

Preparation of Carbon Multi-walled Nanotubes Counter Electrode by Spray Technique For Dye-sensitized Solar Cells

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The use of Pt as counter electrode (CE) in dye sensitized solar cells (DSSCs) is extremely expensive materials for which limit the fabrication cost for large scale DSSCs application. Recently, inexpensive carbonaceous nanomaterials have been utilized as the alternative catalytic materials for the CEs in DSSCs. Among them, carbon nanotubes (CNTs) are emerged a promising counter electrode materials for the fabrication of large size DSSCs, owing to its good corrosion resistance in I⁻/I₃⁻ redox electrolyte with effective cost. In this work, CNTs based counter electrode was prepared using multi-walled CNTs and small amount of carbon black powder for the fabrication of DSSCs. It was found that CNTs based CEs delivered moderately good catalytic activity for I₃⁻ reduction due to the presence of carbon black powder and good adhesion to FTO glass. DSSCs fabricated with CNTs CEs achieved high conversion efficiency of 3.76% with high JSC of 12.53 mA/cm² and VOC of 0.667 volt.