Performance of dye-sensitized solar cell based on double-layered TiO_2 films/TiO_2 fibers

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Application of electrospun TiO_2 nanofibers was reported for an electrode for dye-sensitized solar cells(DSSC). This paper reports on structrural characterization and morphology of titanium dioxide (TiO_2) nanofibers prepared by electrospinning using a solution that contained poly(vinyl acetate) (PVAc) and titanium(IV) isopropoxide (Tip) and acetic acid as a catalyst for sol-gel reaction in dimethyl formamide (DMF) above TiO_2 thin film was fabricated by coating a precursor paste onto the fluorine-doped SnO_2 conducting glass plates(FTO) by using a squeeze printing technique and followed by heating it at 723.15 K for 30 min. TiO_2 nanofibers with diameters of 80-100 nm were successfully obtained from calcinations of the as-electrospun TiO_2/PVAc composite nanofibers at above 400℃ in air for 5hr. The as-electrospun and calcined TiO_2/PVAc composite nanofibers were characterized by SEM,XRD,FT-IR,THA,BET. The results indicated a significant effect of calcinations temperature on the crystalline phase in the form of either anatase or mixed anatase-rutile and the morphology of the nanofibers.