



Kinetic and isotherm study of Bromothymol Blue and Methylene blue removal using Au-NP loaded on activated carbon

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Received 6 March 2012; Accepted 6 May 2013

ABSTRACT

In this research, the efficiency of gold nanoparticle loaded on activated carbon (Au-NP-AC) was used for the removal of Methylene blue (MB) and Bromothymol Blue (BTB) from aqueous solutions. The effect of various parameters such as solution pH, initial dye concentration, amount of Au-NP-AC, and temperature on the extent of dye adsorption was investigated. The performances of two dye adsorption capacities were compared. The adsorption equilibrium data were analyzed using Langmuir, Freundlich, Temkin, Dubinin–Radushkevich, and Harkins–Jura isotherm models. It was seen that Langmuir models represented the equilibrium data well with adsorption capacity of 40.65 and 95.24 mg g⁻¹ for MB and BTB, respectively. Kinetic data revealed that the adsorption of both the dyes on the adsorbent surface followed pseudo-second-order model.

Keywords: Adsorption; Methylene blue (MB); Bromothymol blue (BTB); Kinetic; Thermodynamic

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