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The Velardeña mining district is located in north-eastern part of the state of Durango, in northern of Mexico. The ore deposit is a lead-zinc, garnet-rich skarn developed at the contact between granite porphyry dikes (Eocene) and well-laminated limestones with interbedded chert (Albian-Cenomanian).
A study of sulfur isotopes has been carried out in various sulfide minerals of the ores of Velardeña, in order to: (a) constrain the possible sources of sulfur and, therefore, better understand the sulfide mineralizing processes, and (b) to estimate the temperature of the ore-forming stage of the skarn.
Sulfur isotope analyses were performed in 21 pure fractions of sulfide minerals of the ore mineralization (pyrite, chalcopyrite, sphalerite and galena). The mineral separation was performed using a series of sieves, and the purity of the samples was verified under a binocular microscope. Isotopic analyses were done on a Finnigan MAT Delta C flow elemental analyzer coupled to a TC-EA, according with the method of Giesemann et al. (1974).
The $\delta$34S values of the analyzed sulfides range mostly between -0.6 and +2.6 ‰ (relative to the CDT standard). These values are indicative of a magmatic source of sulfur. A single analysis falls outside the common range of magmatic sulfur; it corresponds to a sphalerite crystal with $\delta$34S of -3.9 ‰. This negative value could be explained by the incorporation of sulfur leached from the sedimentary host rocks.
Pyrite and galena in paragenesis were analyzed from one sample (CO-9F); the isotope fractionation equation of Ohmoto and Rye (1979) was applied for geothermometry purposes. This calculation yields a temperature of 346° $\pm$25° C, from fractionation $\Delta$pyrite-galena of 2.66 ‰.

REFERENCES

Giesemann, A., Jäger, H. J., Norman, A.L., Krouse, H.R., Brand, W.A., 1994: On-line sulfur-isotope determination using an elemental analyzer coupled to a mass spectrometer. Anal. Chem. 66, 2816- 2819.

Ohmoto H., Rye, R.O., 1979: Isotopes of sulfur and carbon. In: Barnes HL (ed.) Geochemistry of Hydrothermal Ore Deposits. 2nd ed, Willey, New York, pp 509-567.

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