



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Christopher R. Swenson</b>	<b>Project Number</b> <b>J1033</b>
<b>Project Title</b> <b>The Effect of Different Electrolytes on Solar Fuel Cell Efficiency</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This project investigates the use of solar power to generate hydrogen through electrolysis and measures the amount of electricity generated when that hydrogen is reabsorbed in a fuel cell. Sulfuric acid, hydrochloric acid, table salt, and baking soda are used as electrolytes in this experiment, which attempts to predict which one will provide the highest electrical output for the longest amount of time. My hypothesis is that sulfuric acid will perform the best because it is the strongest of the electrolytes chosen and will probably increase the electrical conductivity of the water the most.</p> <p><b>Methods/Materials</b> Solar power is applied to electrodes inserted into a solution of water and one of the electrolytes in a standard electrolysis setup. After a charging period, where hydrogen is formed on the electrodes, the solar cell is disconnected, and the setup becomes a primitive fuel cell. The amount of electricity generated during the fuel cell operation is recorded over a 10 minute time period.</p> <p><b>Results</b> The results show that baking soda, not sulfuric acid, generates the highest voltage for the longest period of time. Surprisingly, the order of effectiveness of electrolytes is: baking soda, table salt, sulfuric acid, and lastly hydrochloric acid.</p>	
<b>Summary Statement</b> This project investigates the use of solar power to generate hydrogen through electrolysis and measures the amount of electricity generated when that hydrogen is reabsorbed in a fuel cell.	
<b>Help Received</b> My father paid for the materials and supervised the use of sulfuric acid and hydrochloric acid, ensuring that I wore gloves, goggles, and a mask.	