

Methylene blue adsorption on graphene oxide

ABSTRACT

In this study, graphene oxide (GO), produced using the simple Hummer's method, was used as adsorbent to remove methylene blue (MB) from aqueous solution. Characterizations using transmission electron microscope (TEM) and Fourier transform infrared (FTIR) spectroscopy were carried out on the GO before the MB adsorption experiments. The adsorption kinetics and isotherm studies were conducted under different conditions (pH = 3-7 and MB concentration = 100-400 mg/L) to examine the adsorption efficiency of the GO towards MB in aqueous solution. The adsorption kinetics data were analyzed using different kinetic models to investigate the adsorption behavior of MB on GO. The obtained results showed that the maximum adsorption capacity of the GO towards MB can achieve up to ~700 mg/g for the adsorption at 300 mg/L MB. The adsorption kinetic data were found to fit pseudo-second order model as compared with pseudo-first-order model. The intraparticle diffusion model suggested that the adsorption process of GO towards MB was dominated by the external mass transfer of MB molecules to the surface of GO.

Keyword: Adsorption isotherm; Adsorption kinetics; Intraparticle diffusion; Methylene blue.