RENE-2: Sistemas de Pórfidos de Cu (±Mo? ±Au) e IOCG: de la petrogénesis a la exploración

δ^{65}Cu isotope variations at the Los Bronce cluster, Rio Blanco-Los Bronces porphyry Cu-Mo deposit

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Copper isotope ratios measured in sulfide minerals pretend to provide insights into high-temperature mineralization at the Río Blanco–Los Bronces mega-porphyry Cu-Mo deposit, belonging to the late Miocene to lower Pliocene metallogenic belt of Central Chile. Mineralization concentrates mainly in hydrothermal breccias, as well as in different veinlet types as product of multiple alteration-mineralization events. The deeper parts of the system are dominated by an early calco-sodic hydrothermal overprinted by a strong potassic alteration. Co-genetic to the potassic alteration is the sericite gray green alteration as a product of an early hydrolysis representing a transitional event between potassium and phyllic hydrothermal alterations. Towards to the surface, above and superimposed on the potassic alteration, a phyllic alteration is associated to the different breccia bodies. Finally, the propylitic alteration occurs as gradation of potassic alteration as a distal halo, varying from chlorite-biotite nearby the hydrothermal center to chlorite-epidote to the periphery. Copper isotope ratios in chalcopyrite and bornite belonging to different veinlet types were measured by laser ablation multi-collector inductively coupled plasma-mass spectrometry (MC-ICP-MS) from samples selected strategically from around the hydrothermal centers Los Bronces open pit and San Enrique Monolito, covering the different hydrothermal alterations through a NW-SE trending profile. Preliminary results show that there is a systematic increase in δ^{65}Cu values from deeper to shallower portions of both hydrothermal centers. In addition, a pattern is identified in copper isotopic signatures respect to hydrothermal alterations, where the early calco-sodic δ^{65}Cu values are close to 0.0‰. Both, bt–feld-k and sericite gray green belonging to potassic alteration display in a wide range of copper isotope ratios varying from -0.26 to 1.15‰ and -0.3 to 1.26‰, respectively. The phyllic alteration shows a higher signature from 2.05 to 2.5‰. In general, the samples nearby to hydrothermal centers dominated by high-temperature potassic alteration are isotopically lighter than the samples with phyllic alteration. These preliminary results indicate that fractionation of Cu isotopes during hypogene alteration is controlled by pH and/or temperature variations, physicochemical gradients and thermodynamic properties. This might be useful in exploration for vectoring porphyry copper hydrothermal systems.