

Nonaqueous synthesis of TiO₂-carbon hybrid nanomaterials with enhanced stable photocatalytic hydrogen production activity

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Figure S1. The emission spectra of Xe light source (CEL-HXF300, Beijing Aulight Co., Ltd.) with and without the 400 nm long wave pass filter.

Figure S2. XPS spectra of TiO₂ NS-C and TiO₂ NP-C: a) Ti 2p; b) O 1s; c) C 1s.

Figure S3. UV-vis absorption spectrum of as-prepared TiO₂ nanosheets in hexane.

Figure S4. The transient photocurrent responses of the PEC cells using TiO₂ NS-C, TiO₂ NP-C, TiO₂ NP and TiO₂ NS as working electrodes for three 50 seconds light-on-off cycles under an illumination of 10 mW·cm⁻².

Figure S5. Diffuse reflectance UV-visible spectra (a, c) and IR spectra (b, d) of TiO₂ NS-C (a, b) and TiO₂ NP-C (c, d) before and after photocatalysis.

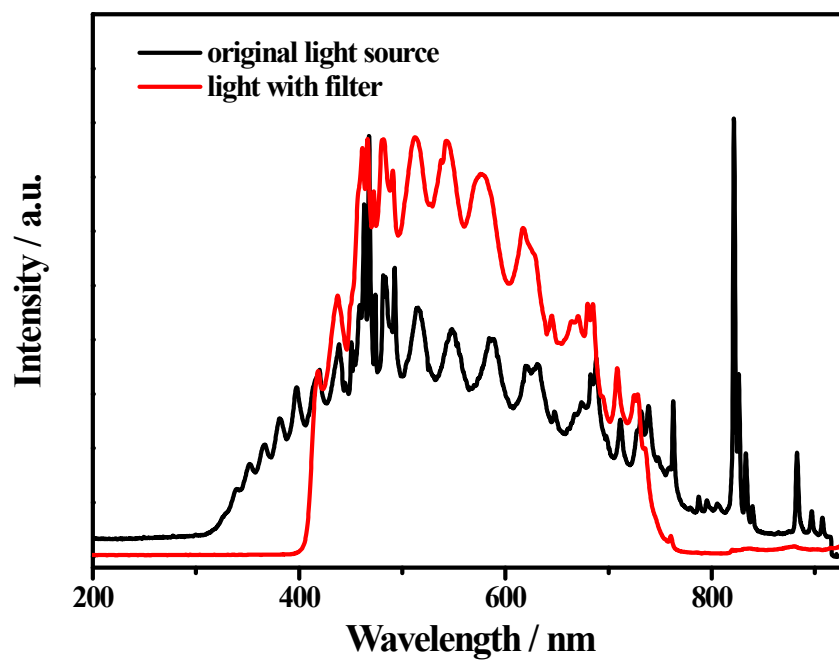


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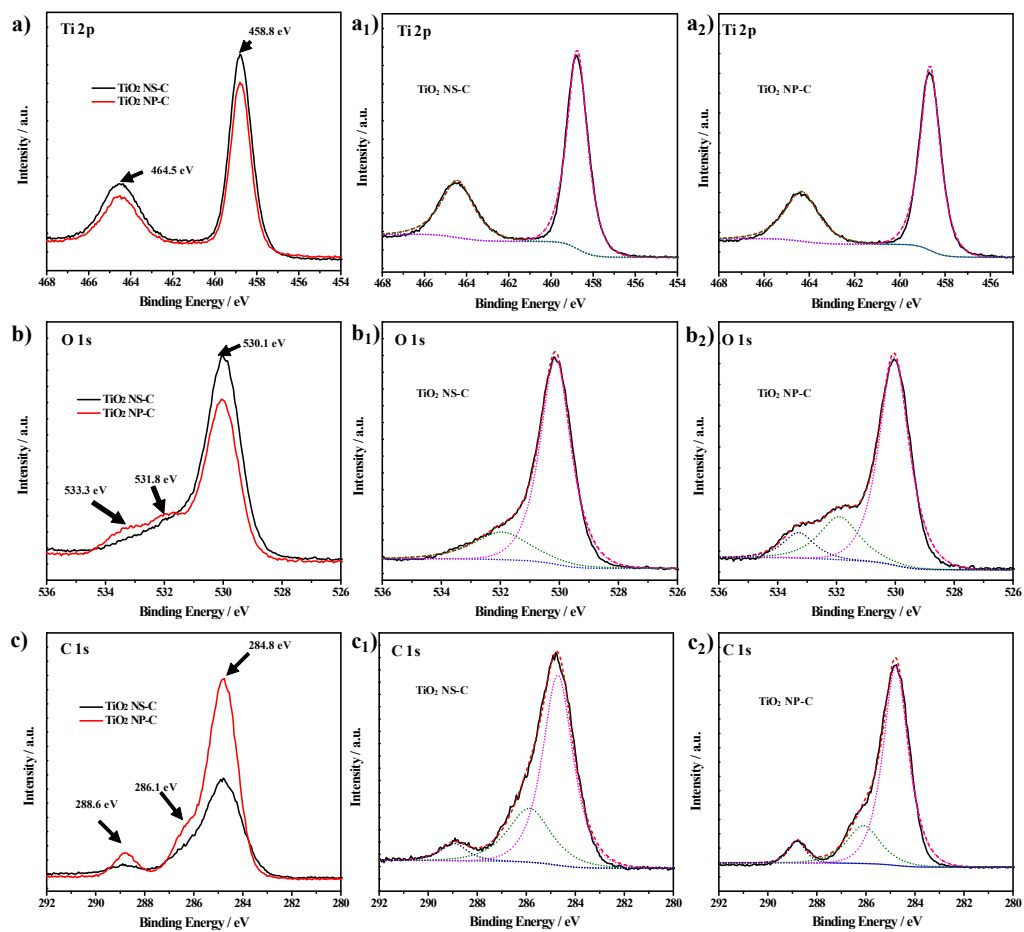


Figure S2. XPS spectra of TiO₂ NS-C and TiO₂ NP-C: a) Ti 2p; b) O 1s; c) C 1s.

