

Rujjirase Kwankhao 2006: Activation Rate of Char from Palm Oil Shell to Activated Carbon. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Terdthai Vatanatham, Ph.D. 124 pages.
ISBN 974-16-2572-3

Activated carbons were prepared from palm-oil shell. In this work two physical steps were used. The first step was carbonization to produce char under N₂ atmosphere. The second step was activation to produce activated carbon using superheated steam. Under the experimental conditions the effects of carbonization and activation temperatures and times on the properties of char and activated carbon were studied to find an optimum condition for the carbonization and activation. The result shows that optimum carbonization condition is at a temperature of 450°C for 30 min. The char product yield is 33.78% with 5.19% moisture, 3.67% ash, 22.01% volatile matter, and 74.32% fixed carbon. For superheated steam activation, the maximum surface area and iodine number can be obtained using a temperature of 800°C for 150 min. The product yield is 27.01% based on raw palm-oil shell with 1.26% moisture, 6.89% ash, 13.06% volatile matter, 0.5108 g/cm³ bulk density, 741.8 mg/g iodine number, and 721.8 m²/g BET surface area. The rate of structure change of carbon based on surface area at 600 to 800°C of activation temperature and 0 to 150 minutes of activation time can be expressed as $dS/dt = 0.088e^{-19,925/RT} S$ m²/g.min. This expression is also applicable to an activation temperature of 900°C with an activation time of 0 to 120 minutes.

Rujjirase Kwankhao
Student's signature

Terdthai Vatanatham 23 June / 2006
Thesis Advisor's signature