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ARTIFICIAL SOLAR TREE

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Abstract : *In today's life, this paper introduces the Artificial tree which gives electrical energy, oxygen and hydrogen. This tree provide hydrogen as fuel and oxygen to be emitted in the air for breathing .The leaves means solar panels are used for collecting sunlight and convert into light energy with the help of PV cell .The collect energy is then stored in battery there it can be used for street lighting .The energy can be used for gadget charging and advertising purpose. The decomposition of hydrogen and oxygen called as Electrolysis of water. The power supply is given to the two electrodes which are placed in the water. The hydrogen appears at negatively charged electrode and oxygen at positively charged electrode. The pure water as well as waste water can be used for electrolysis process.*

Key Words Electrolysis, Street lighting, Gadget charger, Solar Panels, LDR.

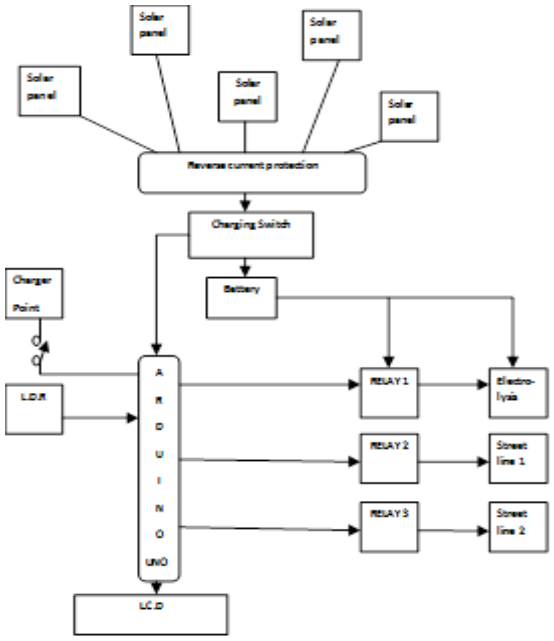
1. INTRODUCTION

Now a day's renewable energy source are more extensively used for electricity generation, more especially photovoltaic (PV) source.

As we know trees is very important part of life on earth as they provide oxygen by consuming carbon dioxide, which is essential for survival of almost all living organism of earth. The number of trees had fallen due to Deforesting and growing population. As a result oxygen level is falling down and concentration of carbon dioxide increasing. These concentrated levels of CO2 gas create adversary environment for trees, making it difficult for them to grow. And the solution for these problems overcomes by our model. Our model is capable of releasing oxygen generating and releasing pure oxygen in atmosphere by using renewable source,

In addition the hydrogen gas is produced which can be stored and used as fuel later. Our project not only provides oxygen and hydrogen but also it can fulfill lighting demand, charging stations and Wi-Fi facility for future.

2. BLOCK DIAGRAM



3. COMPONENTS OF BLOCK DIAGRAM:

I. PV Cell-

A solar cell is a solid state electrical device that converts energy of light directly into electricity by photoelectric effect. A solar cell is also known as photovoltaic cell or photoelectric cell. In our project we have used four solar panels.

Two pairs of single panel are connected in series combination for increasing voltage capacity and formed two pairs are connected in parallel combination for increasing current.

Specification of one panel:

Voltage: 8.82Volt, Current: 0.35Amp, Power: 3Watt.

Fig-2 Solar panel

II. Battery-

It is an electrical storage device .It consists of lead Pb, Pbo2, acid H2SO4. The battery is rechargeable due to reversible chemical reaction. We have used 12 Volt, 7.5 Amp, battery in our project.

III. Reverse current protection-

In the dark, when no voltage is being produced by the panels, the voltage of the battery would cause a current to flow in the opposite direction through the panel which can lead to the discharging of battery, Hence blocking diode is used in series with the parallel battery in reverse biasing.

Normally PN junction diode can be used for reverse current protection.

IV. Relay –

A relay is an electrically operated mechanical switch. The relay is protective device. Four relay are used in our project .relay works on rating 10 amps, 12 volt.

V. Arduino Uno-

The Arduino Uno is a microcontroller board on the ATmega328.
It has 14 digital Input/ Output pins, 6 Analog inputs, A 16 MHz ceramic resonator.
In our project the Arduino uno controlling the applications such as street lighting, Electrolysis, Charging battery etc.

