



Removal of methyl orange from aqueous solution with crosslinked quaternized chitosan/bentonite composite

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ABSTRACT

A crosslinked quaternized chitosan (*N*-2-hydroxypropyl-trimethylammonium chloride chitosan)/bentonite (CHTCC/BT) composite was developed via immobilizing crosslinked quaternized chitosan into bentonite and characterized by X-ray diffraction and fourier transform infrared spectroscopy techniques. This composite was applied for the adsorption of methyl orange (MO) from aqueous solution. Effects of the amount of quaternized chitosan in the CHTCC/BT composite, initial pH, initial dye concentration, inorganic sodium salt and ionic strength on MO adsorption were studied in detail using a batch method. Increasing the amount of quaternized chitosan in the CHTCC/BT composite enhanced the adsorption of MO while increasing initial pH, initial dye concentration and ionic strength decreased the adsorption of MO. The adsorption kinetics followed the mechanism of the pseudo-second-order equation. The equilibrium data were described by the Langmuir model. The monolayer adsorption capacity of CHTCC/BT composite was 632.9 mg/g at 298 K and natural pH value. The adsorbent was prone to regeneration with 0.3 mol/L NaOH solution. The possible pathways for MO adsorption may include the electrostatic interaction and hydrogen bonding between CHTCC/BT composite and MO.

Keywords: Quaternized chitosan; Adsorption; Bentonite; Isotherms

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