Public Abstract
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Title:NANOPOROUS CARBON FROM CORN COBS AND ITS APPLICATIONS

The purpose of this project was to convert corn cob which is an agricultural product of low economic value to value added product such as nanoporous carbon. 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. The effect of various parameters of carbon production on the methane storage and delivery capacity was studied. 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. Thermogravimetric analysis was used to study the mechanism of phosphoric acid activation. 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.

Chemical activation of corn cobs using phosphoric acid and potassium hydroxide led to nanoporous carbon having surface area in excess of 3800 m2/g and pore volume of 2.5cc/g. Methane storage capacity as high as 173V/V or 0.21g/g or 108g/L were obtained on the carbon produced from corn cobs. The methane storage values obtained on the nanoporous carbon of this project are equivalent to the storage capacities of the carbon produced from relatively expensive raw materials by other researchers and hence the future of this technology looks very promising.