



## Development of Low Cost Solar Cell and Inverter

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### ABSTRACT

The first law of thermodynamics postulates that the total amount of energy in the universe is constant. The sun provides plant the food by photosynthesis. Thus the sun is a renewable energy sources of all the life on earth, The photovoltaic energy generated by sun uses solar cell to absorb the sunlight which it transmitted as electric charge in the circuit. The solar panel transfers the energy from the sun by trapping the photon. and ejecting an electron from semiconductor to produce energy. semiconductor has an energy gap between valence electron and conduction Electron.  $TiO_2$  is a wide band gap semiconductor. The gap is very wide and the energy from sunlight can not release electrons easily but if the exited electron are received from the blackberry juice then the blackberry juice becomes slightly positive (oxidised), Thus if it is in demand of an electron to become neutral. If electrode coated with graphite come in contact with blackberry juice and  $TiO_2$  and iodine electrolyte which acts like a boat bringing electrons. This is the basic similar process which is observed and is known as photosynthesis in plants. The solar cell was fabricated on glass plate and tested for generation of voltage successfully in the sun.

**Keywords:** Blackberry, Glassplates, solar cell, electron

### I. INTRODUCTION

Solar energy is the energy which comes from natural sources. These sources are available in abundance and can be naturally replenished. Therefore, for all practical purposes, these solar cell. Blackberry juice contains many water soluble chemicals that may cause a chemical reaction with one or both of the electrodes. So it may get some electricity from that.

Iodine, Blackberry Juice, and Titanium Dioxide it can create a working solar cell that mimics the process of photosynthesis. This is known as a Gratzel Cell.

### II. Construction of Solar Cell

The construction of solar cell requires Distilled white vinegar, Nano crystalline Titanium Dioxide, Ethanol Iodine electrolyte solution, Graphite pencil, Blackberry juice. The 10 ml vinegar to a 6 gm Titanium Dioxide then stirring until smooth and lump free solution is made. Then, Test one of the glass slides with a multi meter to determine which slide is conductive. Mask 3mm on three sides of glass slides and prepared solution is dropped on the slide and allow the slide to dry for few minutes before removing the tape and then put slide directly on the flame of gas burner for 5 to 10 minutes until the slides turn yellow and then again white. Blend or crush fresh blackberries in the blender or by hand and add 1 tablespoon water for every 10 blackberry and take a simple juice from the bottom. Take a 5 leaves of citrus tree and mash with 10 ml of acetone in a mortar and put it in a amber bottle. Use a soft pencil or graphite stick to coat three entire surface of the conductive side. The second slide is coated by the graphite pencil.

Place graphite coated on the top of the dry soaked Titanium Dioxide coated slide of the second slide. The slides should be place slightly offset to allow enough room on the end to place alligator clip. Now use blinder clip to hold the two slides together. Now with an eyedropper of liquid iodine solution to seal between the two slides. The solution will be drawn

into the cell by capillary action and will stain the entire inside of the slides .

Attach the alligator clips to the two overhanging edges of the slide and attach the clips leads to your multi meter with the negative terminal attached to the Titanium Dioxide coated slide and the positive terminal attached to the graphite coated slides. Measure voltage of the cell in the direct sunlight and indoors .the maximum voltage in direct sunlight is about 0.5 volt, also attached several cells in parallel and series to get a 10 volts voltage. As tested shown in figure,



Figure 1: Experimentally tested fruit solar cell

#### IV.INVERTER

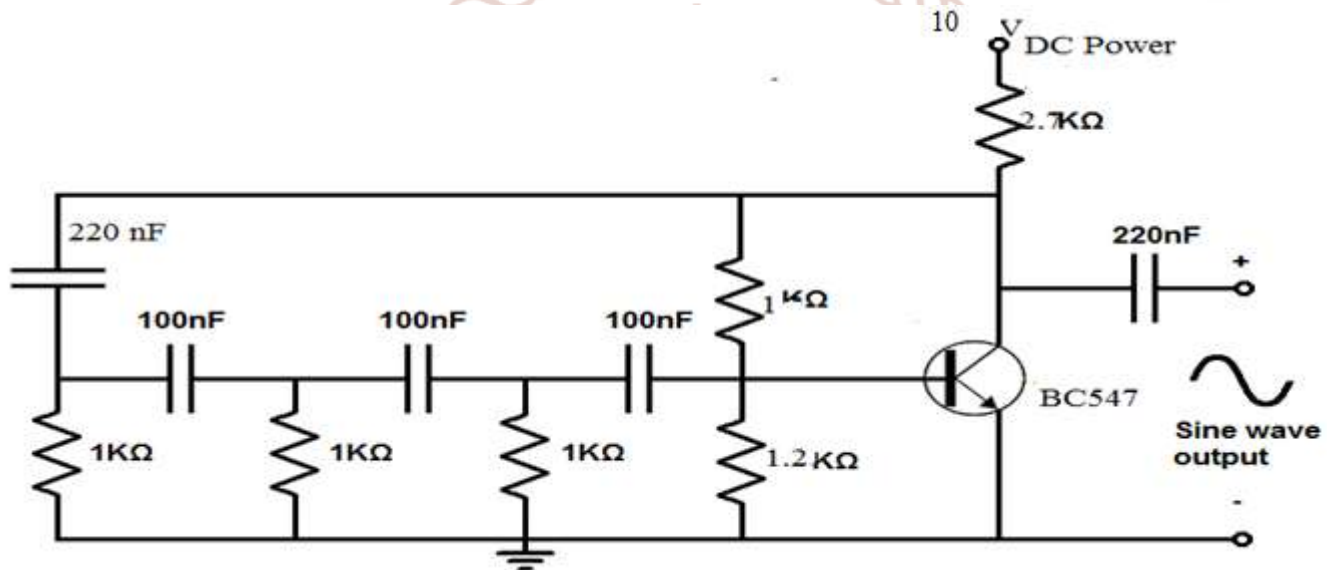


Figure 2: Transistor inverter circuit with RC Network

A simple transistor BC-547 inverter with RC network is shown in figure 2. The fruit solar cell power 10 volt DC was given across A and B ,and the output was measured between C and D. The 10 volts DC got converted into AC ,The transistor action with RC network which has given a faithful conversion of DC into AC.

#### Result:

The DC 10 volts generated from fruit cell is given across collector and emitter through the biasing circuit and RC network faith full converts the DC signals through the transistors by transistor action into AC signal output across the transistor emitter and collector terminals via, coupling capacitors of 220 Nf.

#### Conclusion

The successful testing after the development of simple transistor based solar fruit cell inverter is cost

effective and simple to construct and use since, it is affordable by the masses.

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