Mineralogy and geochemistry of the Hizeh-Jan kaolin deposit, northwest of Varzaghan, East-Azarbaidjan Province, NW Iran

Ali Abedini*

Geology Department, Faculty of Sciences, Urmia University, Urmia, Iran

(Received: 12/12/2015, in revised form: 19/4/2016)

Abstract: The Hizeh-Jan kaolin deposit (NW Varzaghan, East-Azarbaidjan Province) is a typical clayey deposit with andesitic host of Eocene age in northwestern Iran. Based on XRD analyses, the minerals of this deposit include kaolinite, pyrophyllite, quartz, smectite, muscovite-illite, hematite, goethite, anatase, alunite, diaspore, feldspar, hornblende, and calcite. Increasing SiO$_2$/Al$_2$O$_3$ ratio from the center toward outward in the studied profile indicate the presence of hydrothermal zoning in the deposit. Evidence such as the presence of silicic caps in the upper part of the deposit, local brecciation, mineralization of pyrophyllite, diaspore, and alunite, enrichment of LREEs relative to HREEs, pattern of mass changes of elements Al, Fe, Ti, Sr, and Nb, and positive correlations in trend of changes between (La/Lu)$_n$, P, Sr, and S with LOI suggest that the development of the Hizeh-Jan kaolin deposit is affiliated to function of hypogene processes on andesitic rocks. Geochemical analysis indicates that occurrence of negative Eu anomaly (0.39-0.78) in kaolinized samples is in relation to destruction of feldspar and hornblende minerals of the andesitic rocks by hydrothermal fluids and occurrence of negative Ce anomaly (0.62-0.81) is due to the destruction of zircon by acidic-oxidizing fluids.

Keywords: Kaolin deposit; geochemistry; hydrothermal alteration; andesite; Hizeh-Jan; Iran.

*Corresponding author, Tel: 04432972134, Fax: 04432776707, Email: abedini2020@yahoo.com