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Petrogenesis and tectonic setting of the basic volcanic rocks from east of Qazvin, Central Alborz

B. Rahimzadeh[1], M. Ebrahimi[*2], A. Veisinia[1]

1- Department of Resources and Groundwater, Faculty of Earth Sciences, Shahid Beheshti University
2- Department of Geology, Faculty of Sciences, University of Zanjan

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Abstract: A sequence of Tertiary basic volcanic rocks is exposed in the east of Qazvin. The volcanic sequence is mainly composed of olivine-basalt to trachyandesite with porphyrictic, microlitic, and glassy textures. Clinopyroxene, plagioclase, amphibole, and iddingsitized olivine are the main phenocrysts. According to EPMA data plagioclase shows labradorite to bytownite composition and clinopyroxene is diopside. Geothermobarometry of clinopyroxene and amphibole represents the temperature of 1100 °C to 1200 °C and pressure of 1 to 5 kbar during crystallization of these minerals. According to the geochemical data, the sequence shows calc-alkaline affinity which is related to volcanic arc setting. In comparison to chondrite, they are enriched in LILEs and depleted in HFS elements. Also based on geotectonic diagrams, these rocks have been derived from a high potassium calc-alkaline to shoshonitic magma in an active continental margin setting. Ti and Nb negative anomalies and LILE enrichment support an enriched mantle in a supra-subduction zone as a source for magma. According to this study, the magma originated from a low grade 5 to 10 % partial melting from an enriched garnet-spinel lherzolitic mantle source at depth of 50-70 km and finally has risen to the surface via deep fractures and faults within an intra-arc extensional basin in Central Alborz zone during the Middle and Upper Eocene time.

Keywords: *Basic volcanic rocks; geothermobarometry; tectonic setting; Qazvin; Central Alborz.*

[*]Corresponding author, Tel: 09126419453, Fax: 02433054002, E-mail: ebrahimi@znu.ac.ir

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