CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34567

Project Title

How Does Temperature Affect the Intensity of Light Given Off by Fluorescent Rocks?

Abstract

Objectives/Goals

My project studied how temperature affects the intensity of fluorescence in fluorescent mineral samples. I studied four different rock samples (Argonite, Flourite, Scapolite, and Hackmanite) under three different temperatures (72 hours in a freezer, room temperature, and 500 degrees).

Methods/Materials

To measure the light intensity I built a light sensor using a photo resistor attached to an Arduino Uno. To control for the surrounding environment I built my own controlled environment to test the samples in. The minerals were placed in the bottom of the box, the light sensor was held a foot above the sample and the black light was atop of the box. Then the light intensity was recorded for each mineral at each temperature three different times.

Results

Argonite had the greatest intensity at extreme heat, then at extreme cold and finally at room temperature. Fluorite had its greatest light intensity at extreme cold, then extreme heat, and finally at room temperature. Scapolite's greatest light intensity was at extreme cold, then at room temperature, and then at extreme heat. Hackmanite had its greatest light intensity with extreme cold, and then the room temperature and extreme heat had the same average temperature.

Conclusions/Discussion

The correlation between temperature and light intensity is not a linear relationship and it depends on the mineral, but I did find an overarching pattern. The greatest light intensity for each mineral sample, was when it was at an extreme temperature, whether it be hot or cold.

Summary Statement

Extreme temperatures initiate the greatest change in the light intensity of a fluorescent rock.

Help Received

My Father, Jonathan Bishop, reviewed my poster and write up. Craig MacFarlane lent me the Arduino and helped locate light sensor construction tutorial. Leslie Tamminem lent me the black light.