

Supporting Information

Effect of TiO₂ morphology on photovoltaic performance of dye-sensitized solar cells: nanoparticles, nanofibers, hierarchical spheres and ellipsoid spheres

Jin-Yun Liao, Jun-Wen He, Huiying Xu, Dai-Bin Kuang, and Cheng-Yong Su*

MOE Key Laboratory of Bioinorganic and Synthetic Chemistry, KLGHEI of Environment and Energy Chemistry, State Key Laboratory of Optoelectronic Materials and Technologies, School of Chemistry and Chemical Engineering, Sun Yat-sen University, Guangzhou 510275, P. R. China.

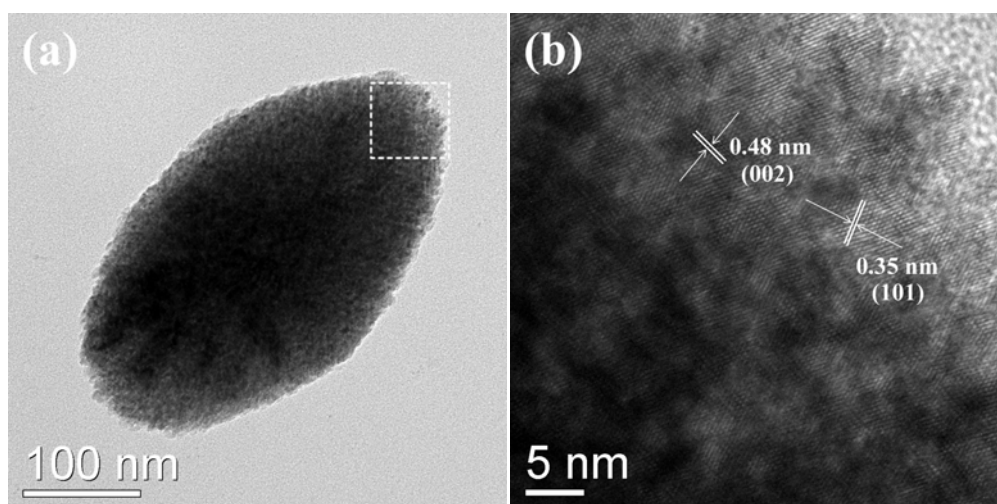


Fig. S1 TEM images of the as-prepared anatase ellipsoid TiO₂ sample. Reaction condition: 1 mL TBT, 30 mL AcOH, 180 °C, 12 h.

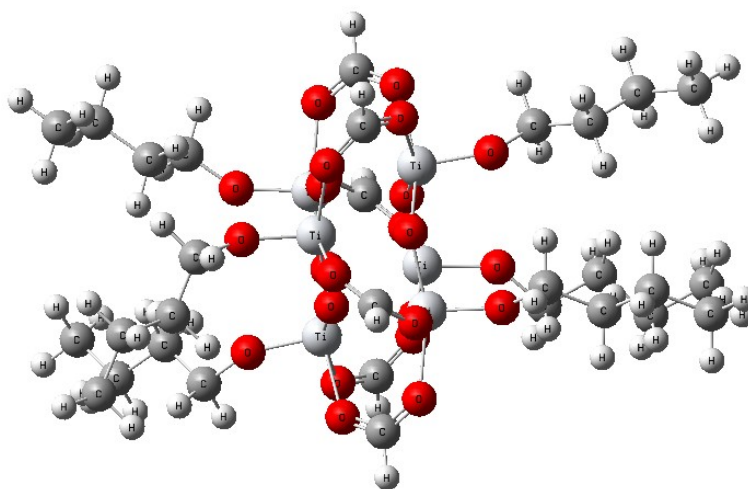


Fig. S2 Molecular structure of $\text{TiO}_6(\text{AcO})_6(\text{OBu})_6$ viewed along the b axes.

