

Geochemical characteristics and genesis of Sijiaoyanggou lead-zinc deposits in Qinghai province, China

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Sijiaoyanggou lead zinc ore is located in the southwest of Qaidam basin and up to north of the East Kunlun mountain front. The orebody is controlled by the layer, structure and intrusion rock, located in carbonate rocks of C_3s^1 and C_3s^{2-1} . The major of ore minerals are galena, zinc blende, magnetite, specularite, pyrite and a few of chalcopyrite. The types related closely of alteration and mineralization are: skarnization, silicified, limonite-oriented, chlorite and so on.

The SiO_2 with content granite between 69.40% and 73.74% is SiO_2 saturation silicate rock in the Sijiaoyanggou mineral area. High volume of rock alkali ($K_2O + Na_2O$) 4.17% ~ 6.8%, and the σ values between 0.57 ~ 1.64, is broadly calc-alkalic series rock.

ΣREE value of Sijiaoyanggou are $82.44 \times 10^6 \sim 143.22 \times 10^6$. $LREE/HREE$ are 7.49~10.06, is the designate of the enrichment of light rare earth and a type of light rare earth in REE.

Contrast with pure granodiorite porphyry elements W, Mo, Ag is more enriched in Sijiaoyanggou mining area, but medium temperature elements Cu, Pb, Zn, V, Cr, Co, Ni, Ba, Sr values are lower than the Vickers.

The category of inclusion is I non-sub-aqueous mineral inclusions in Sijiaoyanggou mining area, with irregular inclusion shape and the size is 4-46 μm . The homogenization temperature is 89-344 $^{\circ}C$ and the salinity is 0.71-42.4 (wt% NaCl equiv) and fluid density is 0.651-1.033 (g/cm³), all the property shows that multiple sources of ore-forming characteristics with magmatic water and heated atmospheric precipitation. The composition of lead isotopic is possessed of a deep-source of low-radiogenic Pb.

The mineralization type of Sijiaoyanggou lead-zinc deposit including three lead-zinc type oxide, such as: the contact zone of skarn-type lead-zinc, layer controlled type lead-zinc and weathering and leaching, the overall is a skarn-type lead-zinc deposit.

Granted jointly by the project of State Crisis Mine (20089943) and the Distinguishing Discipline of KUST (2008).

High-P/T synchrotron X-ray and neutron diffraction study of carbonate minerals

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An indispensable part of the global carbon cycle is the cycling of carbon between the Earth's crust and mantle via subduction of carbonate minerals in oceanic crust and release of carbon dioxide in arc volcanism. However, there appears to be more carbon subducted than released, implying subduction of carbon to depths beyond the source of arc magmas. Thus studying the stability, structures and properties of carbonate minerals at elevated pressure and temperature is important in determining the mode and fate of carbon in the Earth's interior. In this study, we have conducted *in situ* synchrotron X-ray and neutron diffraction experiments of several carbonates, including ankerite, kutnahorite and vaterite, at pressures up to 8 GPa and/or temperatures up to 1473 K. The bulk moduli, thermal expansion coefficients and phase equilibria have been determined, and their relations to structural behavior been discussed.