Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supporting Information

Spatially separated bimetallic cocatalysts over hollow-structured TiO_2 for photocatalytic hydrogen generation

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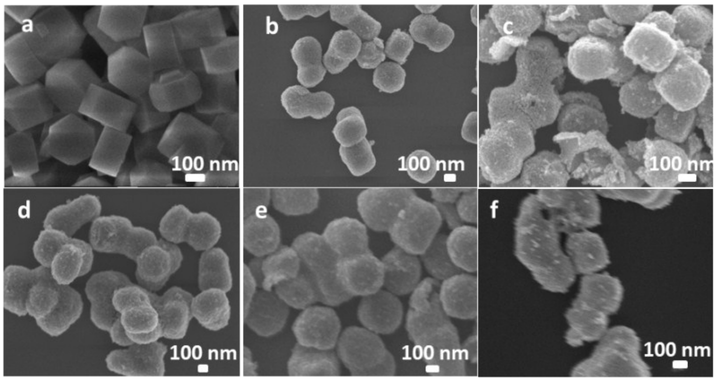

Fig. S1. SEM images of S1 (a)， S1@TiO_2 (b)， hollow TiO_2 (c), Pd@S1@TiO_2 (d), Pd@TiO_2 (e) and Pd@TiO_2@Au (f) in low magnification.

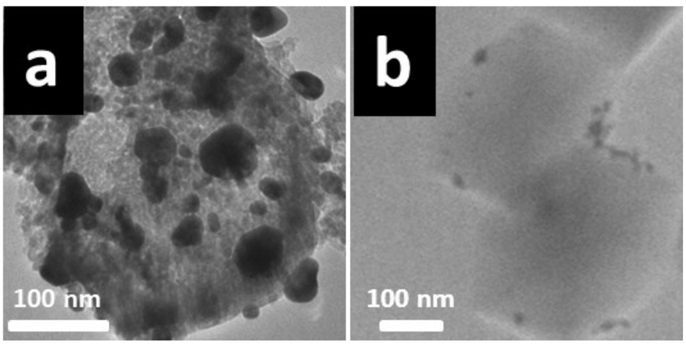

Fig. S2. TEM images of hollow TiO_2@Au (a) and Au-im/Pd@S1 (b).

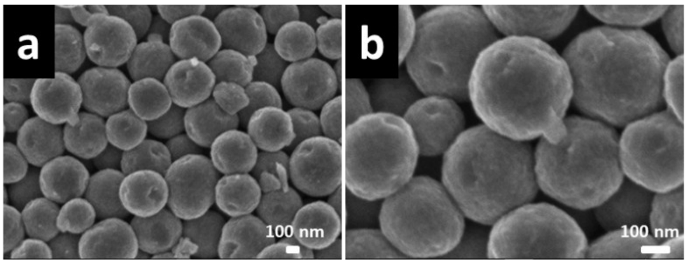

Fig. S3. SEM images of TiO_2 nanoparticles. (b) enlarged image of (a).

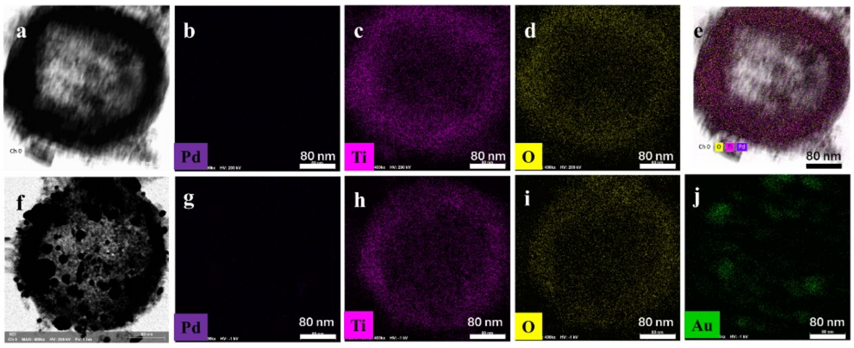

Fig. S4. Elemental mapping images of Pd@TiO_2 (a-e) and sandwiched-like Pd@TiO_2@Au (f-j)

