



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Frank A. Barrack	Project Number J0502
Project Title Bonds Are Broken by Light: The Effect of Varying Salinities on Hydrolysis Using Constant Energy from a Solar Panel	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to determine whether a solution with a greater salinity would yield more hydrogen through hydrolysis than a solution with a lower salinity using a homemade solar panel as a constant source of electricity.</p> <p>Methods/Materials A homemade solar panel with a total output of 3.7 volts was placed in front of a 500-watt work light to produce the current necessary for hydrolysis. NaCl solution with salinities of .45%, .9%, 1.5%, 15%, and 31% were tested. Distilled water without any salt was used as the control. Three hundred mL of a test solution were poured into a beaker in which was placed the cathode from the solar panel under a capped, inverted 10 cc syringe full of the same test solution. The work light was turned on, and the resulting gas rose to the top of the syringe. A fan was used to cool the solar cells. The gas collected was measured in cc's after 1 hour. Each salinity was tested a total of 5 times. Twenty cc's of the gas collected was analyzed by gas chromatography at an independent lab. It was found to be nearly 100 per cent hydrogen at the time of collection.</p> <p>Results The solution with the highest concentration of NaCl yielded the most hydrogen in the course of an hour. The solution with the highest salinity (31%) generated more than ten times as much hydrogen as the solution with the lowest salinity(.45%).</p> <p>Conclusions/Discussion Hydrogen produced by hydrolysis using energy collected with a solar panel is a green, renewable alternative fuel. This experiment demonstrated that the solution with the greatest concentration of NaCl produced the most hydrogen through hydrolysis. This would be important for mass-producing hydrogen by hydrolysis using solar energy in the future.</p>	
Summary Statement My project is about determining the best concentration of NaCl to produce hydrogen through hydrolysis using a solar panel as a constant source of electricity.	
Help Received My father supervised my use of power tools, and my mother helped by gluing my board. Mr. Elgas, an analytical chemist, ran a gas chromatography test on a sample I took to him. I would like to thank my parents and teacher for their support and encouragement.	