

DEVELOPMENT OF SRI LANKAN CLAY MINERALS FOR EFFECTIVE WATER PURIFICATION

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Although Sri Lanka possesses a variety of low-cost minerals identified for water purification, their use in affordable water filters is minimal mainly due to its unsuitability in the raw form. Such minerals should be purified, shape stabilized and the effective surface area for pollutant adsorption should be enhanced. Accordingly, our project involves enhancement of Sri Lankan clay minerals through morphological and structural modifications for water purification. The initial phase of this project has already been started and this abstract presents the work carried out under three sub-projects to develop local clays for water purification.

Under the first sub-project, processing of local kaolinite clay to be used as an inexpensive natural adsorbent to remove water pollutants was performed. But it revealed that kaolinite has poor stability. This set back was overcome through further research where it was found that kaolinite of adequate strength could be obtained by sintering at 400 °C.

Sri Lanka has large montmorillonite deposits in Mannar area but no proper attention has yet been paid on utilizing them for water purification. Therefore, our second sub-project investigated its feasibility in water purification. The supernatant was analyzed and the effect of adsorption parameters such as initial methylene blue dye concentration, temperature, pH, adsorbent dose, contact time has been studied. The outcome revealed that 450 °C as the optimum sintering temperature for this montmorillonite clay. Moreover, the adsorption capacity at room temperature for methylene blue was 12.8 mgg⁻¹.

Finally, fabrication of composites of kaolin and cellulose fibers was investigated to enhance their pollutant absorptivity. Adsorption studies on prepared composites were performed by batch techniques to obtain rate and equilibrium data. This revealed the successful formation of the composite giving promising results in the preliminary absorption studies.

Keywords: Sri Lankan clays, Development of minerals, Water purification, Pollutant absorption.