

supplementary data

Boosting visible-light-driven catalytic hydrogen evolution via surface Ti^{3+} and bulk oxygen vacancy in urchin-like hollow black TiO_2 decorated with RuO_2 and Pt dual Co-catalyst

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The following is Supplementary data to this article:

The SEM of sectioned $\text{RuO}_2/\text{TiO}_2/\text{Pt-B}$ (1: 0.6) sample; The EDS-mapping of $\text{RuO}_2/\text{TiO}_2/\text{Pt-B}$ (1: 0.6) sample; LSV curve; PL curve; BET of the as-prepared samples.

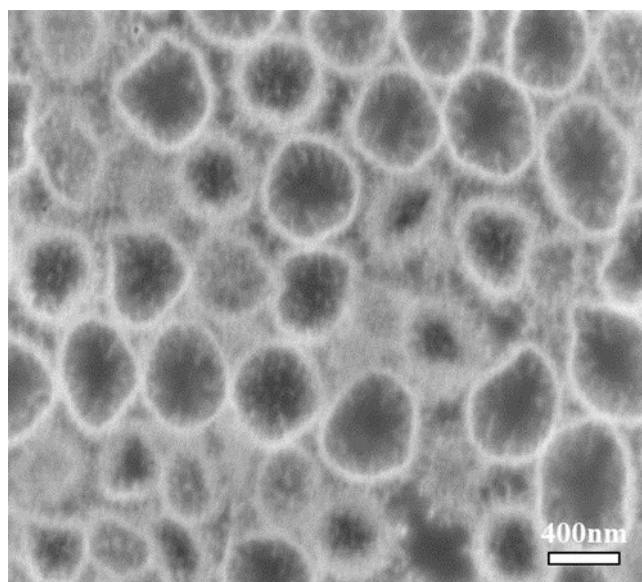


Fig S1: The SEM image of sectioned sample $\text{RuO}_2/\text{TiO}_2/\text{Pt-B}$ (1: 0.6).

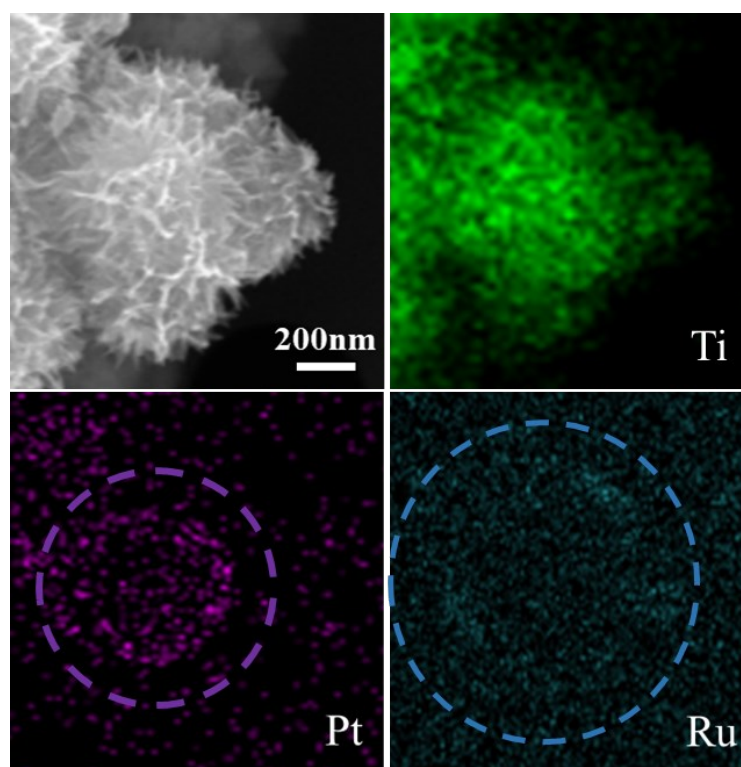


Fig S2: EDS-mapping image of the as-prepared RuO₂/TiO₂/Pt-B (1: 0.6) sample.

