Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Improved Efficiency of Dye Sensitized Solar Cells Using Hollow Sphere TiO_2 Hierarchical Structures as a Scattering Layer

Fujian Lv, Shengxiong Xiao*, Jian Zhu, Hexing Li *

Department of Chemistry, Key Laboratory of Resource Chemistry of Ministry of Education, Shanghai Normal University, Shanghai 200234, China, * Address correspondence: Fax: +(86)21-64322272; Tel: +(86)21-64321673; E-mail: Hexing-Li@shnu.edu.cn

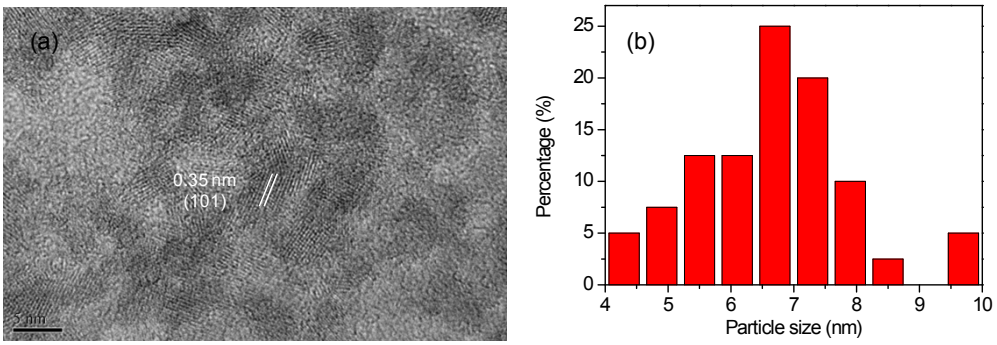

Fig. S1. (a) HRTEM image indicative of anatase TiO_2 lattice and (b) the particle size distribution pattern of the TiO_2 film deposited on the FTO substrate.

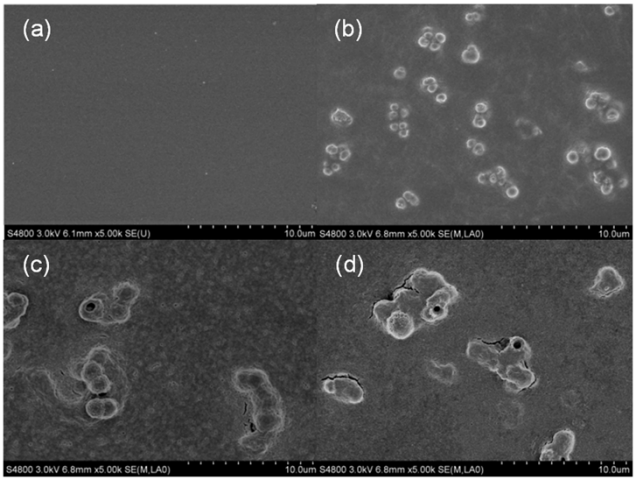

Fig. S2 FESEM images of TiO_2 anodes containing (a) pure TiO_2 film (TF-C) and TiO_2 film with scattering layers containing (b) solid TiO_2 microspheres (SP-C), (c) core-shell TiO_2 microspheres (CS-C), and (d) hollow TiO_2 microspheres (HS-C) covered by an outer-layer of TiO_2 film.

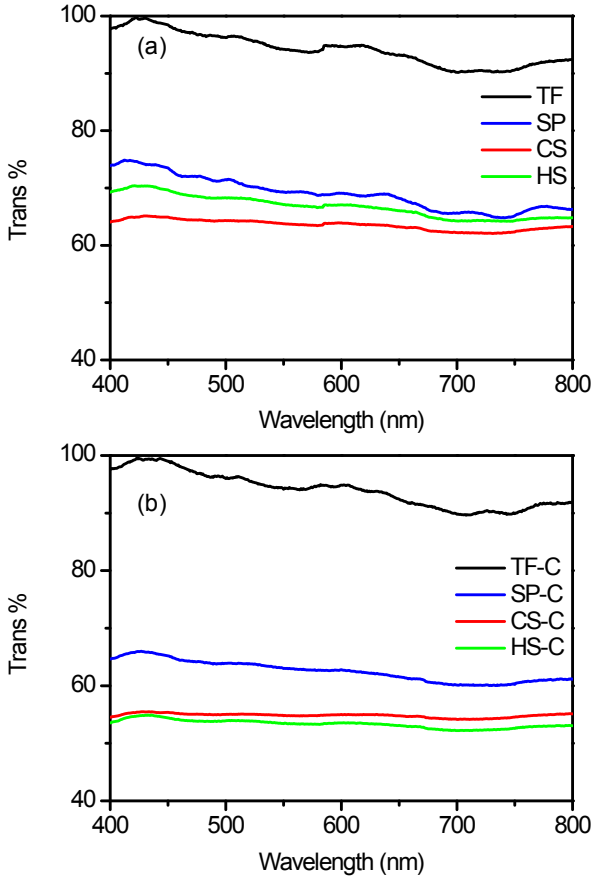

Fig. S3. Transmission spectra of films with different scattering layers before (a) and after (b) coating with an outer layer of TiO_2 film.

Table S1. Structural parameters of different TiO_2 samples.

Samples	S_{BET} ($m^2 \cdot g^{-1}$)	V_p ($cm^3 \cdot g^{-1}$)	D_P (nm)
TiO_2 nanoparticles	135	0.24	3.7
Solid TiO_2 microspheres	32	0.11	1.3
Core-shell TiO_2 microspheres	62	0.48	1.8
Hollow TiO_2 microsphere	51	0.30	2.3

Table S2. Thicknesses and the amounts of absorbed dye for DSSCs with different scattering layers encapsulated by an outer layer of the TiO_2 film.

Samples	Thickness (um)	Absorbed dye ($\times 10^{-8}$ mol/cm^2)
TF-C	3.94	9.33
SP-C	3.98	8.97
CS-C	4.11	8.89
HS-C	4.09	8.81