

ENHANCING THE PHOTOCURRENT OF DYE-SENSITIZED SOLAR CELLS BY NANOFILLER EFFECT

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Dye-sensitized solar cell (DSSC) is a third-generation low-cost photovoltaic device. The overall performance of the DSSC can be enhanced by modifying the photoanode, electrolyte, and counter electrode separately. Liquid-based redox couple electrolyte gives high efficiency but the rapid evaporation of solvent is a major problem. To overcome this limitation polymer electrolytes are used in dye-sensitized solar cells and DSSCs were fabricated with Poly (vinylidene fluoride-co-hexafluoropropylene) (PVDF-HFP) gel polymer electrolyte in this study. In order to enhance the performance of the electrolyte, different weight percentages (wt%) of TiO₂ nanoparticles were added to the electrolyte. 2.5 wt% of the TiO₂ incorporated DSSC shows a high efficiency of 5.93% while the controlled cell shows 5.69%. This improvement is due to the nanofiller effect of the TiO₂ nanoparticles in the polymer electrolytes. The overall efficiency of the solar cell has been enhanced by 4.18% due to the effective charge transportation and quick regeneration of dye molecules with less recombination.

Keywords: *Nanofiller, PVDF-HFP, polymer electrolyte*

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