Supplementary Data

Facile preparation of Ti^{3+} self-doped TiO_2 nanoparticles and their dramatic visible photocatalytic activity for fast restoration of highly concentrated Cr(VI) effluent

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Supplementary Fig. S1

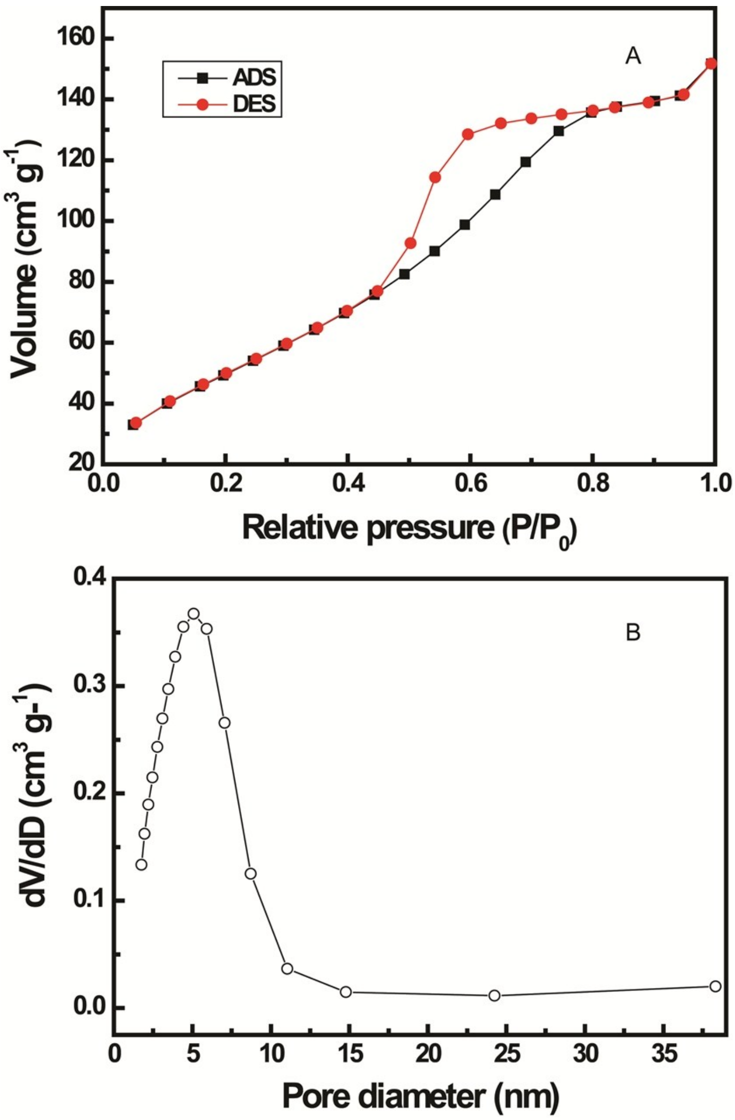

Fig. S1. (A) Nitrogen adsorption-desorption isotherm and (B) pore size distribution curve of TiO_2/Ti (III).

Supplementary Fig. S2

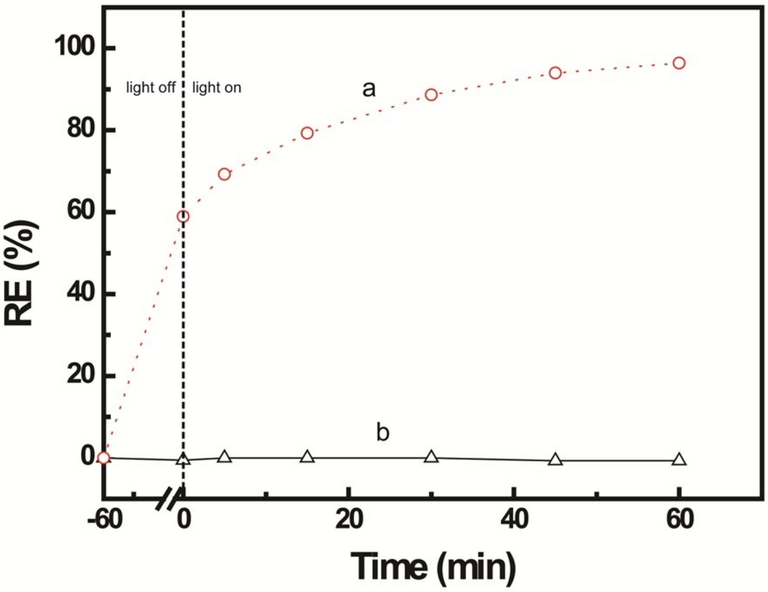

Fig. S2. Time-courses of photocatalytic degradation of methyl orange in the (a) presence and (b) absence of TiO_2/Ti (III) under visible irradiation.

