Supporting Information

True Photoreactivity Origin of Ti^{3+}-Doped Anatase TiO_2 Crystals with Respectively Dominated Exposed {001}, {101} and {100} Facets

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Additional figures and tables.

Table S1. Average exposed percentages of {001}, {101} and {100} facet in R-TiO_2-001, R-TiO_2-101 and R-TiO_2-101, calculated from the surface areas of each facet from SEM and TEM images.

Sample	{001}	{101}	{100}
R-TiO_2-001	82%	18%	0
R-TiO_2-101	14%	86%	0
R-TiO_2-100	4%	12%	84%

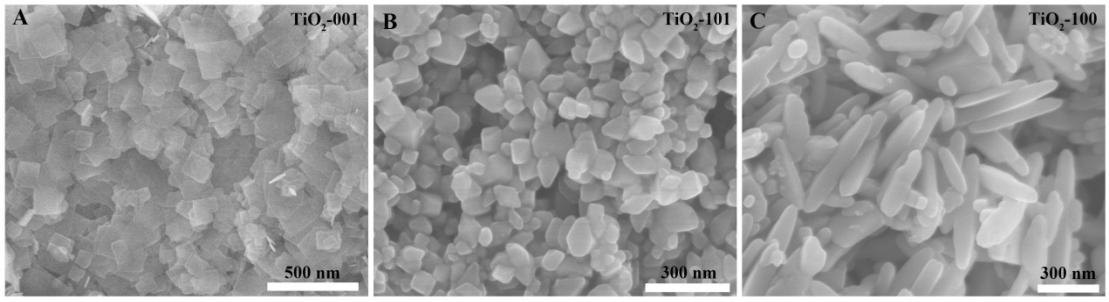

Figure S1. SEM images of TiO_2 samples with different dominant facets: A) TiO_2-001; B) TiO_2-101 and C) TiO_2-100.

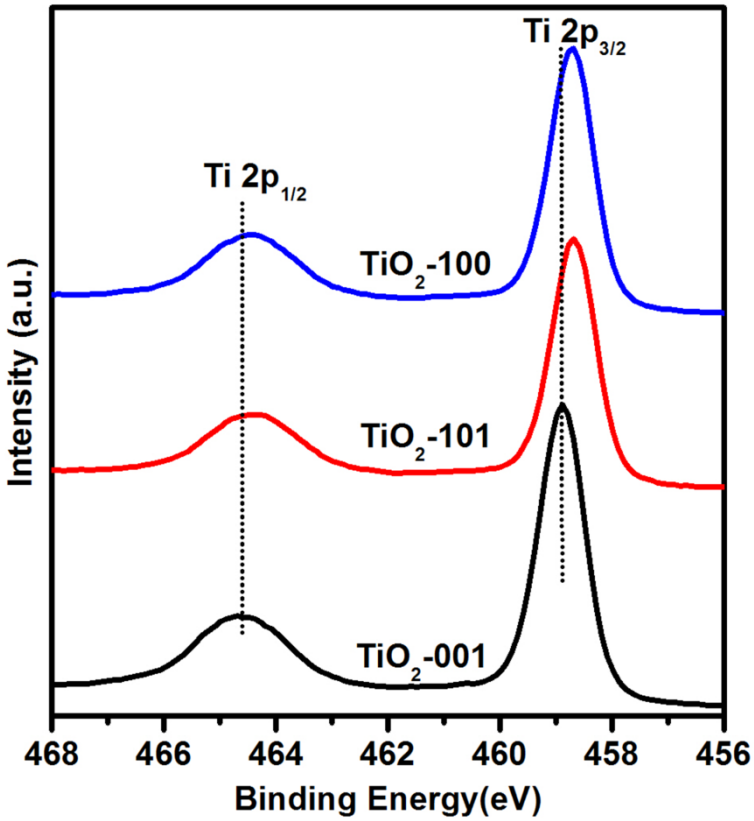

Figure S2. XPS spectra of Ti 2p for TiO_2 with different predominated exposed facets before Al reduction.

