

INVESTIGATION ON MONTMORILLONITE CLAY FOR TECHNOLOGICAL APPLICATIONS

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Abstract

Montmorillonite clay have been identified as natural Nano-material which have higher potential for high-tech applications. Montmorillonite (MMT) clay bed is identified in Murunkan area, Northern Province, Sri Lanka. This clay bed is about 250 m in width and about 2 km in length and it extends for about 2 to 3 m in depth. However, economical extraction of the deposits is not operating at present and very few investigations have been carried out to identify its economic feasibility. Therefore, present study investigate the method to extract the pure Montmorillonite clay from the other impurities and identify its electrical properties.

Montmorillonite clay was extracted by employing gravitational separation and wet sieving. The impurities in the samples were identified from microscopic examination. DC conductivity of dense pellets prepared from purified clay were used to measure the DC conductivity using four-probe method. Microscopic examination reveals that the quartz and carbonates are the major impurity mineral in the deposits with organic debris.

DC Conductivity of the Montmorillonite clay was in the order of 10^{-7} Scm^{-1} . At moisture content of 10.1% and 0.54%. Chemically unpurified Natural MMT Clay in Murunkan area is not a perfect insulator. Showing Bottom level of semi-conductor. The conductivity value was remained approximately constant. So, Conductivity is due to some element or group of elements in this clay. The DC Conductivity measurements of Montmorillonite clay show that, clay is not a perfect insulator. The clay shows the bottom level of semi-conducting behavior. Further, moisture content of the dense montmorillonite pellets did not affected for the conductivity measurements. The conductivity may be resulted from the combine effect of clay material and other impurities.