

**CHARACTERIZATION OF LOCALLY AVAILABLE
MONTMORILLONITE CLAY MINERALS TO BE USED
AS NANO PARTICLES**

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DECLARATION

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Name of the supervisor: Dr. S.U. Adikary

ABSTRACT

The research work describes the extraction of nano particles of Montmorillonite clay from local clay deposits located in the dry zone of the country, and its characterization techniques using X-Ray diffraction, Fourier Transform Infrared Spectroscopy, Differential Thermal Analysis and Thermogravimetry analysis, Scanning Electron Microscope, and particle size analysis.

Montmorillonite gained an increased attention during the past decade due to the superior properties imparted in polymer-clay nano composite synthesized with nano particles of Montmorillonite. These composites synthesized in this way have superior mechanical and thermal properties compared to their bulk counterparts. At present the local demand for Montmorillonite is fulfilled by imported Montmorillonite which is a purified form of bentonite. It has been found by previous research activities, that in Sri Lankan clay deposits located in the dry region, Montmorillonite is available mixed with other minerals. The main ingredients of these deposits are Montmorillonite and kaolinite.

Physically Montmorillonite and Kaolinite are so similar that they are very difficult to be separated from a mixture. However these two minerals have a difference in their specific gravities which can be used to separate the two minerals. This research describes how this separation could be carried out in detail finally leading to the extraction of Montmorillonite from local clay deposits. The clay used in the experiment underwent several purifying processes followed by characterization processes. The characterization of the final extracted clay reveals that it consists of Montmorillonite and the particle size of these falls below 100 nm. This indicates that these extracted Montmorillonite nano particles can be used to synthesize polymer-clay nano composite.

Keywords: Montmorillonite, nano, extraction, clay characterization



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D.D. Wanasinghe

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LIST OF ABBREVIATIONS

Abbreviation	Description
θ	Angle of incidence
d	Inter planar spacing
BT	Bentonite
DTA	Differential Thermal Analysis
FTIR	Fourier Transform Infrared Spectroscopy
MMT	Montmorillonite
SEM	Scanning Electron Microscope
TGA	Thermogravimetry Analysis

XRD



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