Impact of Polymorphism vs Shape of Titania Nanocrystals towards Hydrogen Evolution Reaction

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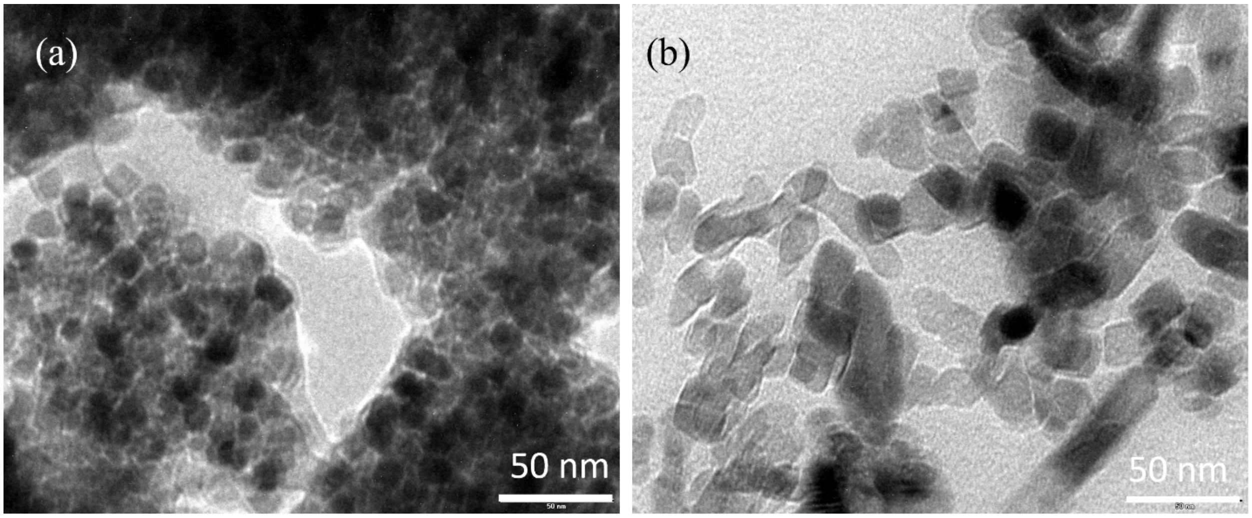

Figure S1: TEM images of (a) anatase granular and (b) rutile TiO_2 nanorod.

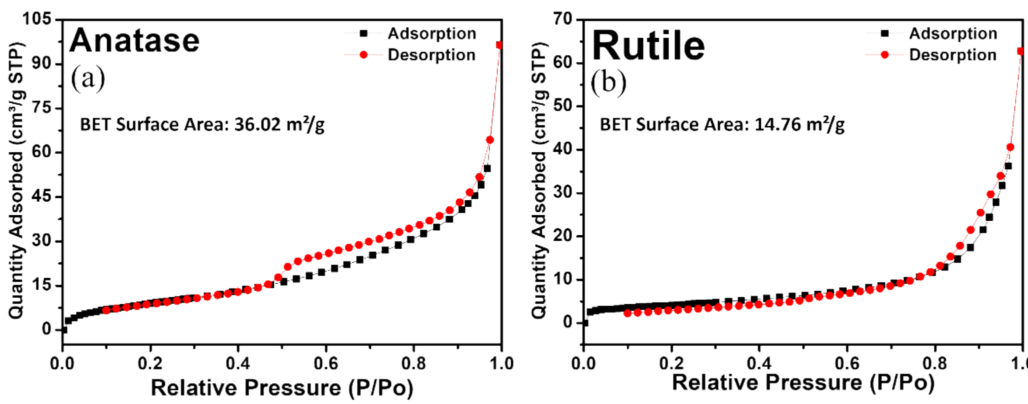

Figure S2: Nitrogen adsorption and desorption isotherm of (a) anatase granular and (b) rutile TiO_2 nanorod.

