COMPOSITES OF CLAY AND LIGNOCELLULOSES FOR WATER TREATMENT

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ABSTRACT

Clay is an abundant and relatively cheap material. Nanoclays have been widely used as adsorbents due to their inherent properties such as high specific surface area, high chemical and mechanical stability as well as their ion exchange capacity (1). Most natural clays have been reported to adsorb pollutants from water. Adsorption was enhanced by surface modification such as when montmorillonite (MMT) was grafted with polymers or reactive organic groups for adsorption and the resultant materials demonstrated enhanced adsorption capacity for Hg^{2+} ions (2). Lignocellulose is also a cheap material which is used for the production of activated carbons and has been reported to adsorb some organic pollutants. It was expected that composites of MMT and lignocellulose can lead enhanced adsorption capacity through a synergistic effect as reported in some studies (3).

In this study nanocomposites are prepared from montmorillonite clay (MMT) via an *in situ* emulsion graft polymerization procedure and also through surfactant modification by dodecylamine. The nanocomposites prepared were characterized by FTIR, SEM, TGA and XRD. Adsorption studies were carried out using the batch method and the concentrations of heavy metals and methyl orange adsorbed for the unmodified clay and lignocelluloses as well as the nanocomposites were determined using AAS. The Langmuir equation was used to determine the adsorption capacity of each adsorbent. The nanocomposites prepared showed improved adsorption towards heavy metals and some organics.

References

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