

Characterization of solar cells using nano titanium oxide and nanocomposite materials

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Abstract: Dye-sensitized (DSSC) and organic composite solar cells (OCSC) were prepared for characterization and comparison of their photovoltaic conversion parameters like open-circuit voltage (Voc), short-circuit photocurrent (Jsc), energy photovoltaic conversion efficiency (PEC). Nanocrystalline TiO_2 films sensitized by the $\text{Ru}(\text{dcbpy})(\text{NCS})_2$ dye (N3) were used for DSSCs and nano structured poly[2-methoxy-5-(2'-ethyl-hexyloxy)-1,4-phenylene vinylene] (MEH-PPV) incorporating nc- TiO_2 (MEH-PPV+nc- TiO_2) composites were used for OCSCs. The influence of the addition of 4-tert-butylpyridine (4TBP) or acetic acid to the electrolyte was investigated. The polymer luminescence quenching effect of the nanocomposites was observed. Due to this, MEH-PPV+nc- TiO_2 nanocomposites can be used for organic solar cells. The PEC of the OCSCs using a 300 nm-thick nanocomposite film was reached a value as high as 0.15% that is comparable to the PEC of the nc- TiO_2 DSSC. ?? 2009 American Institute of Physics.

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