Abstract: The Shotorkhosb kaolin deposit is located about 7 km southeast of Torbat-e-Heydarieh, Khorasan Razavi Province, northeast Iran. This deposit is a part of the Khaf-Kashmar-Bardaskan metallogenic zone. Field observations and laboratory studies indicate that this deposit is a product of alteration of Eocene andesitic rocks. In this study, different analytical techniques, such as XRD, SEM-EDS, FE-SEM, DTA and TGA, were used to evaluate the characterization of the studied kaolin samples. Based on mineralogical examinations, kaolinite, illite, halloysite, montmorillonite, quartz, alunite, jarosite, natrojarosite, albite, muscovite, hematite, pyrite, gypsum, rutile, galena and barite are the most mineral phases in this deposit. Halloysite is a type 7 angstrom in this deposit and can be seen in the form of tubes and plate. Alunites have pseudocubic and rhombohedral forms. The distribution pattern of rare earth elements (REEs) and investigation of lanthanide ratios imply the effective role of pH and temperature changes in the development of this deposit. The correlation coefficients between elements reveal the effective role of clays, hematite, rutile and phosphorus-bearing minerals in the concentration of lanthanides. The decrease of Ce anomaly in the kaolin samples relative to the andesitic precursor rock implies a decrease in oxygen fugacity during the development of kaolinitization processes in the Shotorkhosb deposit.

Keywords: Kaolin deposit; host minerals; geochemistry; REEs; Shotorkhosb; Torbat-e-Heydarieh.