



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

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<b>Project Title</b> <b>The Engineering of Carbon Dioxide Reduction, Part 2</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Every year, over two trillion pounds of CO<sub>2</sub> are emitted from cars and trucks globally. The goal of our innovation is to reduce CO<sub>2</sub> by half through air filtration of the exhaust of a petrol-based automobile.</p> <p><b>Methods/Materials</b> Throughout this procedure, a galvanized steel pipe was filled with flywire mesh capsules containing sodium hydroxide, a chemical compound that has CO<sub>2</sub> absorption properties. Metal protrusions were added to each side of the pipe in order to disperse heat.</p> <p><b>Results</b> The cars tested were a 1998 Toyota Camry (inline 4), a 2006 BMW 325i (inline 6), and a 2015 Mercedes CLS63 AMG (V8), which reduced the CO<sub>2</sub> emitted by 38%, 44%, and 36% respectively. In all trials executed with the three different types of cars, all showed similar success in the reduction of CO<sub>2</sub>.</p> <p><b>Conclusions/Discussion</b> Our tests of the wide variety of cars showed that the filter reduced the CO<sub>2</sub> emissions by almost 50%. One problem is that we tested in an open environment, which meant that we were not able to exactly measure the gaseous compounds that were being inducted into the engine, going through the exhaust system, and passing through the filter. In the future we will implement an airtight gas analyzer which will measure the exact compounds inducted into the engine and emitted by the exhaust. The cooler the crystals, the more CO<sub>2</sub> they absorb. Since steel is a good conductor of heat, the temperature of the crystals became very high, reducing their efficiency. To address this we added metal protrusions to disperse heat.</p>	
<b>Summary Statement</b> Our innovation filters out CO <sub>2</sub> from an automobile using sodium hydroxide, a chemical compound that absorbs CO <sub>2</sub> and thus contributes to CO <sub>2</sub> reduction.	
<b>Help Received</b> None, my team members and I designed, built, and performed the experiments ourselves.	