

GEOCHEMISTRY, FLUID INCLUSION THERMOMETRY & MAGNETIC PROPERTIES OF TAKNAR MAGNETITE RICH CU-ZN-AU-AG-PB MASSIVE SULFIDE DEPOSIT, NORTHEAST IRAN

MALEKZADEH, Azadeh¹, KARIMPOUR, Mohammad Hassan², MAZAHERI, Ahmad¹, and HAIDARIAN SHAHRI, Mohammad Reza¹, (1) Geology, Ferdowsi University, Mashhad, 91775, Iran, aza_malek@yahoo.com, (2) Geological Sciences, CU- Boulder & Ferdowsi Mashhad, Boulder, CO 80309

Taknar magnetite-rich (Cu-Zn-Au-Ag-Pb) massive sulfide deposit is located in northeast Iran. It was formed within Taknar formation in Ordovician time and later it was metamorphosed. It lies in Taknar Exotic block (15× 45Km). Taknar formation consists of slate, chlorite schist, sericite schist, meta-rhyolite-dacite and meta-diabase. Faulting (Taknar, Rivash & other) truncated the original ore body. Four exposed ore bodies are: Tak- I, II, III, IV. At Tak-III, only stockwork is found and consist of quartz, pyrite, chalcopyrite, chlorite ± sericite ± calcite ± minor magnetite. Massive-layering is found only at Tak-I, II, IV. Tak-I and IV consist of magnetite, chalcopyrite, pyrite, chlorite, ± sericite ± calcite and minor sphalerite-galena-sulfosalts. Tak-II has more sphalerite and galena. In both Tak-I and II, The amount of magnetite increases upward and it reach up to 80%. Chlorite is the dominate alteration with minor sericite and calcite.

Tak-I: Cu = 0.01-5.8 %, Zn = 260- 15600 ppm, Pb = 27- 4400 ppm, Au = 0.86-7 ppm, Ag = 2-95 ppm, Tak-II: Cu = 0.3- 2.5 %, Zn = 0.3- 7.7%, Pb = 93- 5000 ppm, Au = 0.33- 11 ppm, Ag = 19- 105 ppm. Tak-III: Cu = 0.05-5.54 %, Zn = 62-179 ppm, Pb = 17- 47 ppm, Au = 0.06- 0.33 ppm, Ag = 2- 40 ppm.

Fluid inclusions in quartz are two phases, liquid rich. Metamorphism changed initial temperature. Th at Tak-I and III are between 550 -500° C and in Tak-II 315-355° C. Tak-I: Log f O₂ = -29 to -30, pH= 5- 7. Tak-II: Log f S₂ = -11 to -12, Log f O₂ = -36 to -39, 5 < pH >9. Tak-III, Log f O₂ = -28 to -29, pH >5.

Taknar formation has low magnetic susceptibility (< 40 ×10⁻⁵ SI) but the ore bodies at Tak-I & II have high magnetic susceptibility (> 900 ×10⁻⁵ SI). Ground magnetic survey helped finding unexposed deposits. Magnetic survey is recommended for Taknar block.

Base on High magnetite (80%), absence of pyhrotite, high Cu-Au-Zn-Bi-Ag, Low Pb, alteration zoning and source-host rocks, Taknar is new type of magnetite-rich