



Nature of Potassium rich alkaline rocks in Central Anatolia: Buzlukdagi Syenitoids (Kırşehir-Turkey)

Kiyimet Deniz and Yusuf Kagan Kadioglu
Turkey (kdeniz@eng.ankara.edu.tr)

Central Anatolia Crystalline Complex has felsic and mafic plutons which are the products of magmas evolved during the early stages of the collisional tectonics that affected much of Anatolia during the latest Mesozoic through the early Cenozoic. The Late Cretaceous calcalkaline to alkaline plutons in the Central Anatolian crystalline complex is divided into three groups as a granite, monzonite, and syenite. Granitic plutons mainly occur along the western edge of the complex, whereas syenitic plutons form in the inner part. Syenitic plutons are composed of silica-saturated and silica-undersaturated alkaline rocks. Buzlukdagi intrusive rocks are exposed as a small alkaline pluton in the Central Anatolia around Alisar and Tatarilyas villages and represent a part of alkaline suite of central Anatolia. The body is typically observed at Buzluk hill as circular in shape and covers an area of approximately 15.75 km². Buzlukdagi syenitoid is intruded to the metamorphic rocks of Central Anatolia Crystalline Complex in the composition of foid bearing syenitoid. Migmatite and marble are observed at the outer zone as a product of contact metamorphism. The pluton can be distinguished with its high rough keen topography in the area. The intrusive body is differentiated into three subunits as a coarse, medium and fine crystalline foid bearing syenite on the basis of textural features and grain sizes. All the subunits of the syenite have similar mineral compositions with different mineral proportions and colors. Fine, medium and coarse crystalline foid syenites are pinkish, pinkish gray and gray in color respectively. They are mainly composed of nepheline, K-feldspar, oligoclase, pyroxene, biotite, phlogopite, amphibole with rare amount of garnet, cancrinite, sphene and opaque minerals. Confocal Raman Spectroscopic studies reveal that the garnets of these units are in the composition of uvarovite and andradite. Uvarovite type garnet group gives a strong Raman shift in 830-900 cm⁻¹, 500-540 cm⁻¹ and 360-390 cm⁻¹. The 532 cm⁻¹ in the garnet group minerals represents the Cr peak of the mineral. Andradite type garnet group gives a strong Raman shift in 820-890 cm⁻¹, 513-540 cm⁻¹, 360-390 cm⁻¹.

Buzlukdagi Syenitoids have a minor amount of magma mixing/mingling, magma segregation and xenolith types of enclaves. Fine crystalline foid syenites have xenolithic enclaves which have different mineral composition and different textural features from the host rock and ranging from 1 cm upto 15 cm in size. Xenolithic enclaves differ from syenite host rocks with their sharp contact and fels texture along the contact with the host rock. The xenolithic enclaves have fels texture at the rim and change to, lepidoporphroblastic and nematoblastic texture at the core. Xenolithic enclaves in the Buzlukdagi Syenitoids may derive from dendritic rock fragment and caught up by syenitic magma and locally metamorphosed due to high temperature with in the magma during the crystallization processes. The field observations, petrography and confocal Raman spectroscopy studies reveal that the presence of the xenoliths within the host rock may explain that the host magma intruded into the dendritic unit and they may refer the upper part of the intrusive body at the current position in the region.

Whole rock geochemical data reveal that the syenites are peralkaline to metaluminous in character. The Buzlukdagi syenitoids both show enrichment in large-ion lithophile and light rare earth elements (LILE and LREE) with respect to high field strength and heavy rare earth elements (HFSE and HREE).

The garnet group minerals with uvarovite composition may form as a result of mantle nature magma of the region. The geology, petrography and geochemical data suggest that the Buzlukdag alkaline intrusive rocks are products of silica undersaturated and may derived from crustal thinning of Central Anatolia during the late period of Mesozoic and early Cenozoic.