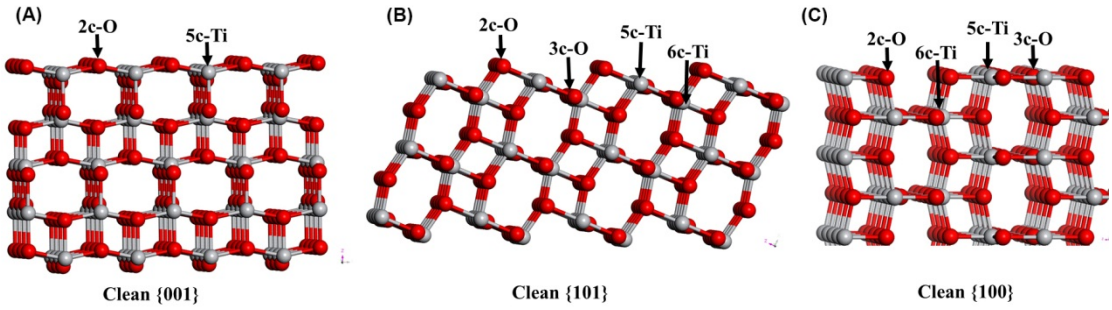

Figure S3. Schematic of atomic surface structure of anatase TiO_2 with (A) clean {001}, (B) clean {101} and (C) clean {100} facets.

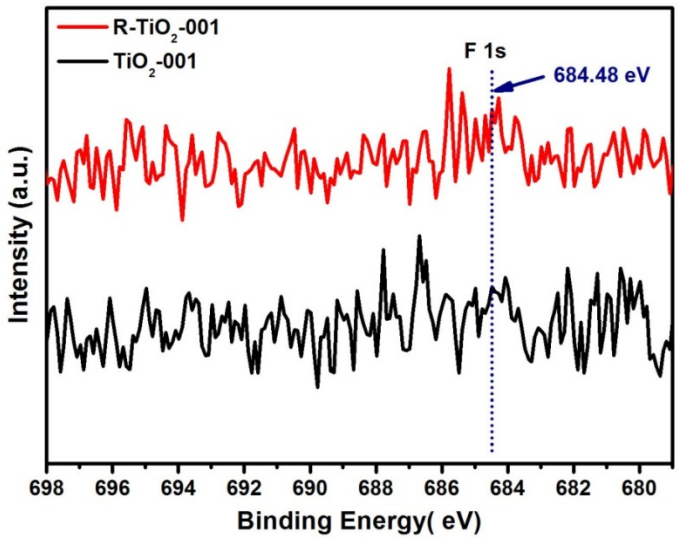

Figure S4. The F 1s XPS spectra of R-TiO_2-001 and TiO_2-001 sample.

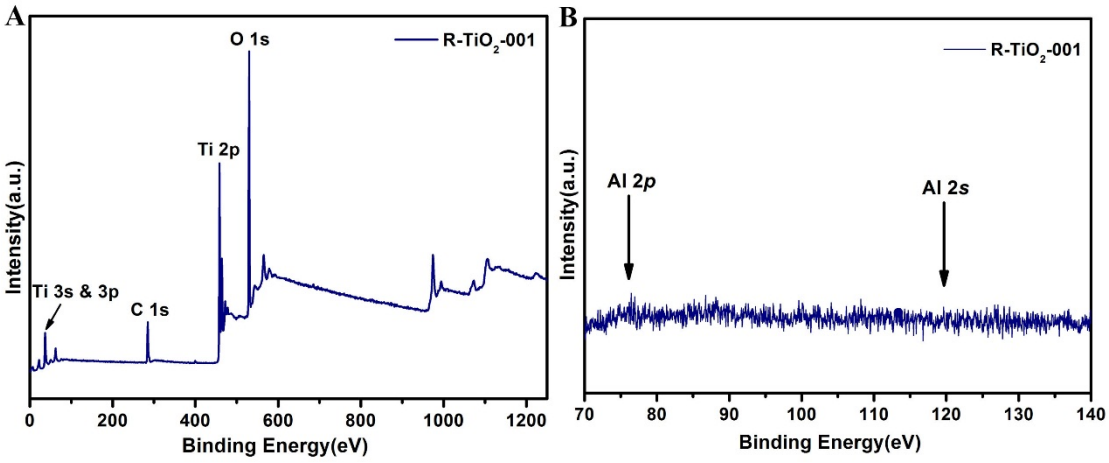

Figure S5. XPS survey spectra (A) and Al element analysis (B) of of R-TiO_2-001 sample.

