

## Preliminary Investigations of Geochemical Characterization in Murunkan Clay Deposit, Sri Lanka

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Clay minerals are categorised into several groups as kaolin group, smectite group, illite group, chlorite group and 2:1 clays such as attapulgite and sepiolite. Over other clays, smectites are far more valuable due to their advanced application potential. Smectites exhibit excellent swell properties and the highest cation exchange capacity (CEC). Smectites can be used as adsorbents, filler material, drilling mud, excipients, and plasticisers. Montmorillonite is a layered aluminosilicate with a higher specific surface area. It is also the most abundant of the smectite clays. The main objective of the current study is to identify spatial and temporal variations in geochemical characteristics of the Murunkan clay deposit. In this on-going project, two boreholes were drilled nearly 1 km distance each other in the Murunkan Basin. One borehole reached a depth of 6.5 feet while the other just passed a depth of 4.0 feet. Samples were cut into 5 inches of each core. Geochemical characteristics of the Murunkan clay deposit were evaluated for 15 clay samples and a Sigma Aldrich montmorillonite sample (reference material) using X-ray fluorescence (XRF), X-ray diffraction (XRD) and Fourier Transform Infra-Red (FTIR) analyses. XRF results indicate ~57% SiO<sub>2</sub>, ~19% Na<sub>2</sub>O, ~10% Al<sub>2</sub>O<sub>3</sub>, ~5% Fe<sub>2</sub>O<sub>3</sub>, ~2% CaO, ~2% MgO, ~1.5% K<sub>2</sub>O, and ~1% TiO<sub>2</sub>. FTIR spectra of analysed clay samples show transmittance bands matching with the standard data of kaolinite and montmorillonite. Similarly, XRD analysis also suggests the occurrence of clay minerals such as montmorillonite, illite, kaolinite, chlorite, muscovite and cookeite. Quartz and feldspar can also be detected as the major impurities in the Murunkan clay samples. However, no considerable spatial and temporal geochemical variations can be observed in this deposit. Therefore, the Murunkan clay deposit can be identified as a prospective area for further exploration. The future research works would focus to demarcate the boundary of clay deposit and quantify the volumetric estimation. Besides, value additional potential such as purification and possible industrial applications would be examined.

**Keywords:** Murunkan clay, Montmorillonite, Value addition potential

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