



CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY

<b>Name(s)</b> Gino R. Gasbarro	<b>Project Number</b>  34490
<b>Project Title</b> Detoxifying the Atmosphere	
<b>Objectives/Goals</b> Human-induced climate change is a severe detrimental stress, particularly on ecological and socio-economic systems that are already affected by pollution. Carbon dioxide (CO <sub>2</sub> ), a greenhouse gas is the key pollutant responsible for global warming. This project hypothesizes that if the fumes from motor vehicle exhausts are passed through aqueous ammonia (aq NH <sub>3</sub> ), then the amount of emitted carbon dioxide pollutant will decrease. <b>Abstract</b> <b>Methods/Materials</b> First create a muffler device that will allow car exhaust fumes to flow through aqueous ammonia. Next use a carbon dioxide sensor to test its concentration in the fumes flowing through air, water, and ammonia. Conduct a lime water test to see if a carbonate or bicarbonate exists in the solution. Conduct a phenolphthalein test to see if ammonium bicarbonate exists in the solution. <b>Results</b> Hypothesis is accepted for this experiment. The amount of carbon dioxide emitted as a pollutant from the car exhaust did decrease when the fumes were passed through aqueous ammonia. The products formed upon the reaction of CO <sub>2</sub> and aq NH <sub>3</sub> contains ammonium bicarbonate (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> . A positive result from the lime water test confirms the presence of either a bicarbonate or carbonate. Lighter pink color with phenolphthalein indicator confirms the presence of a bicarbonate. Ammonium bicarbonate is a very effective and commonly used nitrogen fertilizer. <b>Conclusions/Discussion</b> Thus, this investigation outlines a simple, yet effective method of reducing the CO <sub>2</sub> emission into the atmosphere with the simultaneous production of a useful by-product. The product formed from this reaction, ammonium bicarbonate, has already been proven and is currently being used as an effective nitrogen fertilizer internationally.	
<b>Summary Statement</b> This project tests to see if aqueous ammonia can filter out carbon dioxide in car exhausts fumes, which creates ammonium bicarbonate used in nitrogen fertilizer.	
<b>Help Received</b> Used high school chemistry lab to perform chemical tests.	