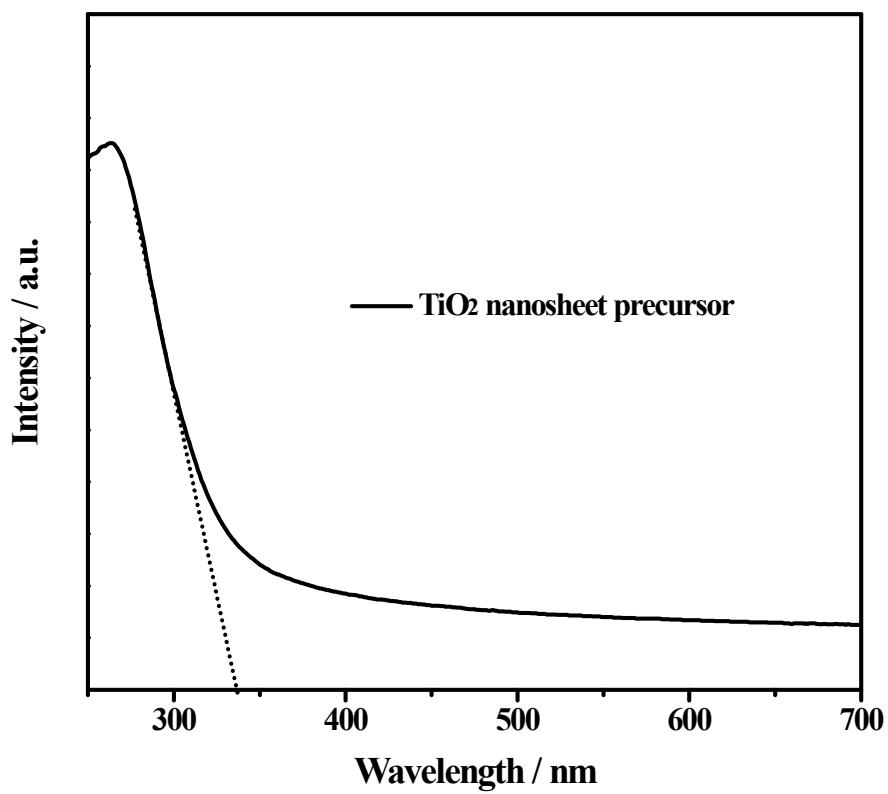


Figure S3. UV-vis absorption spectrum of as-prepared TiO₂ nanosheets in hexane. The bandgap energy is calculated to be 3.68 eV.

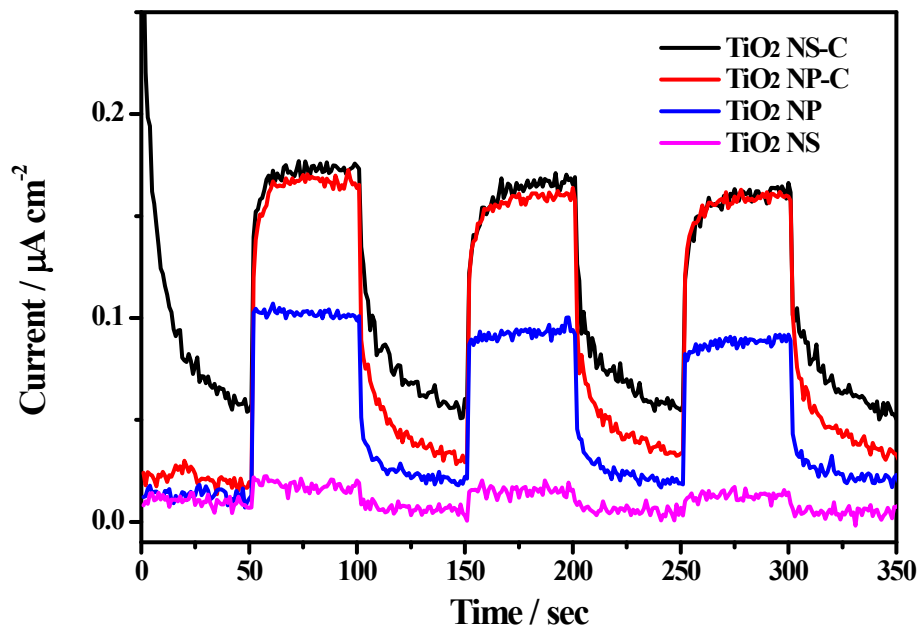


Figure S4. The transient photocurrent responses of the PEC cells using TiO_2 NS-C, TiO_2 NP-C, TiO_2 NP and TiO_2 NS as working electrodes for three 50 seconds light-on-off cycles under an illumination of $10 \text{ mW}\cdot\text{cm}^{-2}$.

Transient photocurrent response was performed on a Zennium electrochemical workstation (ZAHNER, Germany) in a standard three-electrode system with the as-prepared samples as the working electrodes with an active area of *ca.* 1 cm^2 , a Pt wire as the counter electrode and Ag/AgCl (saturating KCl) as the reference electrode, which includes a UV light source (365 nm) and the corresponding control system. $1 \text{ M Na}_2\text{SO}_4$ aqueous solution was used as the electrolyte. For working electrodes, FTO glass ($2 \text{ cm} \times 1.2 \text{ cm}$) was immersed in an ethanolic dispersion of photocatalyst and followed by drying in the air. This process was repeated several times until the coated photocatalyst reaches *ca.* $0.4 \text{ mg}\cdot\text{cm}^{-2}$ on FTO glass. The amperometric *I-t* curves were recorded under an illumination of $10 \text{ mW}\cdot\text{cm}^{-2}$ for three 50 seconds light-on-off cycles.

