

Supporting Information

Plasmonic dye-sensitized solar cells incorporated with Au-TiO₂ Nanostructures with tailored configuration

Yoon Hee Jang,^a Yu Jin Jang,^a Saji Thomas Kochuveedu,^a Myunghwan Byun,^c Zhiqun Lin,^b
and Dong Ha Kim^{*a}

^aDepartment of Chemistry, Global Top 5 Program, Ewha Womans University, 52, Ewhayeodae-gil, Seodaemun-gu, Seoul, 120-750, South Korea, ^bSchool of Material Science and Engineering, Georgia Institute of Technology, Atlanta, GA 30332, United State, ^cDepartment of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 01003, United State

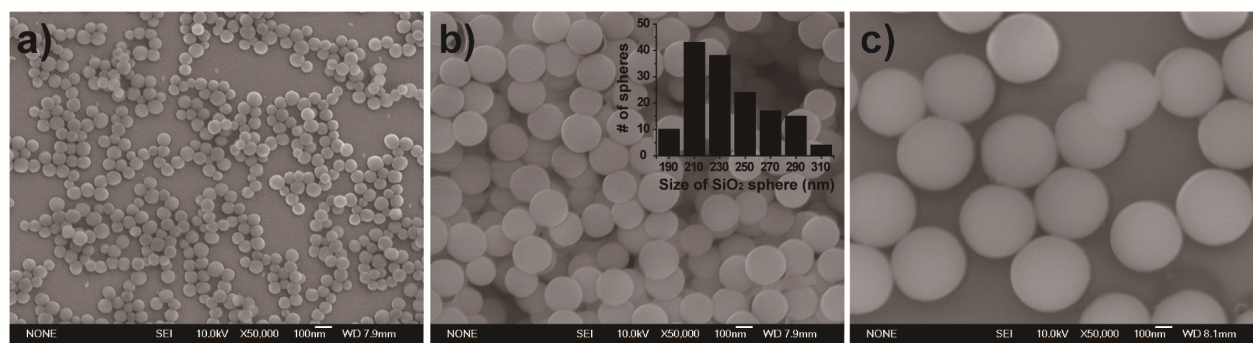


Fig. S1 SEM image of SiO₂ spheres with around a) 50 nm, b) 200 nm, and c) 400 nm size synthesized by modified Stöber method. Inset graph in b) is the size distribution of SiO₂ spheres.

	50 nm	200 nm	400 nm
Ethanol	100 mL	100 mL	100 mL
NH ₄ OH	0.05 mol	0.07 mol	0.16 mol
H ₂ O	2 mol	1 mol	1 mol
TEOS	0.028 mol	0.028 mol	0.028 mol

Table S1 A summary of synthetic conditions of SiO₂ spheres with various size.

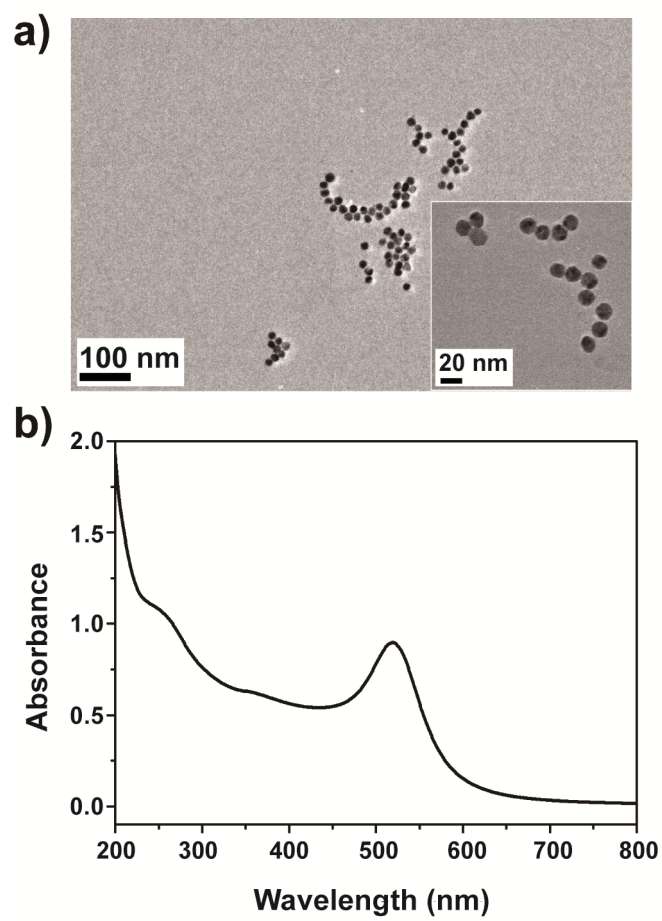


Fig. S2 a) SEM image of citrate-stabilized AuNPs with 15 nm size and b) UV-VIS absorption spectrum.

