CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
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Project Number
J0213

Project Title
Paper Batteries: A Clean Alternative

Abstract

Objectives/Goals
When I set out to work on my science experiment, I was very interested in the idea that I could make a paper battery that was ultra thin, and that such a tiny piece of paper could produce voltage. As I continued my research, I knew this was an amazing idea because it was also good for the environment. These paper batteries are better for the environment than the modern batteries (example: AA battery). The modern batteries all use a chemical build-up to produce electricity. The paper batteries use no chemicals at all. This means that the paper batteries are recyclable and do not create e-waste. The A batteries all use a chemical build-up that (when taken apart incorrectly) lets out a greenhouse gas that is very bad for the environment.

Methods/Materials
The result was found by testing the amount of voltage that the battery produced and seeing which had more, my paper battery or the AA battery. My procedure was to first, build a paper battery. Second, test my hypothesis. My final step was to record data. After much research and many test runs, I was able to create a working papery battery.

Results
I was able to create a working papery battery. Unfortunately, it was not as powerful as the AA battery.

Conclusions/Discussion
My results were supported in my hypothesis. I hypothesized that the AA battery would have more voltage than the paper battery, unless carbon nanotube ink became available "over the counter." It is easy to see that future research and testing, using carbon nanotube ink will further benefit this category. Carbon nanotube ink would increase the voltage of the paper battery because graphite releases voltage slower than carbon nanotube, even though they are both great conductors. Carbon nanotube ink is made of conductive, multiwalled carbon (nano=1/1000000000 m, nanotube=4/1000000000 m) nanotubes. For my future research, I would like to test this same theory using the carbon nanotube ink.

Summary Statement
The purpose my science research is to make a non-chemical paper battery, as an environmentally safe alternative to the AA battery, which is both affordable and easy to print from home.

Help Received