Supporting Information

Low-cost Y-doped TiO_2 nanosheets film with highly reactive {001} facets from CRT waste and enhanced photocatalytic removal of Cr(VI) and methyl orange

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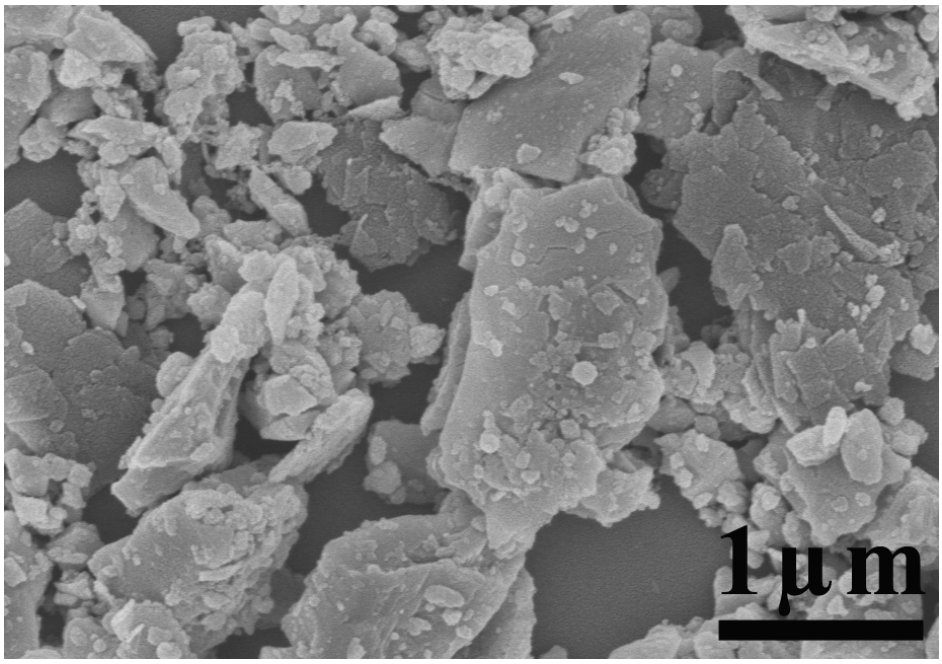

Figure S1. SEM image of CRT phosphors waste.

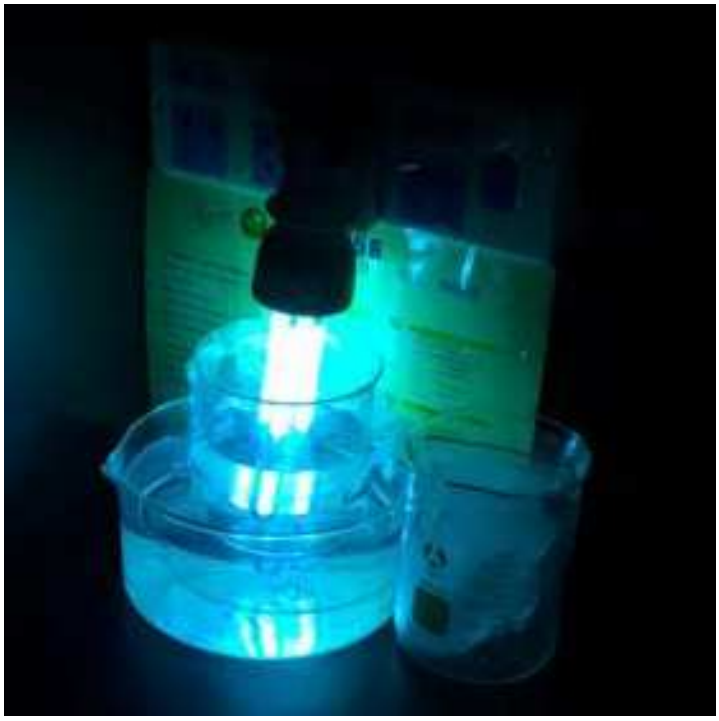

Figure S2. The separation of Y and Eu from the as-obtained rare earth mixtures using photochemical reduction method.

