



Preparation of mesoporous graphene oxide/SBA-15 hybrid nanoparticles as a potential adsorbent for removal of cationic dyes

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Received 30 October 2018; Accepted 1 March 2019

ABSTRACT

In this paper, mesoporous graphene oxide/SBA-15 nanocomposite was used as an adsorbent for removing cationic dyes from wastewater. Adsorption experiments tested the initial concentration of dye, calcination temperature, and pH of dye solution. The features of the composite were examined through X-ray diffractometry, field-emission scanning electron microscopy, transmission electron microscopy, Raman spectrometry, Fourier transform infrared spectrometer, and surface area analysis. The graphene oxide/SBA-15 samples possessed a high degree of oxidation that gave the composite an excellent adsorptive property toward dye. Higher solution pH and initial concentration of dye favored methylene blue adsorption. Adsorption capacity was highest at a calcination temperature of 550°C. Adsorption kinetics and isotherms were analyzed. The adsorption process was well fitted by the pseudo-second order kinetic model and Langmuir isotherm model. The mesoporous graphene oxide/SBA-15 composite is a promising material for removing aqueous organic pollutants.

Keywords: Graphene oxide; SBA-15; Messtructure; Nanocomposite; Cationic dye

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