
Adsorption of n-Aliphatic Alcohols from Dilute Aqueous Solutions on RNH₃-Montmorillonites. III. Interlamellar Aggregation of the Adsorbate

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Abstract: The large amount of water in the interlamellar space of alkylammonium montmorillonites in aqueous solutions is not fixed by intercalated hexanol or octanol. The hydration of the NH₃⁺-group and the filling of the empty spaces between the carbon chains are responsible for this phenomenon. Hydrogen bonds between the alcohols and the ammonium groups reduce the enthalpy of solution of hexanol and octanol in the interlamellar region at infinite dilution to +17.6 and +12.7 kJ/mole, respectively. Self-association of the alcohols further diminishes the enthalpy of solution at higher alcohol concentration. The interlamellar fixation of the RNH₃ cations prevents a micellization as has been obtained in bulk solutions. At a given alcohol concentration smectic type aggregates, i.e., double layers of alcohol molecules, appear as shown by an increase of the basal spacing of the organo-clay complexes. The aggregate formation is favored by a longer chain length of both the cation and the alcohol.

Key Words: Adsorption • Alcohol • Alkylammonium cations • Intercalation • Micellization • Montmorillonite

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