

ANALYSIS OF POROSITY IN CARBON FROM ALKALINE (KOH) TREATED SELF-ADHESIVE CARBON GRAIN FROM OIL PALM BUNCH

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ABSTRACT

Self-adhesive carbon grain (SACG) was prepared from oil palm empty fruit bunch by a low carbonization temperature. Green pellets (GP), with a dimension of 9.4 mm in diameter and 1.3 mm in thickness, made from the SACG added with 0.0% to 7.0% KOH by weight were carbonized up to 700 °C in a nitrogen atmosphere using a multi-steps heating profile. It was found that carbon pellets from GP of 1.0% KOH have the BET surface area (Y1), pore area (Y2), pore volume (Y3), and average pore diameter (Y4) of 290 m²/g, 280 m²/g, 0.112 m³/g and 19 Å respectively. Further increased in the KOH content did not significantly change these values. These values, Y1 to Y3, and Y4 are approximately 9.1, 9.1, 9.3 times higher, and 1.5 times lower than those of the carbon pellet from the GP without KOH respectively. This result shows the advantage of the SACG since significant change in the porosity characteristic can be made by using only a very small quantity of activating agent (KOH) compared to the quantity normally required by the non-precarbonized precursor. The result also shows that the mesopore volume is higher than that of the micropore and macropore. Without KOH, carbon pellets do not have micropores and with 0.5% KOH the micropores are formed and its volume decreases with increasing KOH content. Maximum volume of mesopores occurs at the KOH content approximately in between 4% - 5% and it decreases beyond this range. Macropores do not significantly change with the KOH content.

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