

ANALYSIS OF THE EFFECT OF USING ALUMINUM 5052 AND ALUMINUM 1100 ANODES WITH VARIATIONS OF ELECTROLYTES ON THE PERFORMANCE OF ALUMINUM-AIR BATTERIES IN THE FORM OF A CIRCUIT

Ir. Dwi Djoko Suranto, M.T., *As Chief Conselor*

Bramara Andrino Putra Wibowo

Study Program of Automotive Engineering Departement of Engineering
State Polytechnic of Jember

ABSTRACT

This study analyzes the performance of aluminum-air (Al-air) batteries by comparing the use of aluminum 5052 and aluminum 1100 anodes, as well as two types of electrolyte solutions: 3M nitric acid (HNO_3) and 3M calcium hydroxide ($\text{Ca}(\text{OH})_2$), arranged in a circuit. The aim is to compare the voltage and current generated, as well as the voltage and current durability of the assembled Al-air batteries. The method used is experimental, with voltage and current measurements taken every 10 minutes for 1 hour, and durability measurements conducted every 4 hours over a 24-hour period using a 1.5V LED lamp as the load. The results of the study show that the aluminum 1100 anode provides better performance in terms of voltage and current stability, while the aluminum 5052 anode excels in current durability. The 3M $\text{Ca}(\text{OH})_2$ electrolyte solution proved to be the most effective in generating high voltage and current for both types of anodes, although 3M HNO_3 also demonstrated good performance when paired with the aluminum 1100 anode.

Keywords: *Aluminium – air battery, aluminium anode, HNO_3 and $\text{Ca}(\text{OH})_2$ electrolyte, voltage and current, circuit.*