CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
S1606

Project Title
Glowing Undergoing: The Phosphorescent Phenomenon

Abstract

Objectives/Goals
The objective of our project is to determine if different wavelenghts of UV light will affect the overall quality of light emitted by the minerals, such as the decay of light over time, intensity of light emittance, and the gradualness of decay.

Methods/Materials
We used the minerals Calcite, Colemanite, Gypsum, Willemite, and Celestite. We used a phototransistor connected onto a rubber stopper to measure the light emitted from the minerals. This phototransistor was connected to an oscilloscope through a circuit which used alligator clips, a resistor, and probes. The minerals were crushed and measured in a cuvette and then placed inside a small plastic container that was secured in a black photobox. Above the box we placed a 3UV lamp that would expose the minerals to shortwave(254 nm), midrange(302 nm), and longwave UV(365 nm).

Results
The highest intitial phosphorescence by the minerals in longwave was 9.12 volts (Celestite), in midrange was 4.49 volts (Colemanite), and in shortwave 2.07 volts (Celestite).

Conclusions/Discussion
According to the average graphs of the decays of the minerals, longwave UV light resulted in the brightest emittance and a very even and gradual decay. Midrange UV light resulted in dim but long lasting phosphorescence. Shortwave UV light gave off a bright phosphorescence at the beginning, showed a sudden drop in intensity, and then the light level reached ground state pretty quickly.
An application to consider might be phosphorescent or flourescent substances in highway paint. Another practical but harder to achieve application would be to find a way to use phophorescence as a new natural light source. This would greatly improve the global warming and pollution situations on our planet. As a new light source, phosphorescence would be beneficial by decreasing depletion of natural resources (i.e. coal and oil) and heat and combustion aren#t results of phosphorescence unlike most light soucres.

Summary Statement
In our project we set out to determine the effect of different UV wavelengths on mineral phosphorescence using an oscilloscope to acquire the graph of light decay.

Help Received
Mr. Zimmerman taught us how to use the oscilloscope and suggested means of collecting data; Ms. Black opened the lab for our use and gave us occasional assistance with oscilloscope; Ms. Sharon Cisneros from Minresco company supplied us with minerals and a UV lamp; Mr. Lynn helped us with the oscilloscope.