

Geochemistry of zeolitic alteration in volcanic rocks of Kejal area (NW of Hashjin, Ardebil province)

Gh. Hosseinzadeh*, M. Moayyed, E. Moghaddami

Department of Geology, Faculty of Natural Sciences, Tabriz University

(Received: 9/12/2011, in revised form: 18/2/2012)

Abstract: The study area is located about 20 km north-west of Hashjin, SW of Ardebil Province and is a part of Kejal-Shamsabad zone in the Tarom-Hashjin volcanic belt. Zeolite and associated minerals, such as quartz and calcite, are formed in cavities and fractures of trachy-andesitic country rock. Studies of zeolitic alteration zones show that stilbite is the main mineral and illite, sanidine, chlorite, calcite and, quartz are minor minerals. Based on petrographic studies, the main minerals of country rocks are plagioclase, k-feldspar, augite with volcanic glass and illustrate porphyritic texture. Geochemical studies and mass-changes calculations on the major and minor elements show that the elements such as Na, K, Ca, Mg, Fe and Mn depleted and Al and Si enriched in altered rocks relative to initial tracky-andesite. The rare-earth elements, except Eu and the HFS elements, have relatively similar behavior and show enrichment with increasing alteration whereas the LIL elements have different distribution patterns in altered and fresh rocks. Hydrothermal origin of zeolites are supported by evidences such as the euhedral crystals, open-space filling and amygdaloidal textures and the absence of main burial or contact metamorphic minerals. Stability field of zeolite is controlled by aqueous silica activity and temperature. Stilbite is stable in log (aSiO₂) of -4.1 and forms at temperatures <100°C and pH of 8-9.

Keywords: *Hashjin; Kejal; Shamsabad; geochemistry; zeolitic alteration; stilbite.*

متن فارسی اصل مقاله از صفحه ۸۳ تا ۹۶ در این شماره به چاپ رسیده است.

*Corresponding author, Tel.: (0411) 3392716, Fax: (0411) 3356027, E-mail: g-hosseinzadeh@tabrizu.ac.ir