITE             | 3-0826   |
| 75.63            | 25.21 | 38.07  | 22.80  | 48.46  | 49.58  | 60                 | 100 | 60  | 50  | 50  | 50  | CHLORITOID               | 7-0398   |
| 75.63            | 46.18 | 39.02  | 83.82  | 56.40  | 70.90  | 60                 | 100 | 60  | 60  | 30  | 10  | GALAXITE                 | 12-0431  |
| 75.96            | 43.39 | 38.75  | 47.81  | 72.82  | *****  | 100                | 100 | 90  | 90  | 90  | *** | GARNET (FE,MN)           | 10-0367  |
| 76.09            | 51.69 | 44.24  | 92.46  | 155.70 | *****  | 60                 | 100 | 60  | 20  | 18  | *** | MANGANOSITE SYN          | 7-0230   |
| 76.09            | 63.45 | 37.62  | 108.82 | 90.75  | 113.07 | 100                | 84  | 68  | 68  | 63  | 63  | MICROLITE                | 3-1139   |
| 76.11            | 59.84 | 41.20  | 49.08  | 24.79  | 28.89  | 53                 | 100 | 67  | 40  | 20  | 20  | CRYOLITE                 | 1-1273   |
| 76.20            | 32.90 | 63.14  | 85.95  | 88.11  | 25.26  | 80                 | 100 | 90  | 80  | 80  | 60  | QUARTZ (BETA)            | 7-0346   |
| 76.20            | 45.98 | 41.25  | 77.96  | 36.66  | 22.71  | 50                 | 100 | 63  | 50  | 31  | 20  | HAUSMANNITE              | 1-1127   |
| 76.31            | 37.67 | 63.61  | 18.64  | 36.06  | 43.75  | 50                 | 100 | 60  | 25  | 20  | 20  | PYROCHLORE               | 13-0254  |
| 76.31            | 38.61 | 40.48  | 26.60  | 46.58  | 74.19  | 70                 | 100 | 80  | 60  | 60  | 60  | SPODUMENE (ALPHA)        | 9-0468   |
| 76.59            | 37.67 | 63.88  | 43.57  | 133.07 | 30.44  | 30                 | 100 | 60  | 20  | 20  | 10  | TETRAHEDRITE             | 11-0107  |
| 76.59            | 42.05 | 60.98  | 77.12  | 41.73  | 42.22  | 100                | 100 | 100 | 100 | 80  | 80  | PEROVSKITE SYN           | 9-0365   |
| 76.66            | 46.58 | 84.99  | 39.45  | 57.01  | 23.79  | 90                 | 100 | 90  | 70  | 70  | 50  | HERCYNITE                | 7-0068   |
| 76.77            | 42.05 | 60.95  | 77.35  | 91.78  | 106.36 | 70                 | 100 | 90  | 70  | 60  | 50  | PEROVSKITE               | 8-0091   |
| 76.95            | 43.75 | 73.76  | 38.88  | 61.80  | 70.37  | 40                 | 100 | 30  | 25  | 20  | 20  | SPESSARTITE SYN          | 10-0354  |
| 77.28            | 38.29 | 64.63  | 44.43  | 110.21 | 114.62 | 90                 | 100 | 90  | 60  | 60  | 60  | YTTRIOANTALITE           | 11-0116  |
| 77.28            | 43.29 | 41.58  | 23.06  | 30.67  | 46.68  | 80                 | 100 | 70  | 60  | 60  | 60  | LAWSONITE                | 13-0533  |
| 77.35            | 43.75 | 127.51 | 73.98  | 99.41  | 132.09 | 80                 | 100 | 70  | 60  | 60  | 60  | SPESSARTITE              | 2-0992   |
| 77.59            | 38.20 | 64.55  | 44.47  | 110.49 | 81.63  | 40                 | 100 | 45  | 20  | 20  | 15  | BETAFITE                 | 13-0197  |
| 77.87            | 36.39 | 32.38  | 47.57  | 52.19  | 53.50  | 50                 | 100 | 60  | 40  | 40  | 20  | CORONADITE               | 7-0361   |
| 77.96            | 44.10 | 129.73 | 39.31  | 74.52  | 100.48 | 100                | 100 | 70  | 60  | 60  | 60  | PYROPE                   | 2-1008   |
| 77.96            | 44.30 | 39.41  | 74.57  | 27.74  | 62.54  | 50                 | 100 | 40  | 40  | 30  | 30  | ALMANDITE                | 9-0427   |
| 78.19            | 5.91  | 43.57  | 12.22  | 24.58  | 31.13  | 70                 | 100 | 60  | 50  | 50  | 50  | SAPONITE                 | 6-0002   |
| 78.19            | 31.49 | 15.52  | 24.37  | 45.59  | 43.06  | 100                | 100 | 80  | 70  | 50  | 40  | SERPENTINE (AL) SYN      | 11-0096  |
