

The characteristics and implications of in-situ sulfur isotope in western Awulale, west of Tianshan, Xinjiang

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Qunji PCD is situated west of Awulale metallogenic belt (AMB), western Tianshan, Xinjiang. Qunji PCD occurs in small albite porphyry dike and is closely associated with albite porphyry, but in basalts there is no Cu mineralization. The ore minerals in Qunji PCD mainly include Cp, Bn and Cc, and magnetite and gypsum are absent. The alteration of Qunji Cu deposit is weak, and only potassium is present. The hydrothermal minerals are also rare in the Qunji PCD. This phenomenon is consistent with the reduced porphyry Cu deposit. In order to test our suspect, we made in-situ S sulfur isotope analysis. The analysis results show that the sulfur isotopes of the Qunji PCD are negative and the range of variation is small. The source of sulfur is magmatic. The sulfur isotope is different in different sulfides, sulfur isotope is gradually decreased from pyrite, chalcopyrite to bornite, indicating that ore-forming fluid oxygen fugacity increased gradually. Sulfur isotope within Py, Cpy and Bn is also different. Py and Cpy has higher S isotope in core than rim, but the Bn has opposite phenomenon, showing Py and Cpy is forming in reduced condition and Bn is in oxidized condition. So the Qunji PCD is a reduced porphyry Cu deposit.

[1] Gomide et al (2013) *Chemical Geology*, 341, 38-49. [2] Marini et al (2011) *Reviews in Mineralogy & Geochemistry*, 73, 423-492