Electronic Supplementary Information

Photonic design of embedded dielectric scatterers for dye sensitized solar cells using full-wave optical simulation

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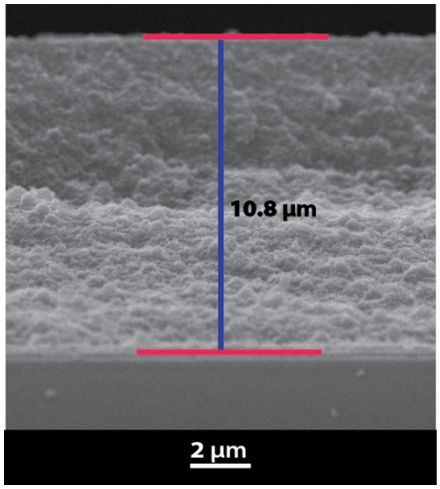

Fig S1. SEM cross-sectional images of TiO_2 film with the estimation of film thickness.

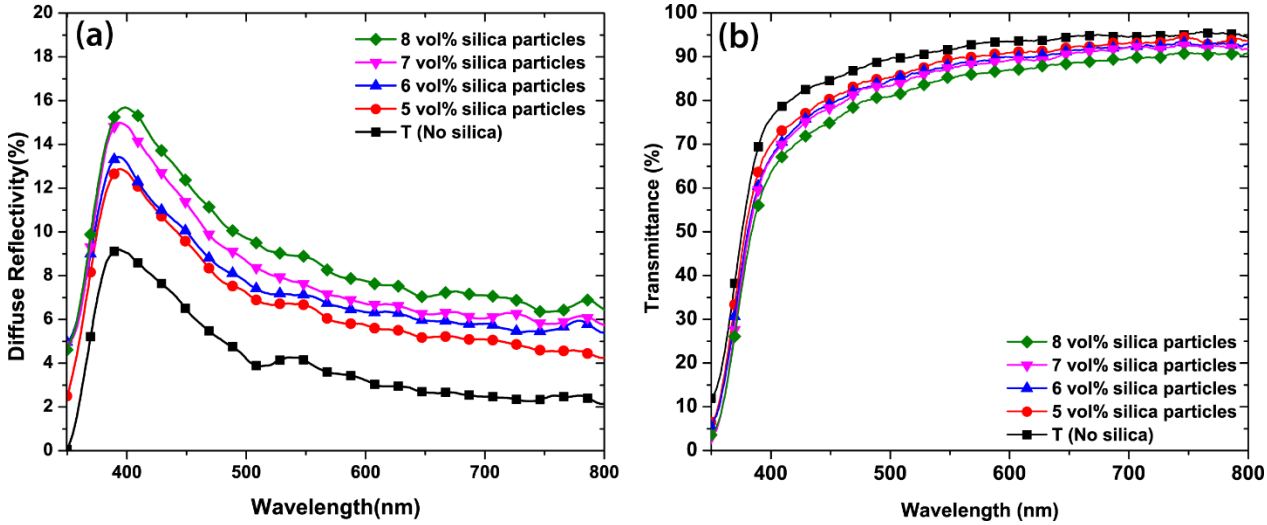

Fig S2. a) Diffuse reflectivity and b) Diffuse transmittance of screen printed layers of silica particles mixed in the TiO_2 paste.

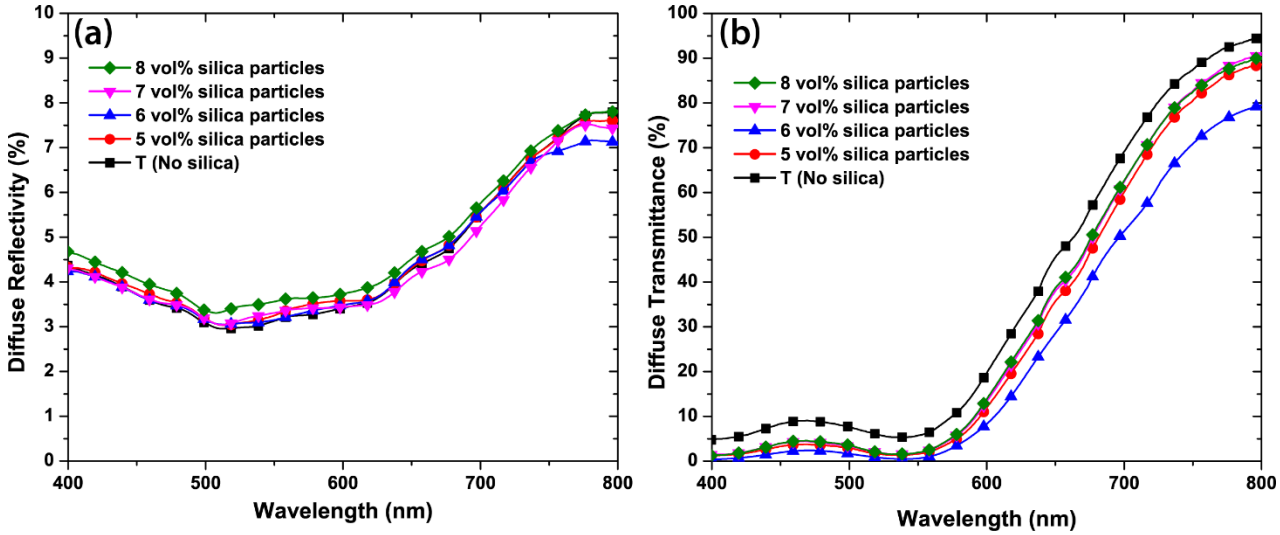

Fig S3. a) Diffuse reflectivity and b) diffuse transmittance of dye-sensitized layers.

