ABSTRACT

TITLE:	Investigating the Source of Copper in the La Plata Mountains Using Copper Isotopes
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ABSTRACT: The La Plata Mountains formed about 65 Ma when magmas were emplaced into older sedimentary rocks creating a dome-shaped mountain range. Some of the intrusive rocks are spatially related to copper mineralization. The greatest concentration of copper-bearing ore deposits in the La Plata Mountains occur within and around the Allard Stock. The Allard stock, one of two major syenite stocks, is cross cut with numerous veins and zones of chalcopyrite and other copper-bearing minerals. Although these deposits have been mined and explored, the source of the copper has never been constrained. In this investigation petrographic analyses and copper isotopes were used to characterize the copper minerals and determine if they originated by melting of the crust or mantle. The results of this investigation demonstrate the copper minerals are dominated by chalcopyrite and minor bornite that are associated with magnetite, hematite, and late-state Au-Ag-PGE tellurides. Copper isotope values of -0.079‰ to 2.7‰ are consistent with a mantle source of copper with minor modification of signature from fractionation of copper isotopes during crystallization. Prior geochemical and U/Pb zircon studies establish that the intrusive rocks and chalcopyrite originated from melting of lithospheric mantle