ABSTRACT

The The demand for electricity in the community is increasing day by day, this is also supported by the rapid development of technology. The increasing demand for electricity from the community makes a huge opportunity in the development of renewable energy and also batteries that function as a means of storing electrical energy. This research focuses on the development of batteries, namely batteries with aluminum as the main material. Aluminum batteries are a very interesting research subject to develop because aluminum materials are very easy to obtain. Even aluminum materials can be recycled so they can be said to be environmentally friendly. Aluminum material can also be fairly cheap so that it can reduce production costs on batteries.

This research aims to develop the performance of batteries that use aluminum as a potential alternative in electrical energy storage. In theory, aluminum material as an anode has an energy density of 8.1 kWh K,g-−1. and can be used for a long time, and this battery can also be integrated with solar cell modules to utilize solar energy sources. Research methods include synthesis and characterization of electrochemical materials, battery cell performance testing, and data analysis. Experiments were conducted to measure the capacity, efficiency, and stability of aluminum batteries under various conditions of use. In addition, technical aspects such as aluminum corrosion, electrode stability, and the potential application of these batteries in real-life situations were also considered in this study.

The results obtained from this study are that aluminum batteries are able to be an alternative to electrical energy storage to be used in the future. Aluminum batteries can be said to be a potential alternative in electricity energy storage, the voltage generated in 1 aluminum battery cell is 0.538 V with a concentration of NaCl 1M, has a capacity of 2,576 mAh for 1 battery module consisting of 24 aluminum battery cells and is integrated by a solar cell module used for battery recharging. Aluminum batteries can also be a solution to the problem of high production costs in batteries, because aluminum materials are very easy to obtain, environmentally friendly, and relatively low production costs. This aluminum battery can be used for various things to meet the electricity needs of the community.

Keywords: Aluminum batteries, solar cell modules, storage alternatives, environmentally friendly.