

The High Efficiency of Cationic Azo Dye Removal Using Raw, Purified and Pillared Clay from Algerian Clay

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Abstract : The aim of this present study is to evaluate the adsorption capacity of a dye, Malachite green, on a local Algerian montmorillonite clay mineral (raw, purified and Cr-pillared). Various parameters influencing the dye adsorption process ie contact time, adsorbent dose, initial concentration of dye, pH of the solution and temperature. Cr pillared clay has been obtained with a better surface character than purified and natural clay. An increase in basal spacing from 12.45 Å (Mont-Na) to 22.88 Å (Mont-PLCr), surface area from 67 m² /g (Mont-Na) to 102 m² /g (Mont-PLCr). The experimental results show that the dye adsorption kinetic were fast: 5 min for Cr-pillared clay mineral, and 30 min for raw and purified clay mineral (RC and Mont-Na). The removal efficiency on Mont-PLCr (98.64%) is greater than that of Mont-Na (86.20%) and RC (82.09%). The acidity and basicity of the medium considerably affect the adsorption of the dye. It attained its maximum at pH 4.8. The equilibrium and kinetic data were found to fit well the Langmuir model and the pseudo-second-order model.

Keywords : Dye removal, pillared clay, isotherm, kinetic

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