

**Preparation and Characterization Composite Activated Carbon of Peanut
Shell (*Arachis hypogaea* L.) - Copper (II) Oxide (CuO)
As a Thermoelectric Material.**

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ABSTRACT

The need for electrical energy continues to increase. Therefore, it is necessary to find alternatives to produce renewable electrical energy, one of which is using thermoelectric materials. Thermoelectric materials are materials that can be used to convert heat energy into electrical energy. In this study, the thermoelectric material was made from a composite of activated carbon peanut shell (*Arachis hypogaea* L.)-CuO. Activated carbon-CuO composite material is made by mixing various mass composition ratios (grams). Composite materials are tested for electrical conductivity, thermal conductivity and the resulting electrical voltage (*Seebeck* effect). To see the shape and crystal size of the composite material, characterization was carried out using *X-Ray Diffraction* (XRD) and to determine the band gap of the composite material, characterization was carried out using *UV-Diffuse Reflectance* (UV-DRS). The test results show that the composite material with a ratio of 3 grams of activated carbon : 7 grams of CuO is the best material as a thermoelectric material because it has a high electrical conductivity value of $2.375 \text{ M}\Omega^{-1} \cdot \text{cm}^{-1}$ and a heat conductivity of 10.85 J/s and electrical voltage (*seebeck* effect) which is high $11.89 \times 10^{-3} \text{ mV/K}$. The results of characterization using XRD showed that the addition of activated carbon to CuO did not damage the crystal form of CuO and the crystal size (D) and crystal lattice (d) of the composite material, namely 27.4320 nm and 0.2322 nm . The results of UV-DRS characterization showed that the band gap of the composite material was 1.23 eV . Based on the test results and characterization, it can be concluded that the activated carbon-CuO composite material can be used as a thermoelectric material.

Keywords : Peanut shells, activated carbon, copper (II) oxide, composites, thermoelectric material.