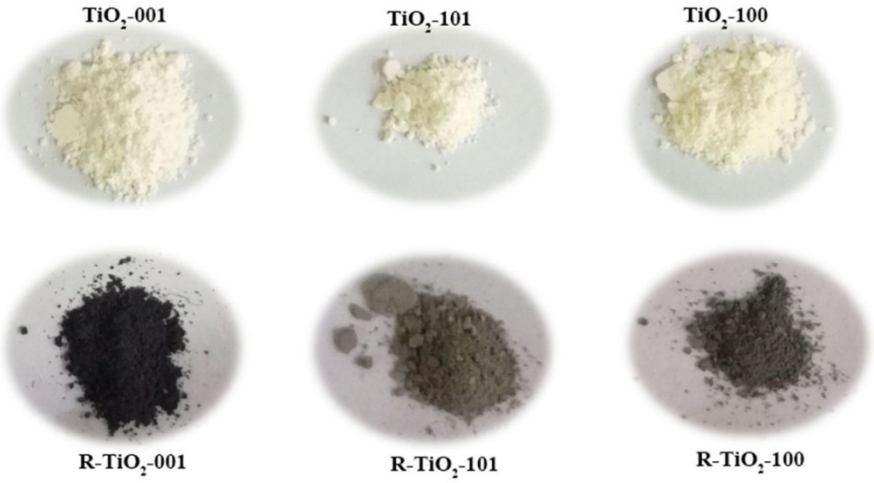

Figure S6. The digital photography of prepared TiO_2 samples before and after Al reduction.

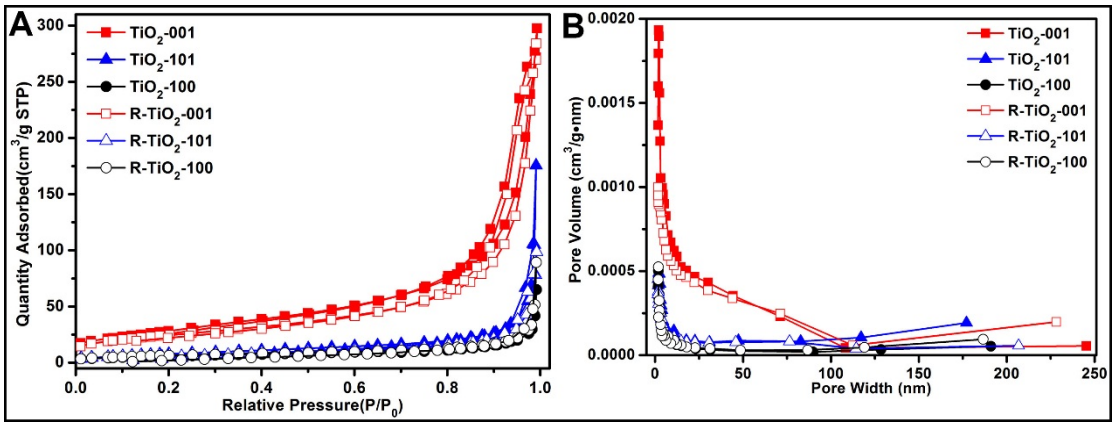

Figure S7. N_2 adsorption-desorption isotherm (A) and pore size distribution (B) of prepared TiO_2 nanocrystals before and after Al reduction.

Table S2. BET surface areas and pore parameters of prepared TiO_2 samples before and after Al reduction.

Samples	S_{BET} (cm^2/g)	Pore Volume(cm^3/g)	Pore Size(nm)
TiO_2-001	25.1059	0.044919	7.38264
R-TiO_2-001	21.7914	0.040023	7.34654
TiO_2-101	31.7491	0.084714	10.67288
R-TiO_2-101	24.3378	0.066210	10.54896
TiO_2-100	103.7212	0.310701	11.98215
R-TiO_2-100	99.5281	0.274669	12.27187

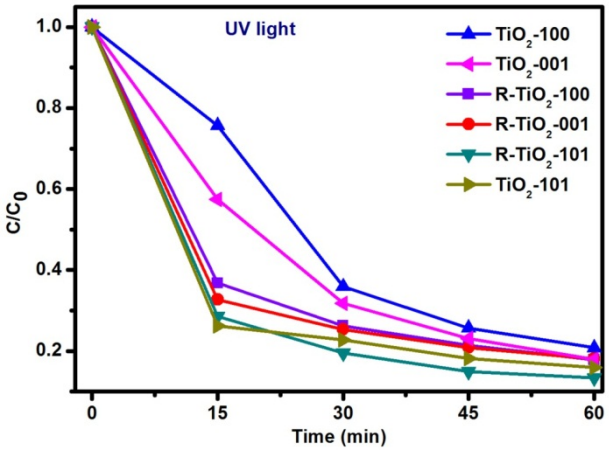

Figure S8. The degradation curves of phenol over different photocatalysts under ultraviolet-light irradiation..

