

Kuh-E-Zar Gold Deposit in Torbat-e-Heydaryeh «New Model of Gold Mineralization»

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(Received: 30/2/2008, in revised form: 4/5/2008)

Abstract: Kuh – e- Zar gold deposit located in central part of Khaf – Bardaskan volcano-platonic belt and about 40 km west of Torbat-e-Heydaryeh area in Khorassan-e-Razavi province. The extensive exploration of the last decade done in the above belt has been caused the exploration of several Iron oxide copper – gold deposits, such as Kuh-e-Zar deposit. Several types of Tuff and Acide to intermediate lavas (lower tertiary) are widespread all over in the area. Mineralization appeared in different type such as vein, stockwork and Hydrothermal breccia in strike slip fault zone which are hidden inside volcano plutonic rocks. The average gold grade is between 3.02 ppm and ore reserve is estimated more than 3 million tons (cut off grade = 0.7 ppm). The copper grade in mineralized zone located in intrusive bodies between 0.3 to 1.1 %. The main mineralized zones are Quartz and specularite (more than 30%). However, the various types of sulfides are very rare on surface. Pure gold can be observed together with Quartz and Specularite. Based on consideration of oxygen stable isotope ($\delta^{18}O$) in Quartz and siderite as well as sulfur ($\delta^{34}S$) in chalcopyrite, geochemical investigation and micro thermometric study has caused the gold mineralization through magmatic fluid with low sulfide content and high oxidation state. It is clear that the kuh-e-zar mineralization in case of paragenesis, alteration and dimension has been the only case all over the world. Regarding the lack of recognized and similar sample in the world, this deposit is a new and different variety of Iron Oxide Cu-Au (IOCG) deposit. It is introduced and named as Iron Oxide Gold deposit (IOG) or Specularite rich Gold deposits. This deposit has unusual richness in gold and LREE and is poor in copper.

Keywords: *Kuh-e-Zar, Gold, Copper, Specularite, Quartz, Iron Oxide, IOCG, IOG*