

*Supporting Information*

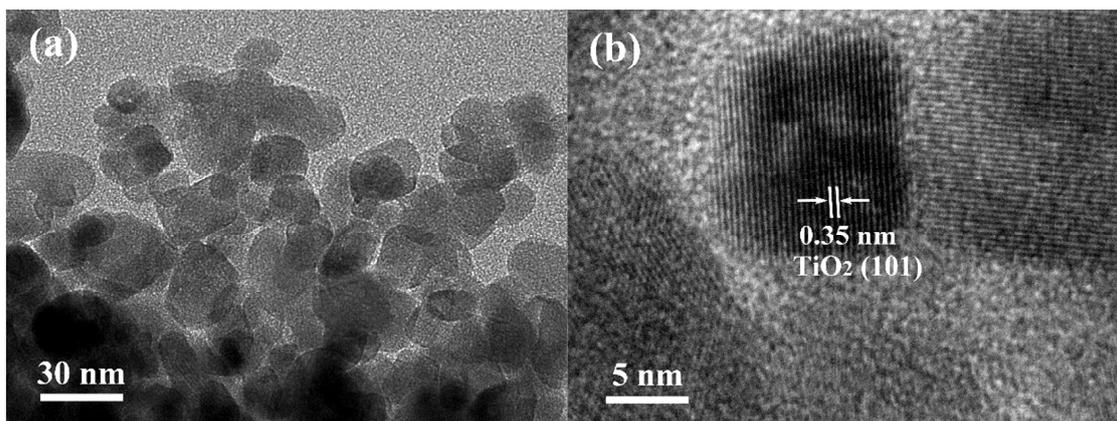
*for*

**Loading of Co<sub>3</sub>O<sub>4</sub> onto Pt-modified Nitrogen-doped TiO<sub>2</sub>  
Nanocomposites Promotes Photocatalytic Hydrogen Production**

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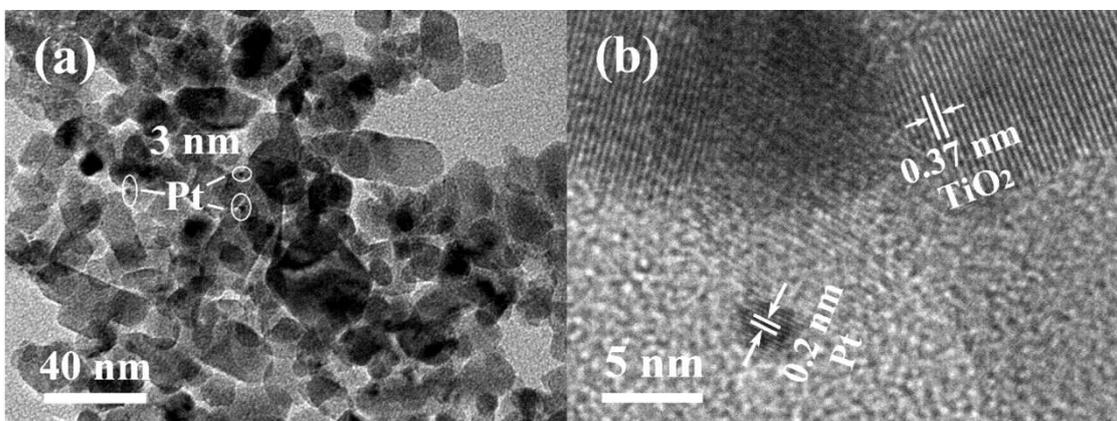
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**Fig. S1** TEM (a) and HRTEM (b) images of Pt-N-TiO<sub>2</sub>

The representative TEM and HRTEM images of Pt-N-TiO<sub>2</sub> with 0.02 wt% Pt were present in Figure S1. As shown in Figure S1a, Pt-N-TiO<sub>2</sub> showed homogeneously dispersed nanoparticles without any impurity. The average size of Pt-N-TiO<sub>2</sub> was about 17 nm ranging from 12 to 23 nm. The lattice spacing of Pt-N-TiO<sub>2</sub> in Figure S1b was measured to be 0.35 nm, which corresponds to (101) of anatase TiO<sub>2</sub>. No lattice of Pt was observed because the content of Pt was too low to be detected.



**Fig. S2** TEM (a) and HRTEM (b) images of Pt-Co<sub>3</sub>O<sub>4</sub>(D)/N-TiO<sub>2</sub> with 0.5 wt% Pt

Figure S2 shows the TEM and HRTEM images of PCNT(D) with 0.5 wt% Pt. PCNT(D) has nanoparticles with diameter of about 17 nm. Some small nanoparticles appeared on the surface of TiO<sub>2</sub>, which corresponds to the loaded Pt particles. The uniform lattice fringe of 0.37 nm was assigned to (101) plane of anatase TiO<sub>2</sub>, and the fringes with a spacing of 0.22 nm corresponds to (111) crystal plane of Pt.

**Table S1** Hydrogen evolution of PCNT(D) and PCNT(S) with 0.5 mol% over different Pt contents under **UV-Vis light** irradiation

<b>H<sub>2</sub> Evolution (<math>\mu\text{mol g}^{-1} \text{h}^{-1}</math>)</b>	<b>Pt loading = wt%</b>					
	<b>0</b>	<b>0.005</b>	<b>0.01</b>	<b>0.02</b>	<b>0.1</b>	<b>0.2</b>
N-TiO <sub>2</sub>	175	1017	1878	2189	4643	4911
PCNT(D)	388	2291	4521	5683	5135	4728
PCNT(S)	317	1979	3969	5068	4927	4484

**Table S2** Hydrogen evolution of PCNT(D) and PCNT(S) with 0.5 mol% over different Pt contents under **visible light** irradiation

<b>H<sub>2</sub> Evolution (<math>\mu\text{mol g}^{-1} \text{h}^{-1}</math>)</b>	<b>Pt loading = wt%</b>					
	<b>0</b>	<b>0.005</b>	<b>0.01</b>	<b>0.02</b>	<b>0.1</b>	<b>0.2</b>
N-TiO <sub>2</sub>	7	64	103	117	200	359
PCNT(D)	9.8	90	157	197	206	281
PCNT(S)	8.7	80	130	153	177	191

**Table S3** Hydrogen evolution of PCNT(D) and PCNT(S) with 0.02 wt% of Pt over different Co contents under **Visible light** irradiation

<b>H<sub>2</sub> Evolution (<math>\mu\text{mol g}^{-1} \text{h}^{-1}</math>)</b>	<b>Co / Ti</b>			
	<b>0.002</b>	<b>0.005</b>	<b>0.01</b>	<b>0.025</b>
PCNT(D)	129	197	89	32
PCNT(S)	94	153	105	29

**Table S4** The BET surface areas of PCNT(D) and PCNT(S) with 0.02 wt% over different Co contents

<b>BET surface area (<math>\text{m}^2/\text{g}</math>)</b>	<b>Co/Ti</b>				
	<b>0</b>	<b>0.002</b>	<b>0.005</b>	<b>0.01</b>	<b>0.025</b>
PCNT(D)	63.87	65.89	63.29	57.32	65.68
PCNT(S)	63.87	62.75	64.42	72.57	78.86

The BET surface areas of PCNT(D) and PCNT(S) over different Co contents were present in Table S4. As can be seen, there were no distinct variations were observed along with the changing of preparation methods and Co contents, suggesting that the differences of photocatalytic performances were less related to the BET surface areas.