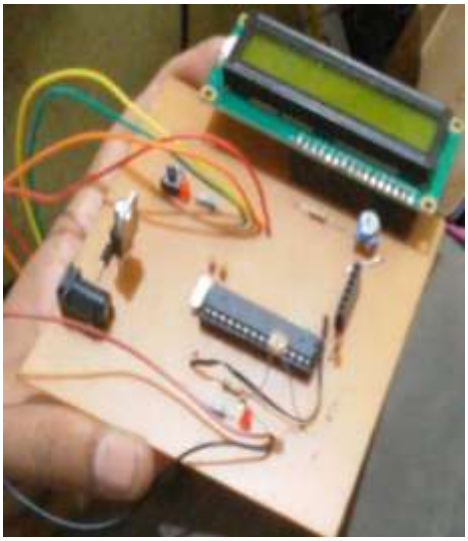


Fig.-3 Arduino uno board

VI. LDR –

Light dependent resistor (LDR). Is component that is sensitive to light .An LDR or photo resistor is made up of semiconductor with high resistance. Cadmium sulfide is popularly used .In our model, we used single 5 mm size ceramic LDR.

VII. Voltage regulator –

Voltage regulator is used to have regulated voltage. The regulator is mounted on arduino Uno board to get 5V of regulated output for microcontroller to operate.

We have used LM7805 C, 05 indicate 5v output voltage.

VIII. Electrolysis process-

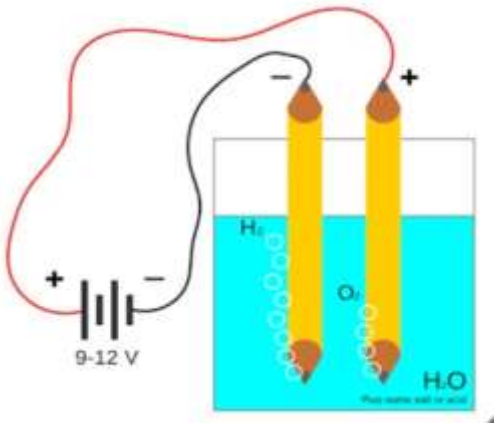


Fig-4 Electrolysis process

The two electrodes are energized by power supply. These two electrodes are placed in water.

For electrolysis of water we can use pure water or waste water.

Hydrogen is appearing at negatively charged electrode and Oxygen is appearing at positively charged electrode.

The amount of Hydrogen generated is twice the amount of Oxygen generated; these both are proportional to the total amount of charge conducted by the solution.

The electrolysis of pure water requires excess energy and the rate of decomposition of pure water is less. By adding some acid with water the rate becomes higher and efficiency of electrolysis gets increases.

WORKING PRINCIPLE

Tree consisting solar panels ,batteries & other equipments .The solar panels are placed on limbs of tree .on each one solar panel is placed .

The arrangement of solar panels is kept in such a way that each panel collects maximum solar energy radiated by sun.

Conversion of solar energy into electrical energy with the help of PV cell.

The produced energy is in the form of dc & this energy collected in the 12volt battery. The diode is connected to each panel's anode for protection against reversal the flow of energy i.e. the energy flowing from batteries to panels.

The plastic container placed near to the solar tree. The container contain to copper electrodes to carry out electrolysis.

We use drinking water for electrolysis by mixing it with small amount of sodium hydroxide (NaoH).

The acid works as medium in separation of oxygen and hydrogen from water. The produced gases can be identifying with the help of two test tubes.

The test tube on the cathode end, when the flame near to face of it (test tube) it will produced pop sound. And the test tube on anode end, when the flame near to the face of anode test tube, it support burning but not produced pop sound.

4. ADVANTAGES

1. Pollution free -

During energy production, combustion of coal and nuclear bombardment takes place, this produces radioactive waste. By using our plant pollution cannot takes place.

2. Less land requirement-

In traditional solar plant the required land is more by using solar tree land can be save.

3. Easy installation
4. No fuel cost
5. Longer life
6. Less maintenance cost

5. CONCLUSION

The implemented Artifical tree provides oxygen as like real tree. These can be more implemented n urban areas where level of oxygen is less and high concentration of carbon dioxide in air. It can be also implemented in rural areas where it fulfills the energy demand .As above said our model also provides electrical energy for street lighting. The used four solar panels can charge 12v battery and produce of electricity which is stored in the battery. The produced electricity can be used for electrolysis purpose. The model is pollution free, cannot produce any waste, it does not require any cost for fuel to produce electricity. It can be installed anywhere. It has longer life.

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