Electronic Supplementary Information for:

Hierarchical hollow TiO_2 spheres: facile synthesis and improved visible-light photocatalytic activity

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Experimental section

Characterization of HTS: The morphology of the HTS was tested by field-emission electron microscope (SU8020, Hitachi, Japan) and transmission electron microscope (JEM-2100, JEOL, Japan). The X-ray diffraction (XRD) pattern was recorded with a PANalytical X'Pert Pro X-ray diffractometer (PANalytical, Netherland) equipped with Cu-Ka radiation. Nitrogen adsorption-desorption isotherms were measured with a Micromeritics ASAP2000 V3.01 analyser. The Brunauer-Emmett-Teller (BET) specific area were calculated using the BET equation. The pore size distribution was obtained using the Barret-Joyner-Halenda (BJH) equation. UV-Vis diffuse reflectance spectra (DSR) was performed on a Hitachi U4100 spectrometer.

Photocatalytic activity: The visible light photocatalytic activity of the HTS were examined by degradation of azo-dye Rhodamine B (Rh.B) at room temperature in a custom made 100 mL reactor. A Xe lamp as a sunlight simulator was placed beside the reactor as light source with a glass optical filter inserted to cut off the short wavelength components (λ<400). 0.05 g HTS was added into 50 mL Rh.B solution (5 mg/L) in the reactor and magnetically stirred in the dark at a speed of 800 rpm for 1 h to ensure the adsorption equilibrium and eliminate the diffusion effects. Then, the mixture solution was irradiated. Samples were taken at an interval of 30 min, filtered through a 0.2 um cellulose acetate membrane and detected by UV-Vis spectroscope (Hitachi U4100, Japan). The vis-photocatalytic activity of DeGussa P25 was performed according to the same protocol as for HTS.

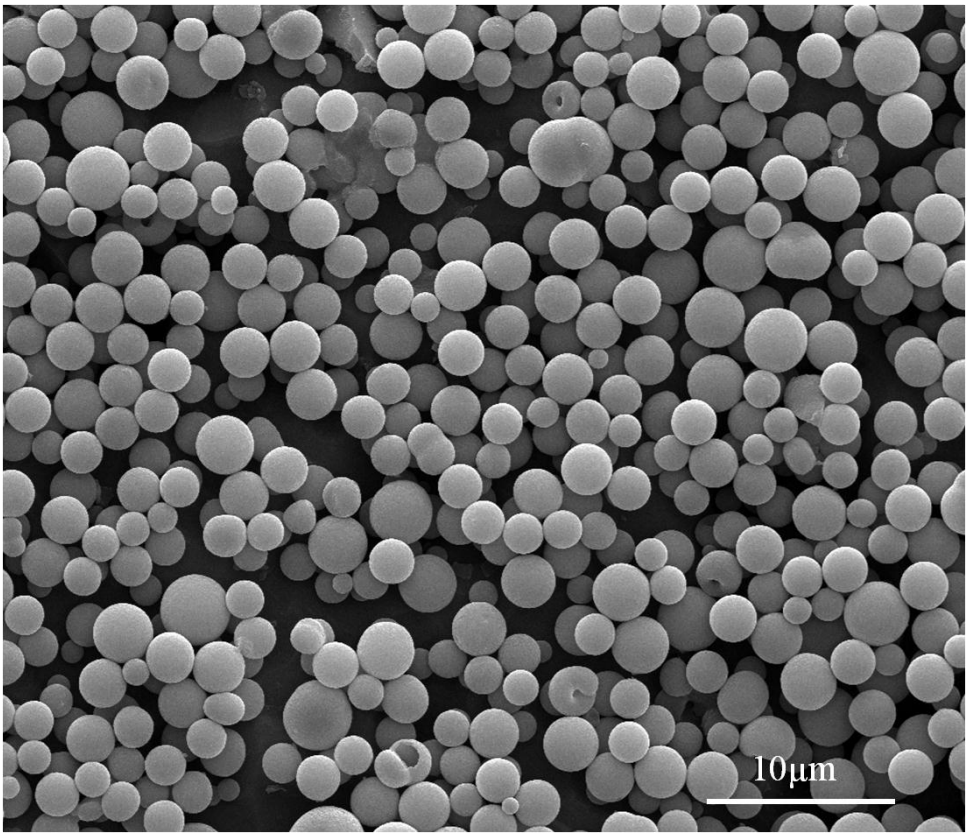

Fig. S1 SEM image of the HTS.