| 78.25            | 6.54  | 33.41  | 13.09  | 24.42  | 19.60  | 70                 | 100 | 80  | 50  | 50  | 40  | SAPONITE SYN             | 12-0168  |
| 78.25            | 38.47 | 65.08  | 44.65  | 111.92 | 137.02 | 50                 | 100 | 80  | 30  | 30  | 30  | TENNANTITE               | 11-0102  |
| 78.38            | 7.13  | 24.53  | 43.22  | *****  | *****  | 50                 | 100 | 40  | 30  | *** | *** | SAPONITE FE RICH         | 12-0160  |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME           | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|------------------------|----------|
| 78.46            | 42.67 | 61.26  | 62.33  | 39.86  | 41.35  | 70                 | 100 | 70  | 60  | 50  | 50  | MERWINITE              | 4-0728   |
| 78.50            | 7.93  | 32.61  | 24.47  | 32.03  | 43.39  | 60                 | 100 | 60  | 40  | 40  | 40  | VERMICULITE            | 10-0439  |
| 78.50            | 44.43 | 39.52  | 46.72  | 75.11  | 51.07  | 50                 | 100 | 60  | 40  | 30  | 25  | PYROPE SYN             | 15-0742  |
| 78.56            | 7.82  | 30.61  | 24.47  | 22.52  | 94.42  | 90                 | 100 | 80  | 50  | 40  | 40  | SAPONITE               | 13-0086  |
| 78.56            | 45.79 | 24.42  | 11.96  | 36.06  | 43.39  | 64                 | 100 | 64  | 48  | 40  | 32  | TALC                   | 3-0881   |
| 78.68            | 7.82  | 24.47  | 43.48  | 44.28  | 45.11  | 70                 | 100 | 60  | 50  | 50  | 45  | VERMICULITE            | 16-0613  |
| 79.11            | 7.21  | 24.50  | 43.00  | 44.43  | 46.94  | 100                | 100 | 100 | 80  | 80  | 40  | NONTRONITE             | 2-0008   |
| 79.18            | 6.69  | 24.80  | 44.10  | 95.37  | 30.35  | 90                 | 100 | 80  | 50  | 50  | 40  | SAPONITE               | 11-0056  |
| 79.18            | 11.34 | 42.87  | 47.60  | 70.42  | 95.37  | 80                 | 100 | 60  | 60  | 50  | 50  | GARNIERITE             | 2-0060   |
| 79.72            | 37.37 | 40.30  | 46.94  | 55.45  | 64.23  | 60                 | 100 | 60  | 40  | 30  | 30  | NAGYAGITE              | 8-0003   |
| 79.72            | 43.52 | 63.08  | 111.62 | 129.51 | 95.25  | 20                 | 100 | 50  | 20  | 16  | 8   | ALABANDITE             | 6-0518   |
| 79.81            | 46.28 | 53.96  | 97.65  | 37.42  | 103.56 | 27                 | 100 | 37  | 17  | 9   | 4   | CUPRITE SYN            | 5-0667   |
| 80.37            | 43.52 | 63.45  | 111.89 | 130.39 | 37.44  | 20                 | 100 | 50  | 20  | 16  | 14  | ALABANDITE             | 6-0518   |
| 80.37            | 44.61 | 37.78  | 72.85  | 123.23 | 161.92 | 80                 | 100 | 70  | 70  | 50  | 50  | FRANKLINITE            | 10-0467  |
| 80.84            | 38.75 | 13.41  | 45.79  | 72.51  | 19.50  | 100                | 80  | 60  | 45  | 45  | 30  | CHRYSOCOLLA            | 11-0322  |
| 80.90            | 39.67 | 46.08  | 67.21  | 117.01 | 85.35  | 32                 | 100 | 50  | 31  | 10  | 9   | LEAD SYN               | 4-0686   |
| 81.09            | 35.24 | 39.16  | 74.52  | 88.36  | 44.65  | 80                 | 100 | 80  | 60  | 60  | 50  | HYPERSTHENE            | 2-0520   |
| 81.16            | 15.52 | 31.41  | 73.44  | 25.64  | 75.28  | 90                 | 100 | 80  | 70  | 60  | 60  | KAOLINITE              | 14-0164  |
| 81.16            | 54.76 | *****  | *****  | 105.62 | 46.97  | 52                 | 100 | *** | *** | 12  | 10  | PERICLASE              | 4-0829   |
