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# Geology, mineralization and geochemistry of Firouzkuh prospect area, northeast of Torbat-e- Jam

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**Abstract:** Firouzkuh prospect area is located about 35 km northeast of Torbat-e- Jam, Khorasan Razavi Province. Geology of the area includes metamorphosed rocks of Miankouhi Formation, which has intruded by monzogranitic to dioritic intrusions. The magnetic susceptibility of the intrusive rocks varies from 0 to 43 × $10^{-5}$ SI and they belong to reduced granitoids of ilmenite series. These rocks are affected by sericitic, silicification, and propylitic alterations in some places. Geochemistry of intrusive rocks indicates that they vary from metaluminous to peraluminous and belong to medium-K to high-K calc-alkalin and shoshonite series. Tectonic setting of intrusions is pre-plate collision to post-collision uplift. Mineralization has controlled by fault zone and formed in the contact between intrusive rocks and metasandstones or in metamorphosed units. Primary minerals consist of gold, arsenopyrite, pyrite, chalcopyrite, and pyrrhotite and secondary minerals include covellite, hematite, and goethite. Geochemical exploration, using chip composite method, shows anomalies of Au (up to 8942ppb), As (up to 74500 ppm), Cu (up to 357 ppm), Pb (up to 45 ppm), and Zn (up to 97 ppm) in the surface samples of the area, which are related to vein mineralization. Core drilling geochemistry indicates that maximum contents of Au (30732 ppb) and Cu (3200 ppm) exist in OBH-7 and high anomaly of As (98670 ppm) and W (133 ppm) are in OBH-2. Au often shows a positive correlation with As in most samples. It mainly exists in arsenopyrite and less as native gold or pyrrhotite and pyrite minerals. Based on presence of reduced intrusive rocks of ilmenite series, reduced mineral assemblages (arsenopryrite and pyrrhotite), type and development of alteration, mineralization form and high concentrations of Au, Cu, As, and W, the area can be part of a reduced intrusion-related gold system, which requires further investigations.

**Keywords:** *Firouzkuh; reduced granitoids; gold and arsenic; reduced intrusion-related gold system*.

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