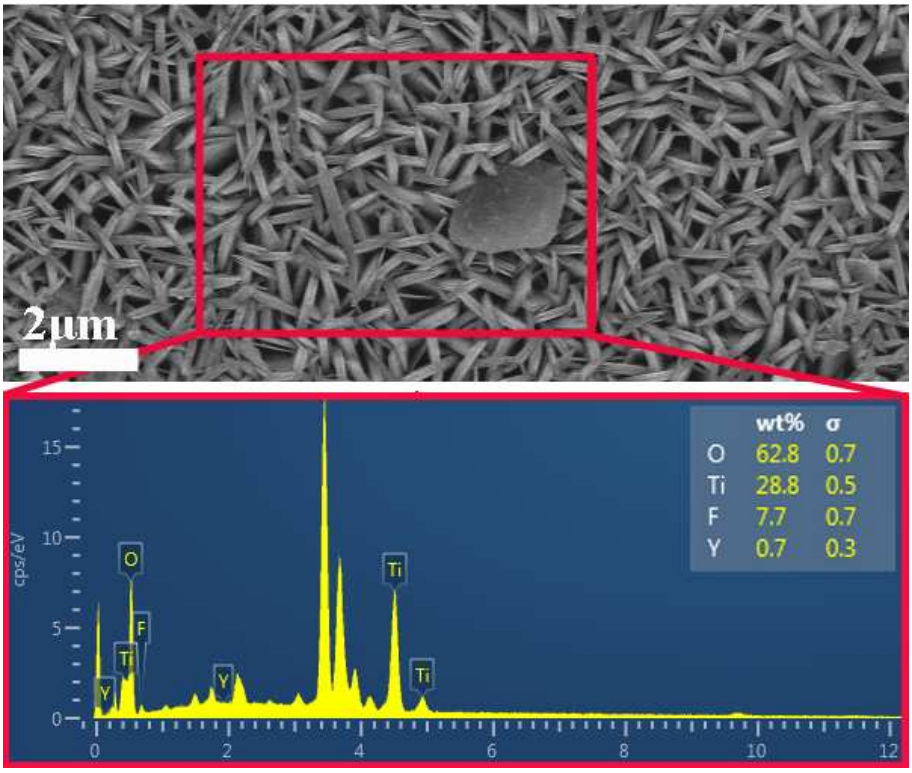

Figure S3. Upper row is SEM image of anatase Y^{3+}/TiO_2 nanosheets film of synthesized by solvothermal approach at 200 ºC for 12 h, and lower row is EDAX image obtained from the region enclosed by the red box in SEM image.

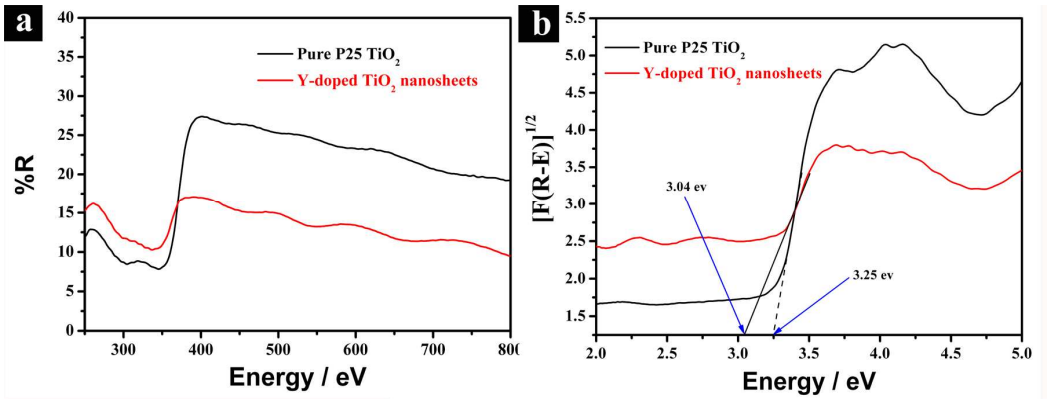

Figure S4. (a) UV-vis diffuse reflectance (DRS) spectra and (b) the plots of $[F(R-E)]^{1/2}$ *vs*. photon energy of samples Y^{3+}/TiO_2 and pure P25 TiO_2.