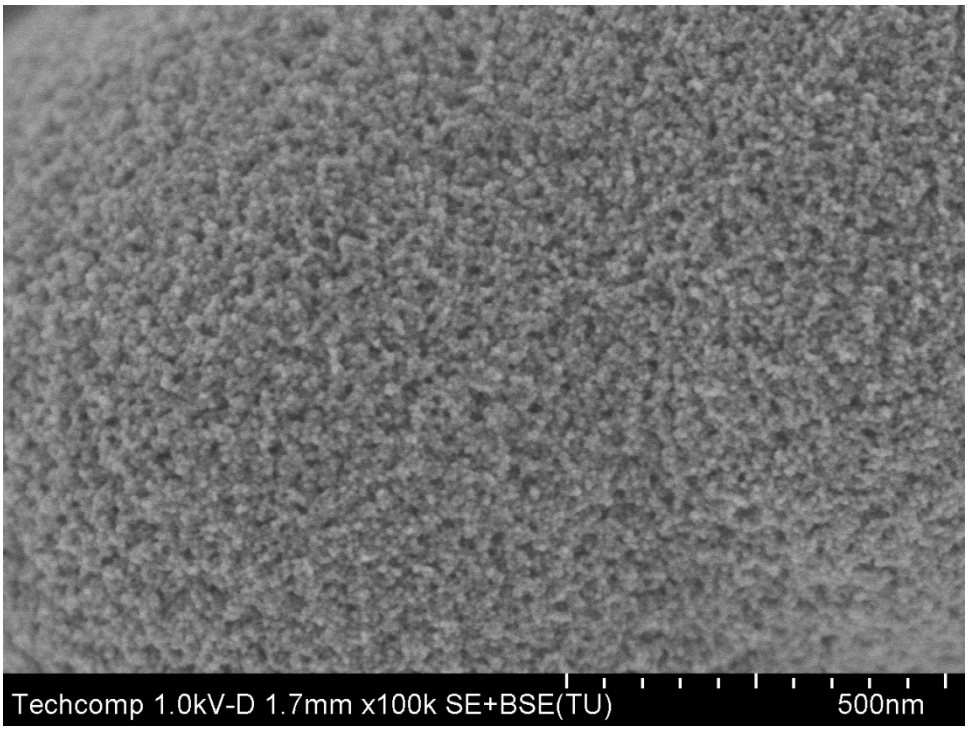

Fig. S2 HRSEM image of the enlarged surface of HTS.

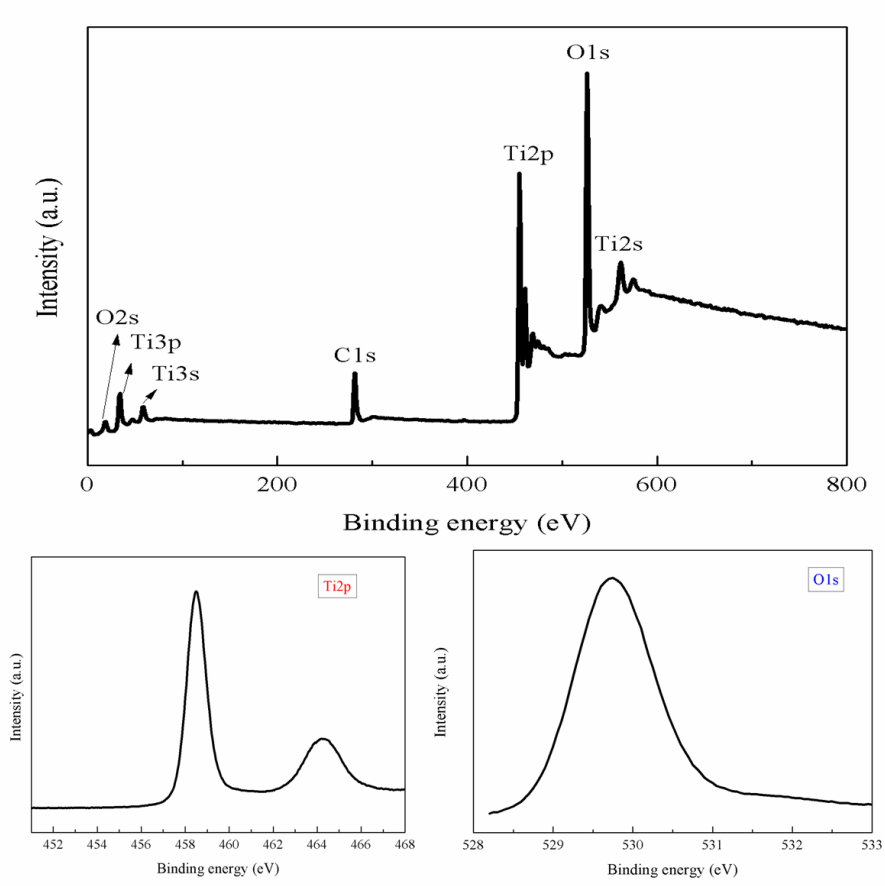

Fig. S3 XPS spectra of the HTS and the high resolution characteristic peaks of Ti2p and O1s.

