

Solar Energy

Does the angle at which the Sun's rays fall on a solar cell affect the power that's produced?

(Project found at <http://www.all-science-fair-projects.com/>)

Purpose

Determine the angle that produces the most power using a solar cell.

Materials

- A solar cell
- Three boards
- A fan
- Voltage Meter
- String
- Two Screws
- Protractor

Procedure

1. First, mount a fan and a solar cell on top of a board, which has been hinged to two other boards about 1/3 of the size of that.
2. Next, bring them out on a sunny day. Move the third board so that it is at different angles with the sun. Measure the angle it is at with the ground. Use a voltage meter to pick up how much energy you are receiving. Jot this down.
3. Repeat the previous step as many times necessary.
4. Calculate for each entry the angle of the sun's rays.
5. Record which one was the most efficient, and which was least efficient.

How does a change in temperature affect the current, voltage, and power generated by a solar cell?

(Project found at <http://www.all-science-fair-projects.com/>)

Purpose

The purpose of this experiment is to determine how different temperatures affected the voltage (mV), the current (mA), and the power (watt) generation of a solar cell.

Materials

- Solar cell (2cm by 4cm)
- Digital Voltmeter
- Digital indoor/outdoor thermometer
- Lamp w/100 watt bulb
- Shoe box
- Dowels- 2.5 cm
- Large bottle of airbrush propellant
- Hairdryer
- Pair of scissors
- Packing tape
- Large piece of plywood

Procedure

1. Gather all the materials. (you may want to lacquer the plywood to make the tape stick better)
2. Take the plywood and glue the dowels apart about the width of the solar cell.
3. Cut a hole larger (2 cm) than the cell itself on top of the box, and cover with a piece of clear, hard plastic.
4. Run the external sensor of the thermometer onto the dowels.
5. Glue the bottom side of the solar cell on top of the dowels.
6. Attach the probes of the voltmeter onto the solar cell.

7. Place the shoebox over the cell so that you can see the cell through the hole.
8. Tape all sides (and the wires). Leave one side alone.
9. Cut a "door" so that you can put the hair dryer in there to warm it up.
10. Place the lamp to my specifications shown in experiment design, and centered over the cell.
11. To test the cell, simply take the mV and mA readings for each temperature.
12. Repeat step #11 as needed (I did four times.)
13. Multiply the mV and mA readings together to get the wattage.
14. Finalize data.