Mineralogy, geochemistry and mass changes due to alteration of Khosh yeylvagh volcanic rocks, East of Golestan province

Sh. Babazadeh¹, S.A. Mazaheri¹*, M. Raghimi², A. Rahimi Chakdel²

¹-Department of Geology, Faculty of Sciences, Ferdowsi University of Mashhad, Iran
²-Department of Geology, Faculty of Sciences, Golestan University of Gorgan, Iran
(Received: 19/6/2012, in revised form: 3/9/2012)

Abstract: The volcanic rocks of Silurian in Khosh yeylvagh are located in eastern Alborz structural zone, east of Golestan Province. This volcanic mass is significantly affected by hydrothermal alteration. Propylitic alteration is the most dominant alteration in this area. Based on field observation and X-Ray diffraction studies, four alteration zones of chlorite, epidote, albite and hematite are recognized in the study area. The results of XPMA show that chlorites present in rocks of this area as peninite, talc-chlorite and diabanite. These minerals are formed in temperature ranging from 180 to 250 °C. The average of pistasite amount in epidotes is 31.15 which shows that this mineral is magmatic type and is composed of saussuritized plagioclase. Isocon diagrams show the high mobility of some immobile elements during alteration. In albite, alteration zone with an average isocon slope of 1.06 and 1.09 is the highest while in chlorite, alteration zone with an average isocon slope of 1 and 1.03 is the lowest mass transfer which can be observed during alteration. Also based on these diagrams, SiO₂ and P₂O₅ show depletion and L.O.I and Fe₂O₃ enrichment in all alteration zones. Chemical index of alteration (CIA) indicate that on epidote alteration zone 46.26% to 46.30%, albite alteration zone 47.86% to 51.49%, chlorite alteration zone 46.50% to 47.33% and hematite alteration zone 59.7% to 71.45% have gone under alteration.

Keywords: Khoshyeylagh; volcanic rocks; propylitic alteration; pistasite; isocon diagram; Chemical index of alteration (CIA).

*Corresponding author, Tel: 09153156703, Fax: (0511) 8797275, E-mail: mazaheri@ferdowsi.um.ac.ir