Supporting information for

Low temperature synthesis of rutile TiO_2 single-crystal nanorods with exposed (002) facets and its decoration of gold nanoparticles for photocatalytic application

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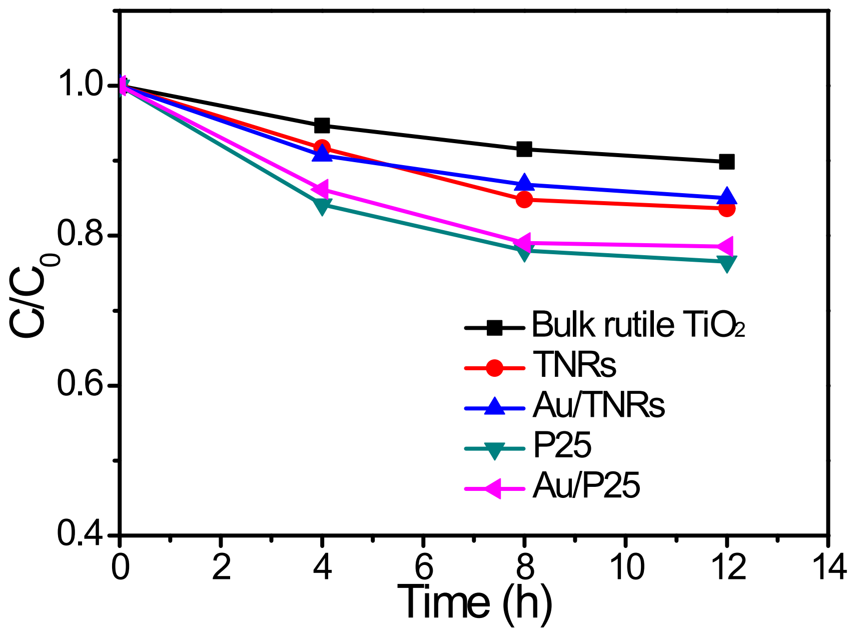

Fig. S1 The absorption plots of RhB on the different photocatalysts under the dark condition, and C_0 is the pristine concentration (10 ppm).

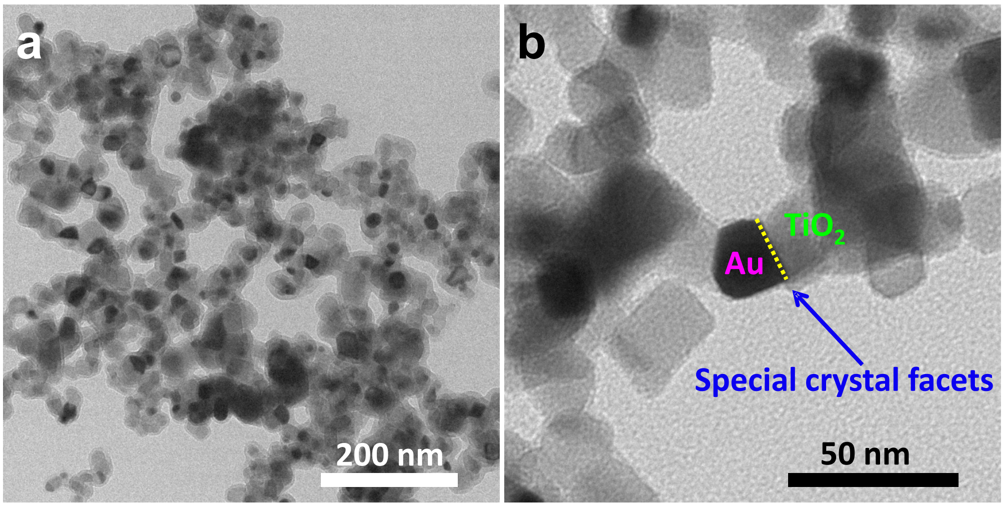

Fig. S2 (a) and (b) TEM images of Au/P25 with different magnification.

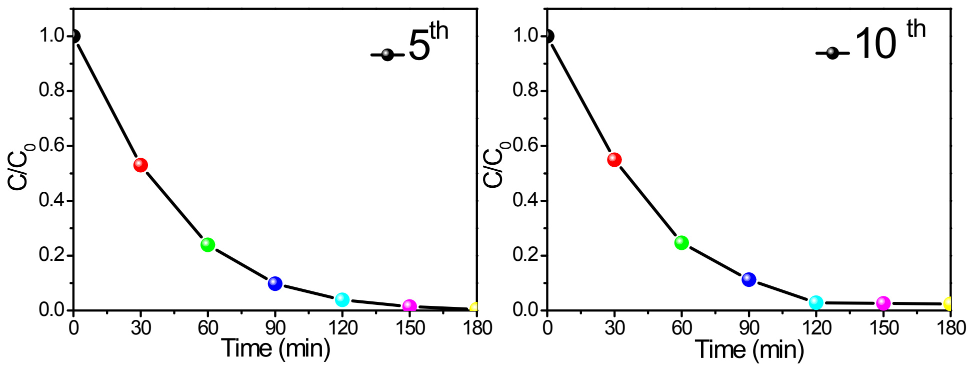

Fig. S3 Reaction time dependence of the relative concentration of the RhB in solution over Au/TNRs during repeated photodecomposition experiments, and C_0 is the relative concentration of the RhB in solution after balancing absorption.

Table S1. A list of Au/TiO_2 and Au/P25 catalysts applied in variable catalytic reactions and their reported optimal Au size and its effects on the reactions.

Kind of Catalyst	Kind of light driven	Particle Size of Au	Kind of reaction	Optimal Au Size	Simple Reason
Au/TiO_2(A or R)[S1]	UV	3-30 nm	Ethanol→H_2	3-12 nm	Electron–hole separation
Au/TiO_2[S2]	UV	2-10 nm	CO oxidation	Beyond 2 nm	Interface, coordinate sites
Au/P25[S3]	UV	2-25 nm	Degradation of MO	2-5 nm	Size-dependent
Au/TiO_2(A)[S4]	UV	2-4 nm	Degradation of MO	2.5 nm	Synergetic action
Au/TiO_2(AR) and Au/TiO_2(A)[S5]	UV and Vis	--	Acetone degradation	5.3 and7.7 nm	Light harvester, Charge injection
Au/P25[S6]	Vis	9.5–3.5 nm	Degradation of Salicylic acid	3.5 nm	Surface to volume ratio, interface
Au/P25[S7]	UV-Vis	1.8 to 3.0 nm	Degradation of MO	2.5 nm	Fermi energy
Au/TiO_2(A)[S8]	UV-Vis	5-100nm	Phenol degradation	5 nm	Charge separation
Au/P25[S9]	UV-Vis	6.1-7.6 nm	Degradation of MO	6.1 nm	Coupled effect
Au/P25[S10]	--	5 nm	CO oxidation	5 nm	Plasma
TiO_2/Au[S11]	Vis	3-8 nm	Photocurrent	3 nm	Fermi level
Au/TiO_2(A)[S12]	Vis	20-90 nm	Degradation of MB and H_2 evolution	20-90 nm	Surface plasmon resonance

Note: A, R, MB, and MO are abbreviation of Anatase, Rutile, methyl blue and methyl orange respectively.

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