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# Swelling of Montmorillonite in Polar Organic Liquids

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**Abstract:** The crystalline and osmotic swelling of Na-, Cs-, Mg- and Ca-montmorillonite has been measured in dimethyl sulphoxide and in formamide, *N*-methyl formamide, dimethyl formamide, *N*-methyl acetamide and dimethyl acetamide. These liquids have similar dipole moments but their relative permittivities vary appreciably from values less than water to values greater than water.

Na-montmorillonite exhibits osmotic swelling (diffuse double layer development  $-d(001) \gg 19 \text{ \AA}$ ) in formamide and *N*-methyl formamide and Cs gives osmotic swelling behavior in formamide. Cs-montmorillonite in the crystalline swelling region give spacings greater than those found for water with all liquids. Mg- and Ca-montmorillonite did not give spacings greater than 19  $\text{\AA}$  in any of the liquids studied.

The swelling behavior of montmorillonite is affected by relative permittivity but for liquids with a similar relative permittivity methyl substitution in the molecule may prevent the development of diffuse double layers on the particle surfaces.

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