Supporting Information

In Situ Doping of Pt Active Sites via Sn in Double-Shelled TiO_2 Hollow Nanospheres with Enhanced Photocatalytic H_2 Production Efficiency

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Photocatalytic MB degradation

40 mg of the as-synthesized photocatalyst was added into 100 mL of 3.12×10^{-5} mol L^{-1} MB solution. A 500 W xenon lamp equipped with an ultraviolet cutoff filter with $\lambda \geq 420$ nm was used as the visible-light source. The solution was stirred for 30 min in dark to reach an adsorption–desorption equilibrium before irradiation. Subsequently, the aforementioned mixture was irradiated in a photochemical chamber under continuous stirring. At certain time intervals, 3 mL solution was drawn out and centrifuged to obtain clear liquid. The quantitative determination of MB was

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performed by measuring the intensity of its absorption peak with a UV-vis spectrophotometer.

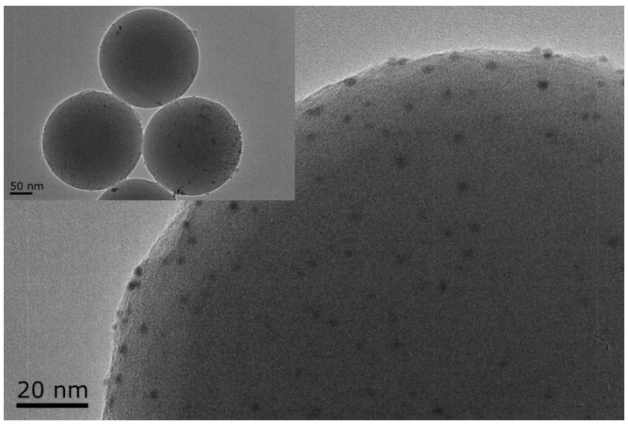

Fig. S1 TEM image of SiO_2/Pt. The Pt NPs were immobilized on silica spheres via the electrostatic interaction between Pt NPs and amino-functionalized silica spheres.

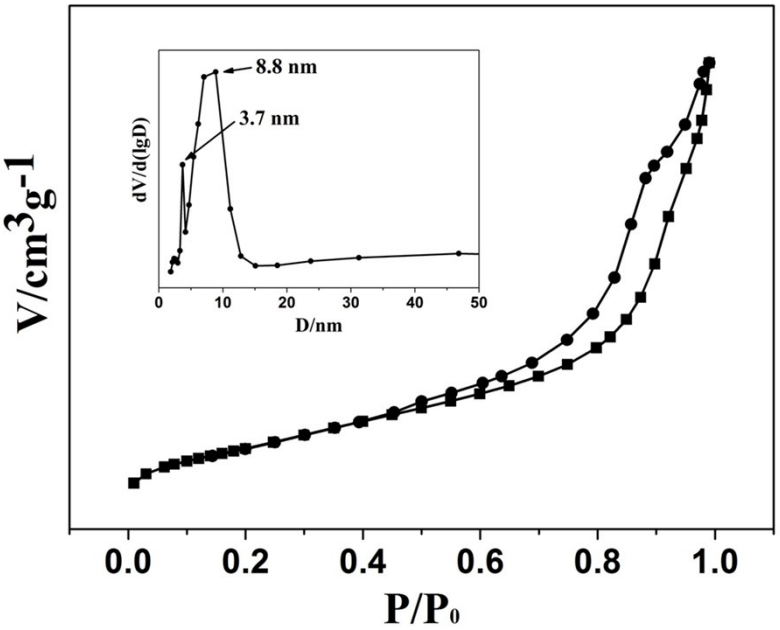

Fig. S2 Nitrogen adsorption-desorption isotherms of DHS, the inset is BJH pore-size distribution.

Table 1. Comparison of H_2 production over hollow photocatalysts

Photocatalyst	Light powder	H_2 production rate ($\mu mol\ h^{-1}\ g^{-1}$)	The multiple of H_2 production rate
DHS-SnPt (This work)	Solar light 150 W	6165	1
TiO_2/CdS[1]	Visible light	996	6.2
Bi-doped ZnS hollow spheres[2]	UV light 350 W	1030	6
$(CuIn)_xZn_{2(1-x)}S_2$[3]	Visible light 300W	360	17.1
$Cd_{1-x}Zn_xS/MoS_2$/graphene[4]	Visible light 300W	2950	2.1
R-PtNi/NiO@SiO_2[5]	Solar light 350 W	16675	0.37
Pt_1–Au_2/TiO_2[6]	Solar light 45 W	1228	5
TiO_2−ZrO_2 hollow spheres	Solar light 300 W	30	205
$Au_{0.25}/Pt_{0.75}/TiO_2$ [7]	Solar light 300W	2331	2.6

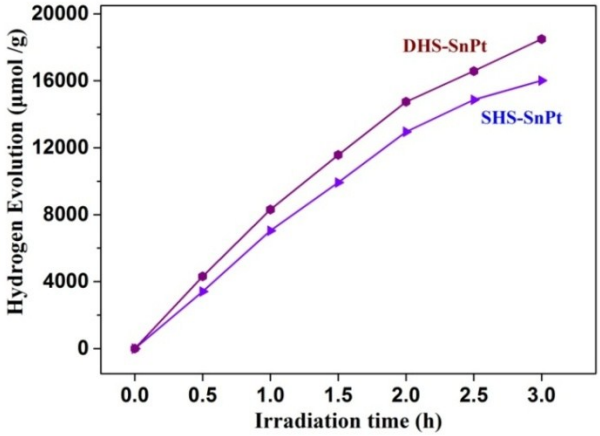

Fig. S3 Photocatalytic H_2 evolution in the presence of DHS-SnPt and SHS-SnPt. The molar ratios of Sn to Pt in all the samples was about 1.7.

Notes and references

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