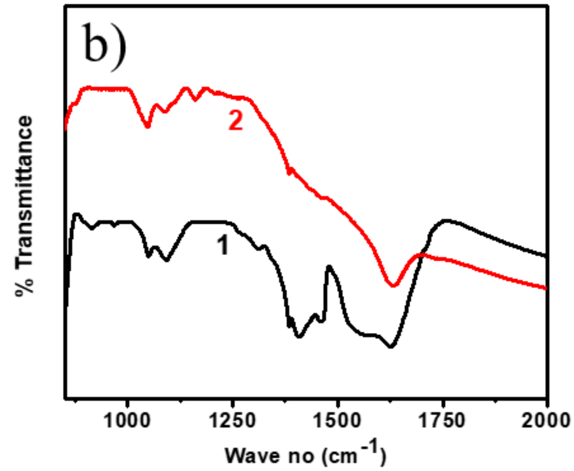

Figure S3: FT-IR of (1) anatase granular and (2) rutile TiO_2 nanorod

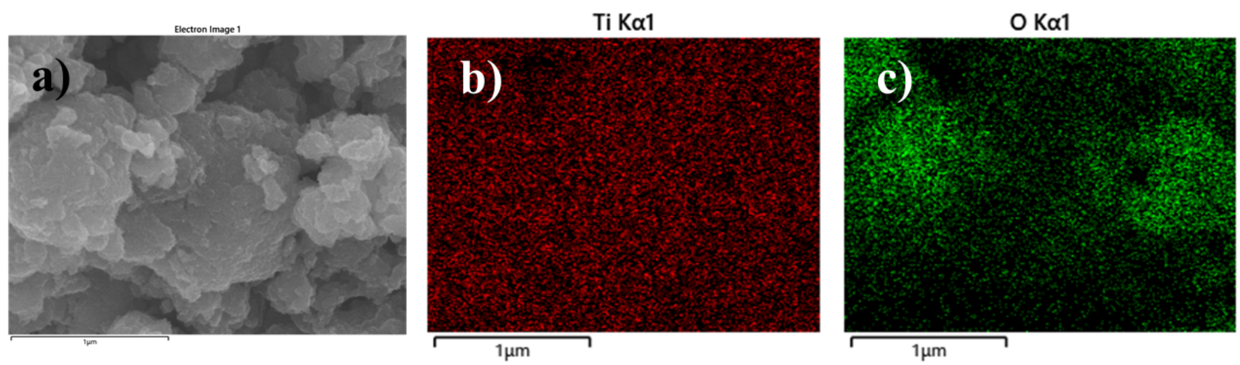

Figure S4: a) SEM image of anatase granular TiO_2 and corresponding EDAX mapping for b) Ti and c) O

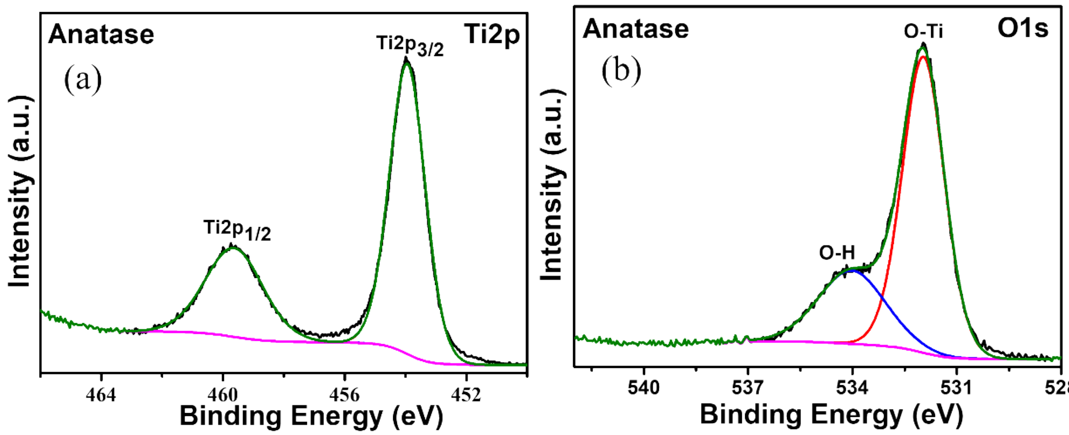

Figure S5: High resolution XPS spectra of anatase granular. (a) Ti 2p and (b) O 1s.

