Fe Isotope Constraints on the Genesis of the Zhaxikang Pb-Zn-Ag-Sb Deposit in Southern Tibet

Wang Da, ZhengYouye, SunXiang,* and HeYongsheng

China University of Geoscience, Beijing, 100083, PR China

*E-mail, 3001140051@cugb.edu.cn

The Zhaxikang Pb-Zn-Ag-Sb deposit is a large deposit located at the Northern Himalayan metallogenic belt (NHMB), the genesis of which is controversial. In recent years, the development of nontraditional isotope testing technology has provided a new research method and train of thought for researchers. We study the Fe isotope of ferromanganese carbonate and pyrite in various mineralizing stages of Zhaxikang deposit. The total Zhaxikang $\delta^{56}Fe$ values range from 0.803‰ to 0.409‰, with and average value of -0.305 ± 0.842‰ (2SD, n = 23). The $\delta^{56}Fe$ values of ferromanganese carbonate is -0.803 to -0.551‰, with an average value of -0.652 ± 0.150‰ (2SD, n = 12). The stage 1 laminated pyrite coexisting with fine-grained ferromanganese carbonate, sphalerite, and arsenopyrite have $\delta^{56}Fe$ values of -0.325‰ to -0.085‰, with an average value of -0.246 ± 0.220‰ (2SD, n = 4). The $\delta^{56}Fe$ values of the stage 2 pyrite coexisting with coarse-grained ferromanganese carbonate, sphalerite, and galena range from 0.020 to 0.432‰, with an average value of 0.218 ± 0.338‰ (2SD, n = 4). The stage 3 pyrite coexisting with quartz, sphalerite, and galena have $\delta^{56}Fe$ values of 0.163 to 0.409‰, with an average value of 0.309 ± 0.259‰ (2SD, n = 3). The $\delta^{56}Fe$ values of the laminated pyrite and ferromanganese carbonate are less than 0 which overlaps with the $\delta^{56}Fe$ of submarine hydrothermal solution. The $\delta^{56}Fe$ values of the stage 2 and 3 pyrites are higher than 0, very similar to the $\delta^{56}Fe$ values of magma. According to the Zhaxikang Fe isotope compositions of ferromanganese carbonate and various stages of pyrite, the Zhaxikang deposit probably underwent two pulses of mineralization. The earlier minerals were derived from hydrothermal solution of sea bottom spout and a late hydrothermal mineralization overprinted the early mineralization.