IRANIAN SOCIETY of CRYSTALLOGRAPHY and MINERALOGY

Vol. 26, No. 2, Summer 1397/2018

IRANIAN JOURNAL of CRYSTALLOGRAPHY and MINERALOGY

Petrography, geochemistry and tectonic setting of volcanic rocks in the Shah Soltan Ali area (Southwest of Birjand)

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(Received: 21/6/2017, in revised form: 7/10/2017)

Abstract: The volcanic rocks of Shah Soltan Ali area are located about 85 km southwest of the Birjand city at the eastern margin of the Lut block. Petrographic studies indicate that volcanic rocks consist of basalt to andesite. The main minerals are plagioclase, pyroxene and hornblende. Biotite and olivine observed rarely. The minor minerals are apatite and zircon. volcanic rocks show weak to strong propylitic alteration. Geochemical studies show that volcanic units are metaluminous, high calc-alkalic to shoshonitic related to subduction zone. They formed in a continental arc tectonic setting. Enrichment in large ion lithophile elements, such as Rb, Sr, K, and Cs, and depletion in high field strength elements, e.g., Nb, Ti, Zr with negative anomaly of Nb indicate magma formed in subduction zone. Based on some ratios, such as Ta/Yb ,Th/Yb ,Ba/La and Th/Nd, magma has originated from metasomatized mantel and slab-drive fluids had played a significant role in the enrichment of Mantle. $(La/Yb)_N$ ratio with REE pattern indicate low amount of garnet in source. The magmatic source of volcanic rocks had been generated from 5% to 20% of partial melting of garnet-spinel lherzolite.

Keywords: *Plagioclase; calc-alkalic; metaluminous; subduction; Lut Block; Birjand.*

[DOI: 10.29252/ijcm.26.2.369]

متن فارسی اصل مقاله از صفحه ۳۶۹ تا ۳۸۲ در این شماره به چاپ رسیده است.

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