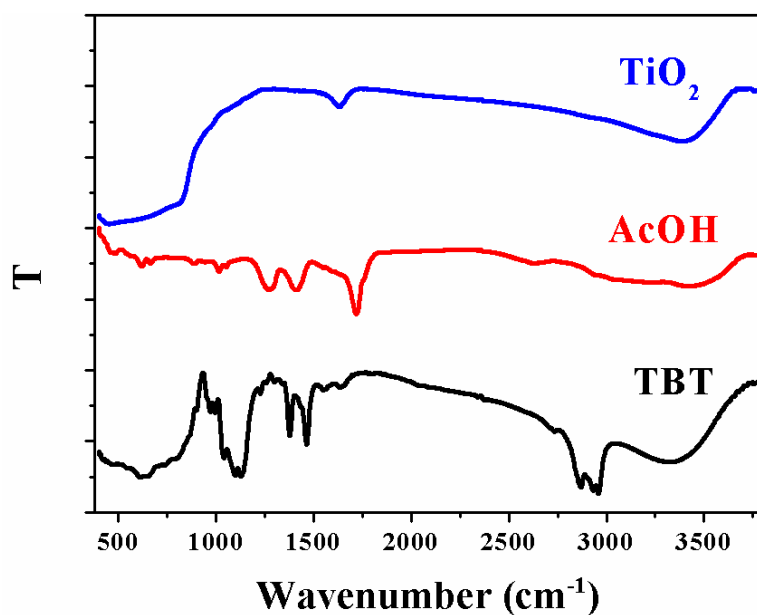


Fig. S3 FTIR curves of AcOH, TBT and calcined anatase hierarchical TiO₂ sphere at 500 °C for 3 h.

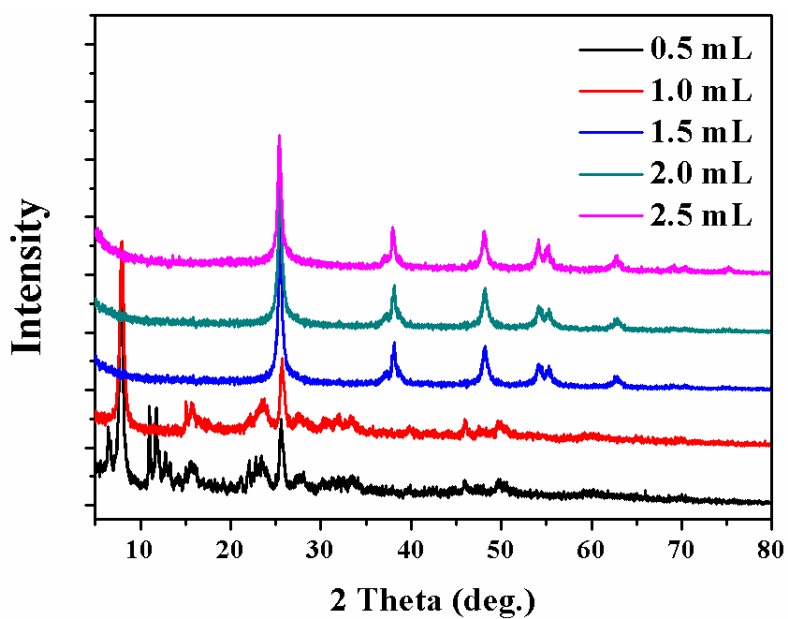


Fig. S4 XRD patterns of as-prepared samples obtained with different TBT amount from 0.5 to 2.5 mL. Other reaction condition: 160 °C, 12 h, 30 mL AcOH.

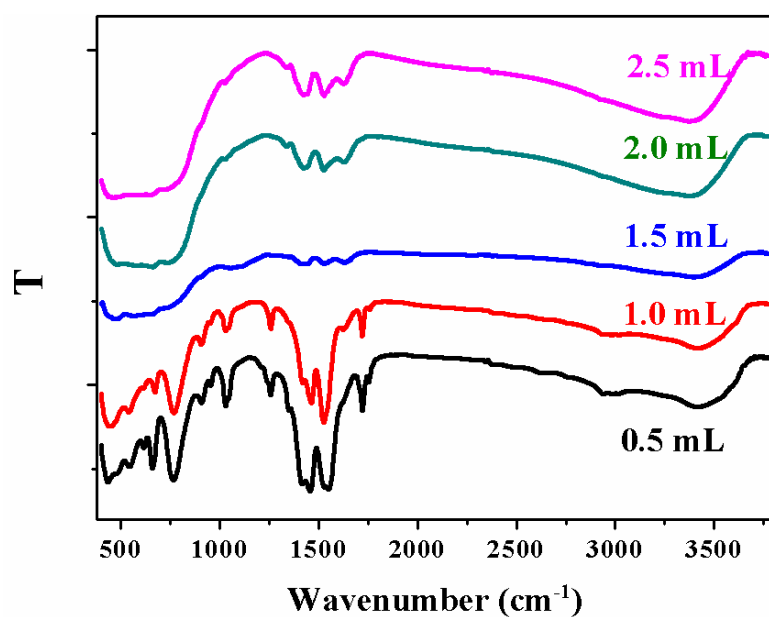


Fig. S5 FTIR curves of as-prepared samples using different TBT amount from 0.5 to 2.5 mL (160 °C, 12 h, 30 mL AcOH).

