



## **SEM-EDX Imaging K-feldspar megacrystals: Subvolcanic syenitic rocks, Keban-Elazig, Eastern Turkey**

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**Abstract:** K-feldspar megacrystals (Kfm) are found in Keban pluton which are composed of syenite and monzonite porphyries with alcalen properties and shallow-seated. These rocks typically composed of phaneritic, porphyritic texture are mainly made up of K-feldspar, plagioclase, and small amounts of amphibole, biotite, quartz, pyroxene, garnet and opaque minerals set in coarse-to medium grained groundmass comprising same minerals. As accessory mineral, there are zircon, apatite, zeolite together with particular titanite. Keban plutonic rocks crop out as an independent of each other as shallow-seated in the form of dyke, sill and dome. K-feldspars, which are found intensively in all of these separate located rocks and show a homogenous distribution, can be found as; (1) megacrystal, (2) euhedral-subhedral phenocrysts, (3) arranged along the margins plagioclase and K-feldspar and (4) located in the groundmass as a microgranular, idioblastic microgranular or microlites. Kfms, which vary in size between 0.5-3.5 cm, microscopically include many various sized mafic and felsic inclusions. These inclusions, are often lined along the twin lamellae of the carrier minerals and sometimes among zoning. This characteristic can be explained as multi-stage growth of Kfms. Apparent zonation can be observed in some Kfm crystals.  $Ba^{2+}$  ( $r=1.34\text{\AA}$ ), whose atom size is compatible with  $K^{1+}$  ( $r=1.33\text{\AA}$ ), replaces K element. As a result, depending on Ba content, zoned growth are commonly observed in Kfms. The zones can occur either as normal or oscillatory zoning. In K-feldspar samples with normal zoning, Ba in the cores is higher than that in the rims. The content of Ba in the rims is similar to the Ba content in the groundmass. Twinning is common Kfm samples, but this does not occur in all of them. The twinnings observed are generally Karlsbad-simple and to a small extent Karlsbad-venture. In addition, there are under-developed perthites in few samples.

Four samples taken from Keban pluton rocks are examined with SEM. In SEM images, similar characteristics are observed. In addition to well-developed plate surfaces and divisions, sometimes very small-sized surfaces, thought to be inclusions (?) with micro cleavage and cracks, and appearances of acicular and intensive lines. Taking into consideration these morphologic differences, in order to determine possible compositional differences, we took EDX-analysis and results in a total of 36 surface / points, varying between 6-12 in each sample. The main elements in these four crystals are O, Na, Al, Si and K. In two samples (K7 and K20) Ba were measured in all points, two other samples (K12 and K13) Ca, Fe and Mg elements were measured. The existence of Ca, Fe, and Mg elements along with the main elements signify either inclusions with these elements or the growth of heterogeneous magma formed with various combinations of magma mixing.