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Lithium Replacement Potato Sheets For Future Batteries

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ABSTRACT- This research aims to this research discusses alternative potato sheets that can replace lithium for future batteries, with a sample of 20 potato experiments. Using laboratory methods with repeated experiments, it was found that the increase in the electrical energy variable was not very significant, around 0.01 Joule.

KEYWORDS- Potato Sheets; Lithium; Future Batteries; Potato Sheets; Batteries

I. INTRODUCTION

Potatoes are one of everyone's favorite foods. Some regions use potatoes as their staple food. This is because potatoes contain many beneficial elements, such as potassium [1-2]
It turns out that potassium can also be used for batteries. In general, Lithium is the element most often used to make batteries. Almost all electronics, such as laptops, smartphones, etc. use this battery. However, lithium has several disadvantages such as being expensive, less safe, and not long-lasting[3-4]. Scientists in many fields are working around the clock to improve and replace lithium-ion battery technology. In this case, the researchers looked for a special type of pure battery, a metal battery that maintains the rechargeability and longer service life of a lithium compound and graphite anode. They found that potassium had potential, but after testing it turned out it was not as good as expected [5-7]
A battery is something that causes chemical energy to be converted into electricity. The battery has a positive side (terminal) and a negative side (terminal). The downside is that it is a source of electrons that energize the cables connected to the electronic devices. Batteries power electronic devices when connected to conductive materials, such as wires.
Potato batteries are a type of electrochemical battery, or cell. Certain metals (zinc in the example below) undergo a chemical reaction with the acid in the potato. This chemical reaction produces electrical energy that can power devices [8-10]
Typically, the dendrites grow and have sharp edges that penetrate vital and volatile parts of the battery, causing chemical leaks or risk of fire. Lithium atoms have low surface mobility, which means that the atoms that combine to form dendrites end up piling up on each other, like droplets forming large icicles on the corner of a house roof[11-12].
In contrast to Lithium, Potassium has a higher surface mobility, meaning the atoms stack up, but then spread out on their own. The image is like sand poured in a wide circle. This is quite beneficial because it can reduce the risk of explosion [13].
The mechanism of the battery is controlled by the heat from the battery itself. According to researchers, the heat from the battery is enough to disperse the atoms over the surface and the system will not melt the potassium or damage the battery as a whole[14-15].
The discovery of a battery that can self-recovery is not the first. But seeing that potassium is cheap and easy to obtain is something that will be profitable for the battery industry in the future [16].
That is why it is necessary to This research discusses alternative potato sheets that can replace lithium for future batteries, with a sample of 20 potato experiments.

II. METHODOLOGY

The research location was carried out at the Basic Science Laboratory of the University of North Sumatra for 2 months from April to June 2024.
1 kg of potatoes is cut into pieces of similar size ranging from 10 to 100.
After that, repeated experiments were carried out to measure electric current, electric potential and electrical energy

III. RESULTS AND DISCUSSION

In the below table 1, results obtained for 10 potato sheets and 60 potato sheets are not very significant, only differing by 0.01 Volt.

Table 1: Electric current and potential electric

No	Sheet Potatoes	I (A)	V (Volt)
1	10	2	0,5
2	20	2	0,5
3	30	2	0,5
4	40	2	0,5
5	50	2	0,5
6	60	2	0,51
7	70	2	0,51
8	80	2	0,51
9	90	2	0,51
10	100	2	0,51

In the below table 2, for an example of calculating the electrical energy obtained from a battery in the form of:

W=V.i.t :
for t=1 second then

W=0.5.2.1=1 Joule

for V=0.51
W=0.51.2.1=1.02 Joule

Table 2: Potential electric and electrical energy

No	V (Volt)	E (Joule)
1	0,5	0,5
2	0,5	0,5
3	0,5	0,5
4	0,5	0,5
5	0,5	0,5
6	0,51	0,51
7	0,51	0,51
8	0,51	0,51
9	0,51	0,51
10	0,51	0,51

IV. CONCLUSION

The conclusions from the research are:

- Potato sheets can be made as a substitute for lithium because potatoes contain potassium which functions almost the same but is environmentally friendly
- There is only an increase of 0.01 Volts for the potato sheet experiment from 10 to 60
- Obtained battery electrical energy of 1.01 Joules
- Further research is needed so that the research results can be used in industry

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