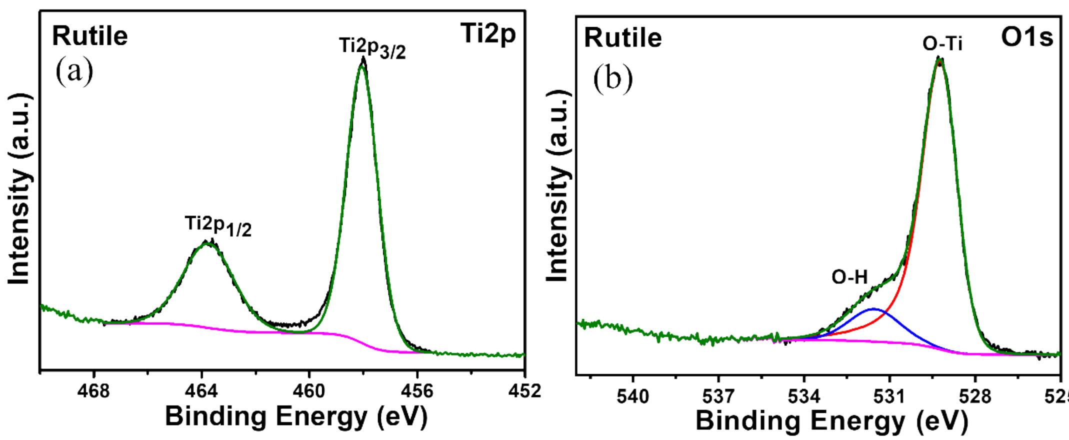

Figure S6: High resolution XPS spectra of rutile nanorod. (a) Ti 2p and (b) O 1s.

Table S1: XPS composition analysis of O and Ti and O: Ti ratio of anatase granular and rutile TiO_2 nanorod

Nanoparticle	Signal	ASF	TA	TA/ASF	Ratio of elements	O : Ti Ratio
Anatase TiO_2	O1s	0.711	16561.10	23292.69	0.669	1 : 2.04
	Ti2p	2.001	23096.82	11542.64	0.331	
Rutile TiO_2	O1s	0.711	16503.48	23211.65	0.701	1 : 2.40
	Ti2p	2.001	19720.28	9855.21	0.298	

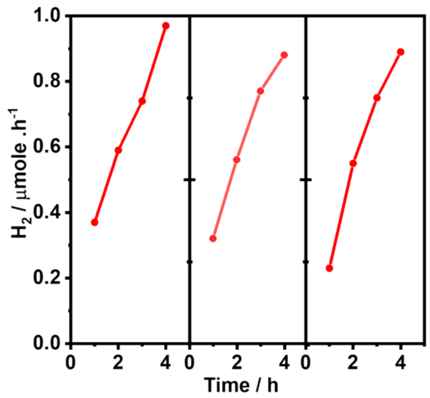

Figure S7: Photocatalytic H_2 generation was conducted using anatase granular under a 300 W Xe-lamp. The experiments involved three consecutive runs, during which we observed the maximum rate of H_2 generation.

