



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> Isabella Correa; Gwyneth Prata	<b>Project Number</b> <b>J1004</b>
<b>Project Title</b> <b>The Ever-Last Battery: Building a Super Long Lasting, Self-Recharging Battery through the Capture of Radio Waves</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our objective was to create a battery that would harvest radio frequencies in order to continually charge a crystal battery so that it could possibly last forever.</p> <p><b>Methods/Materials</b> We made crystal batteries by blending together equal parts of borax, Epsom salt, potassium chloride, and Alum. We melted the mixture around a 16mm magnesium rod encapsulated by a 1 1/4 inch copper tube. We tested our battery with a voltmeter to confirm charge and repeated the processes 3 times. Next we created a radio antenna to capture radio waves from the environment. We did this by wrapping 100' of copper wire around a 2 inch black PVC pipe and then added a metal hanger to create an antenna. We also added a rectifying diode to convert our A/C electricity captured from our radio wave harvester to D/C for our homemade crystal batteries.</p> <p><b>Results</b> We were able to get an average of 1.47 volts per homemade crystal battery. We connected 4 batteries in series and were able to light up a string of LED lights for 2 weeks nonstop. After 2 weeks we disconnected the batteries and tested them with our voltmeter and realized the batteries lost about half of their volts. After 2 hours of resting, we re-tested the batteries and noticed that they fully recharged themselves. We plugged our batteries back into our LED strip and they stayed lit for two more days. We then built a radio frequency receiver and attached the antenna to our batteries. After some trial and errors, we were able to add additional charge to our crystal batteries.</p> <p><b>Conclusions/Discussion</b> Our Science project was very successful. We were able to create batteries that recharged themselves and lasted several weeks while being continually used. And once we disconnected the draw from the batteries, our batteries rejuvenated themselves after a couple of hours and were able to be used again. Adding the RF antenna helped power up our batteries faster. It is our hope that someday homes can have RF antennas on their roofs, which will be attached to a battery source inside a home so that people can charge their small electronics like cell phones, remote controllers, and other items that use batteries. In conclusion, we believe that harvesting radio waves can be a new source of free, clean, renewable energy. Our crystal batteries will also reduce the toxic waste in our landfills buy limiting the need to purchase acid batteries.</p>	
<b>Summary Statement</b> We created crystal batteries that are able to recharge themselves through the capture of radio waves based on the works of Nikola Tesla.	
<b>Help Received</b> Ryan Hickman helped with soldering our circuit boards as well as the wires to our copper tubes for our batteries.	