Supplementary Fig. S3

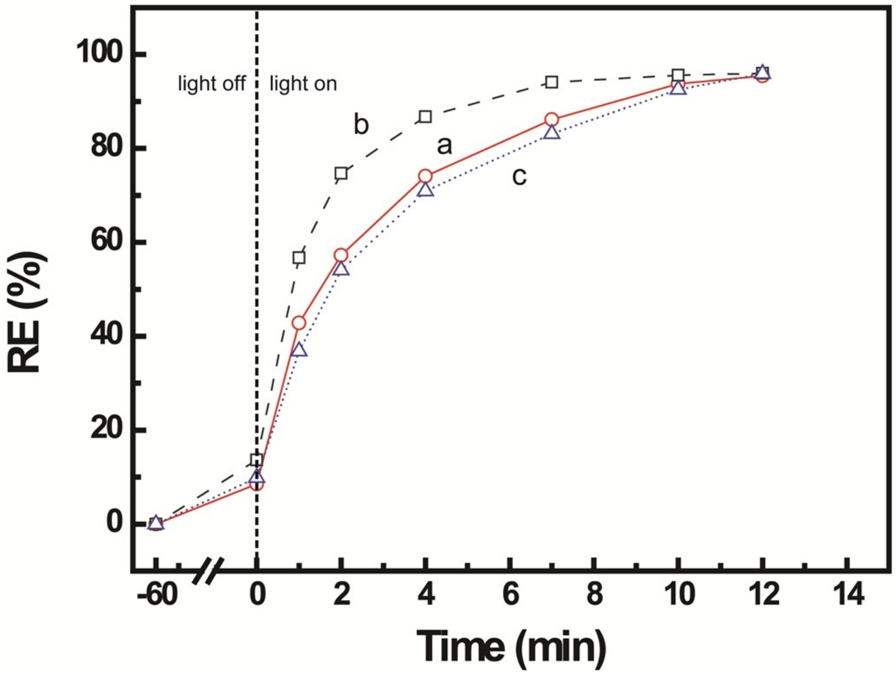

Fig. S3. Time-courses of photocatalytic reduction of Cr (VI) over (a) TiO_2/Ti (III), (b) TiO_2 nanoparticles prepared using NaOH as pH modifier and (c) TiO_2 nanoparticles prepared in the absence of NH_3.

