



Adsorptive removal of acid red from aqueous solutions by cationic surfactant-modified bentonite clay

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ABSTRACT

The performance of hexadecyltrimethylammonium chloride (HDTMA)-intercalated bentonite clay (organoclay) for the removal of acid red (AR) from aqueous solutions has been evaluated in this study. The adsorbent HDTMA-modified bentonite clay was prepared by the reaction of Na-bentonite with (HDTMA⁺) cations equal to twice the cation exchange capacity of the Na-bentonite. The adsorbent characterization was done with the surface area analyzer, FTIR, SEM, XRD, TGA and potentiometric titrations. Maximum adsorption of AR onto organoclay has been found to be at pH 3.0. The Langmuir isotherm model was found to be the best fit model. The maximum adsorption capacity was found to be 140.84 $\mu\text{mol/g}$ at 30°C. Adsorption has been found to be endothermic and follows first-order reversible kinetics.

Keywords: Na-bentonite; Adsorption; Acid red; Isotherm; Desorption

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