

Promising Electrode Material for Biobattery POWER: Oil Palm Front (OPF) Activated Carbon

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Abstract

This study aims to investigate the effect of NaOH immersion time and concentration on the activation of carbon from Oil Palm Frond (OPF), specifically focusing on the surface morphology and characteristics as the electrodes to biobattery application. The method employed involves carbonization and activation with NaOH at various concentrations: 0.5 M, 1 M, 1.5 M, 2 M, and 2.5 M, along with different immersion times of 12, 18, 24, 30, and 36 hours. Subsequently, the activated carbon is analyzed using a Scanning Electron Microscope (SEM) to observe its morphology, and the Brunauer Emmett Teller (BET) method is utilized to determine the carbon surface area. Furthermore, a voltage test uses a multimeter to assess the electric potential properties. Another outcome of this study is developing a prototype bio-battery POWER. Activated carbon from oil palm frond (OPF) testing resulted in 1 M NaOH, giving the highest surface area of $336.493 \text{ m}^2 \text{g}^{-1}$, and immersion time at 30 hours gave the optimum result of $396,808 \text{ m}^2 \text{g}^{-1}$. At the same time, the biobattery electrical test voltage of 0,653 V at a concentration of 1 M and 0,902 V at 30 hours of immersion.

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