Y. Park, G. A. Ayoko, R. Kurdi, E. Horváth, J. Kristóf and R. L. Frost:

Adsorption of phenolic compounds by organoclays: Implications for the removal of organic pollutants from aqueous media.

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Montmorillonite (MMT) was converted to organoclays by intercalation of cationic surfactants into its interlayer space. Two types of organoclays were prepared from different surfactants (DDTMA and DDDMA) at different surfactant loadings, and the structural changes in the clays investigated using var ious techniques. The arrangements of surfactant molecules in the interlayer space was visually aided by molecular mechanical calculation (MM calculation), and the adsorption capacities of MMT and the organoclays for the removal of p-chlorophenol (PCP) and p-nitrophenol (PNP) from aqueous solutions were tested under different conditions. Two adsorption isotherm models (Langmuir and Freundlich isotherms) were used to determine the best fit model and the Freundlich isotherm was found to provide better fit for both PCP and PNP. Due to its hydrophobic properties, the adsorption is more favourable for PNP than PCP. Overall, the adsorption capacity of the organoclays was significantly improved by intercalation with large surfactant molecules as well as highly loaded surfactants as the intercalation with large surfactant mol-ecules created the partitioning phase, which strongly attracted large amounts of organic pollutants. Possible mechanisms and the implications of the results for the use of these organoclays as adsorbents for the removal of phenols from the environment are discussed.

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