High Quality Charcoal Battery

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Introduction

Charcoal battery : It generates electricity for the chemical reaction of charcoal aluminum, water and oxygen.

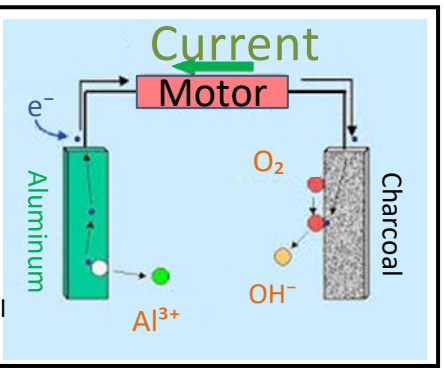
Good point
Cheap→we can make it easily.

Bad point
Performance is not good.
Low current→ not useful.

We studied charcoal batteries to improve this problem and make a practical charcoal battery.

The charcoal that we used is wood which is carbonized at a high temperature of over 1000 ℃ and it has graphite structures.

Figure1⇒
Construction of conventional charcoal battery[1)]



Purpose

To find a high quality charcoal battery

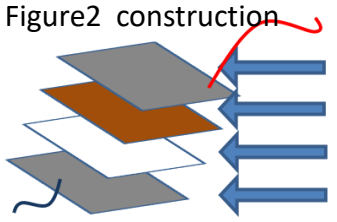
- Search how to generate a large electric current.
- Search how to flow electric current for a long time.

1st experiment

Shape of charcoal

3types→cylinder, powder, small blocks (4mm ～ 6mm)
※Each charcoal piece has a mass of 30 gram

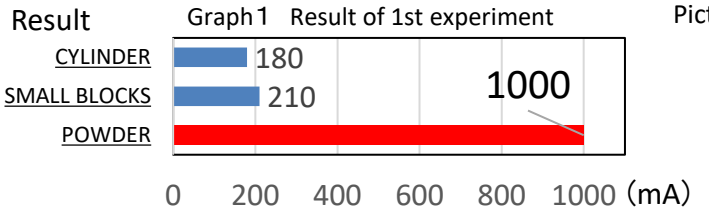
Figure2 construction



Picture1
1st experiment

Result

Graph1 Result of 1st experiment



Powder type is the best shape from Graph1 .

Why? Grounding area between metal and charcoal becomes larger.
Space between charcoal particles becomes smaller.

Practical use and reusability

Method

1. Pile up two charcoal batteries of the structure which was the same as 2nd experiment.
2. Pressured it with a Pickle Device.
3. Measured a current (Picture 4).

※Use wooden board(ϕ16cm,t1.5cm) × 4 below the charcoal +1 above the charcoal to add pressure easily

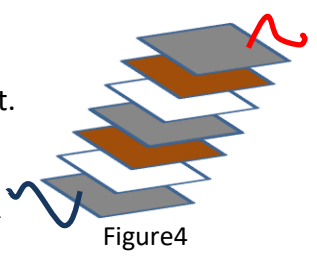


Figure4 construction

Result

Pressure→About 1200mA
-After 30 minutes→About 150mA
-changed air→About 800mA

Consideration

The number of battery increases
→Get more current.
The electricity recovered in the 2nd time
→ Oxygen is necessary for reaction.
The force was released
→ The gap was created
→Oxygen was supplied in a battery

Picture 4
Pickle Device

Future work

1 Doing experiment deeply to find out what causes the relationship between pressure and power, and deepen our discussion.
2 Searching best construction of charcoal battery for practical use.

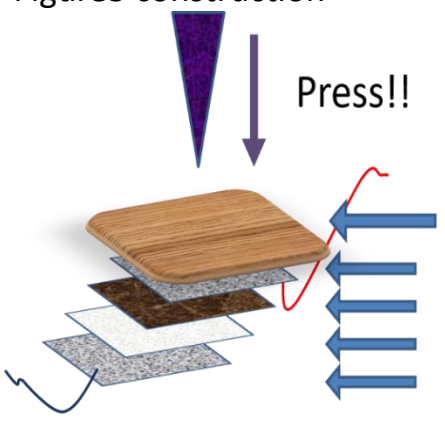
We observed changing in current due to pressure in 1st experiment.

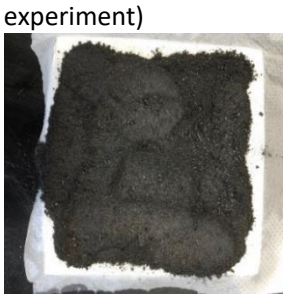
2nd experiment

The relationship between pressure and current

Material ※We prepared wood plates to add pressure the entire of charcoal.
1st experiment's material + Pressure machine, wooden plates
※We used powder-type charcoal (from the result of 1st experiment)

Figure3 construction



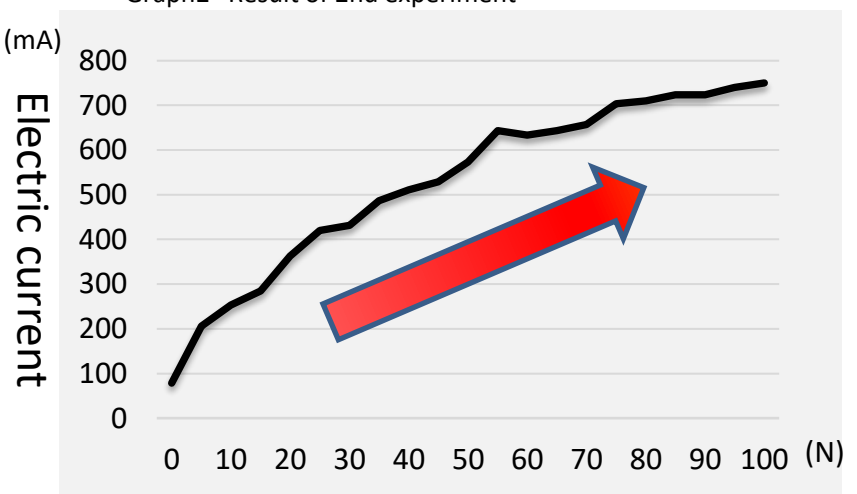


Picture 2 State of experiment 2

Picture 3 Structure of Experiment 2

Result

Graph2 Result of 2nd experiment



According to the graph we found that there is a positive correlation.
Why graph became such a shape?
・Grounding area between metal and charcoal became larger.
・The electric resistance of charcoal reduced because the space of each charcoal particles got closer with each other.

Conclusion

1 The best shape of charcoal is powder.
2 If you increase the number of batteries, you can get more electric current.
3 If you apply pressure, you can get more electric current.
4 If you change the air, you can use battery longer.

References
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