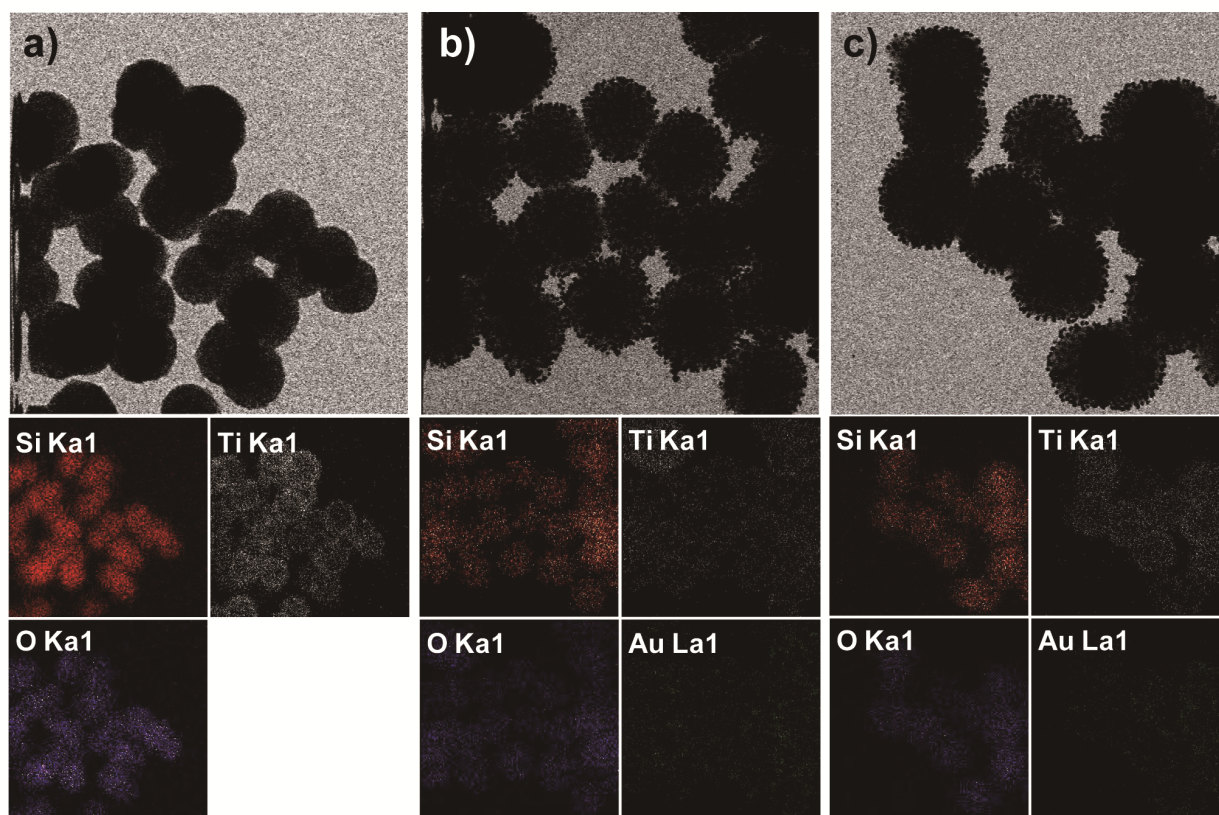


Fig. S3 Elementary mapping of a) $\text{SiO}_2@TiO_2$, b) $\text{SiO}_2@TiO_2@AuNP$, and c) $TiO_2@AuNP@TiO_2$ core-shell structures.

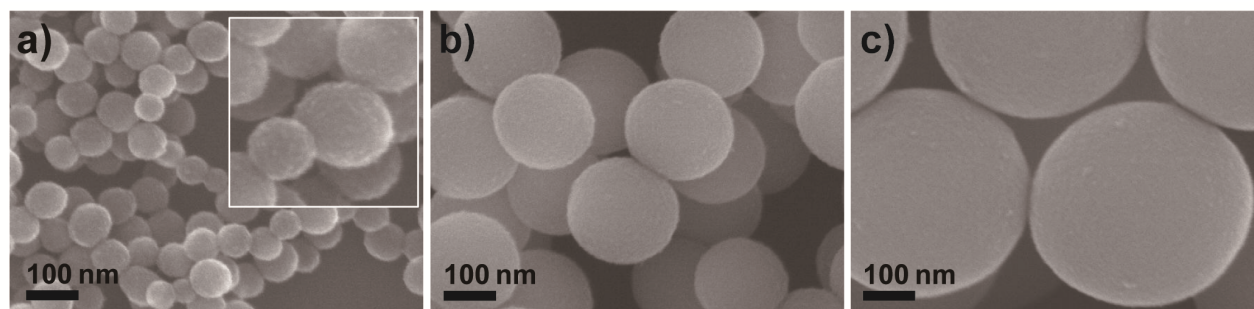


Fig. S4 SEM images of size controlled $\text{SiO}_2@ \text{TiO}_2$ core-shell structures: a) 50 nm, b) 200 nm, and c) 400 nm.