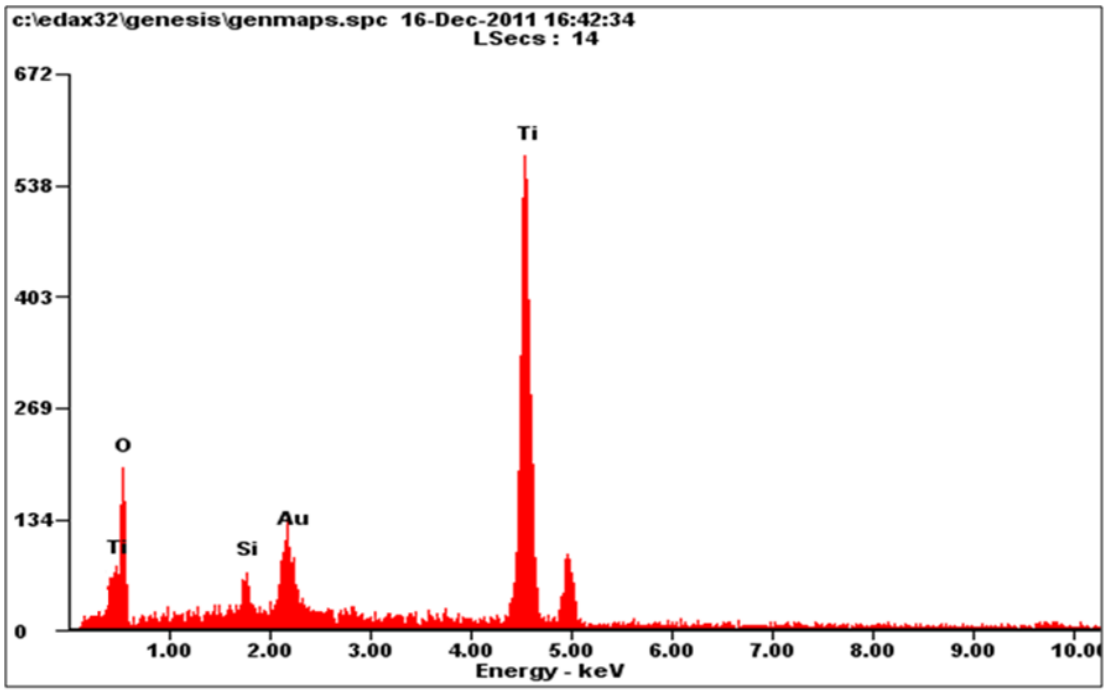

Fig. S4 EDX spectrum of the prepared HTS. (Si is from the monocrystalline silicon supporter, Au is from the golden vaccum sputtered as conductive coating).

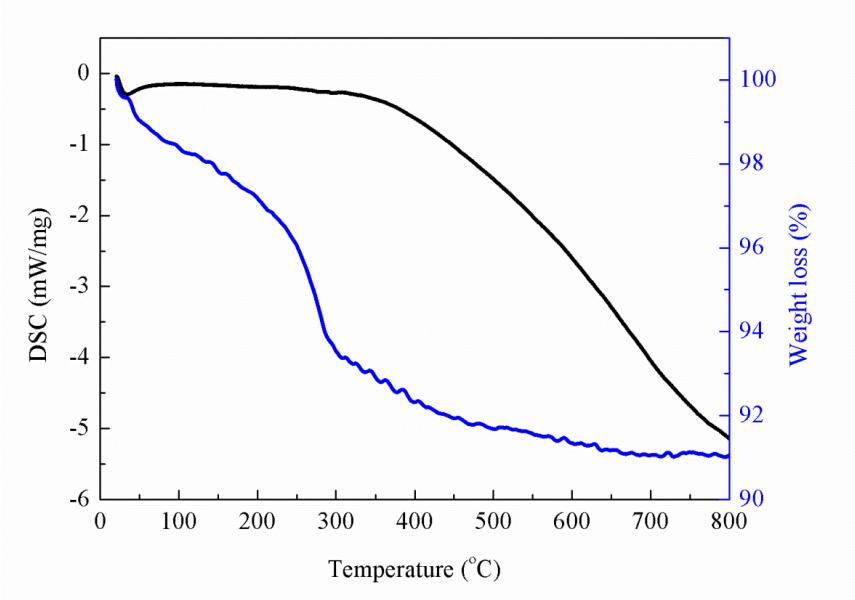

Fig. S5 TG-DSC curves of the HTS.

