

Geology, mineralization and geochemistry of Tak I, Taknar polymetal massive sulfide (Cu-Zn-Au-Ag-Pb) deposit, Khorasan- Bardaskan

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Abstract: Rock unites which are exposed in Tak-I mine area are: Taknar formation (Ordovician), Mid-late Paleozoic and younger intrusive rocks. Taknar formation consists of sericite schist, chlorite schist, chlorite-sericite schist and some meta-diabase- gabbro-diorite. Taknar Polymetal (Cu-Zn-Au-Ag-Pb) Massive sulfide deposit formed at certain horizon of Taknar formation. Three style of mineralization are: stockwork, layered and massive. Due to strong tectonic activity in the area, dimension and geometry of deposit are being changed. Paragenetic minerals within the massive and layered are: magnetite + pyrite + chalcopyrite ± sphalerite ± galena ± sulphosalt ± gold + chlorite ± carbonate ± sericite. Magnetite is the main mineral in the massive zone. Paragenesis within stockwork are: pyrite + chalcopyrite ± magnetite + chlorite + quartz + sericite ± carbonate. Based on mineral paragenesis, the ore bearing solution had the following condition: $T \geq 270$ °C, pH= 5 - 7, $\text{Log } f\text{O}_2 = (-29)$ to (-30) . Also, The range of chemical composition of some elements within Tak-I massive sulfide is as follow:

Cu = %0.01 - %5.86, Zn = 269 – 15600 (ppm), Pb = 27 – 4400 (ppm),

Au = 0.86 - 7.53 (ppm), Ag = 2.4 - 95.1 (ppm), Bi = 34 – 2200 (ppm).

Based on the paragenesis, alteration, style of mineralization, petrography, geochemistry, and structure, Tak-I is part of massive sulfide deposit. Due to high content of Cu, Zn, Au, Ag and Pb, Taknar massive sulfide deposit is a polymetal deposit. Based on high magnetite within sulfides and lack of pyrrhotite, Taknar is a special massive sulfide deposit.

Keywords: *Taknar deposit, Massive sulfide, Polymetal mineralization.*