

Supporting Information

High-Performance Dye-Sensitized Solar Cells Based on Hierarchical Yolk-Shell Anatase TiO₂ Beads

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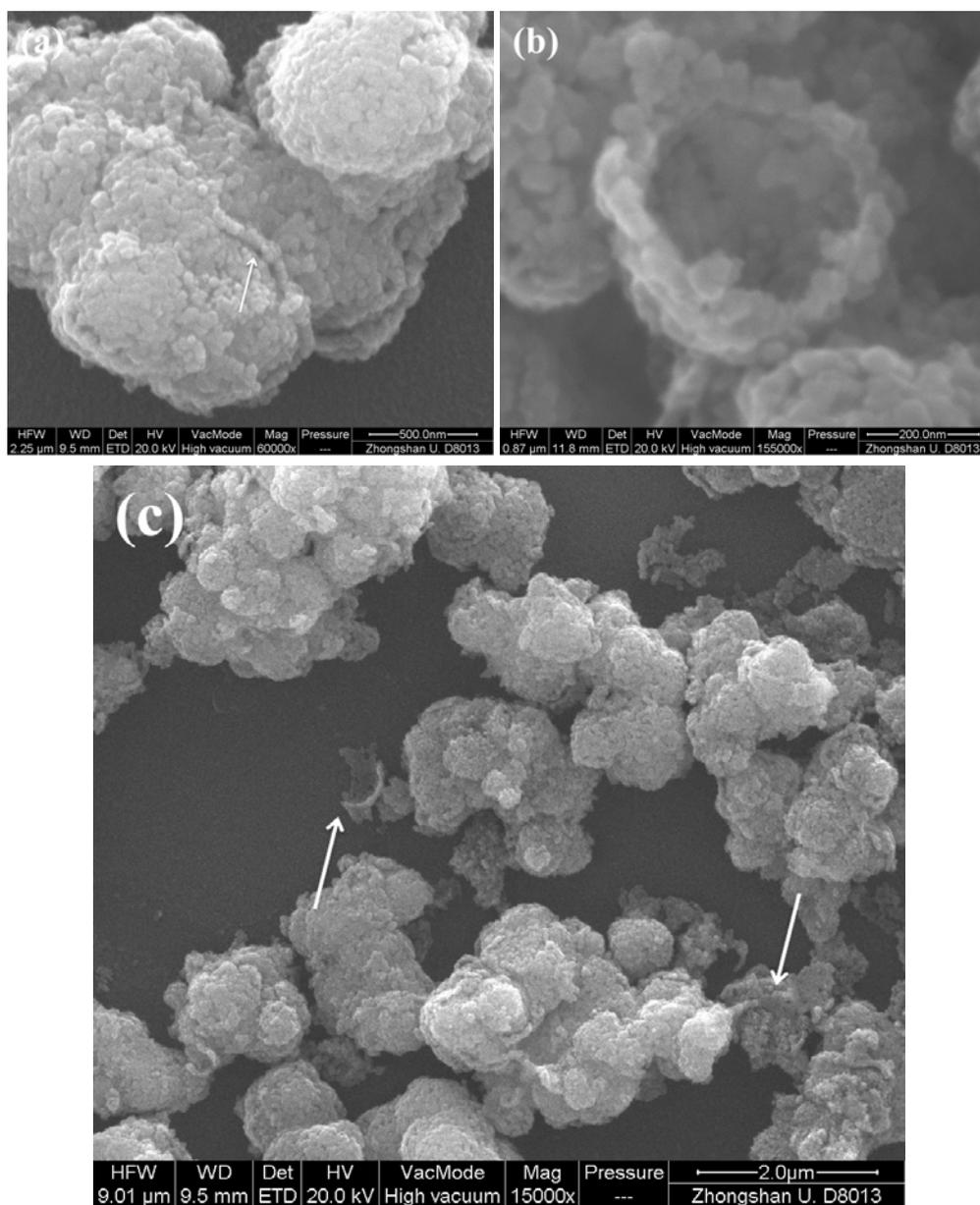


Fig. S1. FE-SEM images of hierarchical yolk-shell TiO_2 beads prepared at 160°C for 12 h. There is a small interstitial space between yolk and shell (a), and the typical shells separated from the yolk-shell beads (b and c).

