
Platinum-Group Minerals and Other Tellurides from the Genina Gharbia Cu-Ni-PGE Mineralization, South Eastern Desert, Egypt

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The Cu-Ni-PGE mineralization in Genina Gharbia area is hosted in a concentrically zoned mafic-ultramafic complex of Precambrian age. The mafic-ultramafic body intruded metasedimentary rocks and metavolcanics along one of the deep structures intersecting the Eastern Desert in a NNE direction. The intrusion is 2.5 x 7 km in outcrop and made of a peridotite core enveloped by pyroxenite and hornblende gabbro, at the margin. The area is highly dissected by faults and shear zones.

The Cu-Ni-PGE mineralization, disseminated and network sulfides, is concentrated mainly in the ultramafic core rocks, however, patches of massive sulfides are hosted in the pyroxenite. Important petrographic features of the rocks hosting the sulfides are the dominance of hornblende, biotite and Cl-bearing apatite and alteration of plagioclase to epidote. The disseminated and network sulfide ore are dominated by pyrrhotite, pentlandite, chalcopyrite and minor pyrite. Accessory sulfides comprise cobaltite, molybdenite and valeriite.

Platinum group minerals (PGM) are mainly present in the sulfide ore hosted in pyroxenite. The PGM comprise michenerite and merenskyite, which are closely associated with palladian bismuthian melonite. Associated minerals comprise altaite, hessite, bismuthotelluride and native tellurium. PGM and associated tellurides occur in three distinct textures: a) 80 % of the grains are included in An-rich plagioclase which is partly altered to epidote, b) at the contact between sulfides and silicates and c) inclusions in sulfides, mainly pyrrhotite and pentlandite.

In many aspects, the Genina Gharbia mineralization resembles the Duluth Complex mineralization. The dominance of tellurides and the close association with altered silicates underline the role of late magmatic hydrothermal event in the formation of the Cu-Ni-PGE mineralization in the Genina Gharbia area. Involvement of a sedimentary component from the surrounding metasediments is evidenced by the formation of molybdenite and the geochemical characteristics of the mafic-ultramafic rocks.