

Investigation of TiO₂/graphene nanocomposite based photoanode in dye-sensitized solar cell

ABSTRACT

Dye-Sensitized Solar Cell (DSSC) which is the third generation photovoltaic solar cell is a promising low cost solar cell. This type of solar cell is robust and do not require clean environment for fabrication. This paper focuses on implementation of graphene in the DSSC photoanode to improve the electron path from photoanode to FTO transparent electrode. In this research, N719 synthetic dye is used as synthesizer and three different types of graphene nanopowder namely 8 nm flakes, multilayer flakes and nanoplatelets were implemented in titanium dioxide as photo-anode. I-V measurement was done under illumination of 1000 W/m² using solar simulator and the results show that the DSSC with titanium dioxide photoanode doped with graphene multilayer flakes performs the best in term of open circuit voltage (0.782 V), short circuit current density (12.408 mA/cm²) and energy conversion efficiency (4.4%).

Keyword: Dye sensitized solar cell; Graphene.