

PREPARATION AND CHARACTERIZATION OF ACTIVATED CARBON FROM PALM KERNEL SHELL USING SODIUM CHLORIDE FOR POTENTIAL WATER FILTER APPLICATION

SHARIFAH ERNA BINTI SAYED YUSOF
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In recent years, many researchers have used agricultural wastes as precursors for the production of activated carbon based on four main reasons: renewable source, inexpensive, readily available and environment friendly. Lately, various studies conducted in Malaysia have indicated that the used of biomass such as palm kernel shell (PKS) which can be found abundantly in a very large number in Malaysia is very effective as energy sources. In this project, PKS was used as a precursor (starting material) to produce activated carbon (AC). Chemical activation method was chosen because chemical activation and carbonization can be performed at a single step with temperature below 600 oC. Sodium Chloride (NaCl) was used as activating agent at concentration of 35 wt%. The effects of different carbonization temperatures at 350, 400, 450, 500, and 550 oC and also different impregnation ratio of 1:1, 2:1 and 3:1 were investigated. The PKS-ACs produced in this project characterized using different analyses techniques such as iodine number, pH, density, moisture content and morphology analysis. From the results obtained, it was found that, the density of PKS-ACs were ranging between 0.68 g/ml and 1.23 g/ml, iodine number value for the PKS-AC has varied from 761 mg/g to 778 mg/g, PKS-ACs moisture content were ranging between 0 and 1 % and the PH values for produced PKS-ACs varies from 6.15 to 7.02. It can be seen that iodine number, PH number and density values were increased with increasing of carbonization temperatures but it decreased with increasing impregnation ratio. FESEM morphology analysis had depicted that more porosities were developed at carbonization temperature of 550 oC but the pore size was increased with increasing of impregnation ratio which can decrease the surface area. PKS-AC carbonized at 550 oC for one hour, at heating rate 10 oC/min and activated with 35 wt% NaCl at impregnation ratio of 1:1 has the best characteristic for water filter application because more porosities developed with highest surface area and good density value.