PREPARATION OF HIGH SURFACE AREA ACTIVATED CARBON FROM TEA LEAVES FOR SUPERCAPACITOR

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The Final Year Project entitled "Preparation of High Surface Area Activated Carbon from Tea Leaves for Supercapacitor" was submitted by Musirah Binti Muhammad Zulhisan, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the faculty of Applied Sciences, and was approved by

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AUTHOR'S DECLARATION

I declare that the work in this thesis was completed in accordance with Universiti Teknologi MARA regulations. Unless otherwise indicated or acknowledged as referenced work, it is original and the results of my own work. This thesis has not been submitted for any degree or qualification to any other academic or non-academic institution.

I hereby acknowledge receipt of the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA, guiding the conduct of my research and study.

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ABSTRACT

Biomass is a source of energy that the world constantly produces by nature. For the purpose of adapting to advanced technology, biomass has been widely used by researchers to replace insufficient energy in supercapacitors. Activated carbon from biomass or biochar has the ability to absorb and release electrical charges as well as chemical substances. Thus, many studies have been carried out to observe the properties of activated carbon from various sources with several processes. In this study, tea leaf wastes are used as a source of biochar since tea leaves are extensively consumed in many Asian countries. Sodium hydroxide (NaOH) is used as an activating agent in the process of producing activated carbon as well as predetermined temperatures and times. The activating agent is observed with different ratios, which are 1:1, 3:2, and 2:1 (NaOH: tea waste) to determine the best result for producing high surface area activated carbon from tea leaves. The main objective of this study is to analyse the influence of mixing activating agents, NaOH, at different impregnation ratios on the percentage of activated carbon yielded in the samples obtained during the study. Chemical analyses of the final product, including the percentage of carbon yield, the ash content, and the moisture content, are calculated at the end of this experiment using a mathematical formula equation approach. According to the findings, a sample with a 3:2 impregnation ratio yields the most carbon, 24.5%. The study concluded that the concentration of the activating agent (NaOH) influenced the chemical properties of activated carbon.

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