

# Synthesis and characterization of Oil Palm Empty Fruit Bunch Activated Carbon for Battery Electrodes

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September 16, 2024

## Abstract

In this work, the synthesis and characterization of the oil palm empty fruit bunch (OPEFB) activated carbon were studied for battery electrodes application. First, chemical activation carried out by variation concentrations and immersion time of NaOH and KOH. Then, the physical activation was studied using variation of activation temperature. The characterization of OPEFB activated carbon investigated on the surface morphology, surface area and the capacitance specific. Moreover, we designed, assembled and measured the electricity potential of the battery prototype. The activator solution of KOH 2 M showed the highest surface area of  $354.25 \text{ m}^2 \text{ g}^{-1}$ , capacitance specific of  $116.78 \text{ F.g}^{-1}$ , and potential of 1.17 V. Furthermore, the optimal immersion time was 18 hours with the highest surface area of  $380.28 \text{ m}^2 \text{ g}^{-1}$ , capacitance specific of  $96.57 \text{ F.g}^{-1}$ , and the potential of 1.05 V. Finally, the optimal activation temperature is  $900 \text{ }^\circ\text{C}$  which showed with the highest surface area  $334.28 \text{ m}^2 \text{ g}^{-1}$ , capacitance specific of  $96.41 \text{ F.g}^{-1}$ , and the potential of 1.12 V. Based on this report, OPEFB activated carbon can be used as the battery electrodes due to the carbon properties.

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