



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Shay C. Edwards	Project Number J1513
Project Title Transmissivity: Observations of Gas in the Infrared Spectrum	
Abstract Objectives/Goals The purpose of my science project was to study the influence of the chemical composition of gas on its ability to absorb and transmit infrared radiation. My main objective was to obscure a heat source with a visibly transmissive gas. I will also be studying the transmission of infrared light through the gas. I hypothesized that the composition of each gas would affect infrared viewing. Methods/Materials To test my hypothesis I constructed a 5" x 29 1/2" gas cell from PVC pipe. I used a Spectroradiometer, which operates in the spectral range from 2.5 to 14.5 um, and an 8-12 micron infrared camera with digital imagery. Testing was performed on Sulfur Hexafluoride, Carbon Dioxide, Tetrafluoroethane, Ammonia, Isopropyl Alcohol, Acetone, Freon 13, Resmethrin, and a Can of Air. A Blackbody was used as a constant heat source. Every gas was tested in a controlled environment and photographed before and during the testing. Results Using the SR5000 Spectroradiometer wide range capabilities, I was able to look at one micron at a time with each gas tested. After the SR5000 testing, I was the able to proceed using the information that I had gathered and test with the infrared imaging system on the same gases to visually look for obscuration of the heat source. Conclusions/Discussion The data from both types of test supports my hypothesis that the chemical composition of gas will directly affect the transmissivity in the infrared spectrum. I was surprised to find that the can of air had high areas of absorption therefore making areas of low transmissivity causing some obscuring in the infrared spectrum.	
Summary Statement This project examines the chemical composition of gas on its ability to absorb and transmit infrared radiation.	
Help Received Testing was performed at NAVSEA in Corona under the supervision of Ed Trovato and Kevin Janosky. My dad tapped in the valves on the gas cell. My mom drove me to all of the testing and Staples for supplies.	