K-Ar dates on intrusive rocks and alteration associated with the Lakeshore porphyry copper deposit

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SHORT NOTES

K-AR DATES ON INTRUSIVE ROCKS AND ALTERATION ASSOCIATED WITH THE LAKESHORE PORPHYRY COPPER DEPOSIT, PINAL COUNTY, ARIZONA

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The four dates reported were run by Geochron Laboratories, Inc., for the Hecla Mining Company. The analytical methods used were reported in Isochron/West, No. 1 (January, 1971), p. 9. The constants used in the age calculations are: $\lambda_e = 0.585 \times 10^{-10}$/yr., $\lambda_\beta = 4.72 \times 10^{-10}$/yr; $K^{40}/K_{total} = 1.22 \times 10^{-4}$ g./g. All samples were collected by J. J. Quinlan, chief geologist, Lakeshore Mine, and his staff. The Lakeshore mine is 30 miles south of Casa Grande on the Papago Indian Reservation.

The copper mineralization at the Lakeshore mine is closely associated with the composite Lakeshore stock as described by Harper and Reynolds, 1969. The Lakeshore stock is composed of two facies: an equigranular quartz monzonite and a quartz monzonite porphyry. The copper mineralization is younger than the quartz monzonite porphyry, but is thought to be closely associated with it. Likewise the quartz monzonite porphyry appears to grade into the quartz monzonite and on this basis the two rocks were assumed to be of about the same age. Age dating has substantiated this geologic observation as well as indicating that the sericite alteration associated with the ore is somewhat younger than the intrusives but also closely associated.

1. G-B1654/H-LS8 K-Ar (biotite) 67.3±2.2 m.y.

Lakeshore stock. Equigranular biotite quartz monzonite (from south decline + 471 feet, Lakeshore Mine; approximate center Sec. 31, T10S, R5E). Analytical data: K = 6.068%; $\overset{*}{Ar}^{40} = 0.0301$ ppm; $\overset{*}{Ar}^{40}/\Sigma Ar^{40} = 64\%, 76\%$; analyzed separate was 80% biotite, 20% chlorite, very minor adhering matrix. Comment: Damon and Mauger (1966) dated this same stock rock at 65.9±6.6 m.y.

2. G-B1652/H-LS6 K-Ar (biotite) 67.1±2.2 m.y.

Lakeshore stock. Quartz monzonite porphyry (from DDH No. H-3, 1200 - 1240 ft; SW/4 Sec. 25, T10S, R4E). Analytical data: K = 6.740%; $\overset{*}{Ar}^{40} = 0.0329$ ppm; $\overset{*}{Ar}^{40}/\Sigma Ar^{40} = 69\%, 70\%$; analyzed separate greater than 95% biotite. Minor chlorite present.

3. G-B1653/H-LS7 K-Ar (biotite) 67.3±2.2 m.y.

Lakeshore stock. Quartz monzonite porphyry (from DDH No. P-41, 1178 - 1244 ft.; SW/4 Sec. 25, T10S, R4E). Analytical data: K = 7.149%; $\overset{*}{Ar}^{40} = 0.0350$ ppm; $\overset{*}{Ar}^{40}/\Sigma Ar^{40} = 75\%$; analyzed separate greater than 95% purity, remainder is adhering matrix material.

4. G-M1655/H-LS7 K-Ar (sericite) 64.2±2.1 m.y.

Lakeshore stock. Intensely altered quartz monzonite porphyry (from DDH No. P-41, 1985 -2021 ft.; SW/4 Sec. 25, T10S. R4E). Analytical data: K = 7.140%; $\overset{*}{Ar}^{40} = 0.0333$ ppm; $\overset{*}{Ar}^{40}/\Sigma Ar^{40} = 86\%, 88\%$; analyzed separate contained about 80% sericite, 10% quartz, and 10% feldspar. Comment: The sericite alteration is closely associated with the chalcopyrite-pyrite mineralization; thus this age date is interpreted as representing the age of the sulphide mineralization within a reasonable order of magnitude.

REFERENCES

Harper, H. E., and Reynolds, J. R. (1969) *The Lakeshore copper deposit:* Mining Congress Journal, Nov., 1969.

Damon, P. E., and Mauger, R. L. (1966) *Epeirogeny-Orogeny viewed from the Basin and Range Province:* Soc. Mining Engineers Trans., Mar., 1966, p. 104.