



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> Ryan S. Hogue	<b>Project Number</b>  36091
<b>Project Title</b> <b>How the Concentration of Platinum in a Fuel Cell Membrane Electrode Assembly Affects Its Performance</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project is to determine how different concentrations of platinum in a fuel cell Membrane Electrode Assembly affect its power output.</p> <p><b>Methods/Materials</b> This project used a hydrogen/air fuel cell, a meter able to measure amperage and voltage at different loads, and an electrolysis cell. Home-built fuel cell was constructed using soft graphite plates, single-sided copper circuit board, and a silicone gasket. Membrane Electrode Assemblies were acquired from commercially available source.</p> <p><b>Results</b> Several Membrane Electrode Assemblies were tested in reference fuel cell. Multiple test trials were run to confirm consistency in results. Higher concentrations of platinum in the MEA resulted in higher power output.</p> <p><b>Conclusions/Discussion</b> Testing showed that higher concentrations of platinum in the MEA of a fuel cell resulted in higher power output. This is important because it is beneficial to balance the power output and cost when designing a fuel cell.</p>	
<b>Summary Statement</b> I was able to determine that higher concentrations of platinum in the MEA of a fuel cell result in a higher power output.	
<b>Help Received</b> I had help from my father in acquiring the materials needed to build the fuel cell. I also was helped by Daniel, from Fuel Cells Etc, who provided information on the platinum loadings of the fuel cells I used.	