Name(s)	Project Number
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Project Title

The Photoelectric Effect

Abstract

Objectives/Goals

This experiment involves solar cells and how they produce electricity. Two important questions are: How is the output power affected by the input power and by distance from the light source? Secondly, what is the efficiency, or percent of light converted into electricity, of the solar cell?

Methods/Materials

To answer these questions, I set up a light bulb in a completely darkened room, and placed the solar cell at different distances of three, six, nine, twelve, fifteen, and eighteen inches from the light bulb. I then recorded the amount of volts produced at each distance using a voltmeter. I then calculated the efficiency by dividing the total output power by the total input power.

Results

I found that the results followed the inverse square law: when the distance of the solar cell from the light source is halved, the amount of electricity produced will be quadrupled. Also, the efficiency of the solar cell was 8.5%, that only 8.5% of the total energy is converted into electricity.

Conclusions/Discussion

It was hypothesized that the efficiency of the solar array would be approximately 11%, however, only 8.5% efficiency was achieved on this solar array. The cause of the reduced efficiency is probably due to the use of cheaper, polycrystalline solar cells vs. the higher qulaity, single crystal cells. Solar cell output power compared to the distance from the light source proved the inverse square law; that is, when the distance of the solar cell from the light source is halved, the amount of electricity produced will be quadrupled. This occurs because the light disperses and has to fill a much larger area , so less light is able to hit a single point on the solar array.

Summary Statement

This experiment involves solar cells and how they produce electricity.

Help Received

Materials and resources provided by Dr. Barry L. Butler.