Ruthenium • Transition Metal

Primary XPS region: Ru3d

Overlapping regions: C1s

Binding energies of common chemical states:

Chemical state	Binding energy Ru3d5/2 / eV
Ru metal	280.2
RuO ₂	280.7

Oxide charge referenced to adventitious C1s peak at 284.8eV.

Fig S3: The Standard binding energy of the Ru metal and RuO₂ on the Ru3d.

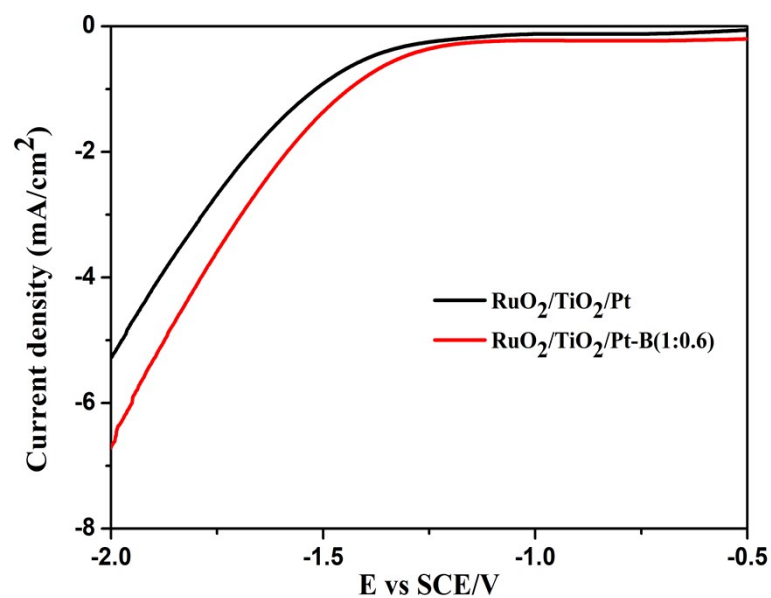


Fig S4: Linear sweep voltammetry (LSV) of the samples RuO₂/TiO₂/Pt and RuO₂/TiO₂/Pt-B (1: 0.6).

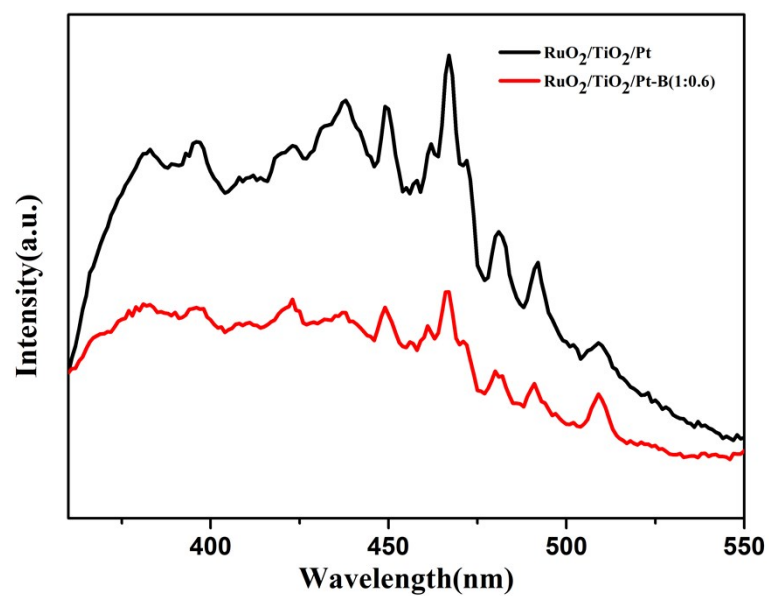


Fig S5: Photo-luminescent spectra (PL) of as-prepared samples RuO₂/TiO₂/Pt and RuO₂/TiO₂/Pt-B (1: 0.6).

Table.S1. BET of the as-prepared samples

Sample	RuO ₂ /TiO ₂ /Pt	RuO ₂ /TiO ₂ /Pt-B (1: 0.6)
S _{BET} (m ² /g)	140.974	119.243