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Dye Sensitized Solar Cells Using Freestanding TiO2 Nanotube Arrays XUKAI XIN, JUN WANG, Iowa State University, LEI ZHAO, Iowa State Univeristy, ZHIQUN LIN, Iowa State University — A TiO2 photoanode was prepared by depositing TiO_2 nanoparticle on the FTO glass followed by placing TiO_2 nanotube arrays on the top of TiO_2 nanoparticle film. The resulting TiO_2 nanotube/nanoparticle photoanode was sensitized with N719 dye after $TiCl_4$ treatment and exposure to O_2 plasma. The resulting dye sensitized solar cell (DSSC) showed that the highest DSSC power conversion efficiency of 8.02% and 7.00% were yielded when a 20 μm thick TiO_2 nanoparticle and a 13/7 μm TiO_2 nanoparticle/nanotube were used as photoanode, respectively. The I$\sim$V curve analysis suggested that the nanotubes had better electron transport pathway but lower electron generation. Future work will be focused on increasing the dye loading of nanotubes to improve the power conversion efficiency.

Xukai Xin
Iowa State University

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