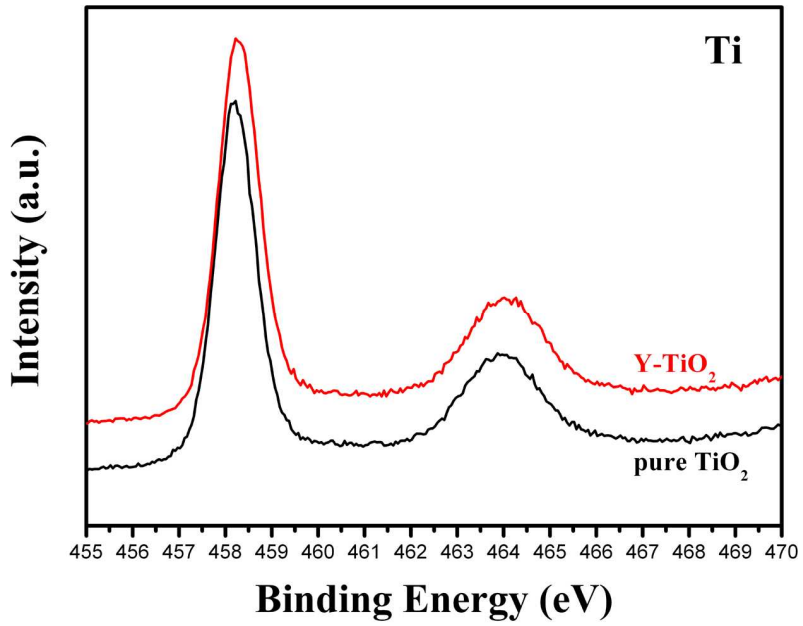

Figure S5. High-resolution XPS spectrum of Ti 2p on the surface of Y^{3+}/TiO_2 and pure P25 TiO_2.

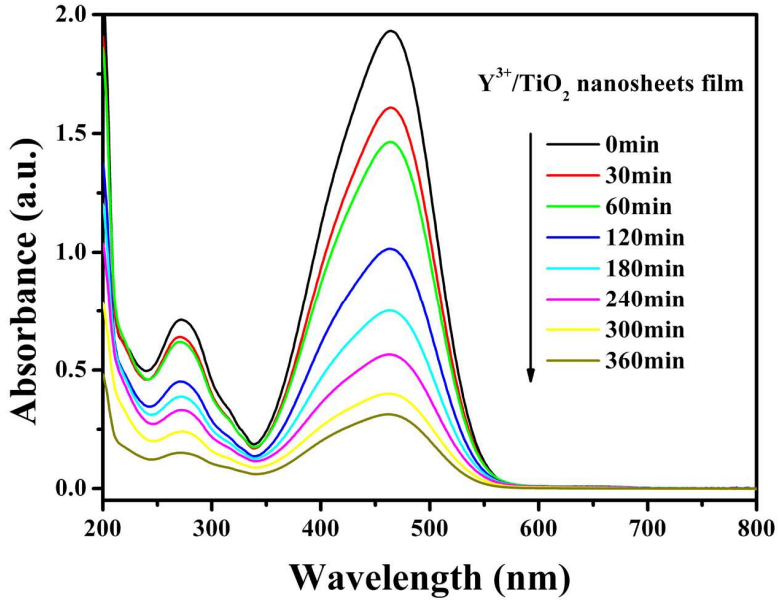

Figure S6. UV-vis spectral changes of MO in the presence the Y^{3+}/TiO_2 nanosheets films as a function of UV light illumination time.

