Geochemical characteristics of the Shaxi-Changpushan porphyry Cu-Au deposit: Significance to ore formation

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Introduction

The Shaxi-Changpushan porphyry copper (gold) deposit is located in the northwestern Luzong volcanic basin. It also belongs to the north of the middle and low part of the Yangtze iron and copper metallogenic zone with the multiple location of faults, where Fanshan-Tongling deep fault and Tan-Lu fault belt come through the whole mineralization region and result in serious rock deformation in Jurassic [1].

Methods and Results

Basd on geochemical studies and literatures [2-10], including chemical analysis on bulk rocks, rare earth and trace element studies, fluid inclusion, S and O isotopic analysis, we present significant proofs for the copper-(gold) mineralization in Shaxi porphyry copper-gold deposit. The sulfur isotope dada show that the magma has the characteristics of deep source. Compared with the other large and supper-large porphyry copper deposits in China and the adjacent copper mineralized areas, ore-forming processes and conditions were analyzed. Our study indicates that the ore-forming fluids and materials were dominated with the magmatic origin, whereas the meteoric water played small role in the ore-forming processes. There are great potentialities to form a large porphyry copper deposit from the point view of tectonic evolution and geochemical characteriscs in Shaxi-Changpushan Cu-Au ore district.

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Oceanic Anoxic Events and Cenozoic large scale molybdenum mineralization

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Half of the world's Mo reserve is hosted in Cenozoic porphyry-copper (Cu)-molybdenum (Mo) and porphyry-Mo deposits along the west coast of the American continents with nearly no Mo porphyry deposits along the west coast of the Pacific Ocean. In contrast, most Mo deposits in Eastern Asia are located along the Qinling-Dabie orogenic belt and in Northeastern China. Here we show that the large scale Mo mineralization along the west coast of the American continents is mainly due to the partial melting of Mo enriched sediments formed during oceanic anoxic events (OAEs) in the Jurassic and the Cretaceous. Porphyry-Cu-Mo deposits in the American continents are formed through partial melting of Mo-rich OAE sediments carried by flatly subducted oceanic crust in the east Pacific. High-fluorine (F) porphyry-Mo deposits are mostly located in the Colorado mineral belt (COMB), which are formed through direct partial melting of high grade metamorphosed Mo-rich OAE sediments in backarc settings, induced by the roll back of the flatly subducted east Pacific slab. Most low-F porphyry-Mo deposits have closer spatial relationship with porphyry-Cu-Mo deposits and are formed through partial melting of metamorphosed OAE sediments induced by arc magmas. In contrast, Mo porphyry deposits in Eastern Asia belong to low-F type, likely formed through partial melting of metamorphosed Mo rich sediments. Molybdenum deposits in Northeastern China were likely also due to Mo rich sediments formed during OAEs, whereas those from the Qinling orogenic belt were likely related to sediments formed in Triassic backarc settings.