

Preparation and Characterization of Electrospun TiO₂ for Dye-Sensitized Solar Cell

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It has been known that electrospun TiO₂ nanofibers can be applied for an electrode for dye-sensitized solar cells (DSSC). Therefore, this paper reports on structural characterization and morphology of titanium dioxide (TiO₂) nanofibers prepared by electrospinning using a solution that contained polyvinyl acetate (PVA) and titanium(IV) isopropoxide and acetic acid as a catalyst for sol-gel reaction in dimethyl formamide. TiO₂ nanofibers with diameters of 80–100 nm were successfully obtained from calcination of the as-electrospun TiO₂/PVA composite nanofibers at above 400°C in air for 5h. The samples of as-electrospun and calcined TiO₂/PVA composite nanofibers were characterized by SEM, XRD, FT-IR, TGA, and BET. It was found that a significant effect of calcination temperature on the crystalline phase in the form of either anatase or mixed anatase-rutile as well as the morphology of the nanofibers.