



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Kaushik Sai Tota</b>	<b>Project Number</b> <b>J0221</b>
<b>Project Title</b> <b>Developing Magnesium Air Fuel Cells</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My project is an alternative source of electricity that can help slow down global warming. My objective was to build a fuel cell that could generate useful electricity with clean energy sources. My fuel cell uses magnesium, salt water, and oxygen from the atmosphere to generate electricity.</p> <p><b>Methods/Materials</b> I created a design for my fuel cell which is a 3-inch cube made of 9 sub-cells. The sub-cells are all connected in one frame. I 3-D printed this frame. Each of these subcells contain a strip of magnesium, saltwater, and carbon fabric. The carbon fabric lets oxygen into the cell, and covers the border of each sub-cell. The cotton holds saltwater, which is the electrolyte in the fuel cell. In the center of each sub-cell is a strip of magnesium. This magnesium is oxidised as the reaction occurs, and it fuels the reaction. The sub-cells are wired so that there are 3 parallel rows of three cells in series. These sub-cells are all connected to a PowerBoost, which has a USB port. This allows a phone to be charged with the fuel cell. As soon as saltwater is poured in all of the cells, electricity starts running through the cell, and the fuel cell is able to light an LED and charge a phone.</p> <p><b>Results</b> My fuel cell, at full capacity, generated 3.47 volts and .74 amperes. I successfully generated enough voltage and current using the fuel cell to charge a smartphone and light an LED at the same time.</p> <p><b>Conclusions/Discussion</b> I was able to accomplish my goal of building a fuel cell that uses clean energy sources to generate electricity. My fuel cell had a portable design, and could charge a smartphone and light an LED.</p>	
<b>Summary Statement</b> I built a fuel cell that generates electricity using salt water, magnesium, and oxygen from the atmosphere.	
<b>Help Received</b> I created the design for my fuel cell, and put together the fuel cell. My mentor, Dr. Ismail from Schmahl Science Workshops, helped me gather materials.	