

## Synthesis of Feldspar Nanoparticles by Top Down Approach

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Feldspars are group of rock forming tectosilicates that found as deposits mainly in central part of Sri Lanka such as Owala Rattota and Matale. Feldspars are used for the industrial purposes such as, ceramic tiles, glazes, glass industry, filler, welding electrodes and abrasives, due to their durability and resistance to chemical corrosion in the macrometer-range. However to the best of our knowledge, there is no reported studies related to synthesis of feldspar nanoparticles which have potential applications in different industrial applications. Usually, materials show different properties in nanometer scale such a thermally stability and Infrared Radiation Absorbance. In this study, we have synthesized nanoparticles of feldspar using a top down approach. Sri Lankan feldspar samples were collected, powdered up to micro meter range using ball mill and further reduced its particle size following two step process of nano-grinding, such that dry grinding and wet grinding using 0.6 mm tungsten carbide balls for 1 h each. The prepared particles were characterized by scanning electron microscopy (SEM), X- ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR). Mineralogical analysis using X-ray diffraction (XRD) show that the product feldspar samples are composed of mainly of potassium oxides and silica oxides with minor aluminium. The particle sizes are in the range of nanometer scale and the average particle size is around 50 nm. The composition of these nanoparticles are proved not to be changing from the original composition as the XRD and FT-IR suggests. When coming down into nanoscale from a higher particle size, some property enhancements can be acquired. Typically, feldspar reflects UV light and absorbs some IR wavelengths. So this property can be applied as a potential application for textile and construction industries using the properties of these nano-feldspar.

**Keywords:** Feldspar, Infrared radiation reflectance, Top down approach, Orthoclase, Filler