

IMPROVEMENT OF DYE SENSITIZED SOLAR CELLS (DSSCS) ENERGY EFFICIENCY BY CARBON NANOTUBES (CNTS) INCORPORATION IN THEIR ACTIVE LAYER.

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The sun is a most inexhaustible and available renewable energy source, it is why photovoltaic cells have attracted much interest in the scientific world. However, the first photovoltaic cells based on silicon have good energy efficiency but are expensive and are not very accessible because of their cost.

Graetzel cells commonly called DSSCs (Dye Sensitized Solar Cells) were studied and searched over the last decade as the third generation of photovoltaic cells because of their potential low-cost manufacturing based on printing technology. However, the energy efficiency of DSSCs remains low compared to those of conventional solar cells. To make DSSCs more competitive, it is important to study their characteristics and energy efficiency by incorporating in the active layer the materials which may improve the conduction and / or absorption in the cell.

Carbon nanotubes (CNTs) are very interesting materials because of their extraordinary physical properties. Some reports have shown that the incorporation of CNTs in a film of polymer poly (3-octylthiophène) increases the electrical conductivity of the film. A composite of poly (p-phenylene vinylene) with CNTs in a photovoltaic device shows good quantum efficiency.

However, this incorporation may be advantageous or not if we do not use good concentrations of these nanotubes. In this study we use MWCNTs (because of their electrical conductivity and low cost) in addition to titanium oxide (TiO_2) in the cell active layer and investigate the optimum condition of using these MWCNTs.