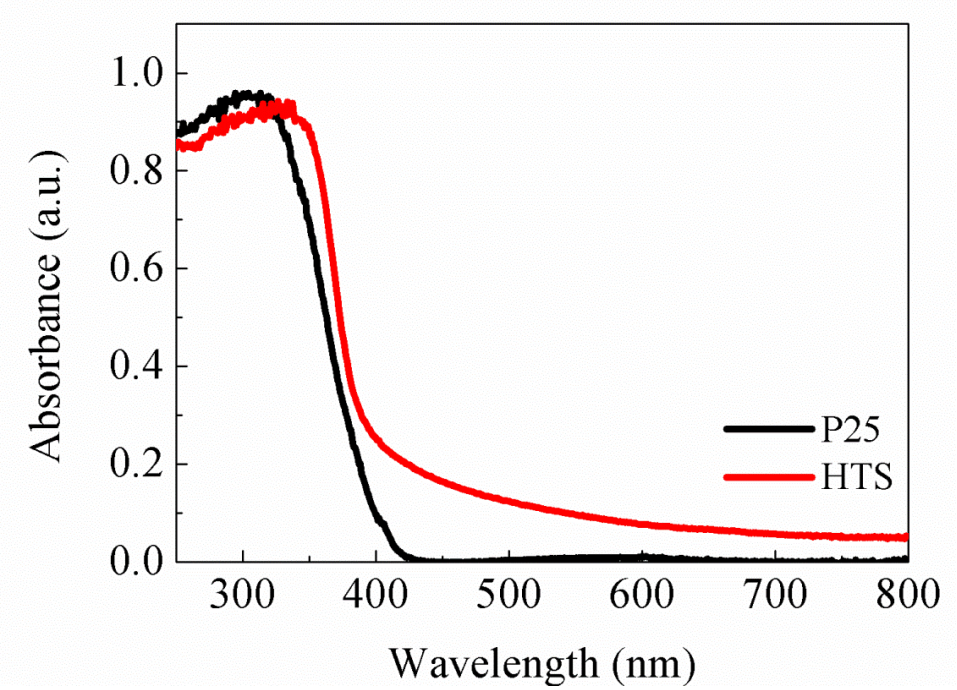

Fig. S6 UV-Vis DRS of the HTS and P25.

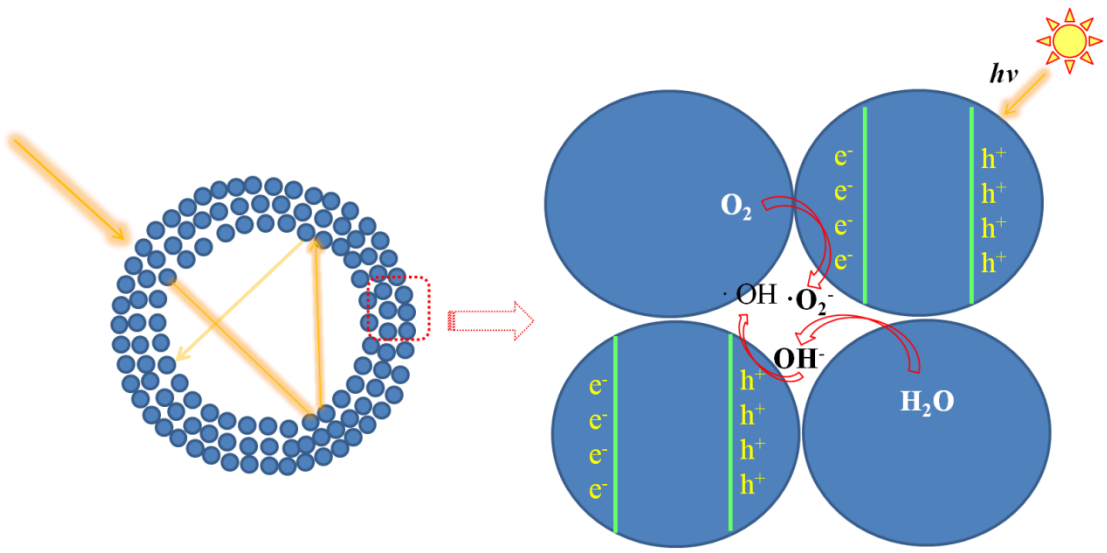

Fig. S7 Scheme of the photocatalytic process of the HTS under visible light irradiation.