Geneses of Gold Mineralization in the Mugomo and Chifumbazi Prospects of the Mualádzi Gold Field, Tete Province, Northern Mozambique

Euclesia P. Cossa[1], Andrea Agangi[2], Manuel Nopeia[3], Vicente Manjate[4]
1. Tete Polytechnic Institute, Tete, Mozambique, 2. Akita University, Akita, Japan, 3. Center for Regional Revitalization in Research and Education, Akita University, Japan, Akita, Japan, 4. National Institute of Mines, Maputo, Mozambique

The Mualádzi gold field is one of several gold occurrences in the northwestern part of Tete province, northern Mozambique. The Mualádzi gold field 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 the associated hydrothermal alteration in the Mugomo and Chifumbazi prospects, based on petrography, bulk chemistry, fluid inclusion, and sulfur isotope analyses.

The gold mineralization in this gold field occurs mainly as dissemination in the metavolcanic rocks of the Mugomo prospect. Part of the gold mineralization is also associated with epidote, quartz and chlorite veins and veinlets hosted by metavolcanic rocks and quartzite, as well as milky quartz, quartz+carbonate, and chlorite veins hosted by sericite-quartz-schists of the Chifumbazi prospect.

Of the three mineralization stages identified in the area, the most important ones are stages I in the Mugomo prospect and stage II on the Chifumbazi prospect. The stage I is characterized by visible gold in pyrite disseminated in the metavolcanic rocks, whose ores contain up to 2 ppm Au. Quartz veins in the stage II of the Chifumbazi prospect consist of visible gold associated with pyrite and chalcopyrite, and contain up to 5 ppm Au. Homogenization temperatures and salinity of fluid inclusions in quartz veins of the Mugomo prospect range from 200 to 430 °C and from 0.0 to 15.0 wt.% NaCl eq. While those in Stage II of the Chifumbazi prospect range from 216 to 369 °C and from 0.7 to 15.3 wt.% NaCl eq., respectively.

The Mugomo prospect was formed by H_2O-NaCl-CH_4 fluids, while the Chifumbazi prospect was formed by H_2O-NaCl-CO_2 fluids. Sulfur isotopic compositions of sulfides are higher in the Mugomo prospect (+2.5 to +3.8 ‰) than those in the Chifumbazi prospect (+1.0 to +2.5 ‰).