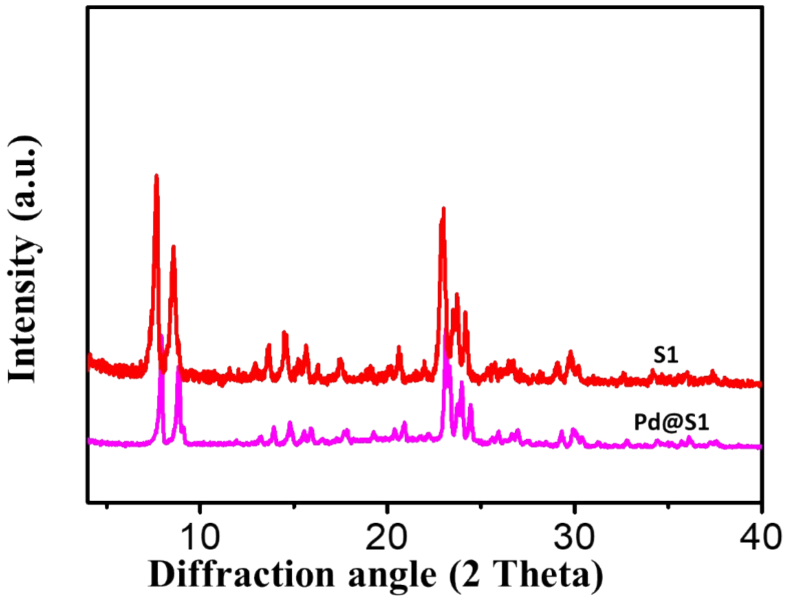

Fig. S5. XRD profiles of S1 andPd@S1.

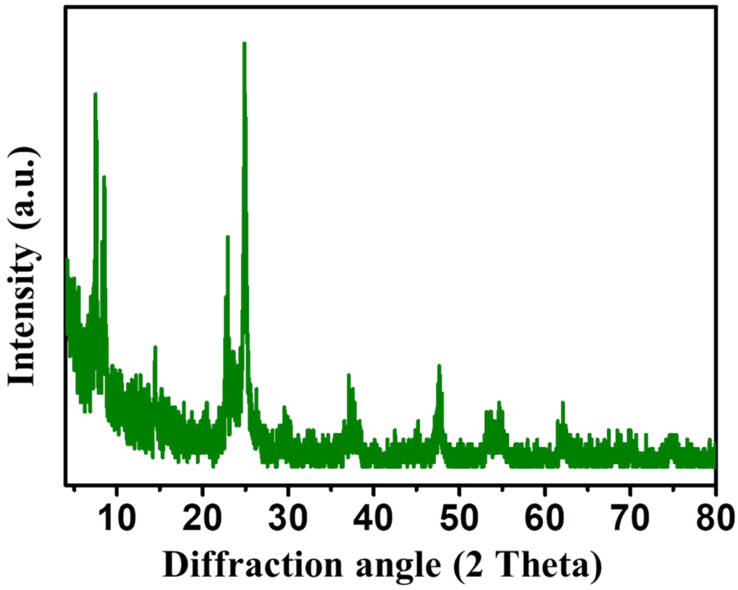

Fig. S6. XRD profiles of Pd@S1@TiO_2.

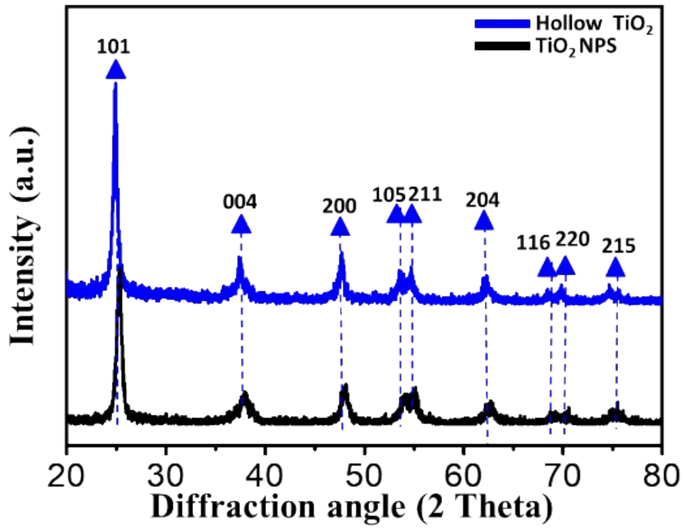

Fig. S7. XRD profiles of TiO_2 NPs and hollow TiO_2.

