

Effect of counter electrode using Graphene like carbon-nickel thin film grown by HFCVD

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We deposited graphene like carbon (GLC, grown by Hot filament chemical vapor deposition) and nickel (Ni, grown by E-beam evaporation) nanocomposite thin film on fluorine-doped tin oxide (FTO) glass and applied as counter electrode (CE) for dye sensitized solar cells (DSSCs). The morphological and absorption properties revealed uniform GLC-Ni thin film with reasonable transmittance. The GLC-Ni thin film showed enhanced electrical conductivity as compared to FTO. The good electro catalytic activity towards iodide ions in redox electrolyte was showed by the prepared GLC-Ni/FTO thin film electrode. The fabricated DSSC with GLC-Ni/FTO CE presented relatively moderate solar-to-electrical conversion efficiency of ~3.1% with high short-circuit current density ( $J_{sc}$ ) of ~10.03 mA/cm<sup>2</sup>, open circuit voltage ( $V_{oc}$ ) of ~0.663 V with fill factor (FF) of ~0.45, which might attribute to enhanced electrical conductivity and the electro catalytic activity of GLC-Ni/FTO CE.