

1-D Zinc oxide nanorod arrays based Dye-sensitized solar cells with D149 indoline dye

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Zinc oxide (ZnO) has similar band gap energy (E_g) of 3.2eV with that of titanium dioxide (TiO_2). In this study, we have synthesized 1-D ZnO nanorod arrays by controlled aqueous chemical route general process and also applied in Dye-sensitized solar cells (DSSC) based on D149 indoline dye. The ZnO nanorods films were sensitized by immersing them into a dye solution that contained 0.5mM of D149 in a mixed solvent consisting of equal parts of acetonitrile and tert-butanol. The surface morphology was characterized by using FE-SEM, TEM. The D149 dye adsorption behavior with respect to nanorod morphology and their DSSC performance have been investigated in details. The interface resistance, charge transport mechanism, diffusion coefficient, electron life time and transport time have been studied by electrochemical impedance spectroscopy (EIS), Intensity modulated photocurrent spectroscopy (IMPS) and intensity modulated photovoltage spectroscopy (IMVS) techniques.