Supplementary Information

Conformal Titanyl Phosphate Surface Passivation for Enhancing Photocatalytic Activity

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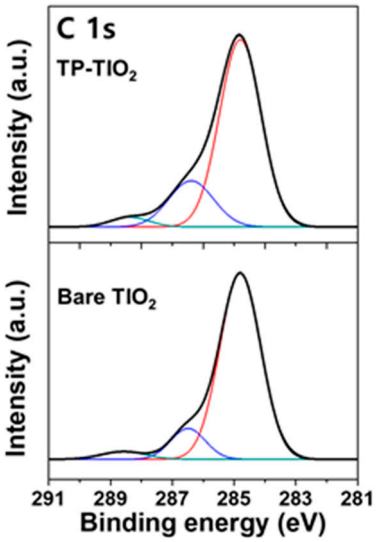

Figure S1. C 1s XPS spectra of bare and TP-TiO_2.

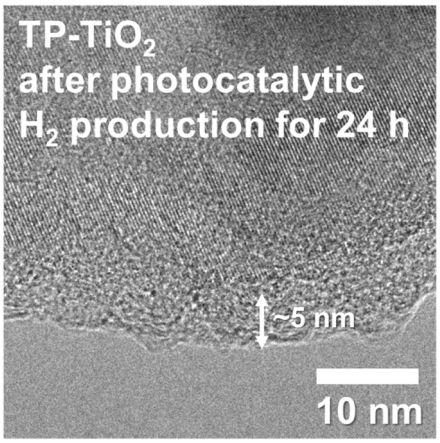

Figure S2. TEM image of TP-TiO_2 after carrying out the photocatalytic H_2 production experiment for 24 hours.

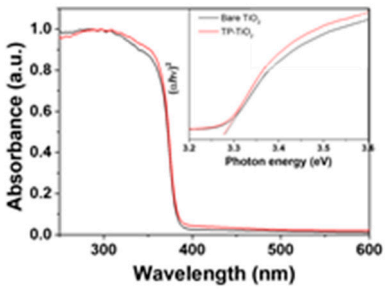

Figure S3. UV-Vis absorbance spectra and Tauc plot (insert) of bare and TP-TiO_2.

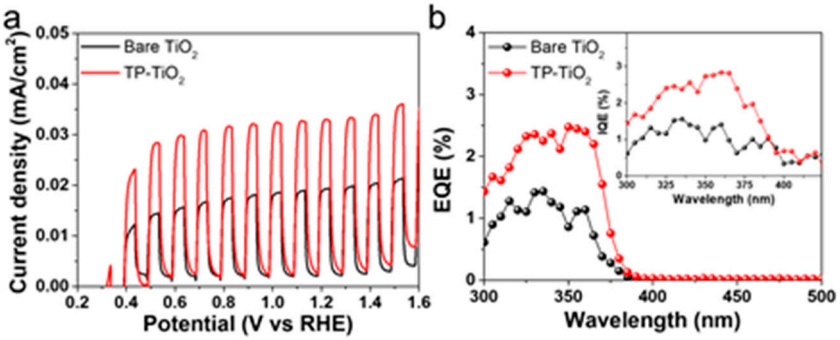

Figure S4. (a) Current density to potential (*J-V*) curves of bare and TP-TiO_2 under on/off chopped 1 sun irradiation and (b) external quantum efficiency (EQE) spectra. The insert graph shows internal quantum efficiency (IQE = EQE/Absortance) spectra. Here, a Polarnoix K3100 IPCE Measurement System (McScience Inc.) with a 300 W Xe lamp as a monochromator was exploited.

The wavelength-dependent external quantum efficiency (EQE = Absorptance (λ) × Charge separation efficiency × Charge transfer efficiency) was characterized to investigate the solar conversion efficiency. TP-TiO_2 exhibited higher quantum efficiency values than bare TiO_2 at the range of wavelength from 300 nm to 385 nm. To gain more insights into the EQE, the internal quantum efficiency (IQE = EQE (λ)/Absorptance (λ)) spectra were characterized in the insert image of Figure S4b. The calculated IQE spectrum of TP-TiO_2 shows significantly higher efficiency compared to that of bare TiO_2.