CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

Akshar G. Patel

Project Number

35840

Project Title

Recycled Light: An Attempt to Create a Solar Light Bulb That Can Be Used with the Absence of Constant Radiation

Abstract

Objectives/Goals

This project was developed on the speculation that water could be refracted through a plastic bottle to provide light inside of a home. Furthered it dwelled upon the understanding that a phosphorescent substance, such as copper doped zinc-sulfide would remit the radiation it absorbed at a lower intensity for up to several hours after the original excitation.

Methods/Materials

The solar bottle bulb was made out of 2-liter soda bottles. The phosphorescent device within the solar bottle bulb was copper-doped zinc sulfide. To resemble a dark room, the solar bottle bulb was placed within a testing chamber composed of cardboard. The emittance of light was measured during the day and the night with an photomoter.

Results

The data collected from each solar bottle bulb was compiled from 72 hours, spanning through a course of 3 days. Through this process I proved the first portion to my hypothesis correct. As the data showed, from 7 AM to 11 AM the solar bottle bulb produced 318 lx of light, comparable to indoor lighting in average houses. As the data shows, the phosphorescent device was not capable of absorbing light to be remitted at a lower intensity when the sun isn#t available to provide a direct source of energy. I hypothesized that, if I utilize phosphorescent technology to enhance the plastic bottle bulb, then I will be able to create a light bulb that harnesses solar energy and is also able to radiate light when the sun isn#t present to provide a source of energy. When tested for a measure of light at 7 PM, the solar bottle bulb showed no evidence or capability of emitting light that could be measure and documented.

Conclusions/Discussion

In conclusion, the experiment established these points:

1. Light could be refracted through water contained within a plastic bottle to function as a replacement for a light bulb.
2. The solar bottle bulb relies on the radiation of the sun. Without direct exposure to the sun#s radiation the effectiveness of the solar bottle bulb is drastically reduced and later fails to function when the sun sets.
3. Phosphorescent devices do have the capabilities of absorbing radiation and remitting it at a lower intensity for an extended period of time, but those principles failed to provide light at

Summary Statement

The focus of the project was to make the solar bottle bulb functionable at night.

Help Received

My friend, Keyur Maru, helped me design my board.

Preliminary