

Tectono-geochemical Characteristics at 1260m Level in the Songliang Zn-Pb Deposit, Yunnan, China

BO LI*, RUN-SHENG HAN, HAI-JUN ZOU AND PENG WU

Kunming University of Science and Technology, Southwest Institute of Geological Survey, Geological Survey Center for Non-ferrous Mineral Resources, Kunming 650093, P.R. China (*correspondence: libo7_211@yahoo.com.cn)

The Songliang Zn-Pb deposit occurs in Dengying Formation (Sinian), which is located in the Sichuan-Yunnan-Guizhou Zn-Pb metallogenic province, and controlled strictly by faults. Based on studying the geological characteristics of the deposit, 36 tectonite samples in 1260m level and 17 non-mineralized dolomite samples were collected, and these samples are tested by ICP-MS.

According to element multi-analysis, it shows that the contents of Mg and Ca in strongly-altered, weakly-mineralized tectonites are higher than of the other tectonites. The ores in the NW-striking and NE-striking faults were formed in the different stages of the same ore-forming period, but the former was earlier than the latter. There were element associations: Zn-Pb-TFe, Al_2O_3 - K_2O and CaO-MgO- Na_2O . The former one represents Zn-Pb mineralization; the latter ones may have relationship with the sedimentation-diagenesis and the associated hydrothermal alterations. The parameters of $\Delta(Zn+Pb+TFe)$ and $\Delta(CaO+MgO)$ indicate mineralization and halo-forming action in the hydrothermal ore-forming process. There exists Zn-Cd-Ga→Pb-Ag-Ge element zonation from the center to the border of ore-bodies. The research is significant for the ore-forming prognosis in the Sichuan-Yunnan-Guizhou area.

Notes: $\Delta(Zn+Pb+TFe)$ and $\Delta(CaO+MgO)$ are the different values between contents of $\sum(Zn+Pb+TFe)$ and $\sum(CaO+MgO)$ for tectonites and of non-mineralized dolomite.

Granted jointly by the funds for Program of NCET in University (NCET-04-917) and Project of the Major Discipline of KUST (2008).

Experimental study on Cu isotope fractionation during crystallization and reduction at low temperatures

J. LI*, X.K. ZHU AND S.H. TANG

Lab isotope Geol., MLR, Inst. Geol., CAGS, Beijing, China (lijin80119@hotmail.com)

The extents and mechanisms of Cu isotope fractionation during various geochemical processes are still poorly known, despite of the fact that this knowledge is essential in applying this new tracer to constrain some important issues in Earth and environmental sciences. Here we present the results of some experiments on Cu isotope fractionation processes at room temperature.

Cu Isotope Fractionation During Crystallization

Saturated $CuSO_4$ solution was prepared using $CuSO_4 \cdot 5H_2O$ (Analytical grade) and Milli-Q water. Three experiments were carried out in Teflon containers with 2mL of the saturated solution each, and $CuSO_4$ were crystallized after small crystal seeds were put into the solution. The crystals were separated from the supernates after about 2 hours when growth of crystal was not obvious. Both supernates and precipitates were purified through anion exchange chromatography before the Cu isotope compositions were measured using Nu Plasma HR MC-ICPMS. The results are expressed in ‰ unit which is deviations in parts per 10^4 from the same isotope ratios of the original $CuSO_4$ solution used in the experiments. Consistent results are obtained from the experiments, and Cu isotope compositions of the crystals are systematically heavier than those of the corresponding supernates. A mass fractionation factor $\alpha_{crystal/supernate} = 1.00017$ is deduced presuming that isotope equilibrium were reached between the crystals and supernates.

Cu isotope Fractionation During Reduction

$CuCl_2$ solution was prepared by dissolving CuO powder (Analytical grade) in concentrated HCl, and re-dissolved in pure water after dryness. 4 experiments were carried out by adding metallic Zn into the prepared $CuCl_2$ solution, where Cu^{2+} was reduced, and red alveolate metallic Cu was formed. The resultant Cu metal was separated from supernate after the experiment had been finished. The Cu isotope compositions of both the metal and supernates were measured after purification. It is found the metallic Cu shows systematic light isotope enrichment relative to it corresponding supernate, with $\Delta\epsilon^{65}Cu_{metal-solution}$ ranging from -5.3 to -2.6. As the displacement is an irreversible process, the mass fractionation occurred during the reaction is a pure kinetic process. These kinds of experiments provide an analogue to the formation of native copper in Nature.