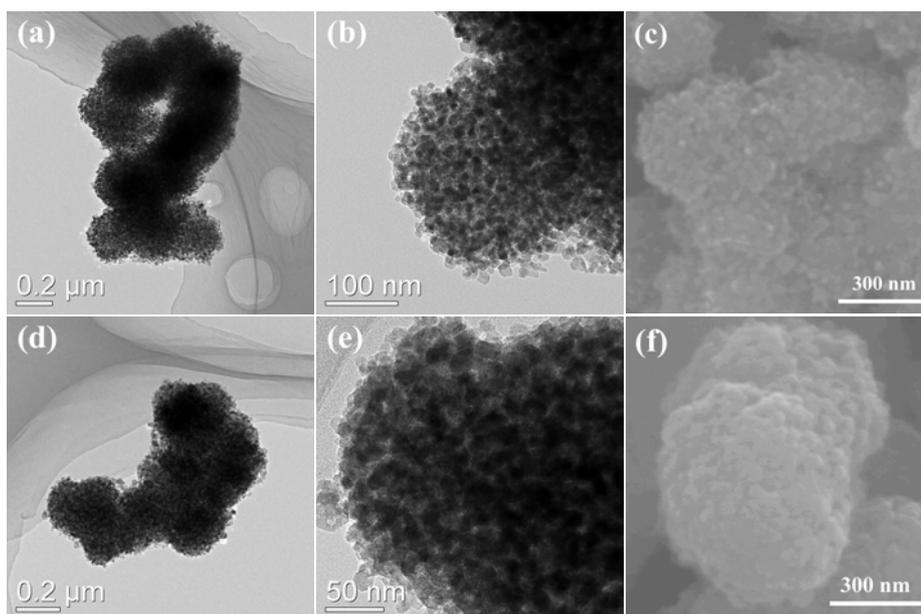


Fig. S2 Electron microscopy (TEM and SEM) images of hierarchical TiO₂ beads prepared at 160 °C for 3 h (a-c) and 6 h (d-f).

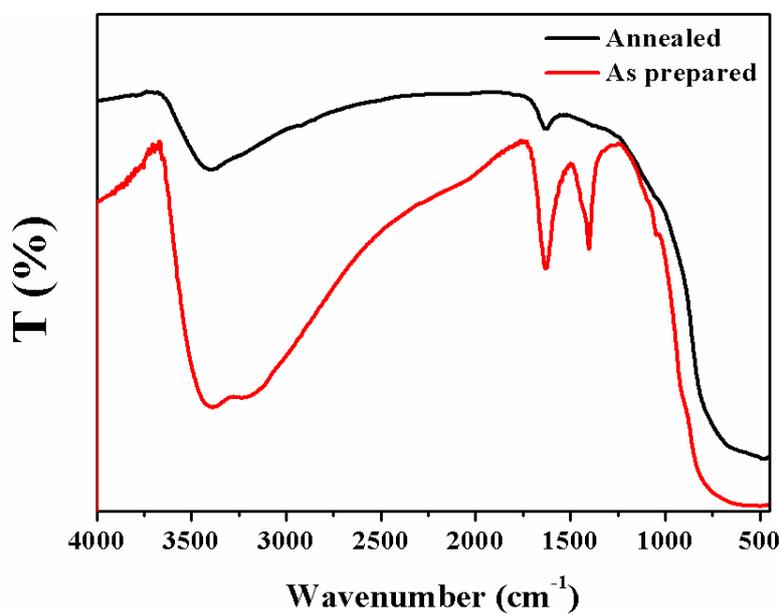


Fig. S3 FTIR curves of the sample prepared via a hydrothermal reaction at 160 °C for 12 h (red curve) and annealed sample at 500 °C for 3 h (black curve).

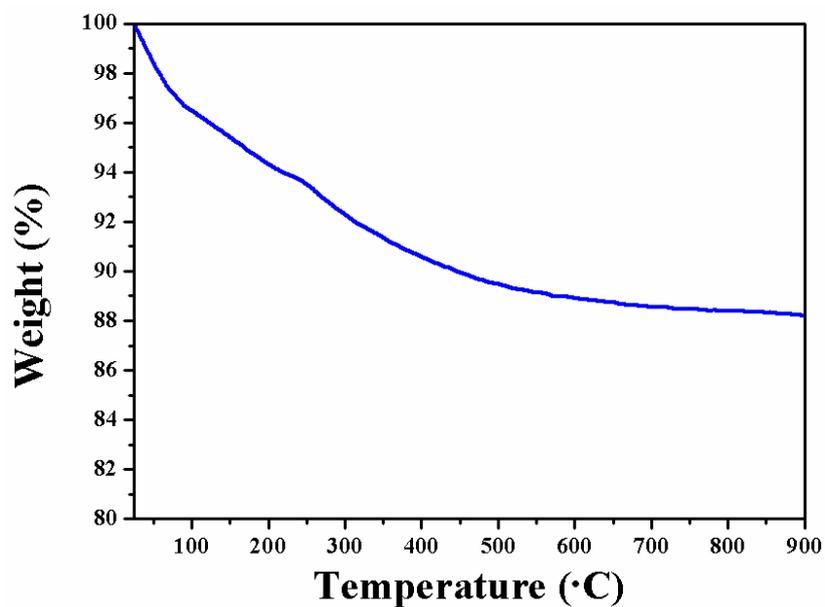


Fig. S4 TG curve of the as-prepared sample (Sample-160).

