

Light scattering effect of polyvinyl-alcohol/titanium dioxide nanofibers in the dye-sensitized solar cell

ABSTRACT

In the present work, polyvinyl-alcohol/titanium dioxide (PVA/TiO₂) nanofibers are utilized as a light scattering layer (LSL) on top of the TiO₂ nanoparticles photoanode. The TiO₂ nanoparticles decorated PVA/TiO₂ nanofibers display a power conversion efficiency (PCE) of 4.06%, which is 33% higher than TiO₂ nanoparticles without LSL, demonstrating the incorporation of PVA/TiO₂ nanofibers as LSL reduces the radiation loss and increases the excitation of the electron that leads to high PCE. The incorporation of PVA/TiO₂ nanofibers as LSL also increases the electron life time and charge collection efficiency in comparison to the TiO₂ nanoparticles without LSL.