The study of mineralogy and petrology of volcanic rocks in Golcheshmeh area, south of Neyshabur, north east of Iran

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Abstract: The study area is located at 220 km southwest of Mashhad and 80 km south of Neyshabur and is situated between 58° 40' 30" to 58° 43' 30" E longitudes and 35° 47' 30" to 35° 52' 00" N latitudes. The study area is part of Sabzevar zone. The lithology of the area consists mainly of volcanic rocks with trachyte, trachy andesite, and basaltic trachy andesite composition and in some parts has been subjected to argillic, carbonate and propylitic alterarations. The dominant phenocrysts in these rocks are plagioclase, alkali feldespar, opacitized hornblende and pyroxene. The main texture in these rocks is porphyritic with fine and medium grain matrix. These rocks have calc-alkaline nature and show enrichment in LILE (except for Ba) and depletion of HFSE. The enrichment of LREEs relative to HREEs indicates that the parental magma formed in a subduction zone, which is well manifested by the volcanic rocks of Golcheshmeh area. Tectonic setting diagrams and geochemical properties of volcanic rocks of the study area suggest an active continental margin setting. The low ratios of (La/Yb)$_N$ (5.3 to 9.3) and (Ce/Yb)$_N$ (4.2 to 7) point to low degree partial melting at shallow depths and low garnet in the source magma. The source magma formed by 2 to 5% partial melting of a spinel-garnet lherzolite source (low garnet) accompanied by crustal contamination.

Keywords: Golcheshmeh; Sabzevar zone; volcanic rocks; partial melting; calc-alkaline.

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