

## INTERCALATION OF MONTMORILLONITE WITH OCTADECYLAMINE UNDER VARIOUS CONDITIONS

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Expansion of phyllosilicates with organocations, mainly alkylammonium cations, has been widely studied. This intercalation, which courses with the exchange of the compensating cations of the clay by these organic cations, transforms the surface of the clay particles from hydrophilic (organophobic) to hydrophobic (organophilic). Swelling with alkylammonium cations having different chain lengths has been reported. Solids thus formed are usually called organo-smectites, their organophilic character allowing applications in different fields, as in the adsorption of organic pollutants.

We report in this communication a systematic study of the intercalation of montmorillonite with octadecylammonium cations under different conditions. Montmorillonite from Tamame (Zamora, Spain) was used as parent material. Octadecylamine,  $\text{CH}_3-(\text{CH}_2)_{17}-\text{NH}_2$ , was used as precursor of the intercalating cations, being protonated in situ with HCl. Different studies were carried out varying the reaction medium (using water or ethanol, in which the amine is more soluble), the amine-clay ratio (between 0.5–10.0) and the HCl-amine ratio (between 2 and 95). Finally, simultaneous co-intercalation of octadecylammonium and of the inorganic polycation  $[\text{Al}_3\text{O}_4(\text{OH})_{24}(\text{H}_2\text{O})_{12}]^{7+}$  was considered.

Solids are successfully intercalated in most of the experiments carried out. When amine-clay ratio was considered, intercalation was observed in the range 1–3; when this ratio is  $\leq 1$  the clay is not intercalated, probably because of the very small amount of organic molecules, and when this ratio is  $\geq 5$ , an excess of amine, not soluble, was observed. Basal spacings of the intercalated solids are between 17.2 and 36.7 Å. The amount of organic matter incorporated into the solids also varies widely, up to 40wt% C is fixed. The C-N ratio in the solids intercalated is similar to that in octadecylamine molecule. Specific surface area is very low in all the intercalated solids, in most of them between 3–6 m<sup>2</sup>/g, because of the total blockage of the clay porosity by the organic molecules. Co-intercalation of octadecylamine and of the inorganic  $\text{Al}_{13}$  polycation gives rise to intercalated solids with basal spacings between 17–23 Å, also with a high fixation of organic matter and a high blockage of the porosity of the solids.

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