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Plasmonic Study of Nanoparticles in Organic Photovoltic Cells: A Review- Sakshum Khanna

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Global energy consumption has increased every year by several percent. Today, a large amount of energy is produced by fossil fuels and to some extent by nuclear energy. However, these resources are limited and their use has a serious environmental impact. Sunlight is the most important source of regenerative energy and an inexhaustible source of energy. As a result, attention has been drawn in recent years to solar cells. In addition, overcoming obstacles such as efficient profitability and commercial feasibility, energy generation methods have turned to organic photovoltaic devices. The advantages of being: the generation of cost-effective devices, the use of renewable energy sources and easy flexibility. In recent years, the design has led to a 3% to almost 9-10% increase in the amount of PCE of an organic solar cell. To improve the efficiency of organic solar cells, it is therefore important to determine the limits of efficiency and efficiency of the cell. The diffusion of metallic nanoparticles is a means of increasing light absorption and efficiency of organic solar cells. This review discusses some of the most significant technological developments that have been presented in the literature on basic mechanisms at work,

In recent years, the demand for clean energy resources has increased, resulting in rapid growth in the field of solar energy research and development. Solar cells are the devices that convert light into electrical energy. Solar cells can be made from organic, inorganic or hybrid materials and are divided into three different generations. The first generation of crystalline semiconductor wafers, with a thickness of 200-300 μm, occupying environments with 90% of the solar cell market. The second generation solar cells are based on thin film technology with a thickness, mostly between 1 and 2 μm. Third generation solar cells are the second generation solar cells. The desired frequency at light of the trapping is increased by absorption and efficiency. A new method has been developed in recent times to increase the absorption of light, which is to say that the use of nanoparticles diffuses when they are excited at their plasma resonance. Silver and gold are some of the most commonly used plasmonic materials, and they have also been combined with oxide cores or shells. The desired frequency at the light of increasing trapping by efficiency. A new method has been developed in recent times to increase the absorption of light, which is to say that the use of nanoparticles diffuses when they are excited at their plasma resonance. Silver and gold are some of the most commonly used plasmonic materials, and they have also been combined with oxide cores or shells. The desired frequency at the light of increasing trapping by efficiency. A new method has been developed in recent times to increase the absorption of light, that is to say the use of nanoparticles diffuse light when they are excited at their plasma resonance. Silver and gold are some of the most commonly used plasmonic materials, and they have also been combined with oxide cores or shells.

The solar cell is a device which directly converts light energy into electricity through photovoltaic effect. Solar cells are made of semiconductor materials that have certain properties for absorbing sunlight, and their electrical properties vary with exposure to light. They can be made from a single layer of light absorbing material or multiple junctions to obtain more absorption. The basic properties of a photovoltaic (PV) cell require such as: light absorption, generation of electron-hole or exciton pairs, separate extraction of carriers, etc. An organic solar device includes four layers on a transparent substrate which can be either glass, polyester, plastic or many other transparent materials. It is covered with various transparent conductive oxides such as indium tin oxide and other materials. The transparent layer is used as: the transparent window layer and the collector for the photo-generated holes (anode). Recently, carbon structure nanotubes (CNTs) have been used as a transparent conductive layer.

The electronic structure of organic solar cells is based on n electrons and an alteration between single and double DC bonds. The band gap of these materials varies from 1 to 4 eV. The π electrons have much more mobility than the □ electrons. Because of the overlap between the carbon atoms, the π electrons can jump from one band to another. The empty π bands are the lowest unoccupied molecular orbit LUMO and when filled with electrons they are the highest occupied molecular orbit HOMO.

The operating principle of plasmonic solar cells includes: the diffusion and absorption of light to the deposition of metallic nanoparticles. A thin sheet of silicon does not absorb light, because of the increase in absorption of a thin sheet of silicon, more light must be placed on the surface to convert it into useful tilelectric energy. Metal nanoparticles have been found to help diffuse incoming light at resonant wavelengths across the Si substrate. Thin film solar cells have three ways of increasing absorption of light: a) integrating nanoparticles on the surface of solar cell cells, b) placing nanoparticles inside the active layer; and c) the active layer on the back side of the grate. These plasmons create a strong electric field around the nanoparticle and improve absorption in the region adjacent to it. This technique is very useful for OPV because in OPV the diffusion length is short. Thus, the nanoparticles of the placement are more advantageous when it is placed near the junction. The different metals shows the order of the electron densities of the light, which corresponds to the resonance. The surface resonance frequency for spherical particles mainly depends on the density of free electrons in the particle. absorption in the region adjacent to it. This technique is very useful for OPV because in OPV the diffusion length is short. Thus, the nanoparticles of the placement are more advantageous when it is placed near the junction. The different metals shows the order of the electron densities of the light, which corresponds to resonance. The surface resonance frequency for

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Analysts say the global market for organic solar cells has an estimated net worth of 25.518 million US dollars in 2013, estimated at 97.412 million US dollars by 2020. market for organic solar cells. The North American market takes second place, representing approximately 28% of the global market. The demand for organic solar cells is currently the highest in the integrated photovoltaic section of the building (BIPV). This market segment should also prosper at a good pace in the coming years between 2014 and 2020.

Recent progress has shown that for conventional silicon cells compared to plasmonic solar cells. MFFs in Research is an exploration of the advantages of the plasmonic solar cell. The advantages of plasmonic particles are to use them on any thin SC film (silicon or organic). The electromagnetic spectrum of a wide range of solar cells over the efficiency of different sizes, shapes and coating media of metallic nanoparticles. Their adaptability in production methods, properties and applications is also very promising for the future of solar energy. Therefore, PSCs hold promise for high efficiency while producing solar energy.

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