

**PERFORMANCE EVALUATION OF ELECTRODE FOR SUSTAINABLE
ENERGY STORAGE DEVICE**

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UNIVERSITI TEKNOLOGI MARA



MUHAMMAD IZZAT BIN RAZALI

FACULTY OF ELECTRICAL ENGINEERING

UNIVERSITI TEKNOLOGI MARA

40450 SHAH ALAM

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ABSTRACT

This report presents a study on the performance evaluation of the electrode for the sustainable energy storage device. Three different combinations of electrode metals which are Aluminum+Lead, Aluminum+Ferrum, and Lead+Ferrum with different in sizes are analyzed to determine the capacity and power density of energy storage capability. The method used in analyzing the performance were by measuring the voltage and current output from a circuit of battery by using soil as the energy sources. The measurement and reading were collected every day. The data collected were then tabulated and were analyzed by using Minitab 7 window software. The method of data analysis used were one-way ANOVA and multiple regression. The results reveal that a combination of Aluminum and Lead with large size gives highest capacity storage with a discharge rate of 1.345m C and power density of 6.69W/m³

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

A battery is an electrochemical device that has the ability to supply an electrical energy to a diverse range of applications. The basic structure of this energy storage includes an anode, a cathode, an electrolyte, separators and the outer case. In general, the type of electrode used and electrolyte determines the specific characteristics of batteries.

The total of energy of electric over mass or volume which an energy storage device can deliver is a function of voltage and capacity, which are determined by the chemistry of the system. Besides, other important criterion is power, which depends crucially on the chemicals which the battery contains. From open literature, hundreds of electrochemical couples were suggested during the early twentieth century. The most notable electrochemical couples for main battery - Zn-MnO₂ whereas, for secondary battery - with lead-acid and Ni-Cd.

This project runs to perform an evaluation on another materials to act as the anode and cathode of electrodes in order to get the best power storage devices specifications.