

New findings for Ni-Cu mineralization in Iranshahr-Birjand zone, Iran

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Patang Ni-Cu mineralization in Iranshahr-Birjand zone located 10km northeast of Gazik. From lithostratigraphical and geometrical point of view, ore is in form of vein and veinlets along the faulted zone and in matured listvenite units. The studied rock units include ophiolite melange of Eastern Iran (gabbro, peridotite and serpentized harzburgites), Andesite and Andesite-Basalts of Upper Cretaceous and shale-sandstones of Paleocene and quartz-microdiorites of Eocene trending north-south to northwest-southeast. Two separate alteration and hydrothermal mineralization have been identified in Patang. 1. Hypogene and 2. Supergene. Hypogene mineralization is in form of open space filling and contains nickelite, ullmannite, magnetite, pyrite, chalcopyrite and bornite. Mineral assemblage of supergene alteration includes goethite, hematite, limonite, malachite, azurite, chalcocite and covellite. Mineralization is controlled by structural processes in patang. The most significant geological feature in the area is listvenitization and presence of nickel in above units. In high pH low XCO₂ conditions, peridotites altered to serpentinites and in later stages with lowered pH and higher XCO₂, serpentinitization is halted and are converted to silicic-carbonate minerals. Active tectonics and favorable structural controls for transferring listvenite bearing fluids and temperature increase due to intrusion of quartz-microdiorite bodies in Eocene have created necessary conditions for the formation of listvenite. Hence, presence of nickel and remainder of serpentinitized grid in listvenite indicates a peridotite protolite. In this article, 60 samples were analyzed for main, secondary and trace elements by ICP-MS method, 28 thin and polished sections, 24 heavy mineral samples, mineralogy and geochemical studies were carried out to determine the ore genesis as Ni-Sulfide mineralization for first time in Iran.

Keywords: listvenitization, peridotites, nickelite