CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
Ryan D. Rusch

Project Number
35021

Project Title
DIY Fuel Cells: Which Is Mightier: the Pen or the Sword?

Abstract

Objectives/Goals
The U.S. Department of Energy is constantly looking for ways to have power while not polluting the environment. One way to do this is by using fuel cells. Which type of electrode conducts better in water? Electrodes are 2 pieces of metal in water where a current gets sent through in a fuel cell to combine hydrogen and oxygen to make power and water. In the regenerative fuel cell that I am using, the electrodes separate the hydrogen and oxygen in water so that the hydrogen and oxygen will combine again, creating power. My project tests which type of electrode, silver or pencil graphite, will conduct better.

Methods/Materials
I test the conductivity by seeing which electrode's voltage decays slower in a mixture of 1 part salt to 27 parts water. I timed the voltage and its decay rate with a stopwatch.

Results
I hypothesized that silver electrodes would conduct better because silver is a highly conductive metal, and therefore, the voltage will decay slower in water. My results did not agree with my hypothesis, and the pencil graphite conducted better than the silver.

Conclusions/Discussion
The silver voltage decayed faster possibly because of the tarnish build up around the silver. The graphite does not tarnish, corrode, or rust because of the wood surrounding the pencil. I learned from this project that the pen(cil) is mightier than the sword (silver)!

Summary Statement
I learned that pencil graphite is a better electrode than silver when used inside a makeshift regenerative fuel cell.

Help Received
My mother helped attach the cloud wallpaper, and my father helped structure the fuel cell.