



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Jeremy P. Rudd	Project Number S1813
Project Title Laser Induced Fluorescence	
Abstract	
Objectives/Goals to find the wavelength that chromium 3+, alumina, and neodymium fluoresce at in different concentrations in pure glass. Also to find the cause of the green glow observed in the paperweights when a violet laser was shown through them.	
Methods/Materials PROCEDURE (TESTS) 1. mount lasers to heat sinks (to prevent overheating) 2. make an optic table (magnetic to keep lasers from moving) 3. in a dark room, shine laser through glass samples and measure fluorescence with spectrometer MATERIALS glass frit lasers spectrometer chromium 3+ ruby neodymium alumina PROCEDURE (GLASSES) 1. measure out 10 grams of glass frit into mixing dish 2. add correct amount of dopant to the glass frit 3. add water to mixture and mix 4. let mixture of glass frit, dopant, and water dry 5. put mixture in crucible and put in furnace for 10 minutes at 900°C 6. take glass out of crucible and let cool	
Results the chromium and alumina did not fluoresce and the neodymium samples fluoresced infrared.	
Conclusions/Discussion The rubies fluoresced at slightly different wavelengths, but the surprising part of the experiment was that the chromium and alumina glasses showed no fluorescence. The neodymium glasses did fluoresce in the infrared and were seen from a camera only and not testable with the spectrometer. the green glow in the paperweight was possibly from small amounts of uranium in the glass, called vaseline glass.	
Summary Statement finding the differences in fluorescence in samples doped with different amounts of dopants.	
Help Received used furnace at Spectra Mat inc. under supervision of Gregory Rudd (father)	