Supplementary Fig. S4

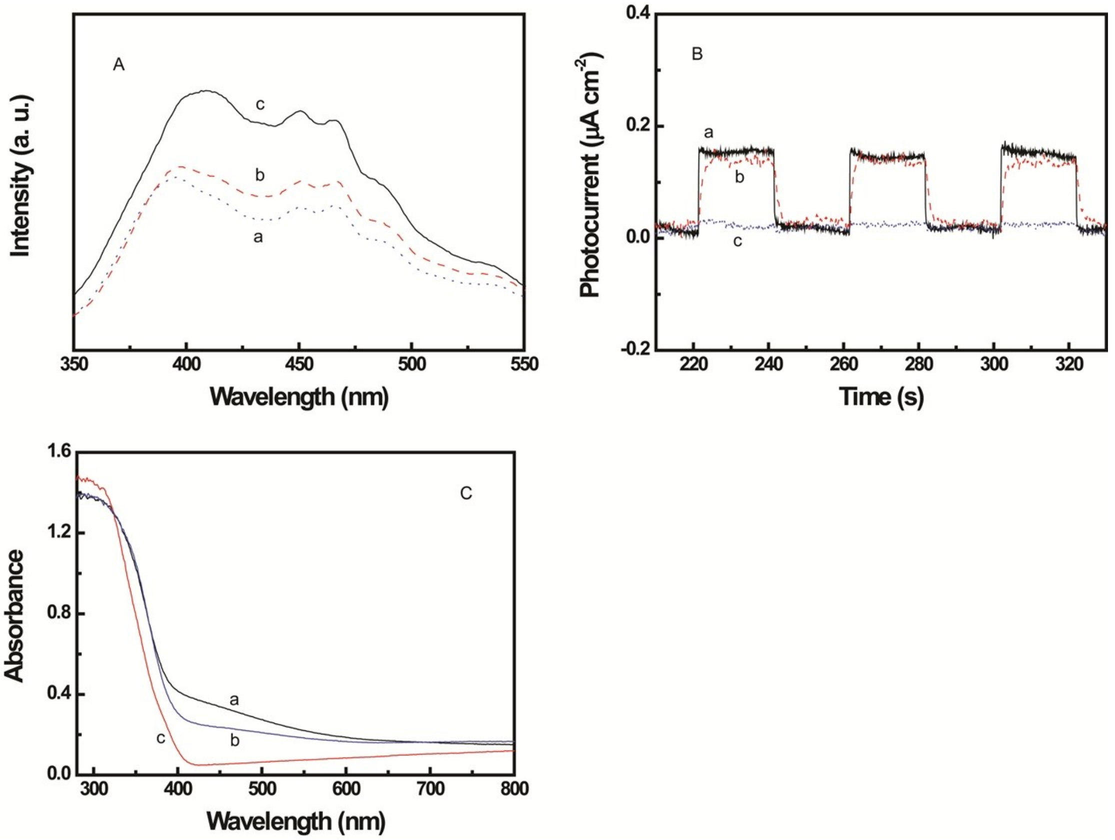

Fig. S4. (A) Photoluminescence spectra of (a) TiO_2/Ti (III), (b) TiO_2 nanoparticles prepared in the absence of NH_3 and (c) P25 excited at 280 nm; (B) transient photocurrent-time curves of (a) TiO_2/Ti (III), (b) TiO_2 nanoparticles prepared in the absence of NH_3 and (c) P25; (C) UV-vis spectra of (a) TiO_2/Ti (III), (b) TiO_2 nanoparticles prepared in the absence of NH_3 and (c) P25.

Supplementary Fig. S5

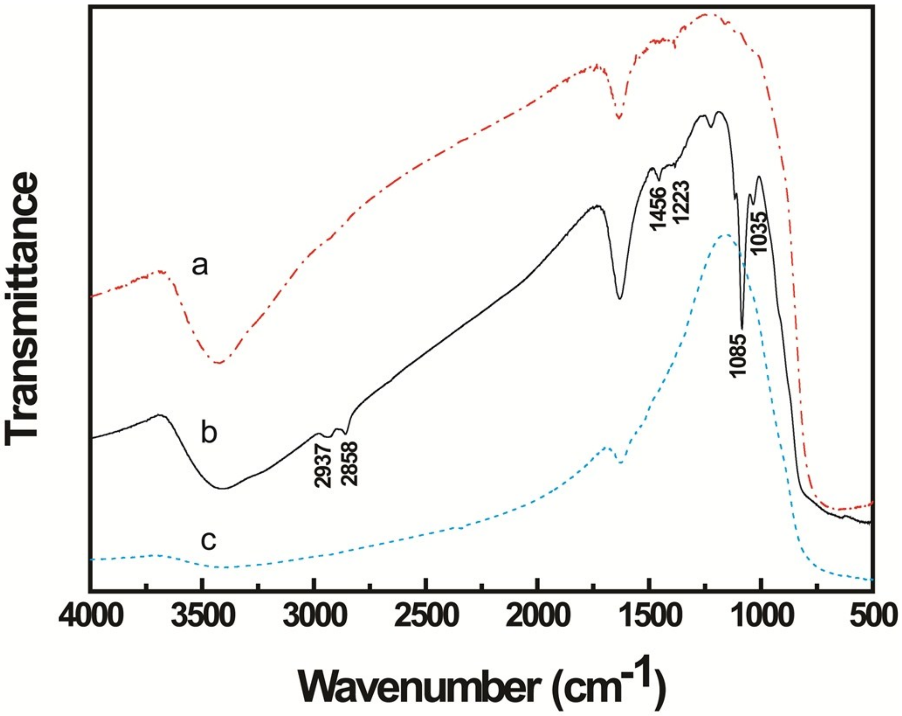

Fig. S5. FT-IR spectra of (a) P25, (b) TiO_2/Ti (III) and (c) TiO_2/Ti (III) after calcined at 400°C for 2 h.

