Solar cell in the heating

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Abstract :

In this project we made a solar cell which is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect. **Light shining on the solar cell produces both a current and a voltage to generate electric power.** We used copper alloy to give us a good solar cell which we can make a model used it for warming Such as water and food.

Introduction :

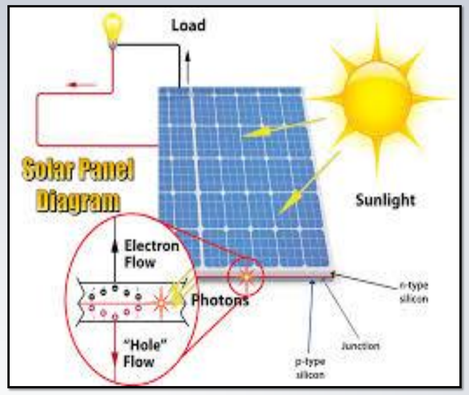
The basic idea of a solar cell is to convert light energy into electrical energy. The energy of light is transmitted by photons, small packets or quantum's of light. Electrical energy is stored in electromagnetic fields, which in turn can make a current of electrons flow. Thus a solar cell converts light, a flow of photons, to electric current, a flow of electrons, When photons are absorbed by matter in the solar cell, their energy excites electrons higher energy states where the electrons can move more freely. The perhaps most well-known example of this is the photoelectric effect First by French physicist Edmond Becquerel.

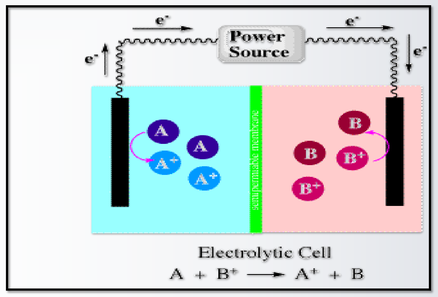
In 1839 , at age 19 ,he built the world's first photovoltaic cell in his father's laboratory Willoughby smith first described the "effect of light on selenium during the passage of an electric current" in a 20 February 1873 issue of nature. In 1883 careerists built the first solid state photovoltaic cell by coating the semiconductor selenium with a thin layer of gold to from the junctions :the device was only around 1% efficient .

Therod:The solar cell is a tool for converting solar energy into electrical ,idea when the sunlight brings to electronic copper oxide is gaining some of the electronic enough power to become free movement ,and electronic moved from valance band to conductor band, we used in the experiment electrolytic cells because our midst was akatroliti(salt)where the interaction of oxidation -reduction is automatic.it turns the electrical energy into chemical energy. Example : a vase containing electrolytes with electrodes are connected to an external source .

Theory :

An electrochemical cell can be created by placing metallic electrodes into an electrolyte where a chemical reaction either uses or generates an electric current. Electrochemical cells, which generate an electric current are called voltaic cell . In other electrochemical cells an externally supplied electric current is used to drive a chemical reaction which would not occur spontaneously. Such cells are called electrolytic cell [1]. In our project, we use electrolytic cell which has solution of sodium chloride. Electrolysis is used to drive an oxidation-reduction reaction in a direction in which it does not occur spontaneously by driving an electric current through the system while doing work on the chemical system itself, and therefore is non-spontaneous. They are composed of two half-cells--one is a reduction half-cell, the other is an oxidation half-cell [2].





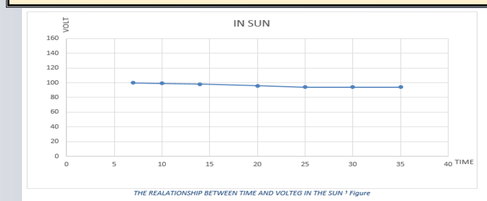
MATERIALS AND METHODS

In our project, we made a simple solar cell by using several steps are,

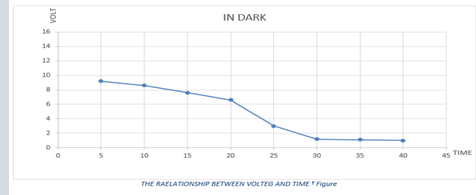
- **Take a copper sheet and cut it into equal parts.** After cutting you have 2 pieces of the same size
- **Heat up one piece of copper sheet completely using a burner or gas stove.** Heat up 20 to 30 minutes. Then place it undisturbed to cool down.
- **Attach a piece of copper wire to it.** Clear that place where you will attach copper wire to it.
- **Take another piece of copper sheet and attach it to another piece of copper wire.**
- **Take a plastic bottle and cut it half.** In the bottom part of bottle make a solution of hot water and salt.
- **Paste burned copper sheet in the bottle.** Only copper sheet touched with water not copper wire.
- **In opposite direction paste another piece of copper sheet.**
- **So the solar cell is ready to use for any uses**

RESULTS :

In our result we studied the relationship between the time and the output voltage in the sun and in the dark as shown in figure 1 . we had observed the efficiency of the solar cell improved by 98% in the sun than in the dark .



THE REALATIONSHIP BETWEEN TIME AND VOLTEG IN THE SUN ¹ Figure



THE RAELATIONSHIP BETWEEN VOLTEG AND TIME ² Figure

Fig. the relationship between the time and out put voltage in sun light (up) and in darkness (down)

CONCLUSIONS

Our research focused on how making a solar cell converts heating, without needing electricity .We studied the relationship between the voltage and time ,once on the shadows and once under the sunlight . This study recommends to study efficiency of the solar cell at different solutions and different concentration to improve it , At the end we just got a solar cell converts heating , but it's converts small heating because we used just one scorched plate ,so if we want to get high energy or high heating we should put a hundred scorched plate of copper.

REFERENCES

[1] Allen J. Bard, György Inzelt, Fritz Scholz (2012).*Electrochemical Dictionary*, second edition, page 254-356, Springer Science & Business Media.
[2] Kolbe, Hermann(1947).*The Electrolysis of Organic Compounds*, Edinburgh : E. & S. Livingstone.
[3] arken C. 2009 . *Solar collectors – behind the glass*, Homepower magazine 133,70–76
Gulland, John. 2012. Heating water with a wood stove , woodheat.org. Wood Heat Organization Inc.. Retrieved 29 March 2012.
[4] John Perlin. 2001. *History of Solar. Energy*, California Solar Center
[5] Del Chiaro Bernadette and Telleen-Lawton Timothy. 2007. *Solar Water Heating (How California Can Reduce Its Dependence on Natural Gas*, Environment California Research and Policy Center. Retrieved 29 September 2007
[6] John C. Bacher. 2000. *Petrotyranny Dundurn Press Ltd* , (2000) David Suzuki, published ; reference is at Page 70
[7] "Israel's Solar Industry. Februaryu 2012. *eclaiming a Legacy of Success* , Climate.org. Retrieved 10