

Experimental Studies and Theoretical Modeling of the Adsorption of Cationic Surfactants on Na-Bentonite

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Clays can be considered as adsorbents that respond to the environmental problem posed by the use of toxic chemicals products in many industries (textile, paint, agrochemical and food industry ...) and receive special attention thanks to their abundance and low cost compared to other adsorbent materials.^{1, 2, 3}

The modification of the clays (Bentonite) by surfactants (CPC) finds several applications in various fields, such as cosmetics, drugs, paints, nanomaterials,^{1, 3} etc. The samples of clay bentonite that we took from Nador region in North-Eastern Morocco have already undergone a series of chemical and physic-chemical analyses.² The adsorption of the cationic surfactant CPC on a hydrophilic smectite (Bentonite) surface has been investigated. The adsorption of aqueous surfactant solutions on mineral substrates is mainly governed by electrostatic and hydrophobic interactions.^{5, 6, 7, 8} For low coating rates, the surfactant cations physically adsorb in the form of individual ions at the negatively charged surface sites.^{5, 6, 7} In this first stage of the adsorption process, the surfactant molecules exchange with exchangeable cations of the clay (sodium cations)^{5, 6, 7} and may be other counter-ions present at the solid / water interface, it was found that the rate of surfactant CPC adsorption reached up to 1.7 CEC.

We have studied the first process of adsorption by a theoretical model, electrostatic, which takes into account all the physico-chemical properties of the system during the exchange. And we calculated the cation-clay bond coefficients by calculating the concentration of surface banded sites taking into account a complete surface charge layer using Matlab software.

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