

Discoloration of Azo Dye Solutions by Adsorption on Activated Carbon Prepared from the Cryogenic Grinding of Used Tires

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Abstract: This present work reports a study about the adsorption of cationic dye (Methylene blue) by activated carbon prepared from the cryogenic grinding of used tires. Characterization of the obtained activated carbon by chemical analysis, FTIR and SEM, was studied and resumed that the activated carbon was mesoporous. The effect of various experimental parameters such as contact time, solution pH, adsorbent dose and dye concentration, on the dye adsorption uptake on the activated carbon has been investigated using batch adsorption experiments. According to the experiments results, it was shown, that equilibrium was achieved in less than 114 min. The effect of pH investigated for values ranging from 2 to 11, showed maximum adsorption for pH 11. The equilibrium adsorption isotherms models of Langmuir, Freundlich and Dubinin-Radushkevich, were tested for the quantitative description of the dye adsorption. The Langmuir isotherm provided the best fit for dye adsorption onto the prepared activated carbon and the maximum adsorption capacity was found to be 30.21 mg.g⁻¹. The results show that the produced activated carbon from used tire is an alternative low-cost adsorbent for removing dyes from solutions.

Keywords : adsorption, FTIR, SEM