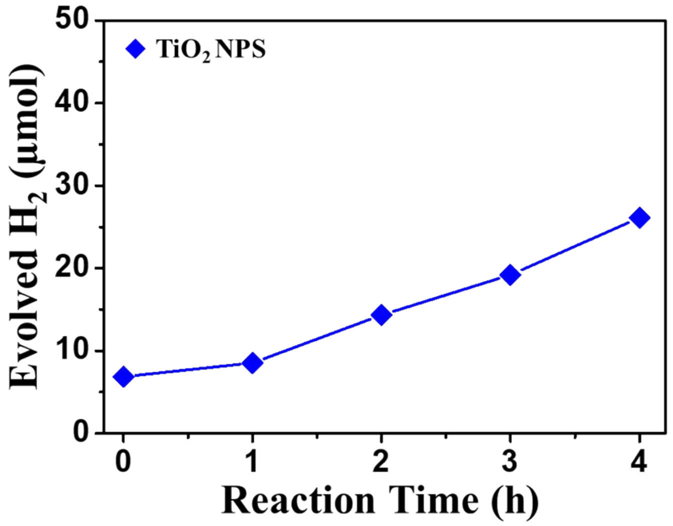

Fig. S8. Photocatalytic H_2 evolution by TiO_2 NP_S.

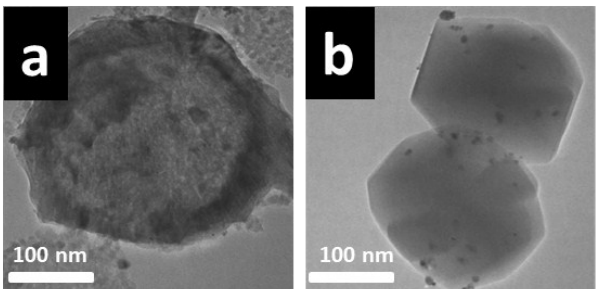

Fig. S9. TEM images of hollow TiO_2@Pt (a) and Pt-im/Pd@S1 (b).

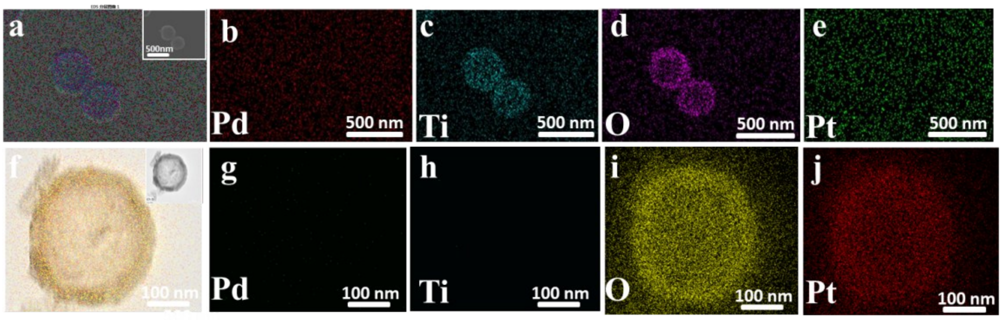

Fig. S10. Elemental mapping images of Pd@TiO_2@Pt: (a) and (f) the corresponding mixed elemental mapping of SEM and TEM images. The insets are the corresponding SEM and TEM images； (b, g) Pd mapping images; (c, h) Ti mapping images; (d, i) O mapping images; (e, j) Pt mapping images.

