Heterogeneous garnets in the alkaline feldspathoid-bearing rocks from the Kaleybar pluton, northern Azerbaijan (NW Iran)

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Abstract: The Kaleybar intrusion with an area of 750 km² is located in the north east Azerbaijan, NW Iran. Based on structural subdivisions of Iran, it is located in the West Alborz-Azerbaijan Zone which is intruded into the Azerbaijan continental crust during Eocene to Oligocene following the Pyrenean Orogeny. It consists of various rock types including nepheline syenite, syenite, nepheline diorite together with minor diorite and microgranite. The rock forming minerals of the investigated nepheline syenites are plagioclase, orthoclase, nepheline, biotite and amphibole. Clinopyroxene, plagioclase, amphibole and nepheline are dominant minerals in nepheline diorite. Titanian garnet is an uncommon accessory phase of the both rock types. Chemically, garnet from the nepheline syenite has TiO₂ contents ranging from 1 wt% to 5.0 wt%. Its composition is consistent with Ti-Adr 67 to 78 mole %, Grs 21 to 33 mole %. Ti-garnet from the nepheline syenite is euhedral to subhedral with reddish to deep brown colours which is different from light brown anhedral and fine grain garnet from the nepheline diorite. Magmatic origin of the Ti-garnet from nepheline syenite is suggested on the basis of petrographic studies, mineralogical criteria and chemical properties whereas the secondary garnet in the nepheline diorite seems to originate from metasomatic source.

Keywords: alkaline feldspathoid-bearing rocks, Ti-garnet, garnet and clinopyroxene mineral chemistry, Kaleybar intrusion, NW Iran.