



Investigation of adsorption performance of activated carbon prepared from waste tire for the removal of methylene blue dye from wastewater

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ABSTRACT

Disposal of exhausted waste rubber tires discarded from vehicles is a serious environmental problem. Their storage requires large amount of space and can cause fire hazard. Burning of these tires produces toxic gases, which impose severe health hazards. In this study, tire activated carbon, obtained by the pyrolysis of waste tire, is used for the removal of Methylene blue dye from its aqueous solutions through adsorption process. The morphology and other characteristics of the tire activated carbon have been analyzed using scanning electron microscope, energy dispersive X-ray analyzer and Brunauer–Emmett–Teller surface area analyzer. The results show that at ambient temperature, the maximum adsorption of dye onto tire activated carbon has been achieved at pH 3, 4 g of adsorbent and contact time of 90 min. The adsorption isotherms and kinetics of dye with tire activated carbon were also investigated. Pseudo-second-order kinetic model and Langmuir isotherm have been found suitable for the adsorption of Methylene blue dye over tire activated carbon. The obtained results demonstrate that waste tires can work as potential adsorbent for the removal of Methylene blue dye from wastewater.

Keywords: Activated carbon; Adsorption; Tire; Methylene blue; Kinetics; Isotherm

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