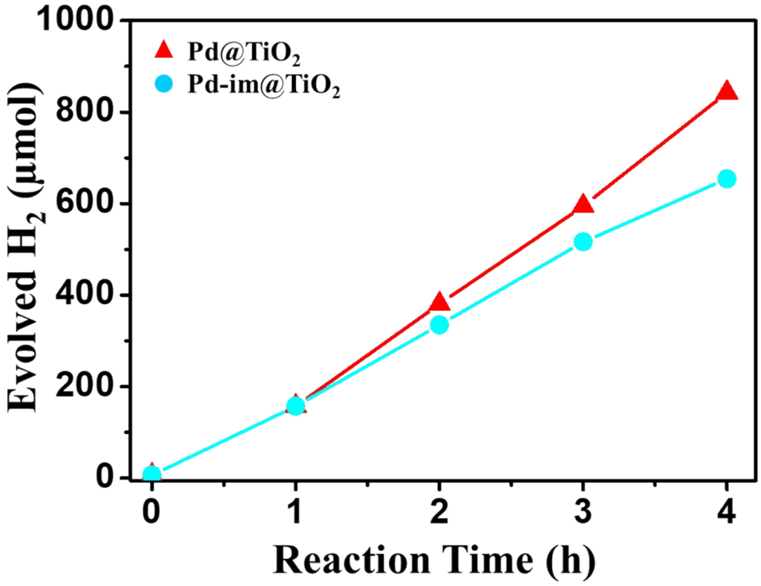

Fig. S11. Photocatalytic H_2 generation over Pd@TiO_2 and Pd-im@TiO_2.

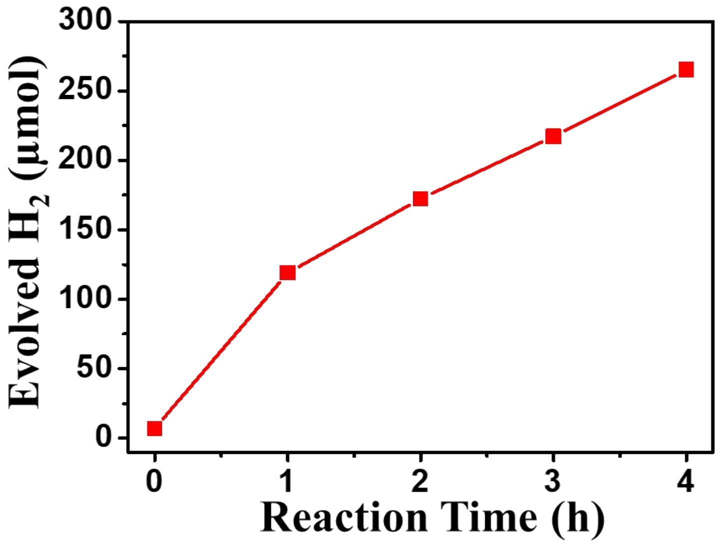

Fig. S12. Time courses of H_2 generation over Pd@TiO_2@Au catalyst. Catalytic condition: catalysts: (10 mg), light source: Xenon lamp (300W) with a bandpass filter (λ =380 nm).

Table S1. Summary of the photocatalytic hydrogen generation properties of TiO_2 based photocatalysts reported in this work and recent literature works.

Photocatalyst	H_2 evolution rate ($\mu mol\ g^{-1}\ h^{-1}$)	Photocatalytic condition (irradiation range, sacrificial reagent, light source)	Ref.
$Pd@TiO_2@Au$	**27231**	**(λ=200-1100 nm, methanol, 250 mW/cm^2)**	**This work**
$Pd@TiO_2@Pt$	**64859**	**(λ =200-1100 nm, methanol, 250 mW/cm^2)**	**This work**
$RuO_2@TiO_2@Pt$	4100	(λ = 365 nm, methanol)	[S1]
$Au@TiO_2$	4900	(λ =200-1100 nm, methanol, 300 W Xe-lamp)	[S2]
$Fe_2O_3/TiO_2/Pt$	625	(λ > 420 nm, triethylamine, 450 W Xe-lamp)	[S3]
Janus Au-TiO_2	2.0 mL min^{-1}	(λ > 400 nm, isopropyl alcohol, 500 W tungsten halogen lamp)	[S4]
$CoO_x/TiO_2/Pt$	7883	(UV light, methanol, 300 W Xe lamp)	[S5]
Mg-TiO_2	666	(300-W xenon lamp, pure water)	[S6]
TiO_2-C_3N_4	770	(λ =200-2500 nm, triethanolamine,150 W Xe lamp)	[S7]
NiO/rGO/TiO_2	240	(300-W xenon lamp, methanol,100 mW/cm^2)	[S8]
Pt/TiO_2/rGO	1076	(A full spectrum solar simulator, triethanolamine, 1 sun power by CELS500)	[S9]

References

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