CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

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Project Number

J0622

Project Title

Does the pH of Water Exposed to Hydrogen and Oxygen Change after Separation by Electrolysis?

Abstract

Objectives

My project involved creating electrolysis of water using a battery to examine the pH of the water after it was affected by electrolysis. My hypothesis was that if we separate the atoms of hydrogen and oxygen in water then the remaining water pH will be lowered.

Methods

I used baking soda and Sodium Hydroxide as agents and selected a model that would allow me to collect and test water touched exclusively my Hydrogen and Oxygen. I conducted the 6 evolutions of my experiment by building out and slightly modifying YouTuber Thomas Kim s model (Kim, 2015) In this model, metal rods are attached to the base of a container. The lid is modified to cover aluminum rods with tubes to allow gases to flow to feed the gases into smaller containers filled with tap water and a separate tube leading to a balloon to capture the gases. I recorded the pH of the water before and after, the voltage, time and other notes.

Results

Ultimately, I found that while there was no difference in the pH levels of water touched by hydrogen versus the water touched by oxygen the pH levels of water actually increased after electrolysis which makes the water better for the environment.

Conclusions

My hypothesis was that if we separate the atoms of hydrogen and oxygen in water then the remaining water pH will be lowered. I suspected that this reduction of the pH levels then would render the water harmful to the environment.

I conducted electrolysis of water in 6 evolutions of my experiment. My findings disproved my hypothesis and illustrates that the pH did change but it did not decrease, it increased which is actually better for the environment as pH values increased making the water less acidic consistently in all evolutions.

Hydrolysis of water is used in many fields and is the solution to many different problems. The knowledge I ve acquired through this experiment means large scale hydrolysis can be used without much risk to the environment s surrounding water. Therefore Hydrolysis could be a viable renewable energy source of the future.

Summary Statement

I took a look at the aftermath of the separation of hydrogen and oxygen in water by examining the pH balance of the remaining water touched exclusively by hydrogen and oxygen.

Help Received

Mr. Mitchell assisted me with using the power tools and equipment to build out my project device and helped verify that it worked properly. Mr. Mitchell and my mother proofed and gave feedback on my report.