

## ***K-Ar age of ore deposition, Tuscarora mining district, Elko County, Nevada***

Edwin H. McKee and Robert R. Coats

Isochron/West, Bulletin of Isotopic Geochronology, v. 13, pp. 11

Downloaded from: <https://geoinfo.nmt.edu/publications/periodicals/isochronwest/home.cfm?Issue=13>

---

Isochron/West was published at irregular intervals from 1971 to 1996. The journal was patterned after the journal *Radiocarbon* and covered isotopic age-dating (except carbon-14) on rocks and minerals from the Western Hemisphere. Initially, the geographic scope of papers was restricted to the western half of the United States, but was later expanded. The journal was sponsored and staffed by the New Mexico Bureau of Mines (now *Geology*) & Mineral Resources and the Nevada Bureau of Mines & Geology.



**ISOCHRON/WEST**  
*A Bulletin of Isotopic Geochronology*

All back-issue papers are available for free: <https://geoinfo.nmt.edu/publications/periodicals/isochronwest>

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

## K-AR AGE OF ORE DEPOSITION, TUSCARORA MINING DISTRICT, ELKO COUNTY, NEVADA

Edwin H. McKee  
Robert R. Coats  
U. S. Geological Survey  
Menlo Park, CA 94025

This report is one of a series of K-Ar geochronological studies of epithermal gold and silver deposits in Nevada being carried out jointly by staffs of the Nevada Bureau of Mines and Geology and the U. S. Geological Survey. Analytical equipment and procedures are the same as those described in McKee and others (1971). Analytical uncertainties of the ages were calculated at one standard deviation. Constants used in the calculation of the K-Ar ages are:  $\lambda_e = 0.585 \times 10^{-10} \text{ yr}^{-1}$ ;  $\lambda_\beta = 4.72 \times 10^{-10} \text{ yr}^{-1}$ ;  $K^{40}/K \text{ total} = 1.22 \times 10^{-4} \text{ gm/gm}$ . Abbreviations used are:  $*\text{Ar}^{40}$  = radiogenic argon-40;  $\Sigma\text{Ar}^{40}$  = total argon-40.

### GEOLOGY

The Tuscarora mining district is located in the western part of Elko County, Nevada, about 40 mi (65 km) northwest of Elko. The district was discovered in 1867 and produced only placer gold until 1871 when lode and vein deposits were discovered. Placer mining accounted for about \$700,000 (Nolan, 1936) and lode mines about \$4 million. Recorded production through 1941 was 128,165 ounces of gold and 7,138,684 ounces of silver (Granger and others, 1957) with most production before the turn of the century.

The mineralized area is underlain by a series of bedded rhyolite tuffs, andesite flows, and irregularly shaped andesite intrusive bodies. These rocks are cut by many faults, mostly with northerly trends and with variable dips and displacements. Mineralization consists of narrow veins in andesite that are rich in silver (weight ratio of silver to gold of about 150 to 1) and wide, poorly defined, gold-bearing fracture zones in the bedded tuffaceous rocks (weight ratio of silver to gold of 4 or 5 to 1).

The principal ore minerals according to amount are argentite, stephanite, proustite, pyrargyrite, pyrite, enargite, arsenopyrite, bornite, chalcocopyrite, sphalerite, and galena (Nolan, 1936), and the gangue minerals are quartz, adularia, and calcite.

No radiometric age determinations have been made on the host rocks at Tuscarora, but volcanic and plutonic rocks in the region have yielded K-Ar ages that suggest late Eocene and early Oligocene ages. For example, biotite from pumice from a rhyodacite about 6 miles (9.6 km) south of Tuscarora is dated at about 41 m.y. (unpub. date, R. R. Coats). The granodiorite pluton at Mount Neva, 7 miles (11.2 km) west of Tuscarora yielded an age of  $38.4 \pm 1.5$  m.y. (Coats and McKee, 1972), which is late Eocene or early Oligocene. The age of mineralization at Tuscarora determined by a K-Ar date on adularia from the De Frees vein, which is of the high-silver type, is  $38.4 \pm 1.5$  m.y. This age suggests that alteration and mineralization at Tuscarora may be related to emplacement of the Mount Neva pluton or at least to higher level hydrothermal activity that may be part of the regional igneous activity.

The 38-m.y. age of mineralization at Tuscarora dates it as the oldest Tertiary epithermal vein mineral deposit in northern or central Nevada. All other vein deposits for which age determinations have been made in this region are of Miocene or older age (Silberman and McKee, 1974).

### SAMPLE DESCRIPTION

USGS (M) 01063

K-Ar

(adularia)  $38.4 \pm 1.5$

Coats no. 67NC13

Adularia ( $41^\circ 19' 20'' \text{N}$ ,  $115^\circ 51' 40'' \text{W}$ ; from the De Frees vein, Grand Prize claim, at Tuscarora; Elko Co., NV). Analytical data:  $\text{K}_2\text{O} = 14.77, 14.87\%$ ,  $*\text{Ar}^{40} = 8.50 \times 10^{-10} \text{ mole/gm}$ ,  $*\text{Ar}^{40}/\Sigma\text{Ar}^{40} = 75\%$ , collected by R. R. Coats, U. S. Geological Survey. Dated by: E. H. McKee, U. S. Geological Survey. Comment: Most of the available adularia at Tuscarora is in the form of crystals, generally less than 5 mm in greatest dimension, that, with prisms of quartz, line open fractures. A study of the adularia by X-ray diffractometry showed, using the 3 reflection method of Wright (1968, p. 88-93), the adularia to be intermediate in structure between orthoclase

and high sanidine. The (131) peak was not accompanied by a recognizable ( $\overline{131}$ ) peak indicating that no triclinic component of feldspar is present. The value of  $20.96^\circ 2\theta$  (CuK $\alpha$ ) for ( $\overline{201}$ ) corresponds to a composition of 96 wt percent Or, according to Wright's diagram (his Fig. 4), whereas the K<sub>2</sub>O content indicates 87.5 wt percent Or, most probably due to intergrowth of fine-grained quartz, which is very common in hydrothermal K-feldspars. A feldspar of this composition should be highly retentive of argon (Evernden and James, 1964, p. 918).

## REFERENCES

- Coats, R. R., and McKee, E. H. (1972) Ages of plutons and types of mineralization, northwestern Elko County, Nevada, *in* Geological Survey research, 1972: U. S. Geol. Survey Prof. Paper 800-C, p. C165-C168.
- Evernden, J. F., and James, G. T. (1964) Potassium-argon dates and the Tertiary floras of North America: *Am. Jour. Sci.*, v. 262, p. 945-974.
- Granger, A. C., Bell, M. M., Simmons, G. C., and Lee, Florence (1957) Geology and mineral resources of Elko County, Nevada: Nevada Bur. Mines Bull. 54.
- McKee, E. H., Silberman, M. L., Marvin, R. E., and Obradovich, J. D. (1971) A summary of radiometric ages of Tertiary volcanic rocks in Nevada and California, Part I, central Nevada: *Isochron/West*, no. 2, p. 21-42.
- Nolan, T. B., 1936, The Tuscarora mining district, Nevada: Nevada Bur. Mines Bull. 25.
- Silberman, M. L., and McKee, E. H. (1974) Ages of Tertiary volcanic rocks and hydrothermal precious-metal deposits in central and western Nevada: Nevada Bur. Mines and Geology Rept. 19, p. 35-41.
- Wright, T. L. (1968) X-ray and optical study of alkali feldspar, *in* II. An X-ray method for determining the composition and structural state from measurement of  $2\theta$  values for three reflections: *Am. Mineralogist*, v. 53, p. 88-104.