Petrographical, mineral chemical and geochemical studies of the lamprophyric bodies and alkaline gabbro from the Houway area (NE Hourand-NW Iran)

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Abstract: The lamprophyric body of the Houway area at northeast of Hourand and northwest of Iran, is injected in the form of a laccolite within the core of a plunging anticline with WNW-ESE axial trend, which is composed of the Upper Cretaceous-Paleocene flysch deposits, and is cut by an alkaline gabbroic stock. The lithology composition of the lamprophyric body indicates camptonite to sanait. Based on the TAS diagram. The parental magmas of olivine gabbro and lamprophyres was alkaline in nature. On the basis of spider diagrams, both of the rock types display enrichment of LREE compared to HREE. Thermo-barometry using a variety of methods indicates that the minerals of the lamprophyric body are crystallized at a pressure equal to 6 kb and a temperature equal to 877°C and olivine in the olivine gabbros is crystallized at a temperature of 1013°C, respectively. The parental magmas of the alkaline gabbro and alkaline lamprophyre crystallized by the partial melting of 5% and 1% of the spinel-garnet lherzolite, respectively. The alkaline gabbro resulted from the melting of the enriched lithospheric mantle, evolved to the parental magma of the alkaline lamprophyres by ascending towards the upper levels and stopping at the base of the continental crust due to the low-rate contamination with the crustal materials. It embedded within the axis of a plunging anticline in upper levels of the crust. Subsequently, due to the ascending of the alkaline basaltic magma diapirs and their injection into the lamprophyric body, the gabbro was formed. Based on the studies, both of the rock types are evolved in a post-collision magmatic arc setting.

Keywords: Lamprophyre, Houway, Laccolite, Thermo-barometry, Lithospheric mantle, Magmatic arc

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