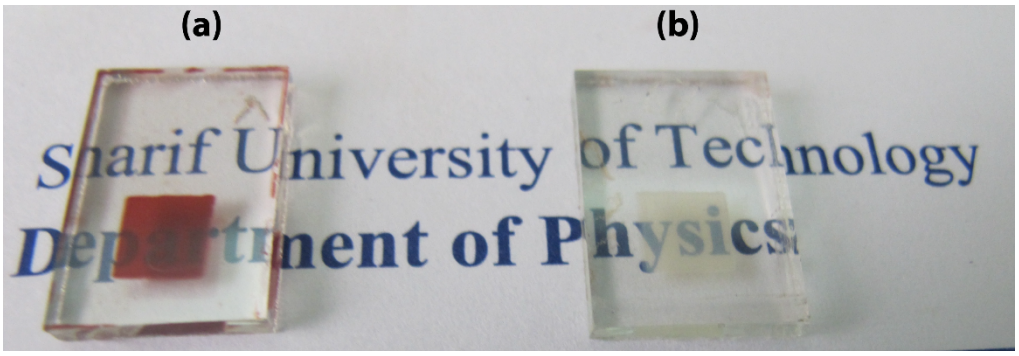

Fig S4. Digital photographs of films made from 6 vol% silica particles in the paste a) after and b) before dye loading.

Table S1. Number of dye adsorbed on the different samples. The values are measured by dye desorption using aqueous solution of 0.1 M NaOH and measurement of absorptivity of the dye in the solution.

Sample	Number of dye molecule(#/cm^2)*10^{15}	Roughness factor	Roughness factor [μm]
T (No silica)	16.5	992	94.5
5 vol% silica particles	15.7	942	89.8
6 vol% silica particles	15.5	931	88.7
7 vol% silica particles	15.3	923	87.9
8 vol% silica particles	15.2	910	86.7

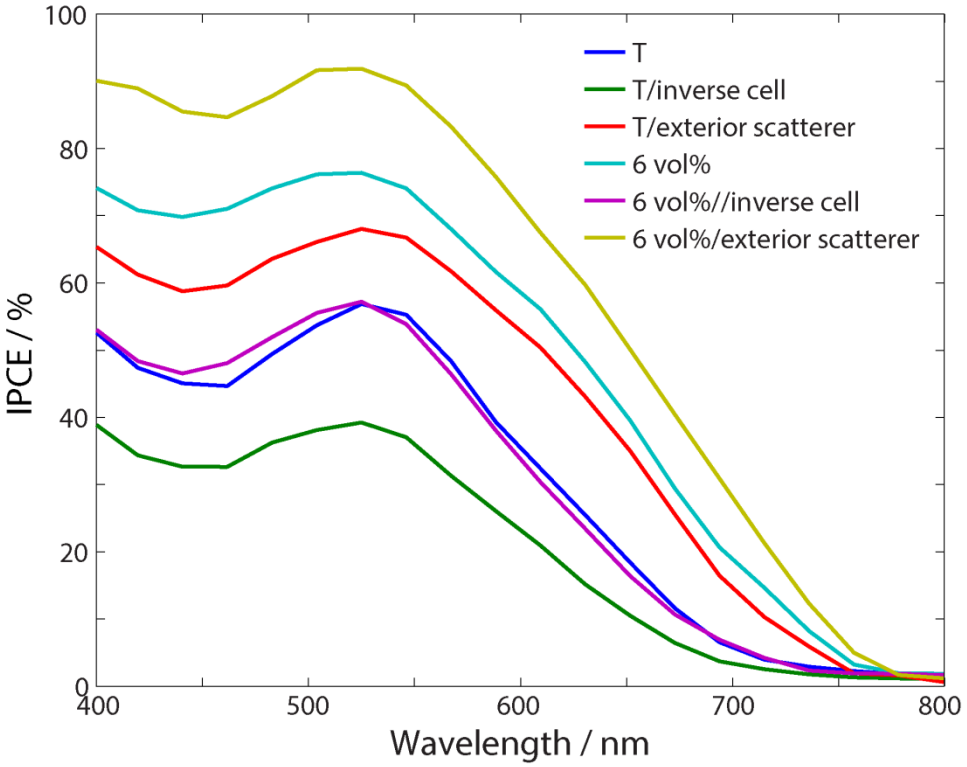

Fig S5. IPCE spectra of reference cell (T) and the cell with 6 vol % of spherical silica particles in normal and inverse illumination along with the case that a scattering layer is applied to the rear-side of the cathode.