Pb, C, H, O and S isotope geochemistry of the Maoping carbonate-hosted Pb-Zn(-Ag-Ge) deposit in Northeast Yunnan province, China

G.S. YANG[1]*, Y. ZHANG[1], R.S. HAN[1,2] AND P. WU[1,2]

[1]Kunming University of Science and Technology, Kunming 650093, China (*correspondence: ygs0080009@163.com)
[2]Kunming University of Science and Technology, Southwest Institute of Geological Survey, Kunming 650093, China

In order to trace the sources of the ore metals and ore-forming fluids of the large-sized carbonate-hosted Maoping Pb-Zn(-Ag-Ge) deposit, Pb, C, H, O and S isotopic compositions of the deposit are presented in this paper.

The Pb isotopic ratios of the ores range from 18.340 to 18.914 for $^{206}Pb/^{204}Pb$, 15.510 to 15.796 for $^{207}Pb/^{204}Pb$ and 38.845 to 39.573 for $^{208}Pb/^{204}Pb$, which are similar to those of the host carbonate rocks and the Emeishan basalts, indicating that these rocks may have provided metals to the ore fluid. The $\delta^{34}S$ values of the ores show a total range from 7.96‰ to 24.1‰, most of which are between 10‰ and 16‰, indicating that the sulfur should be derived from the sedimentary strata. The $\delta^{13}C_{PDB}$ values of the gangue minerals range from-1.1‰ to -3.7‰, indicating that the carbon of the ore-forming fluid was derived from the mixture of the crust-source carbon in the strata and deep-source carbon. The fluid inclusions δD values of the sphalerite, pyrite and calcite range from -37‰ ~ -49‰, -42‰ ~ -61‰, and -45‰ ~ -64‰ , the corresponding $\delta^{18}O_{SMOW}$ values range from -9.0‰ ~ 3.4‰, -6.8‰ ~ -12.7 ‰ and 14.9‰ ~ 18.8‰. The calculated $\delta^{18}O_{H2O}$ values of calcite range from 5.2‰ to 9.7‰, if the formation temperature is 200°C. These data indicate that the ore-forming fluids were likely a mixture of magmatic hydrothermal fluid and metamorphic water, and had water-rock interaction and isotope exchange with the underlain ore-bearing strata during their ascending process from the depth.

Genesis of barite in eclogite from the main-hole of the Chinese Continental Scientific Drilling (CCSD)

H. YANG[1], L-F. ZHANG[2]* AND F-L. LIU[1]

[1]Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China (hyang@cags.ac.cn, lfl0225@sina.com)
[2]School of Earth and Space Sciences, Peking University, Beijing 100871, China
(*correspondence: lfzhang@pku.edu.cn)

Barite was found as an accessory mineral in eclogite from the main-hole core (in the depth intervals of 0~700 m) of CCSD. It is a diagnostic mineral of fluid activity, which is uncommon to be found in metamorphic rocks. The presence or absence of this mineral helps to constrain interpretation of the redox conditions [1]. Strontium-isotope analyses have been used to constrain the genesis of barite and thus make it possible to supply the origin information of related fluid.

Barite in eclogite has various occurrences during the metamorphic process. (1) UHP metamorphic eclogite-facies stage. Barite mainly exists as mineral inclusions in garnet, omphacite and the aggregates of K-feldspar ± albite + Quartz. It is rich in Sr, and the $SrSO_4$ content is about 45 mol%. (2) Early retrograde stage. Barite (0~20 mol% $SrSO_4$) was preserved among the mineral grains and dispersing in symplectite composed of clinopyroxene and albite. It is associated with allanite, epidote, hyalophane, celsian, K-feldspar. (3) Retrogressive amphibolite-facies stage. Barite (<5 mol% $SrSO_4$) exists as the oxidized outmost rim of pyrite. The Sr content in barite almost decreases during the retrogressive process. Barite together with the associated minerals constrain the change of redox conditions throughout the there metamorphic stages, which is oxidition-reduction-oxidition.

Barite separated from eclogite samples have $^{87}Sr/^{86}Sr$ values of 0.70621~0.71043. It shows that barite is mainly originated from the continental crust and may be precipitated from the fluid exsoluted from the continental crust during the plate exhumation.

[1] Hanor (2000) *Rev. Min. Geochem.* **40**, 193-275.