Mineralogical and chemical evaluation of five major feldspar mines in Sri Lanka

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The geochemistry of Sri Lankan feldspar has been investigated through several studies, but none of them have examined the chemical composition of major mining sites based on industrial needs. This study evaluates the chemical composition and impurity mineral incorporation of Sri Lanka's major feldspar mining sites. Five major mining sites atMathele-Naula, Sewanagala, Weli-Oya, Owala-Kaikawela and Badalkubura were identified for the study. Ten samples were collected overall, with multiple samples taken from each site with varying compositions by preliminary mineralogical observations. Samples were powdered using a planetary ball mill and sieved below 125 μm and directed for the analysis. Crystallinity and mineral phase identification were completed by X-ray diffraction (XRD) analysis (RigakuUltima IV, CuKα1 – λ= 1.5432 Å) and X-ray fluorescence (XRF) analysis (Rigaku NEXCG, with 20mm diaphragm). Microcline feldspar is the major compound found in Mathale-Naula (59.68%),Sewanagala (41.36%), Welioya (54.06%),and Owala-Kaikawela (78.14%) mining sites. However, the mining site at Badalkubura is composed of albite (40.44%). In addition, quartz and muscovite mica are common in most mines as impurity incorporations. Further, the feldspar samples collected from the Weli-Oya mine have the maximum crystallinity compared with other samples. Hence, Owala-Kaikawela and Mathale-Naula mines are suitable for the ceramic and porcelain industry, while Badalkubura mine is suitable for the glass industry.

Keywords: Ceramic industry, Chemical composition, Feldspar, Glass industry, Mineralogy

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