| 81.23            | 31.40 | 15.51  | 48.88  | 24.98  | 44.37  | 100                | 100 | 100 | 90  | 80  | 80  | KAOLINITE (DISORDERED) | 6-0221   |
| 81.49            | 25.74 | 45.18  | 35.12  | 11.57  | 47.64  | 90                 | 100 | 90  | 80  | 70  | 60  | PARAGONITE             | 9-0428   |
| 81.56            | 45.02 | 73.76  | 38.12  | 55.05  | 68.91  | 85                 | 100 | 85  | 70  | 70  | 60  | MAGNETITE              | 11-0614  |
| 81.56            | 49.09 | 25.79  | 44.59  | 45.90  | 25.09  | 100                | 95  | 85  | 85  | 85  | 75  | KAOLINITE              | 12-0447  |
| 81.62            | 45.07 | 38.16  | 73.80  | 55.05  | 125.21 | 35                 | 100 | 40  | 30  | 25  | 12  | MAGNESIOFERRITE        | 17-0464  |
| 81.76            | 25.74 | 33.51  | 38.75  | 40.33  | 46.38  | 80                 | 100 | 50  | 20  | 20  | 20  | CHRYSOCOLLA            | 3-0219   |
| 81.76            | 45.02 | 55.22  | 73.98  | 38.07  | 47.40  | 60                 | 100 | 50  | 40  | 30  | 25  | SPINEL (MN,NI)         | 1-1110   |
| 81.76            | 45.40 | 35.47  | 25.50  | 11.71  | 47.40  | 100                | 90  | 70  | 60  | 50  | 50  | PARAGONITE SYN         | 10-0420  |
| 81.83            | 50.85 | 46.82  | 67.70  | 30.86  | 42.19  | 70                 | 100 | 70  | 65  | 50  | 50  | HUMITE                 | 12-0755  |
| 82.23            | 45.36 | 38.41  | 55.39  | 74.89  | 69.47  | 50                 | 100 | 50  | 30  | 30  | 16  | SPINEL (LI) SYN        | 13-0207  |
| 83.04            | 41.38 | 51.45  | 89.89  | *****  | *****  | 60                 | 100 | 80  | 60  | *** | *** | MERCURY                | 9-0253   |
| 83.12            | 45.22 | 74.52  | 55.80  | 38.34  | 123.44 | 90                 | 100 | 90  | 70  | 60  | 60  | CHROMITE               | 3-0873   |
| 83.75            | 55.45 | 57.24  | 84.47  | 30.92  | 93.39  | 50                 | 100 | 100 | 50  | 40  | 40  | BETA DOMEYKITE         | 14-0454  |
| 84.47            | 34.86 | 50.22  | 95.25  | 62.70  | 129.51 | 50                 | 100 | 80  | 40  | 30  | 20  | ALTAITE                | 8-0028   |
| 84.54            | 44.65 | 42.37  | 36.42  | 72.45  | 40.63  | 100                | 100 | 90  | 80  | 80  | 70  | HORNBLÉNDÉ             | 11-0493  |
| 84.99            | 46.58 | 76.66  | 39.45  | 57.01  | 23.79  | 90                 | 100 | 90  | 70  | 70  | 50  | HERCYNITE              | 7-0068   |
| 85.06            | 57.10 | 111.77 | *****  | 145.98 | *****  | 19                 | 100 | 30  | *** | 9   | *** | IRON (ALPHA)           | 6-0696   |
| 85.20            | 46.73 | 39.55  | 77.06  | 71.94  | 103.32 | 50                 | 100 | 90  | 40  | 30  | 30  | GAHNITE (FE)           | 12-0267  |
| 85.27            | 37.80 | 73.44  | 127.51 | 129.73 | 129.73 | 100                | 100 | 100 | 100 | 100 | 100 | AUGITE                 | 3-0623   |
| 85.27            | 46.79 | 39.45  | 57.01  | 76.77  | 71.90  | 100                | 100 | 80  | 80  | 80  | 60  | SPINEL SYN             | 2-0175   |
| 85.35            | 46.82 | 39.58  | 77.01  | 71.90  | 133.83 | 43                 | 100 | 84  | 40  | 24  | 12  | GAHNITE SYN            | 5-0669   |
| 85.35            | 46.86 | 57.28  | 77.06  | 39.63  | *****  | 58                 | 100 | 58  | 45  | 40  | *** | SPINEL SYN             | 5-0672   |
| 85.95            | 41.73 | 71.55  | 127.73 | 29.30  | 134.07 | 80                 | 100 | 90  | 70  | 60  | 60  | BIXBYITE               | 8-0010   |
| 87.56            | 47.81 | 58.58  | 78.56  | 40.33  | 73.44  | 100                | 100 | 70  | 60  | 50  | 40  | SPINEL (LI)            | 3-0911   |
| 89.40            | 51.19 | 59.68  | 111.20 | *****  | *****  | 25                 | 100 | 42  | 24  | *** | *** | PALLADIUM              | 5-0681   |