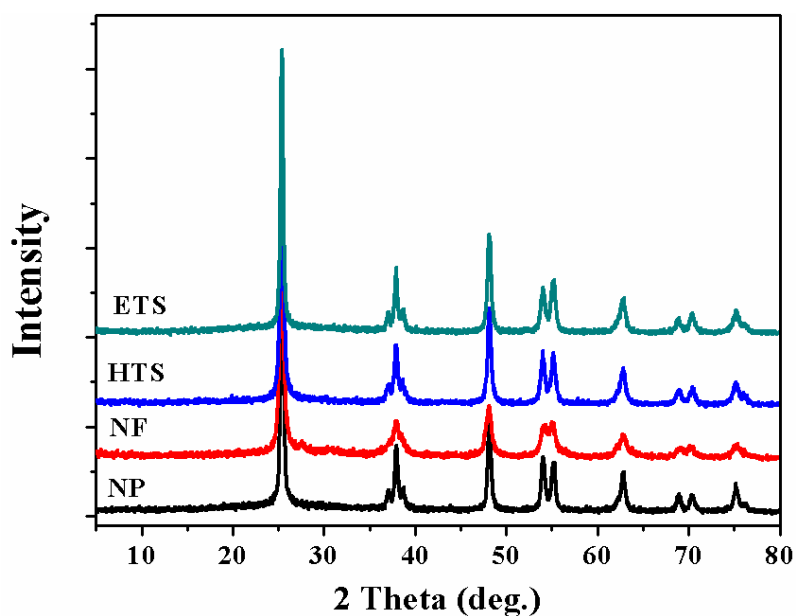


Fig. S6 XRD patterns of nanoparticles, nanofibers, hierarchical spheres and ellipsoid spheres calcined at 500 °C for 3 h.

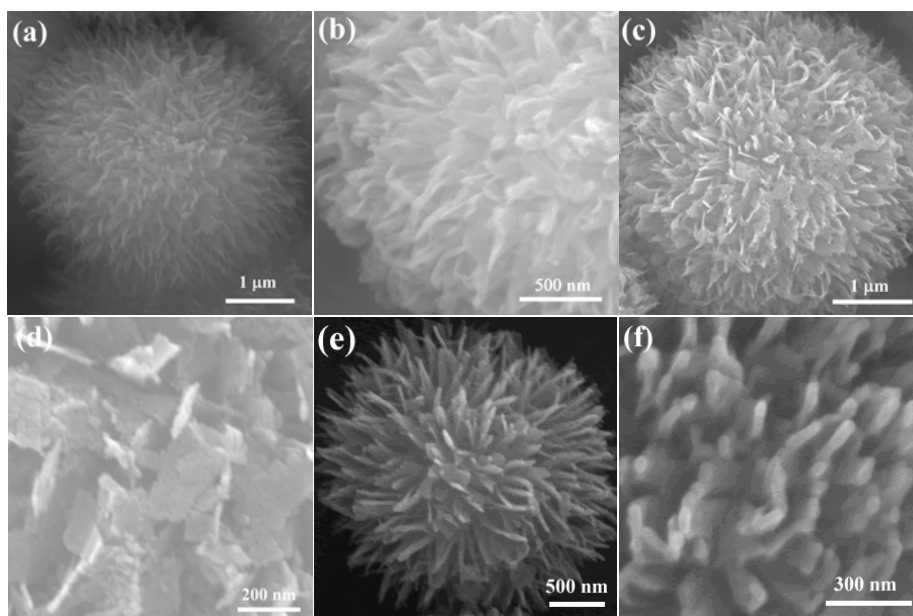


Fig. S7 SEM images of as-prepared samples via a solvothermal reaction at 150 °C for 12 h (a, b) and the calcined hierarchical TiO₂ sphere at 500 °C for 3 h (c, d); single hierarchical sphere prepared at 140 °C with 1 mL TBT and 30 mL AcOH (e) and the magnification SEM images of calcined hierarchical TiO₂ sphere at 500 °C for 3 h.

