DEVELOPMENT OF MESOPOROUS CARBON AS SUPERIOR WATER SELECTIVE ADSORBANT TO PURIFY ETHANOL INTO ITS FUEL GRADE

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ABSTRACT
Starting from the benefits of porous carbon material for a wide variety of applications, ranging from energy conversion technology applications to biomedicine and the environment, this study aims to synthesize porous carbon fibers have a morphology resembling. By using the method of synthesis that can provide a condition called kinetically controlled, a method which we call the sequential method of gas - liquid, can synthesize mesoporous carbon having a high surface area (836.25 m² / g) and iodine number of 602.5 mg / g, the optimum operating conditions of gas treatment, namely (a) the gas composition of 30 vol% O₂, (b) gas treatment time 1 hour, (c) gas treatment temperature 300°C, and (d) the gas flow-rate of 100 cc / m, and the optimum operating conditions of the treatment liquid, namely (a) the composition of 65 % HNO₃ solution, (b) 6 hours of treatment, and (c) the temperature of 100°C. Synthesis method developed here the aspect of process technology, the availability of materials, and environmental friendliness.

The function of gas and liquid treatment is directing the formation of the morphological structure of micro-porous carbon, which is covered by the oxygen functional groups, such as carboxylic acid, quinones, -C-OH (stretching), and carboxylic anhydrides, which are able to meet all the essential requirements as an ideal carbon mesoporous. In addition, liquid treatment serves to change the characteristic of the carbon from the...
hydrophobic become hydrophylic. As an example for the potential usefulness demonstrated, mesoporous carbon used as capable adsorbant that providing superior adsorption capacity and selectivity against water on fuel grade ethanol purification process.

The experimental results of carbon as adsorbant at ethanol purification showed an increase in the concentration of ethanol after distillation-adsorption process. This proves that the carbon black that has been activated by gas-liquid treatment method, can be used as adsorbant for ethanol purification. However, the mesoporous carbon adsorbant not yet produce fuel grade ethanol.

Keywords: mesoporous carbon, sequential gas-liquid, kinetically controlled, hydrophobic, hydrophylic, distillation-adsorption.