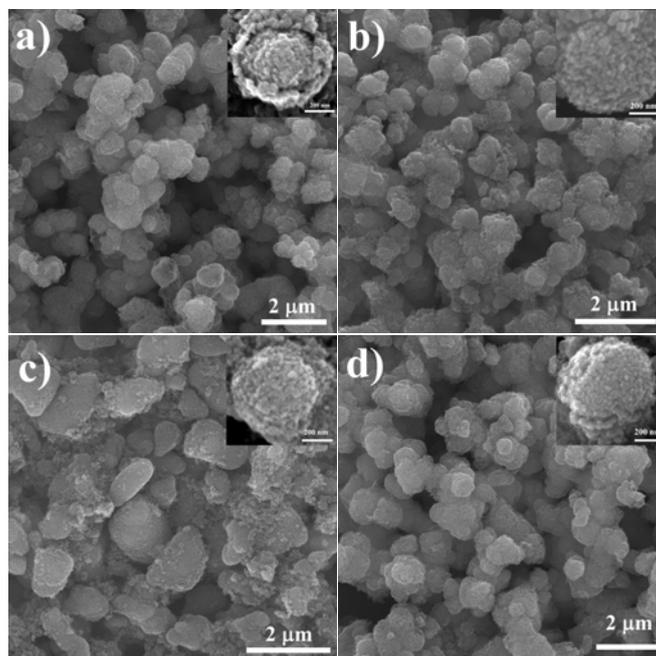


Fig. S5 FE-SEM images of hierarchical mesoporous yolk-shell TiO_2 beads prepared at different hydrothermal reaction temperatures for 12 h. (a) 100 °C; (b) 120 °C; (c) 140 °C and (d) 180 °C.

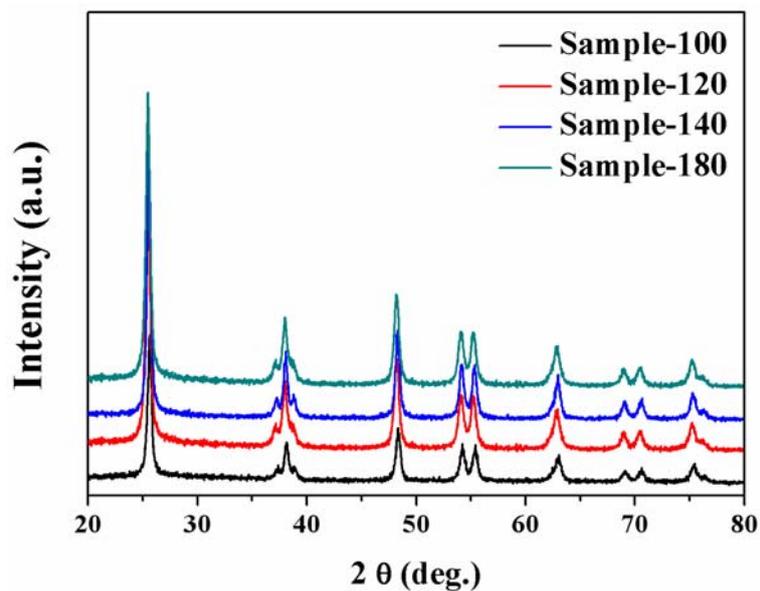


Fig. S6 XRD patterns of hierarchical yolk-shell TiO₂ beads prepared at different hydrothermal reaction temperatures for 12 h.