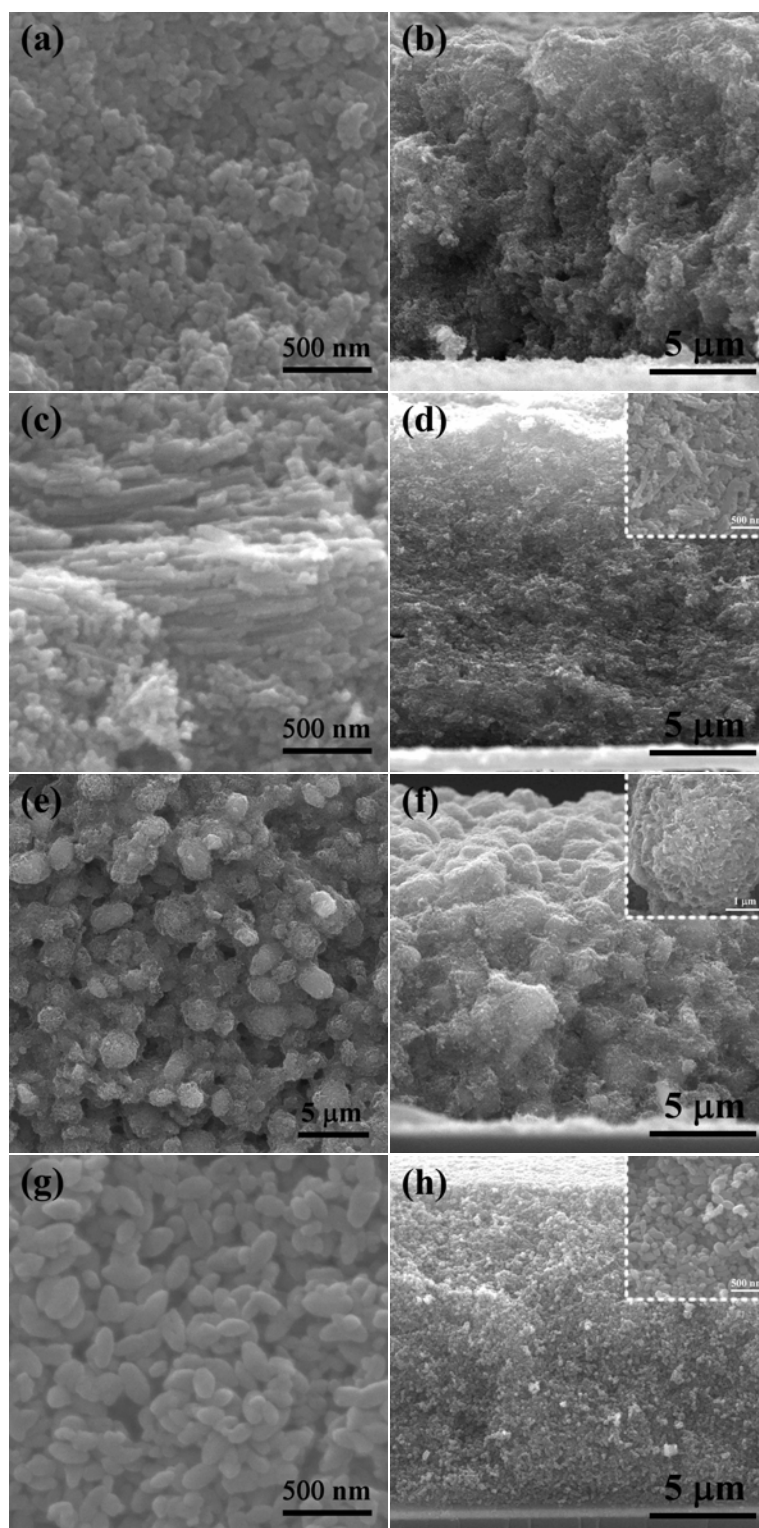


Fig. S8 Top and cross-sectional SEM images of different TiO₂ electrodes: NP (a,b); NF (c, d); HTS (e, f) and ETS (g, h). Insets in (d), (f), (h) are the corresponding enlarged part of the cross-sectional SEM images.

