



Adsorption of reactive blue 29 dye from aqueous solution by multiwall carbon nanotubes

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ABSTRACT

Industrial effluents that carry dyestuff into natural water systems are serious environmental concern. The complex aromatic structures of dyes make them more stable and more difficult to remove from the effluents discharged into water bodies. Dyes are known pollutants that not only affecting esthetic merit but also reducing light penetration and photosynthesis, and some are considered toxic and even carcinogenic for human health. This study examined the feasibility of removing reactive blue 29 dye (RB29) from aqueous solutions using multiwall carbon nanotubes (MWCNTs) and oxidized MWCNTs. The effects of RB29 dye concentration, MWCNT and MWCNT-COOH dosage, and pH on adsorption of RB29 by both MWCNTs and MWCNT-COOH were also evaluated. Also, the adsorption isotherms of this dye on to carbon nanotubes (CNTs) and related constants were studied. Results showed that adsorption capacity of pristine MWCNTs was higher than oxidized MWCNTs due to negative charge put on the surface of MWCNT-COOH. The adsorption capacities of MWCNTs and MWCNTs-COOH in the best conditions were 49 and 34 mg/g, respectively. The results also demonstrated that adsorption capacity of RB29 on CNTs was higher in lower pHs due to significantly high electrostatic attraction exists between the positively charged surface of the adsorbent and negatively charged anionic dye. And finally the Freundlich isotherm showed the best conformity to the equilibrium data.

Keywords: Adsorption; Reactive blue 29 dye; MWCNTs; Isotherm; Oxidized MWCNTs

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