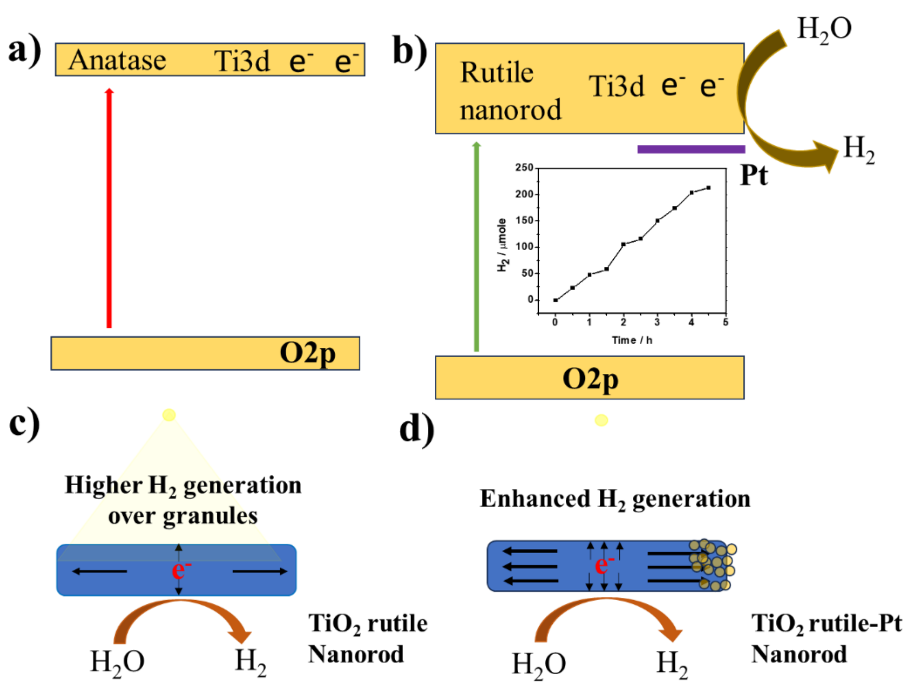

Figure S8: Band structure of a) anatase granular and b) rutile TiO_2-Pt nanorod for charge separation (inset shows the trend and maximum rate of hydrogen generation). Mechanism of H_2 generation on c) rutile TiO_2 nanorod and d) rutile TiO_2-Pt nanorod, respectively.

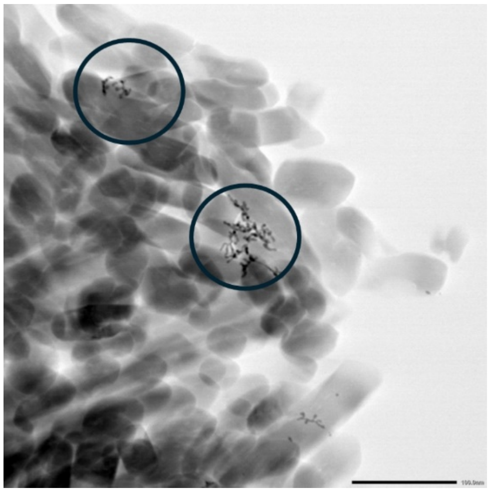

Figure S9: TEM image of TiO_2-Pt (0.1 wt. %) after photo-deposition induced H_2 production.

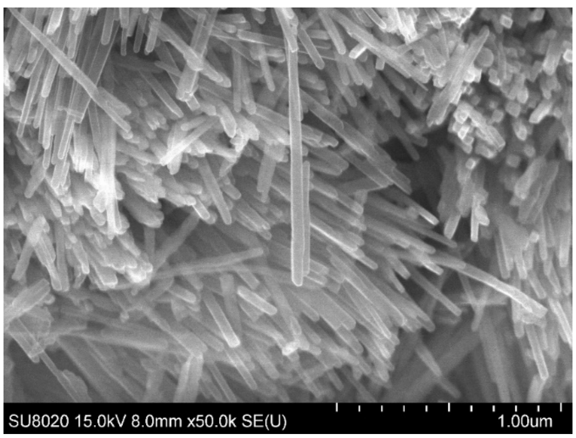

Figure S10: SEM image of TiO_2-Pt (0.1 wt. %) after photo-deposition induced H_2 production. Pt deposition present within circle.

AQE calculation formula:

$$AQE = \frac{number\ of\ reacted\ electrons}{number\ of\ incident\ photons} * 100\%$$

$$= \frac{2 * number\ of\ evolved\ H_2\ molecules}{number\ of\ incident\ photons} * 100\%$$

$$E = \frac{nhc}{\lambda}$$

n = number of incident photon per second

h= Planck's constant

c= velocity of light

λ = wavelength