Supplementary Fig. S6

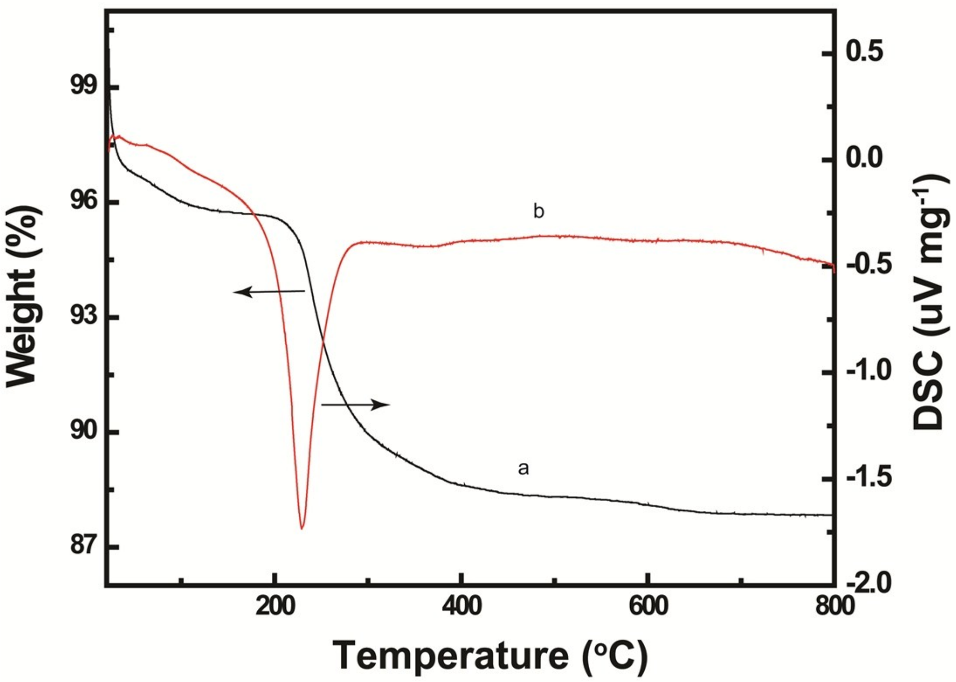

Fig. S6. TGA curve (a) and DSC curve (b) of TiO_2/Ti (III).

Supplementary Fig. S7

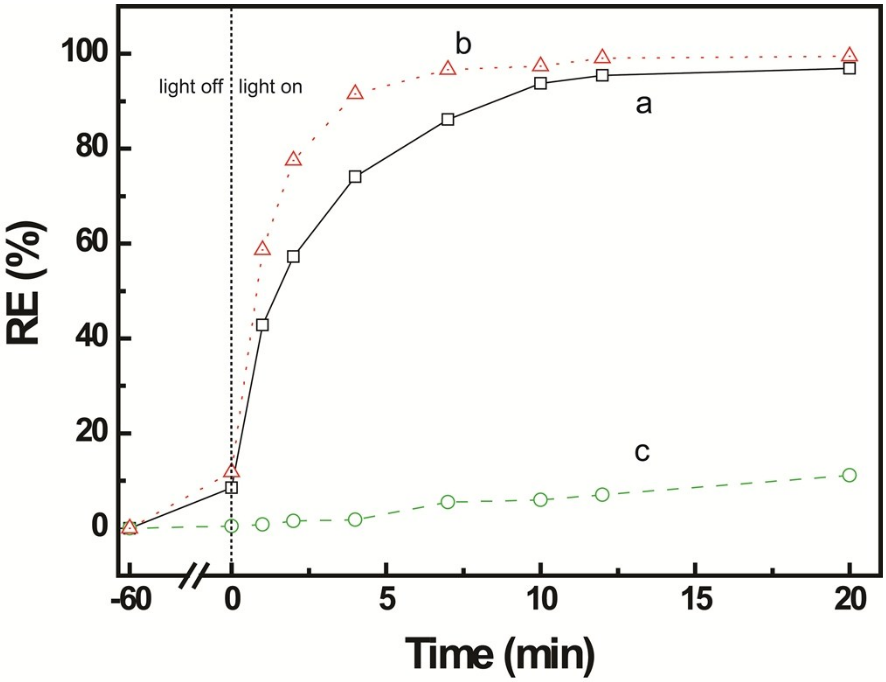

Fig. S7. Time-courses of photocatalytic reduction of Cr (VI) in the presence of (a) TiO_2/Ti (III), (b) TiO_2/Ti (III) and ethylene glycol (1.8×10^{-2} mol L^{-1}) and (c) ethylene glycol (1.8×10^{-2} mol L^{-1}).

