

Petrography, geochemistry and tectonic setting of Roodare granitoid (South of Birjand)

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Abstract: Roodare granitoid outcropped at contact of upper cretaceous diabas in south of Birjand. It is compositionally ranging from tonalite to granodiorite and granite. The main minerals are plagioclase, quartz, alkali feldspar, hornblende and biotite. Disequilibrium evidences such as oscillatory zoning, embayment of hornblende and inclusion of plagioclase in alkali feldspar are present. Roodare granitoid is calc-alkaline, low to medium-K, metaluminous-slightly peraluminous and I-type. Based on HFSEs depletion (e.g. Nb, Ti, P, Y, Yb and Ta), these rocks belong to subduction-related tectonic setting. These depletions can be resulted from contamination and mixing of magma with crustal constituents during ascent and replacement. The REE patterns of analysed samples are characterized by light REE-enrichment, heavy-REE depletion and small negative Eu anomalies ($Eu/Eu^*=0.71-0.97$). Enrichment of samples in LREE and depletion in HREE imply continental margin volcanic arc metaluminous I-type magmatism. These characteristics demonstrated that magma generation occurred in subducted oceanic lithosphere and metasomatized mantle wedge which followed by fractional crystallization and crustal contamination. On the tectonic discrimination diagrams, all samples fall within the volcanic arc granite field and subduction zone enrichment. Roodare granitoid have Low Sr (110-261ppm), Sr/Y and plot predominantly in the field of mantle-derived arc magmas (normal calc-alkaline rocks) and hence, are different from adakites.

Keywords: *Roodare; Birjand; granitoid; geochemistry; tectonic setting.*

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