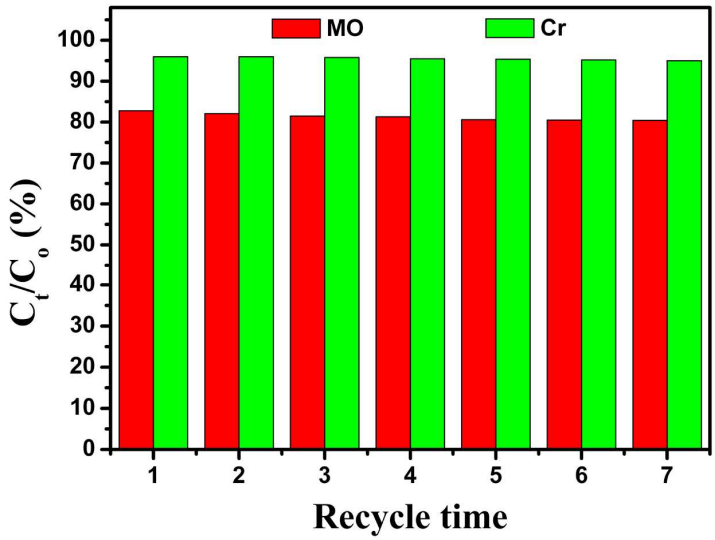

Figure S7. Results of recycling studies. Conditions: $[MO]_0$ = 10 mg/L; V_{MO} = 20 mL; $[Cr(VI)]_0$ = 10 mg/L; $V_{Cr(VI)}$ = 20 mL; $S_{catalyst}$ = 2 cm × 4 cm; 30 W UV light irradiation; irradiation time for MO and Cr(VI) is 360 min and 300 min, respectively.

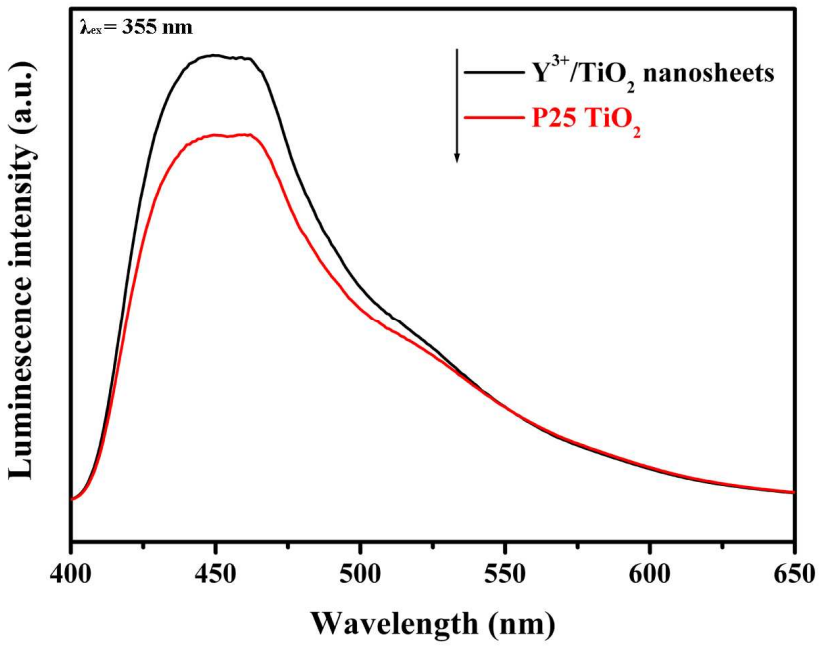

Figure S8. PL spectra of the as-prepared Y^{3+}/TiO_2 and pure P25 TiO_2, which clearly indicates that a more efficient transfer and separation of photogenerated electrons and holes caused by doped Y^{3+} ions.

Table S1. Chemical compositions (wt %) of recycled Y_2O_3/Eu_2O_3, $EuSO_4$ and the as-obtained yttrium sulfate. (XRF analysis).

	Y_2O_3	Eu_2O_3	SO_3	ZnO	Al_2O_3	SiO_2	Fe_2O_3	PbO	BaO	K_2O
Recycled Y_2O_3/Eu_2O_3	94.46	5.28	N.D.	0.02	0.06	0.06	0.07	0.05	N.D.	N.D.
$EuSO_4$	1.44	59.45	39.08	N.D.	N.D.	N.D.	N.D.	0.03	N.D.	N.D.
Yttrium sulfate	48.5	0.03	51.35	0.01	0.03	0.03	0.04	0.01	N.D.	N.D.

N.D.: not detectable.