

NANOPOROUS CARBON FROM CORN COBS AND ITS APPLICATIONS

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ABSTRACT

Chemical activation of corn cobs using phosphoric acid or potassium hydroxide can lead to nanoporous carbon having surface area in excess of 3800 m²/g and pore volume of 2.5cc/g. Dried, crushed, corn cobs were carbonized at temperatures between 450- 900°C and chemically activated using H₃PO₄ and KOH. The effect of different variables of activation such as heat treatment temperature, rate of heating and concentration of activating agent was studied. The mechanism of phosphoric acid activation was studied using thermogravimetric analysis. The nanoporous carbon was characterized by N₂ adsorption at 77 K, and the isotherms were analyzed using BET, T-method and D-R method for determining surface area and pore volume.

The nanoporous carbon obtained from corn cobs was further converted to monolithic form and its capacity to store natural gas at 500psi and 298K was measured using gravimetric and volumetric measuring techniques. Methane capacity as high as 173V/V or 0.21g/g or 108g/L were obtained on the carbon produced from corn cobs. The effect of various parameters of carbon production on the methane storage and delivery capacity was studied