

Stratiform Copper Deposits in the San Jeronimo Group, Cusco Area, Peru: Petromineralogical and Genetic Case Study of the Tambomachay Deposit

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A feldspathic greywacke of the San Jeronimo Group, varying from 10 to 90 cm in thickness, hosts ore that is either disseminated predominantly along laminations or within veinlets. The primary minerals are chalcopyrite and bornite, there is also abundant chalcocite, and covellite-digenite replaces chalcocite. The presence of oxide minerals (malachite, brochantite, goethite) intergrown with the ores, particularly with covellite, chalcocite, and digenite, suggests a supergene enrichment event. Nevertheless, it is also possible that these oxides are of primary origin. The presence of calcite and chlorite has been observed in veinlets, with the chlorite suggesting some involvement of hydrothermal fluids. Six samples of the ore were analyzed for 50 elements analysis (ICP-MS) with digestion by four acids. The results show enrichment in metals that include Ag, Pb, and Zn, as well as in large ion lithophile elements that suggests the sedimentary rocks of the San Jeronimo Group were derived from a source with calc-alkaline composition.

We preliminarily suggest that Tambomachay is a SRHSCD, based mainly on petromineralogical and geochemical analyses. The basin architecture of the studied area is similar to the general basin model that characterizes most SRHSCDs and this work suggests that the source of the sulfur could be the evaporites of the Maras Formation. The texture, as well as the presence of chlorite and ore in veinlets, rules against a previously hypothesized syngenetic ore model. To confirm the existence of widespread SRHSCD occurrences, detailed geological and structural mapping, and fluid inclusion and isotope geochemistry will be carried out on the nine known occurrences in the Cusco region.