

The Geochemistry and Mineralization of Taknar Polymetal Massive Sulfide (Cu-Zn-Au-Ag-Pb) Deposit, North-East Iran

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The Taknar formation (Ordovician), Mid-late Paleozoic and younger intrusive rocks are the major rock units in the area. Taknar formation consists of sericite schist, chlorite schist, chlorite-sericite schist and some meta-diorite-gabbro-diorite. Taknar polymetal (Cu-Zn-Au-Ag-Pb) massive sulfide deposit has formed at certain horizon of Taknar formation. The mineralization styles are mainly : stockwork, layered and massive. Strong tectonic activities in the area have changed the dimensions and geometry of this deposit. Paragenetic minerals within the massive and layered are: magnetite+pyrite+chalcopyrite±sphalerite±galena±suphose±gold+chlorite±carbonate±sericite. Magnetite is the main mineral in the massive zone. Mineral paragenesis within the stockwork are : pyrite +chalcopyrite ±magnetite +chlorite +quartz+sericite±carbonate. Based on mineral paragenesis, the ore bearing solution has had the following conditions: $T \geq 270^{\circ} \text{C}$, $\text{pH} = 5-7$, $\text{Log } f\text{O}_2 = (-29) \text{ to } (-30)$. The range of chemical composition of some elements are as follow: $\text{Cu} = 0.01\% - 5.86\%$, $\text{Zn} = 269-15600 \text{ ppm}$, $\text{Pb} = 27- 4400 \text{ ppm}$, $\text{Au} = 0.86 - 7.53 \text{ ppm}$, $\text{Ag} = 2.4-95.1 \text{ ppm}$, $\text{Bi} = 34-2200 \text{ ppm}$. Based on the paragenesis, alteration, style of mineralization, periphery, geochemistry and structure, the Taknar is part of massive sulfide deposit. The high content of Cu, Zn, Au, and Pb shows that The Taknar massive sulfide deposit is a polymetal. Finally, due to high magnetite content within sulfides and the lack of pyrrhotite, Taknar is a special type of massive sulfide deposit.