Geochemical characteristics and genesis of Bayin copper deposit in Xinjiang, China

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The Bayin medium-sized copper deposit is located in the eastern section of Southwest Tianshan, Xinjiang and the northern border of Youludusi mountain basin. It is strictly subject to the control of strata, structure and intrusive rocks, and there is occurrence of stratiform-like rocks in the basic volcanic rocks and sedimentary rocks of upper Silurian series.

The study investigates the ore mineral assemblages, zoning of wall rock alteration, REE composition and the isotope composition characteristics of sulfur, hydrogen and oxygen. The ore minerals are mainly chalcocite, chalcopyrite, bornite and so on, and they show granular structure and disseminated texture. The ore-forming temperature is between 130º to 140º, and the metallogenic hydrothermal mainly comes from magmatic water and metamorphic water, which belong to acid-rich fluid containing potassium, chlorine and carbon dioxide. The REE composition in ore-hosting volcanic rocks is similar to that in the unmineralizing volcanic rocks, and bears great difference with that in the vein ore bodies which came into being later. The sulfur isotope $\delta^{34}S$ in ore minerals is at the range of -17.5‰ ~ +10.0‰, oxygen isotope is between -62.1‰ ~ -79.6‰, with δO^{18} being 12.3‰~13.5‰. The author holds that the formation of the deposit is related to the intermediate basic volcanic rocks formed in the immature environment of tensile rift in Upper Silurian. The metallogenic materials are chiefly derived from lower crust or the upper mantle. They have a same parent magma origin with volcanic rocks, and are characterized by a deep seated source feature.

The mineralization was formed by filling metasomasis of the Upper Silurian volcanic hydrothermal solution and superimposition of magmatic hydrothermal in early Hercynian period. It is a polygenetic compound deposit which is primarily featured by VMS-type Upper Silurian marine with the superimposition of granite magmatic hydrothermal in the late section of early Hercynian period.

Erosion rate measurements with cosmogenic ^{36}Cl in carbonate from Guizhou, China

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We have conducted a study of erosion rates in Guizhou karst area, southwestern China, to better understand geomorphological history of the area and to evaluate implications to the current environment. Surface lowering can be measured directly by micro erosion meters or calculated from the mass loss in rock tablets exposed to dissolution in different environments. Indirect approaches are based on the measurements of solute load leaving the catchment area, geomorphological investigations and methods of cosmogenic nuclides. Of these, cosmogenic nuclides are advantageous as they record the history of erosion and can bypass some of the extrapolation problems that other methods need to consider. Consequently we have collected carbonate samples from the study area and measured the cosmogenic ^{36}Cl concentrations.

In-situ cosmogenic ^{36}Cl is used as carbonate is essentially the only available sample form in the area and can safely be assumed to have reached equilibrium due to its half-life of 3.0e+5 years. The surface samples were collected from flat-lying ($\pm10°$) outcrops chosen to avoid recent soil cover and to be as representative as possible of the surrounding landscape. After adjusting the ^{36}Cl production rates for sample latitude, altitude, thickness, horizon and target composition, erosion rates can be calculated. Variations and mechanisms of the local erosion rates are discussed and the results are compared with the existing observations obtained by other measurement techniques.