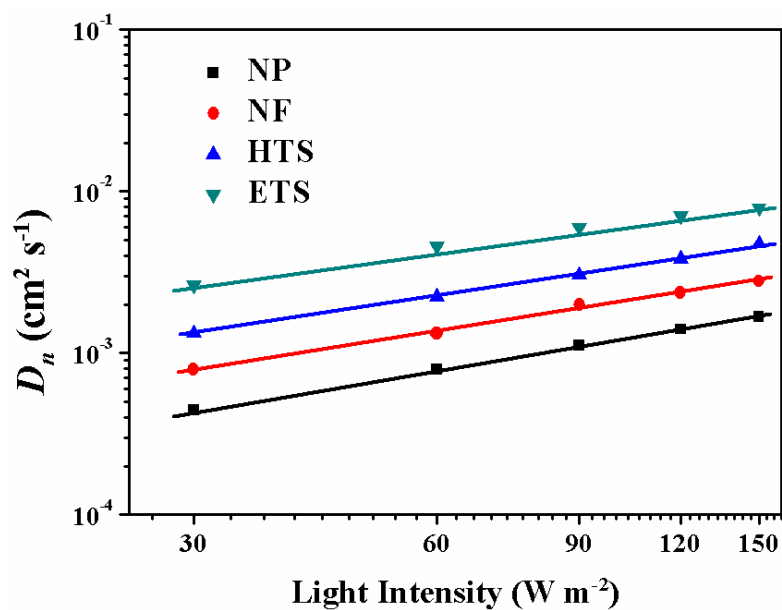


Fig. S9 Incident light intensity dependent electron diffusion coefficient for DSSCs based on NP, NF, HTS and ETS.

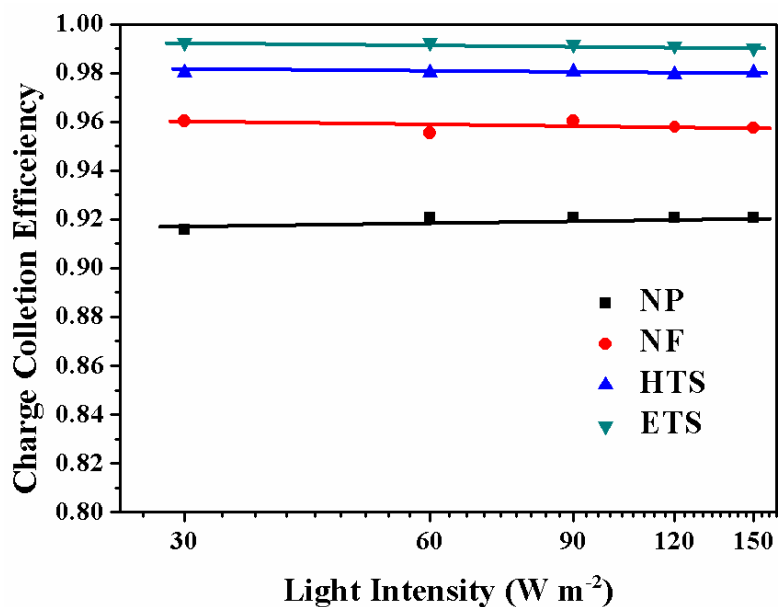


Fig. S10 Incident light intensity dependent charge collection efficiency of DSSCs based on NP, NF, HTS and ETS.

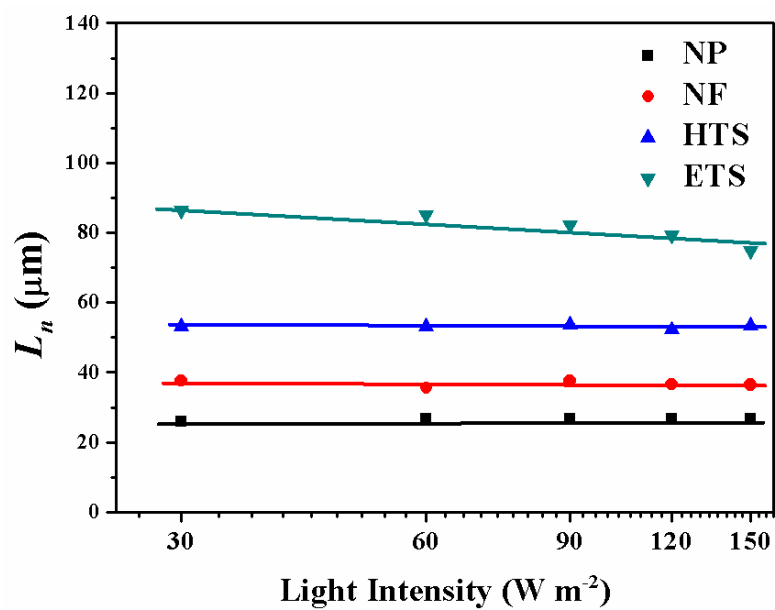


Fig. S11 Incident light intensity dependent effective diffusion length for DSSCs based on NP, NF, HTS and ETS.