

Effect of activation method on the pore structure of activated carbon from date pits application to the treatment of water

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ABSTRACT

Four active carbons have been prepared by carbonisation without adjuvant (DC) and by chemical activation of date pits with ZnCl_2 (DZ), KOH (DK), and H_3PO_4 (DP) in order to show the effect of variables such as the nature of the chemical reagent, extent of impregnation on the adsorbent surface area, and porosity of the resulting activated carbons. The pore structure of the activated carbons was characterized by CO_2 adsorption at 273 K and by N_2 adsorption at 77 K. The macro and mesoporosity were determined by mercury porosimetry. According to the nature of the adjuvant, the activated carbons present different porosity. Chemical activation of the date pits with KOH and H_3PO_4 produces an activated carbons having mesoporosity as well developed as in the ZnCl_2 activation. This last process led also to develop the microporosity more than KOH and H_3PO_4 activation. Adsorption at 298 K of potassium dichromate, triton X100 and potassium hydrogen phthalate from aqueous solutions on activated carbons has been studied. The adsorption capacity of the activated carbons depended on the surface area and porosity of the carbon, and the nature of the compounds adsorbed. The adsorption of potassium hydrogen phthalate and triton X100 on activated carbons DK, DP and DZ is comparatively better than potassium dichromate.

Keyword: Adsorption; Inorganic molecules; Organic molecules; Activated carbon; Chemical activation

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