K-Ar ages of mineralization at Round Mountain and Manhattan, Nye County, Nevada

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K-AR AGES OF MINERALIZATION AT ROUND MOUNTAIN AND MANHATTAN, NYE COUNTY, NEVADA

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This report is part of a series of K-Ar geochronological studies of epithermal vein deposits from Nevada and eastern California. Analytical equipment and procedures are the same as those described by Silberman and McKee (1971). The plus-minus figures represent analytical uncertainty calculated at one standard deviation. Constants used in the calculation of the K-Ar ages are: $\lambda_\epsilon = 0.585 \times 10^{-10}$ yr^{-1}; $\lambda_\beta = 4.72 \times 10^{-10}$ yr^{-1}; $K^{40}/K^{40}{}_{total} = 1.22 \times 10^{-4}$ gm/gm. Abbreviations used are: $^*Ar^{40}$ = radiogenic argon-40; ΣAr^{40} = total argon-40.

At Round Mountain in northern Nye County, Nevada, gold, along with quartz, adularia, alunite, and minor fluorite, pyrite, and other minerals, was deposited in veins along high- and low-angle faults in densely welded rhyolite ash-flow tuff. The veins are oxidized, and iron and manganese oxides are abundant in places; sulfide minerals may have been moderately abundant in the preoxidation veins, and gold may have been originally closely associated with pyrite. The veins show comb structure; quartz, adularia, alunite, and the sulfide minerals all appear to be primary (Ferguson, 1921).

The rhyolite ash flow at Round Mountain contains abundant crystals 1 to 3 mm in diameter of quartz and sanidine and some plagioclase and biotite set in a devitrified groundmass. The rock is locally argillized and silicified. Sanidine separated from an unaltered sample of the tuff yielded a K-Ar age of 26.1 m.y.

Adularia (sanidine structure) separated from a quartz-adularia vein near the summit of the hill at Round Mountain yielded a K-Ar age of 25.2 m.y.

At Manhattan, 10 miles south of Round Mountain, gold deposits occur as broad zones of innumerable small veinlets that contain gold-bearing quartz and calcite with some adularia, pyrite, iron and manganese oxides, and a few other minerals, in quartz-mica schist (metamorphosed siltstone containing a few thin sandstone and conglomerate beds) of Cambrian age. The minerals other than iron and manganese oxides all appear to be primary (Ferguson, 1924). Adularia (sanidine structure) collected from dump material on Gold Hill has been dated by K-Ar method at 16.0 m.y.

The age of mineralization at Manhattan is typical of a large group of epithermal vein mineral deposits in central and northern Nevada in a variety of host rocks that formed between about 16 and 14 m.y. ago, after the onset of Basin and Range faulting that permitted ascent of hot, mineralizing solutions (Silberman and McKee, 1974).

The age of mineralization at Round Mountain is atypical of ages of mineralization in central Nevada. It is one of only two epithermal ore deposits (Wonder is the second) associated with ash-flow tuffs deposited during the time interval when ash flows dominated volcanic activity in the region, between approximately 35 and 20 m.y. ago. Most epithermal deposits are either older or younger than this and are associated with or are found within intermediate volcanic or plutonic rocks or Paleozoic to Mesozoic sedimentary rocks (Silberman and McKee, 1974).

SAMPLE DESCRIPTIONS

1. <u>USGS RM 1</u> K-Ar (sanidine) 26.1±0.8 m.y.

Porphyritic rhyolite ash-flow tuff (sec. 19, T10N, R43E; 38°42′30″N, 117°05′00″W; Round Mountain, Nye Co., NV). Analytical data: K_2O = 12.26%; $^*Ar^{40} = 4.758 \times 10^{-10}$ mole/gm; $^*Ar^{40}/\Sigma Ar^{40}$ = 75.8%. Collected by: B. B. Goddard, Copper Range Exploration Co., Inc., Round Mountain, Nevada. Dated by: M. L. Silberman, U. S. Geological Survey, Menlo Park.

2. USGS-DRS 146-68 K-Ar (adularia, sanidine structure) 25.2±0.8 m.y.
Adularia (sec. 19, T10N, R43E; 38°42′20″N, 117°04′30″W; Round Mountain, Nye Co., NV) as small (1 mm) euhedral crystals, intergrown with quartz, occurring as irregular, vuggy fracture fillings up to 1 mm across, coated with limonite in altered rhyolite ash-flow tuff. Analytical data: K_2O = 15.76%; $^*Ar^{40}$ = 5.915 x 10^{-10} mole/gm; $^*Ar^{40}/\Sigma Ar^{40}$ = 71.5%. Collected by: D. R. Shawe, U. S. Geological Survey, Denver. Dated by: M. L. Silberman, U. S. Geological Survey, Menlo Park. Comment: The adularia has the sanidine structure as determined by X-ray diffraction, according to the three reflection methods of Wright (1968).

3. USGS-DRS 120-68 K-Ar (adularia, sanidine structure) 16.0±0.5 m.y.
Adularia (sec. 19, T8N, R43E; 38°32′10″N, 117°04′10″W; Gold Hill, Manhattan, Nye Co., NV) as fine euhedral crystals intergrown with quartz, occurring as thin fracture coatings on dark-gray micaceous argillite. Analytical data: K_2O = 15.97%; $^*Ar^{40}$ = 3.790 x 10^{-10} mole/gm; $^*Ar^{40}/\Sigma Ar^{40}$ = 90.3%. Collected by: D. R. Shawe, U. S. Geological Survey, Denver. Dated by: M. L. Silberman, U. S. Geological Survey, Menlo Park. Comment: The feldspar has sanidine structure as determined by X-ray diffraction, according to the three reflection methods of Wright (1968).

REFERENCES

Ferguson, H. G. (1921) The Round Mountain district, Nevada: U. S. Geol. Survey Bull. 725, p. 383-406.

___(1924) Geology and ore deposits of the Manhattan district, Nevada: U. S. Geol. Survey Bull. 723.

Silberman, M. L., and McKee, E. H. (1971) K-Ar ages of granitic plutons in north-central Nevada: Isochron/West, no. 1, p. 15-32.

___(1974) Ages of Tertiary volcanic rocks and hydrothermal precious metal deposits in central and western Nevada: Nevada Bur. Mines and Geology Report 19, p. 67-72.

Wright, T. L. (1968) X-ray and optical study of alkali feldspar—(Pt.) 2, An X-ray method for determining the composition and structural state from measurement of 2θ values for three reflections: Am. Mineralogist, v. 53, nos. 1-2, p. 88-104.