

## Mineralogy and fluid inclusion investigations in the Zarshuran gold deposit, north of Takab, NW Iran

T. Yousefi<sup>\*1</sup>, A. Abedini<sup>1</sup>, F. Aliyari<sup>2</sup>, A. Asghar Calagari<sup>3</sup>

1- Department of Geology, Faculty of Sciences, Urmia University, Urmia, Iran

2- Faculty of Mining Engineering, Urmia University of Technology, Urmia, Iran

3- Department of Earth Sciences, Faculty of Natural Sciences, University of Tabriz, Tabriz, Iran

(Received: 25/8/2018, in revised form: 1/12/2018)

**Abstract:** The Zarshuran Carlin-type gold deposit is located about 30 km north of Takab, West-Azarbaidjan Province, NW Iran. Interaction between the ore-forming fluids and the host carbonates and shales resulted in development of the decarbonatization, argillic, alunite, silicic, and sulfide alteration zones in the study area. Based on mesoscopic and microscopic studies on drill core samples, gold mineralization is mainly associated with Au-bearing pyrite and arsenic-containing pyrite generated during two stages. The mineral assemblages associated with these stages are As-bearing pyrite, realgar, orpiment, cinnabar, stibnite, and colloform sphalerite together with lesser amounts of sulfosalts (tetrahedrite and getchellite) intergrown with jasperoid and quartz. The microthermometric studies on liquid-rich 2-phase fluid inclusions in euhedral quartz crystals intergrown with the Au-bearing sulfides showed that the ore-forming fluids had an average homogenization temperature ( $T_h$ ) and salinity of about 260°C and 9.2 wt% NaCl equivalent, respectively. The variation trends in salinity and  $T_h$  of fluid inclusions could be explained by a combination of mixing and dilution of ore-bearing fluids with subsurface waters of meteoric origin. These processes were likely the principal cause for instability of Au-bearing complexes and hence gold deposition in the veins/veinlets. In addition, on the basis of the obtained pressures from microthermometric data the estimated depths for ore formation were within the range of 160 to 300 meters correlated with 40 to 75 bars, which is in agreement with some known Carlin-type gold deposits. In general, the geological, mineralogical, textural, and microthermometric data provided sufficient evidence to categorize the gold mineralization at Zarshuran as Carlin-type.

**Keywords:** *Carlin; gold mineralization; fluid inclusions; Carlin-type; sulfosalts; Zarshuran.*

---

\*Corresponding author, Tel: (044)32972134, Fax (044)32776707, E-mail: t.yousefi674@gmail.com