



Petrogenesis of the Late Eocene Taron-e-‘Olya shoshonitic plutonic rocks from the Alborz-Azarbayjan zone, NW Iran

Asma Nazarinia (1,2), Nematollah Rashidnejad Omran (2), Mohsen Arvin (3), and Parham Ahmadi (2)

(1) Department of Geology, Faculty of Sciences, Hormozghan University, Bandar Abbass, Iran, (2) Department of Geology, University of Tarbiat Modares, P.O. Box 14155-175, Tehran, Iran, (3) Department of Geology, College of Sciences, Shahid Bahonar University of Kerman, P.O. Box 133-76175 Kerman, Iran

Abstract

The Late Eocene Taron-e-‘Olya pluton is one of the plutonic bodies cropped out in the Alborz-Azarbayjan zone in the NW of Iran. The pluton, with NW-SE trend, is intruded into the Eocene Sedimentary- volcanic rocks and comprises mainly of monzonite and quartz monzonite rocks with subordinate monzogranite, monzodiorite and quartz monzodiorite. They are I-type metaluminous in nature and shoshonitic in composition, characterized by rather high total alkalis ($K_2O + Na_2O$, ranging from 0.9 to 2wt %). On primitive mantle normalized trace element spider diagrams the pluton shows strong enrichment of large-ion lithophile elements (LILE) and depletion in high-field strength elements (HFSE) such as Nb, Ta and Ti. The Chondrite- normalized REE patterns are characterized by slightly enrichments of LREE over MREE and flat heavy REE Patterns [(Gd/Yb) N = 0.80-1.87], high (La/Yb) N = 6.38-9.89 and negative Eu anomaly [(Eu/Eu*) N = 0.46 -1.38]. These are typical geochemical features of subduction related magmatic rocks. The negative Eu anomaly suggests an important role for plagioclase and K-feldspar during fractional crystallization. The geochemical features indicate that a small degree of partial melting (1-5%) of lithospheric mantle source, previously undergone metasomatism due to infiltration of fluids and melts released from the subducted Neotethyan slab, generated the parental magma in a post-Collisional tectonic setting. The melting resulted from slab roll back of the down going Neotethyan oceanic crust in the final stages of subduction beneath the Central Iran that facilitated upwelling of hot asthenospheric mantle which in turn caused lithospheric extension and promote decompression melting of the metasomatized mantle wedge. Later, extensive fractional crystallization accompanied by minor crustal assimilation led to evolution of the intermediate acidic composition of the Taron-e-‘Olya pluton.

Key words: Taron-e-‘Olya, Shoshonitic, Alborz-Azarbayjan zone, Neotethys