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Investigation of skarn formation using petrographic, mineral chemistry and fluid inclusion data, south west of Khaf, (southeast of Razavi Khorasan Province)

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Abstract: Keybarkuh Skarn is located in southwest of Khaf and northeast of Lut block in the Razavi Khorasan Province. Cretaceous limestone in the study area was intruded by granitoid plutons and as a result the skarn and related iron minerals were formed. The most important minerals in Keybarkuh skarn are garnet (andradite-grussolar), clino-pyroxine (diopsid – hedenbergite), amphibole, epieote, magnetite, calcite and Quartz. The Keybarkuh skarn is a calcic skarn that can be divided into garnet skarn, pyroxene-garnet skarn, amphibole-epidote skarn and epidote skarne zones.The study garnets vary in compositions and contain 59.46 to 99.45 mole percent andradite. The pyroxenes belong to diopside-hedenbergite solid solution series and contain 48.54 to 67.25 mole percent hedenbergite. The fluid inclusion studies in the western Kyberkuh carried out on the quartz veins that are associated with mineralization and skarns. The fluid inclusions in the mineralized quartz veins can be divided into two types A and B. According to microthermometry studies, homogenization temperatures of the fluid inclusion range from 200 to 340 C° and their salinity ranges from 2 to 19 wt. % Nacl equi for the A-type and 34 to 40 wt. % Nacl equi for the B-type showing that salinities of the B-type fluid inclusions are considerabley higher than those of the A type fluid inclusions. Presence of two types of fluid inclusion with high and low salinities in the the western Kyberkuh is probably due to circulation and mixing of the magmatic and meteoric waters. The skarn minerals were probably formed during two stages of prograde and retrograde in the Keybarkouh at high to intermediate fO_2. The Fe mineralization is mainly associated with prograde skarn and the B-type fluid inclusion. The fluids that prouduced the prograde skarn and iron mineralization were probably derived from magmatic waters.

Keyword: *Lut block; Khaf; Keybarkuh; Skarn; Fe mineralization; fluid inclusions.*

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