Supplementary Fig. S8

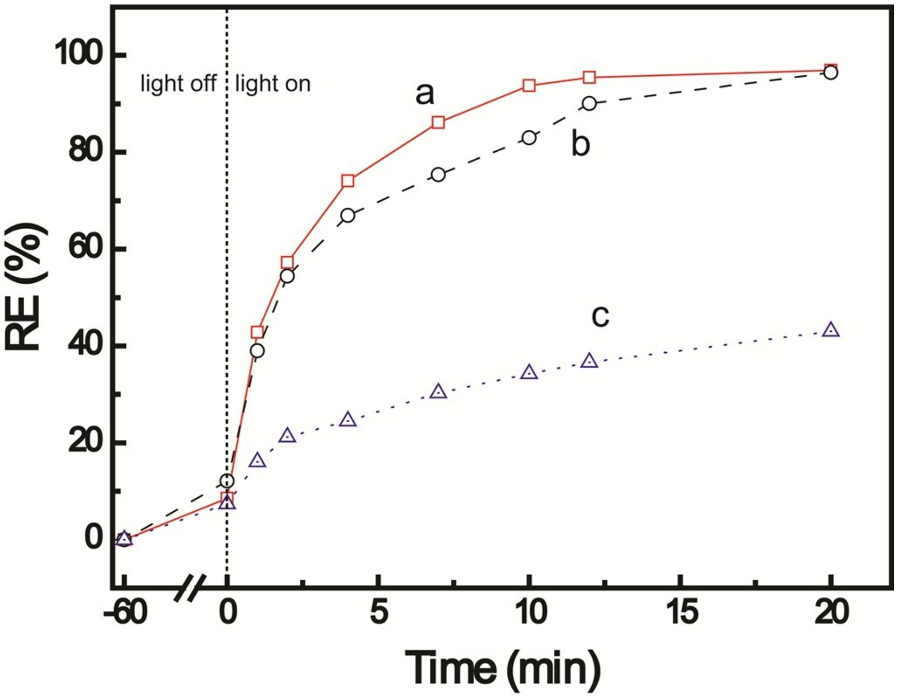

Fig. S8. Time-courses of photocatalytic reduction of Cr (VI) over (a) the fresh TiO_2/Ti (III), (b) the used TiO_2/Ti (III) after regenerated in the same solvothermal process and (c) the used TiO_2/Ti (III).

Supplementary Fig. S9

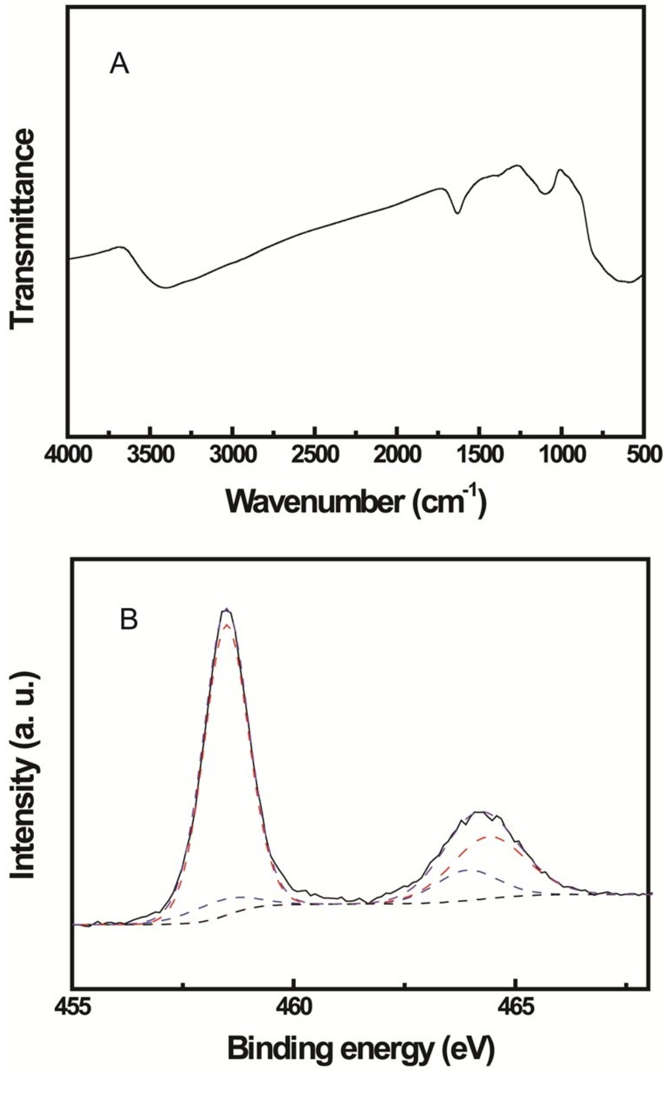

Fig. S9. (A) FT-IR spectrum, and (B) XPS spectrum of Ti 2p and curve-fitting analysis (dot lines) of states of Ti of the used TiO_2/Ti (III) after the fifth cycle.