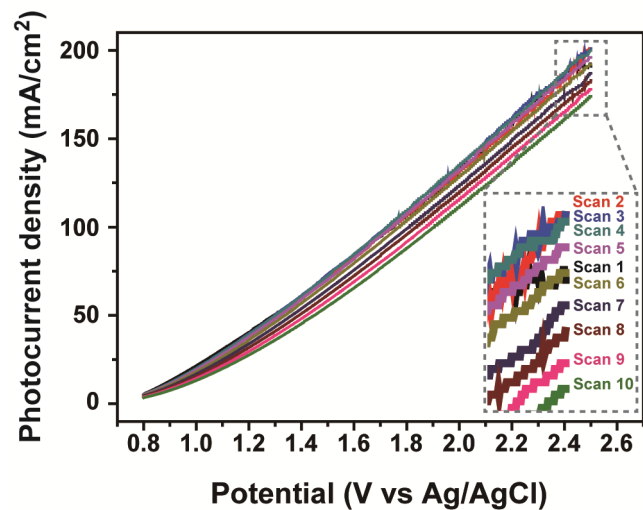


Fig. S5 Photocurrent versus potential characteristics (linear-sweep voltammetry, LSV curves) of SiO₂@TiO₂@AuNP-containing TiO₂ films in 0.1 M NaOH electrolyte under visible light illumination.

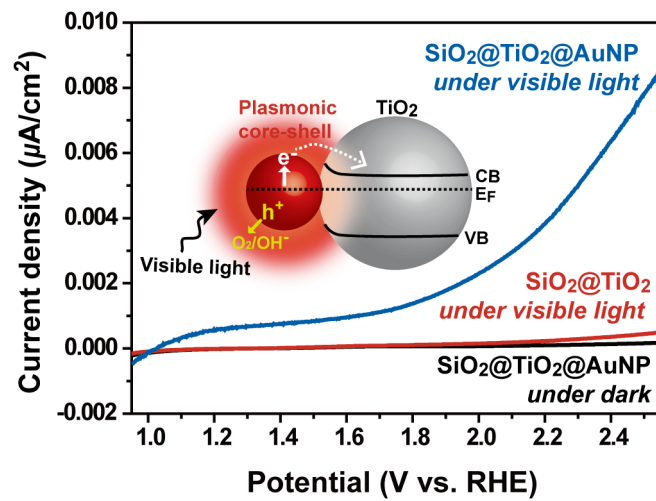


Fig. S6 Visible light-driven photo-oxidation of $\text{SiO}_2@\text{TiO}_2$ and $\text{SiO}_2@\text{TiO}_2@\text{AuNP}$ core-shell structures in 0.1 M NaOH electrolyte under visible light illumination (using a cut-off filter with a wavelength of 420 nm).

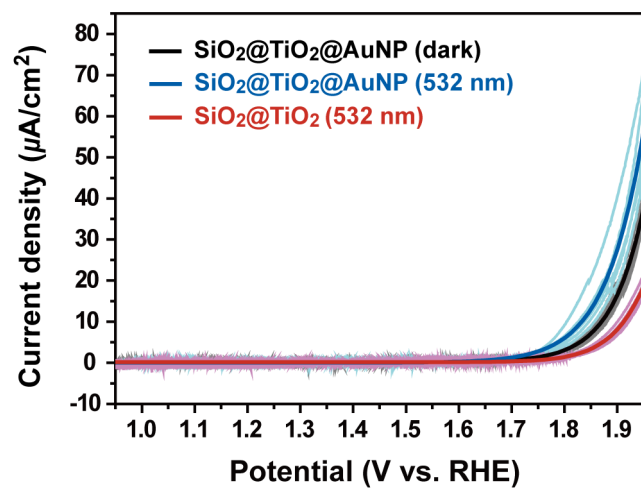


Fig. S7 Visible light-driven oxygen evolution of $\text{SiO}_2@\text{TiO}_2$ and $\text{SiO}_2@\text{TiO}_2@\text{AuNP}$ core-shell structures: cyclic voltammetry (CV) in oxygen-saturated 0.1 M KOH electrolyte with 532 nm, 10 mW laser illumination.