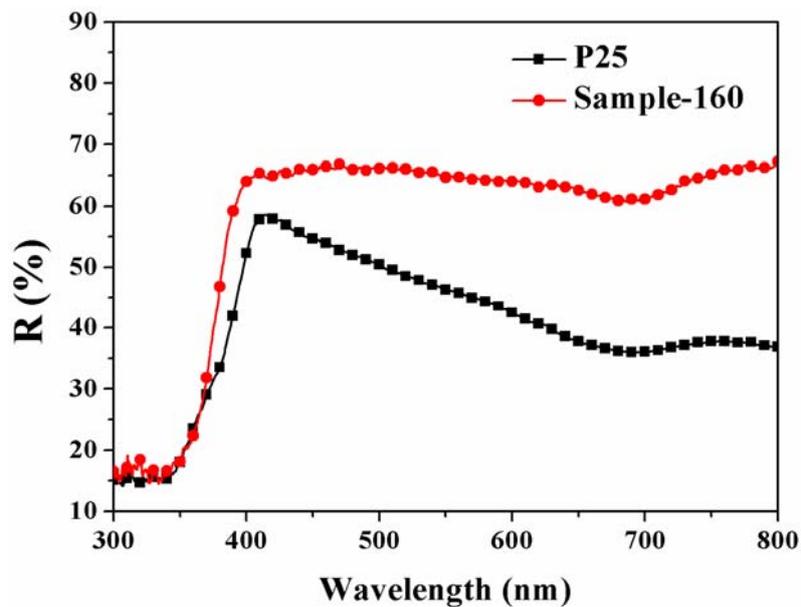


Fig. S7 Diffused reflectance spectra of Sample-160 and P25 films with similar thickness of around 15 μm .

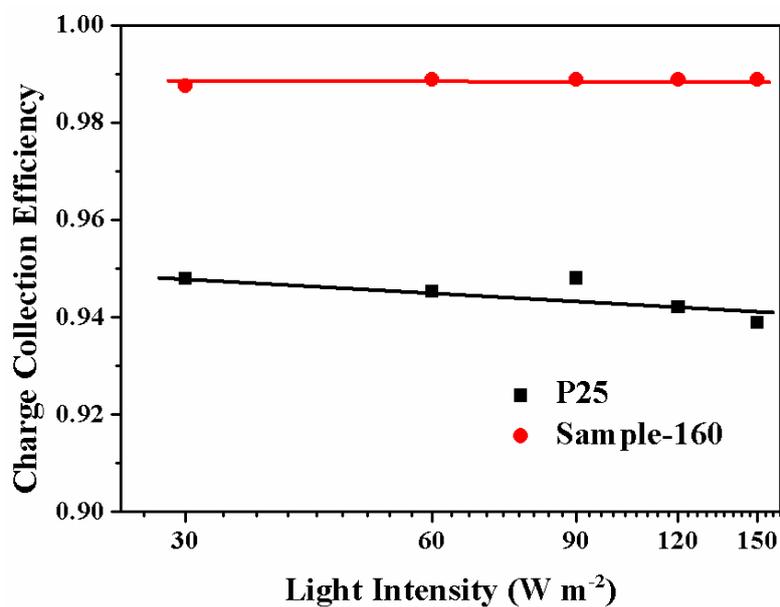


Fig. S8 Charge collection efficiencies measured at different light intensities for P25 and Sample-160 based DSSCs.

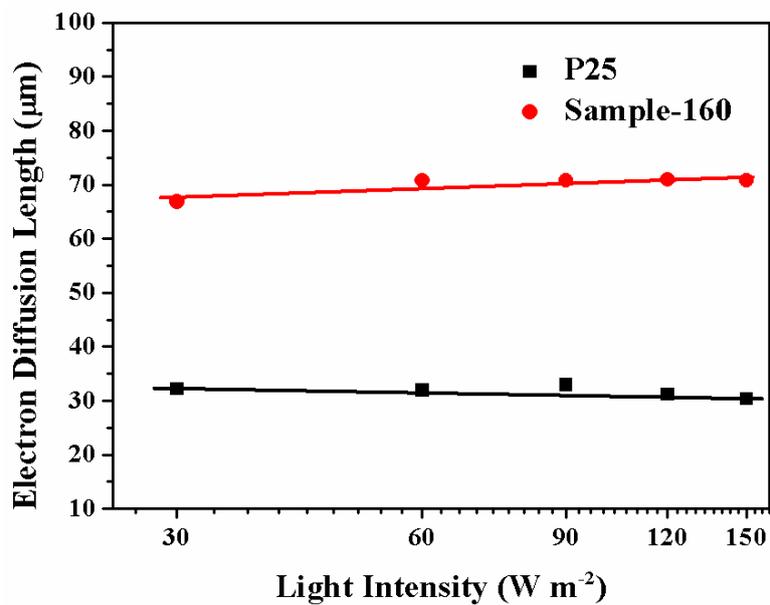


Fig. S9 Comparison of electron diffusion length at different light intensities for P25 and Sample-160 based cells.