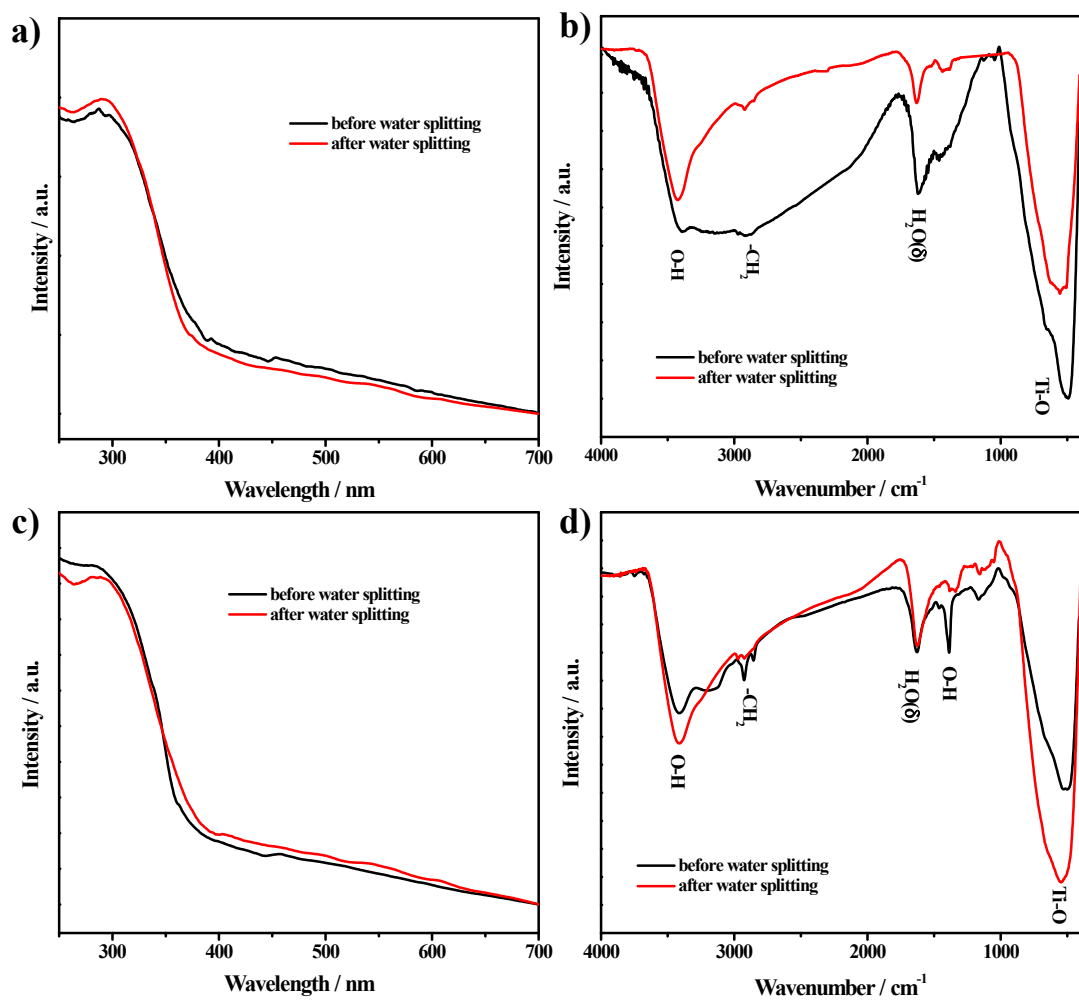


Figure S5. Diffuse reflectance UV-visible spectra (a, c) and IR spectra (b, d) of TiO₂ NS-C (a, b) and TiO₂ NP-C (c, d) before and after photocatalysis.