CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
22888

Project Title
Hydrogen through Electrolysis: A Case for Alternative Fuels

Abstract

Objectives/Goals
The objective was to find the most effective way to produce hydrogen using electrolysis.

Methods/Materials
Three electric cells were constructed using 1000 ml glass vessels, with lids modified to accommodate the insertion of two test tubes with copper, steel, and aluminum electrodes. Each was connected to a 6 volt battery. Each cell was tested using a diluted solution of alcohol, hydrogen peroxide, and hydrochloric acid, and water, as electolytes. Gas collection was measured over a two hour time period.

Results
Of the variables that I used as electolytes, the hydrochloric acid clearly generated the most hydrogen in the shortest time period. The aluminum electrode produced the least amount of corrosion, while the steel produced the most.

Conclusions/Discussion
Different combinations of electrodes and electrolytes produced a variety of results, including the efficient production of hydrogen using hydrochloric acid in contrast to the slower, but steady, production using water. This suggests that this technique could be used to produce hydrogen as an alternative to carbon-based fuels that result in the production of carbon monoxide and carbon dioxide, which are considered pollutants.

Summary Statement
My project used various combinations of electrodes and electrolytes and measured the output of hydrogen gas.

Help Received
Father helped with locating the raw materials, drilling holes in the vessel lids, and provided general safety oversight; Science teacher provided hydrochloric acid.