



Mica Characterization in the Determination of the Nature of Magma Source, Central Anatolia Turkey

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Mica minerals (especially biotite) are generally observed as a mafic mineral component within the igneous rocks. They are usually form primary mineral within the igneous rocks with different chemical composition depending on the source of the magma. The type, shape and chemical composition of mica minerals are very important for assigning the nature and tectonic setting of magmas. The mica minerals form within the igneous rocks although they are also form in contact metamorphic aureoles of intrusive igneous rocks with magnesian country rocks. In this study, giant mica bearing alkaline rocks are selected where we can see in host and wall rocks in the region. Giant mica minerals are observed at the contact between foid bearing syenites and contact metamorphic rocks. These minerals are especially crystallized within the veins shape like body as a narrow lens. We have carried out mineralogical, petrographical and geochemistry studies using Confocal Raman Spectrometer (CRS), X-Ray Diffraction (XRD), X-Ray Fluorescence Spectrometer (XRF) and Electron Probe Micro Analyser (EPMA) for understanding the type and formation of these giant mica minerals in the study area.

The CRS technique was applied to giant mineral samples for determining the type and composition of the mica minerals. CRS results are briefly summarized as follows; giant mica group minerals are phlogopite in composition and have strong Raman Shifts in 190 cm⁻¹ and 684 cm⁻¹, weak peaks in 280 cm⁻¹, 523 cm⁻¹, and 1037 cm⁻¹. XRD is also used for determination of these giant mica minerals to reveal the purity of the crystal and their identity within the spectroscopy system. According to the XRD measurements of the separated mica minerals, giant micas have main peak in 9.8838 and 3.3026 Å with phlogopite composition.

The average chemical composition of micas are 0.05 wt. % Na₂O, 43.46 wt. % SiO₂, 10.38 wt. % Al₂O₃, 3.72 wt. % CaO, 8.84 wt. % K₂O, 10.059 wt. % Fe₂O₃, 0.75 wt. % MnO, 0.61 wt. % TiO₂. The mineral chemistry of these occurrences reveal that most of the micas are biotite in composition arguing with the CRS and XRD results.

The giant mica minerals of host alkaline rocks in Central Anatolia are represented the products of reequilibrated primary biotites of alkaline magma and contaminated with the basement of the metamorphic rocks during the crystallization.

Keywords: Phlogopite, biotite, foid bearing syenite, Raman, XRD, EPMA, XRF, Central Anatolia Crystalline Complex (CACC)

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