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Geological and Geochemical Characterization of the Mugomo Gold Prospect, Tete Province, Northern Mozambique

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The Mugomo gold prospect is one of several gold occurrences in the northwestern part of Tete province, central Mozambique. Characteristics of geology and mineralization of the Mugomo prospect are poorly understood. The prospect is hosted in a terrane composed of metavolcanic rocks of the Proterozoic Mualádzi Group, part of the Southern Irumide Belt. This study aims to describe the gold mineralization and associated hydrothermal alteration in the Mugomo prospect based on petrography, whole-rock geochemistry, and sulfur isotope data.

The mineralization in the Mugomo gold prospect is controlled by NE-SW– and N-S–striking regional Pan-African shear-zone systems. Epidote, quartz, and chlorite veins and veinlets are hosted by metavolcanic rocks and quartzite of the Mualádzi Group.

The metavolcanic rocks consist mainly of plagioclase, biotite, muscovite, and quartz, with secondary epidote, chlorite, calcite, and sericite; the quartzite is composed of quartz and minor plagioclase. Gold and sulfide mineralization occurs as dissemination of the host rocks and epidote-quartz veins.

The ore minerals consist mainly of pyrite and chalcopyrite with minor magnetite, bornite, covellite, silver-telluride, bismuth-telluride, and native gold. Bulk chemical compositions of ores show up to 2 ppm Au, and native gold is associated with pyrite and chalcopyrite. We consider that gold deposition in the Mugomo prospect was intimately related to sulfidation. The $\delta^{34}\text{S}_{\text{CDT}}$ of pyrite varies narrowly between +2.5 and +4.0‰, suggesting a single source of sulfur, either magmatic or metamorphic in origin.

Based on the geological setting, mineralogy, alteration, and sulfur isotope signatures, the Mugomo prospect can be classified as orogenic.