



Adsorption of dyes using magnesium hydroxide-modified diatomite

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ABSTRACT

Diatomite and $\text{Mg}(\text{OH})_2$ -modified diatomite (MMD) were employed as adsorbents for the removal of one cationic dye, Methylene Blue (MB), and two anionic dyes, Ramazol Golden Yellow (RGY) and Telon Blue (TB), from aqueous solution. Physical characteristics of the adsorbents were investigated using scanning electron microscope (SEM), energy dispersive X-rays (EDX), pH value of isoelectric point of zeta potential (pH_{IEP}) and Fourier transform infrared (FTIR) analyses. The $\text{Mg}(\text{OH})_2$ content of MMD was found to be 13.45%, and three isoelectric points were observed around pH 2.0, 8.5 and 11.5 for MMD. The adsorption performance of dyes onto diatomite and MMD was studied using spectrophotometric analysis. It showed that the modification of diatomite enhanced removal of the anionic dyes from aqueous solution. The adsorption data were fitted to the Langmuir, Freundlich and Redlich-Peterson models. The results indicated that the Redlich-Peterson model was the best one in simulation of the adsorption isotherms, suggesting some heterogeneity in the surface or pores of the adsorbents. The adsorption of dyes onto diatomite and MMD may be attributed to electrostatic interaction, hydrogen bonding interaction, n - π interaction and Van Der Waals interaction.

Keywords: Adsorption; Diatomite; Textile dye; Magnesium hydroxide

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