



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> Arteen Galstyan; Farah Kandah	<b>Project Number</b> <b>S0610</b>
<b>Project Title</b> <b>The Effects of a Cobalt-Phosphate Catalyst on the Efficiency of an Electrochemical Cell</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal of our experiment was to test the effects of a Cobalt-Phosphate catalyst on an electrochemical cell.</p> <p><b>Methods/Materials</b> We first used copper wiring, alligator clips, 9V batteries, and a breadboard to create a circuit. The electrochemical cell was created using metal plates as electrodes secured in a Styrofoam block where about 1/3 of the electrode was submerged in the beaker filled with Phosphate buffer. We then connected the electrochemical cell to the circuit in order to stabilize the electric current and measure the voltage of the cell. We then measured the change of voltage after adding the cobalt nitrate and determined the efficiency of the electrochemical cell.</p> <p><b>Results</b> The average energy efficiency of the electrochemical cell increased by about 15% when cobalt nitrate was introduced to the cell. The overall highest energy efficiency of the electrochemical cell was 72.4%, 70.3%, and 72.4% for trials 1, 2, and 3 respectively.</p> <p><b>Conclusions/Discussion</b> Our conclusion was that the cobalt-phosphate compound served as a catalyst which electroplated to the electrodes of our electrochemical cell. The catalyst dropped the required voltage to keep the same amount of current running through the circuit, thus making it more efficient.</p>	
<b>Summary Statement</b> The effects of cobalt nitrate and phosphate buffer on an electrochemical cell.	
<b>Help Received</b>	