| 89.41            | 35.47 | 33.62  | 59.17  | 60.08  | 60.26  | 75                 | 100 | 65  | 55  | 50  | 50  | KYANITE (DISTHENE)     | 11-0046  |

| TWO-THETA (IRON) |       |        |        |        |        | RELATIVE INTENSITY |     |     |     |     |     | MINERAL NAME        | FILE NO. |
|------------------|-------|--------|--------|--------|--------|--------------------|-----|-----|-----|-----|-----|---------------------|----------|
| 89.64            | 36.26 | 51.45  | 86.22  | 53.45  | 100.26 | 67                 | 100 | 70  | 63  | 56  | 40  | ANTIMONY            | 5-0562   |
| 89.89            | 49.99 | 47.15  | 43.52  | 66.28  | 79.72  | 40                 | 100 | 40  | 30  | 30  | 30  | DYSCRASITE          | 10-0452  |
| 90.00            | 35.47 | 60.26  | 45.22  | 48.69  | 59.23  | 75                 | 100 | 50  | 40  | 40  | 40  | KYANITE             | 3-0513   |
| 91.60            | 49.08 | *****  | 71.67  | 135.60 | 111.82 | 38                 | 100 | *** | 21  | 19  | 13  | TANTALUM            | 4-0788   |
| 98.57            | 55.28 | 64.80  | 125.41 | *****  | *****  | 20                 | 100 | 46  | 17  | *** | *** | COPPER              | 4-0836   |
| 100.36           | 40.45 | 58.20  | 73.37  | 114.62 | 34.75  | 40                 | 100 | 60  | 30  | 30  | 20  | EMBOLITE            | 14-0255  |
| 100.37           | 56.09 | 128.59 | *****  | *****  | *****  | 27                 | 100 | 16  | *** | *** | *** | DIAMOND             | 6-0675   |
| 103.67           | 33.41 | 70.33  | 114.00 | 154.06 | 56.82  | 6                  | 100 | 8   | 6   | 4   | 3   | GRAPHITE SYN        | 12-0212  |
| 103.80           | 48.49 | 56.57  | 84.18  | *****  | *****  | 26                 | 100 | 40  | 25  | *** | *** | SILVER              | 4-0783   |
| 103.91           | 48.58 | 56.73  | 84.40  | *****  | *****  | 36                 | 100 | 52  | 32  | *** | *** | GOLD                | 4-0784   |
| 109.93           | 50.64 | 59.17  | 88.59  | *****  | *****  | 33                 | 100 | 53  | 31  | *** | *** | PLATINUM            | 4-0802   |
| 111.62           | 51.43 | 60.19  | 89.89  | 119.57 | *****  | 70                 | 100 | 50  | 40  | 20  | *** | IRIDOSMINE          | 17-0213  |
| 111.77           | 57.10 | 85.06  | *****  | 145.98 | *****  | 30                 | 100 | 19  | *** | 9   | *** | IRON (ALPHA)        | 6-0696   |
| 114.62           | 65.04 | 37.91  | 54.60  | 37.89  | 93.39  | 70                 | 100 | 60  | 50  | 40  | 40  | SPERRYLITE          | 9-0452   |
| 127.07           | 36.90 | 62.25  | 74.52  | 105.62 | 143.49 | 75                 | 100 | 97  | 70  | 60  | 60  | CHALCOPYRITE (BETA) | 11-0515  |
| 127.51           | 43.75 | 77.35  | 73.98  | 99.41  | 132.09 | 70                 | 100 | 80  | 60  | 60  | 60  | SPESSARTITE         | 2-0992   |
| 128.59           | 56.09 | 100.37 | *****  | *****  | *****  | 16                 | 100 | 27  | *** | *** | *** | DIAMOND             | 6-0675   |
| 129.73           | 44.10 | 77.96  | 39.31  | 74.52  | 100.48 | 70                 | 100 | 100 | 60  | 60  | 60  | PYROPE              | 2-1008   |
| *****            | 54.76 | 81.16  | *****  | 105.62 | 46.97  | ***                | 100 | 52  | *** | 12  | 10  | PERICLASE           | 4-0829   |
| *****            | 40.63 | 67.92  | 31.31  | 54.10  | 59.14  | ***                | 100 | 80  | 60  | 60  | 60  | SIDERITE            | 8-0133   |
| *****            | 49.08 | 91.60  | 71.67  | 135.60 | 111.82 | ***                | 100 | 38  | 21  | 19  | 13  | TANTALUM            | 4-0788   |