

SUPPPORTING INFORMATION

3D bicontinuous SnO₂/TiO₂ core/shell structures
for highly efficient organic dye-sensitized solar
cell electrodes

*Chang-Yeol Cho, Sujin Baek, Kiwon Kim and Jun Hyuk Moon**

Department of Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea,

Corresponding author, E-mail: junhyuk@sogang.ac.kr

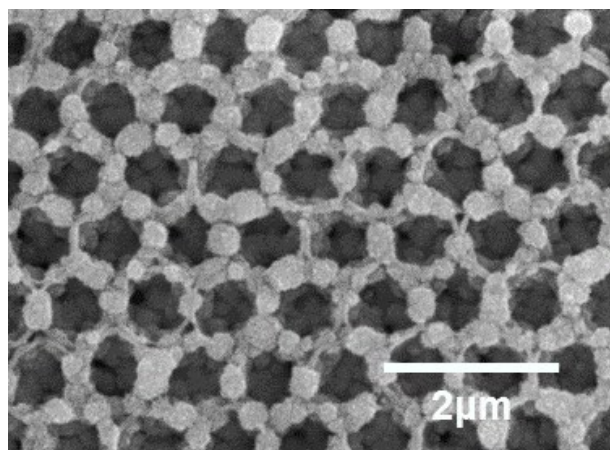


Figure S1. Surface SEM image of 3D connected $\text{TiO}_2/\text{TiO}_2$ structure. We deposited the TiO_2 shell on the TiO_2 core under the same precursor bath conditions but controlled the deposition time to obtain a similar adsorption density of the sensitizing dyes.

Table S1. Comparative list of conversion efficiencies of the SnO₂/TiO₂ DSSCs.

| Electrodes | Efficiency | Reference |
|---|------------|---|
| 3D Bicontinuous SnO ₂ /TiO ₂ | 8.21% | Our result |
| TiO ₂ -coated mesoporous SnO ₂ | 3.8 % | J. Phys. Chem. C 2010, 114, 22032 |
| TiO ₂ -coated SnO ₂ nanotubes | 11% | ACS Nano, 2011, 23, 2302 |
| TiO ₂ -coated Zn-doped SnO ₂ nanoflowers | 6.78 % | Chem. Mater. 2011, 23, 3938 |
| TiO ₂ -coated Ultrathin SnO ₂ Nanosheets | 2.82 % | Ind. Eng. Chem. Res. 2012, 51, 4247 |
| TiO ₂ -coated Mg-doped SnO ₂ | 4.15 % | ACS Appl. Mater. Interfaces 2012, 4, 6261 |
| TiO ₂ -coated SnO ₂ nanotubes | 3.53 % | J. Phys. Chem. C 2013, 117, 3232 |
| TiO ₂ nanosheets on SnO ₂ nanotubes dispersed in an organized mesoporous TiO ₂ film | 7.7 % | Adv. Mater. 2013, 25, 4893 |
| TiO ₂ nanosheets on SnO ₂ hollow spheres dispersed in an organized mesoporous TiO ₂ film | 8.2 % | Adv. Funct. Mater. 2014, 24, 5037 |

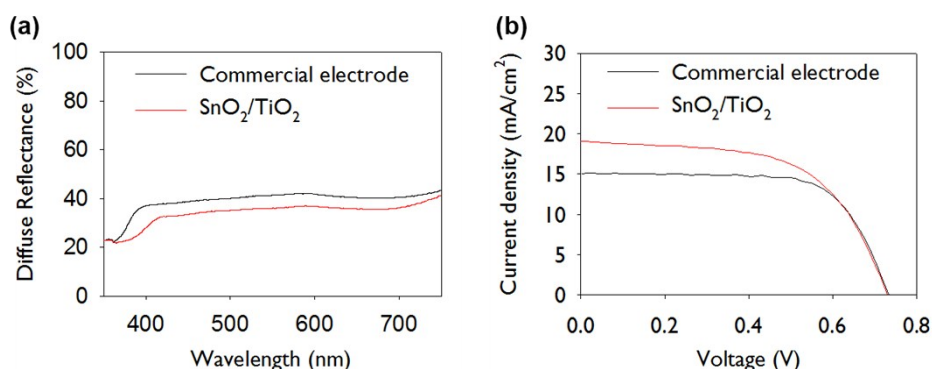


Figure S2. (a) Diffuse Reflectance spectra and (b) photocurrent density–voltage characteristics of SnO₂/TiO₂ and commercial electrodes. A commercial nanocrystalline TiO₂ electrode (Dyesol Inc.) with a scattering layer (JGC C&C Inc.) on top was prepared. The nanocrystalline electrode and scattering layer were each 5 μm in thickness. The average diffuse reflectance of SnO₂/TiO₂ electrode is comparable to that of the commercial electrodes. The amounts of dye adsorbed on the commercial and SnO₂/TiO₂ electrodes are approximately 0.08 and 0.11 μmol cm⁻². The *J*_{sc} of SnO₂/TiO₂ and commercial electrodes is 19.06 mA/cm² and 15.07 mA/cm², respectively. The *η* of SnO₂/TiO₂ and commercial electrodes is 8.21% and 7.63%, respectively. Considering the lower scattering property of and the lower dye adsorption density on the SnO₂/TiO₂ electrode as compared with those of the commercial electrode, we attribute the higher *J*_{sc} and efficiency of the former electrode to its enhanced charge-transport properties.