Sr isotope initial ratios from hydrothermal vein deposits of fluorite and carbonates I: deposits in Mineral County, Nevada

D.G. Brookins

Isochron/West, Bulletin of Isotopic Geochronology, v. 34, pp. 17-18

This page is intentionally left blank to maintain order of facing pages.

SR ISOTOPE INITIAL RATIOS FROM HYDROTHERMAL VEIN DEPOSITS OF FLUORITE AND CARBONATES I: DEPOSITS IN MINERAL COUNTY, NEVADA

D. G. BROOKINS *Department of Geology, University of New Mexico, Albuquerque, NM 87131*

The $^{87}Sr/^{86}Sr$ ratios and total Sr content for eighteen samples of hydrothermal vein fluorite and carbonate minerals are reported for four fluorspar deposits from Mineral County, Montana. The deposits are Laramide in age (Rosenberg and others, 1970). Preliminary estimates of temperature of formation of the fluorites and carbonates range from 410°C to 425°C (Metz, 1971; Brookins and others, 1971).

The samples were analyzed by isotope dilution and/or x-ray fluorescence for total Sr; reported values are precise to ± 3–5 percent of the reported values. Rubidium was not detected in any of the samples by x-ray fluorescence; the level of detection is 10 ppm for the method. Strontium isotopic ratios were analyzed at both the University of New Mexico and Kansas State University by conventional mass spectrometry. Replicate runs of the Eimer and Amend $SrCO_3$ yielded $0.7080_3 \pm 0.0000_4$ (two sigma). M. S. Abashian, H. A. Vogler, and K. T. Emanuel assisted with the analytical work.

DISCUSSION

The samples analyzed contain very high $^{87}Sr/^{86}Sr$ ratios and low total Sr for all samples relative to sedimentary carbonates and carbonatites (Faure and Powell, 1972). This is characteristic of other hydrothermal vein fluorites and carbonate minerals reported elsewhere (Brookins and Emanuel, 1982).

SAMPLE DESCRIPTIONS

Group A: Snowbird Deposit (center S19,T12N,R25W, 46°46'45"N, 114°47'30"W; unsurveyed part Mineral Co., MT).

1. *SB-111A*
   Massive dolomite. Sr content = 14 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (dolomite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8854

2. *SB-117*
   Vein-filling calcite. Sr content = 30 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8795

3. *SB-124C*
   Vein-filling calcite. Sr content = 26 ppm. *Collected by:* M. C. Metz; *data from:* Univ. New Mex. Geochronology Laboratory.
   (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8695

4. *SB-124D*
   Dolomite from brecciated zone. Sr content = 18 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (dolomite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8970

5. *SB-128*
   Well crystallized fluorite cubes. Sr content = 5 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (fluorite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8487

6. *SB-134C*
   Vein-filling calcite. Sr content = 32 ppm. *Collected by:* M. C. Metz; *data from:* Univ. New Mex. Geochronology Laboratory.
   (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8700

7. *SB-134D*
   Vein-filling dolomite. Sr content = 15 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (dolomite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8580

8. *SB-134F*
   Fluorite from brecciated zone. Sr content = 8 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (fluorite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8531

9. *SB-135*
   Vein calcite. Sr content = 20 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
   (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8965

10. *SB-138*
    Vein fluorite. Sr content = 9 ppm. *Collected by:* M. C. Metz; *data from:* Univ. New Mex. Geochronology Laboratory.
    (fluorite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8125

11. *SB-140*
    Calcite from brecciated zone. Sr content = 25 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
    (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.8250

Group B: Spar Deposit (SE¼ SE¼ S25,T17N,R28W, 47°01'16"N, 114°59'34"W; unsurveyed part Mineral Co., MT).

12. *SP-1a*
    Large calcite rhombohedral crystals. Sr content = 250 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
    (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7726

13. *SP-1b*
    Vein calcite. Sr content = 115 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
    (calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7734

14. *SP-2*
    Vein fluorite. Sr content = 42 ppm. *Collected by:*

M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
(fluorite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7980

15. *SP-3*
Massive ankerite. Sr content = 38 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
(ankerite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7870

Group C: Spires Deposit (SE¼ S26,T17N,R28W, 47°01'19"N, 114°58'53"W; unsurveyed part Mineral Co., MT).

16. *SPI-1a*
Vein-filling calcite. Sr content = 32 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
(calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7380

17. *SPI-1b*
Massive calcite. Sr content = 35 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
(calcite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7382

Group D: White Cap Deposit (center S16,T13N,R22W, 46°52'38"N, 114°35'08"W; unsurveyed part Mineral Co., MT).

18. *WC-1*
Vein-filling dolomite. Sr content = 45 ppm. *Collected by:* M. C. Metz; *data from:* Kans. State Univ. (D. Brookins, analyst).
(dolomite) $^{87}Sr/^{86}Sr$ initial ratio = 0.7711

REFERENCES

Brookins, D. G., and Emanuel, K. T. (1982) Sr isotope initial ratios from hydrothermal vein deposits of fluorite and carbonates II: deposits in the Zuni Mountains, New Mexico: Isochron/West, no. 33.

Brookins, D. G., Metz, M. C., Rosenberg, P. E., and Zartman, R. E. (1971) Strontium geochemistry of some quartz-fluorite-carbonate veins from western Montana: Trans. Amer. Geophys. Union, v. 73, p. 364.

Faure, G., and Powell, J. L. (1972) Strontium isotope geology: Springer-Verlag Pub., Inc., New York.

Metz, M. C. (1971) The geology of the Snowbird deposit, Mineral County, Montana: M. S. thesis, Wash. State Univ.

Rosenberg, P. E., Metz, M. C., Brookins, D. G., and Zartman, R. E. (1970) Genesis of a pegmatitic, quartz-carbonate deposit, western Montana: Geol. Soc. Amer. Prog. with Abs., v. 2, p. 669.