Petrography, mineralogy of alteration zones, and geochemical exploration in Southwest of Sorkh Kuh prospect area, Eastern Iran

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Abstract: The southwest of Sorkh kuh prospecting area is located in 120 km SW of Birjand city, western Lut Block. Geology of this area comprising andesitic and basaltic volcanic rocks, which have intruded by intrusive rocks such as hornblende diorite, hornblende tonalite, and biotite monzonite caused extensively alteration and mineralization. Based on remote sensing, field survey, petrography, and XRD, mineralogy of alteration zones are chlorite, epidote, carbonate, sericite, quartz, kaolinite, and natroalunite, so the alteration had been divided into 5 zones: porphyritic, argilllic, carbonatic, quartz-sericite-pyrite, and silicification. Disseminated, stockwork and vein type of mineralization have been observed. The vein type of mineralization has NW-SE trend and hosted by hornblende diorite porphyry. This type of mineralization includes quartz, Chalcopyrite, pyrite, and secondary Cu-Fe minerals. Disseminated and stockwork mineralization is consist of quartz, pyrite, magnetite, chalcopyrite, and secondary minerals that formed in altered biotite monzonite and hornblende diorite porphyry rocks. Chalcocite, covellite, malachite, azurite, hematite, and goethite are the secondary minerals in this area. Geochemical studies of stream sediments show anomalies in some elements such as 48-92 ppm Cu, 16-22 ppm Pb, and 27-123 ppm Zn. In lithogeochemical samples, 5% of Cu, 1.3% of As, 150 ppm of Mo, 362 ppm of Pb, 743 ppm of Zn, and 278 ppb of Au have meseaured. The highest anomalies was related to vein type mineralization in NW of area. Different factors such as petrology, alteration type and development, mineralization form and geochemical anomalies are the evidences for probably porphyry copper deposit in the area that need more exploration studies.

Keywords: Lut Block; Intrusive rock; Mineralogy; Alteration; Porphyry copper.

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