The effect of activation temperature on properties of activated carbon prepared from wine industry pressing waste

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ABSTRACT

Activated carbons have been widely used as adsorbents in the separation and purification processes for gaseous or aqueous solution systems, and they have been also used as a catalyst or a catalyst support in the catalytic processes. Its textural and surface properties depend on the raw material and the method used in its preparation. In this study, activated carbons were prepared by chemical activation with ZnCl₂ by using the wine industry pressing waste (grape pulp) as raw material. The influence of activation temperature on the yield, BET surface areas, pore volumes and sizes of the activated carbons were investigated. For this purpose, the wine industry pressing waste was activated at temperatures ranging from 600°C to 800°C, with heating rate of 5°C min⁻¹ and impregnation ratio of 1:1 (ZnCl₂:grape pulp) under nitrogen atmosphere. The results showed that the activated carbon yield and quality depend principally on the applied temperature where the activation at 700°C resulted in an activated carbon with higher BET surface area (727.10 m² g⁻¹) in comparison with the grape pulp (not detected). As a result, the wine industry pressing waste (grape pulp) could be effectively used as a raw material for the preparation of activated carbon.

Keywords: Wine industry pressing waste; Activated carbon; Zinc chloride; Activation temperature

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