



Activated carbon produced from sugarcane bagasse waste as a low-cost dye-containing wastewater adsorbent for reactive turquoise blue removal

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ABSTRACT

Sugarcane bagasse-based activated carbon (SBAC) materials had been successfully prepared from sugarcane waste by zinc chloride activated method. Structure of the obtained materials was studied by scanning electron microscopy, X-ray diffraction and a surface area and pore size analysis method. Adsorption performances of the as-prepared materials were evaluated by a batch method on a 722 spectrophotometer. Results indicated that the obtained materials had abundant pore structure, that is, the Brunauer–Emmett–Teller surface area could be up to 1,843 m²/g and the total pore volume V_t increased with increasing activator proportion. The proportion of mesopores increased first and then decreased with increasing activator proportion. For the sample of SBAC-3, the mesoporous surface area content can be up to 52% and there was a sharp peak at 4.9 nm by quenched solid density functional theory. Adsorption experiments showed that the obtained material had good adsorption performance. The acid condition is benefit for the adsorption behaviour. The adsorption quantity of SBAC-3 increased with increasing the initial dye concentration.

Keywords: Biomass; Sugarcane bagasse; Activated carbon; Adsorption

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