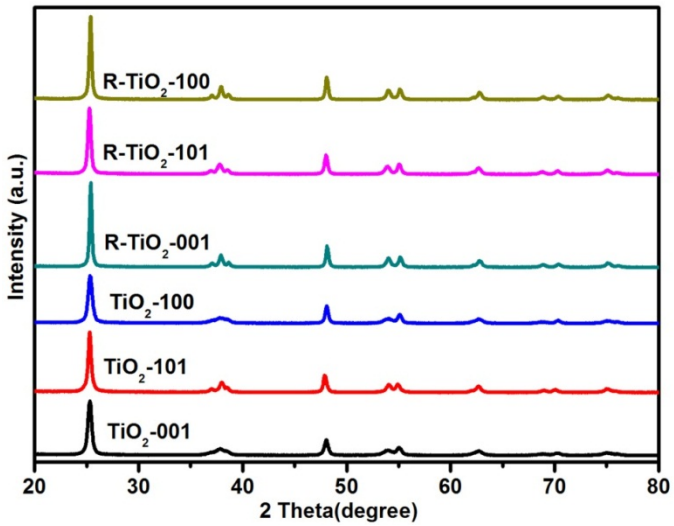

Figure S9. Re-tested XRD patterns for TiO_2 and reduced TiO_2 nanocrystals after photocatalytic performance evaluation.

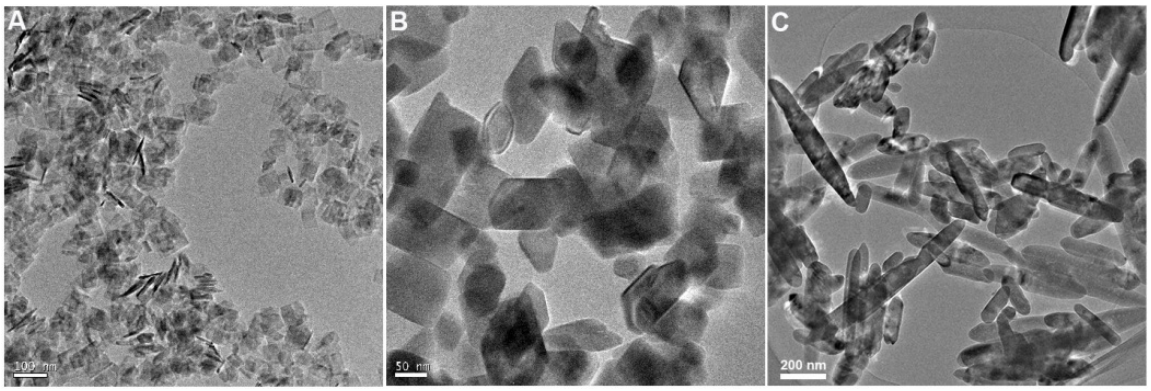

Figure S10. TEM images of (A) R-TiO_2-001, (B) R-TiO_2-101 and (C) R-TiO_2-100 after photocatalytic performance tests.

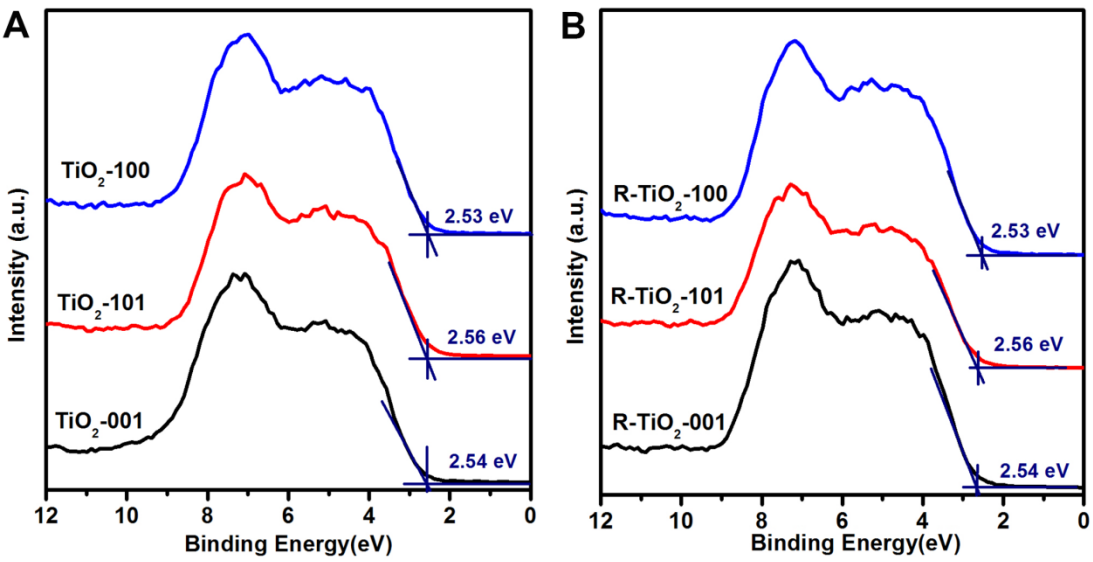

Figure S11. XPS valence band spectrum of as prepared TiO_2 with different dominate exposed facets before (A) and after (B) Ti^{3+} doping.

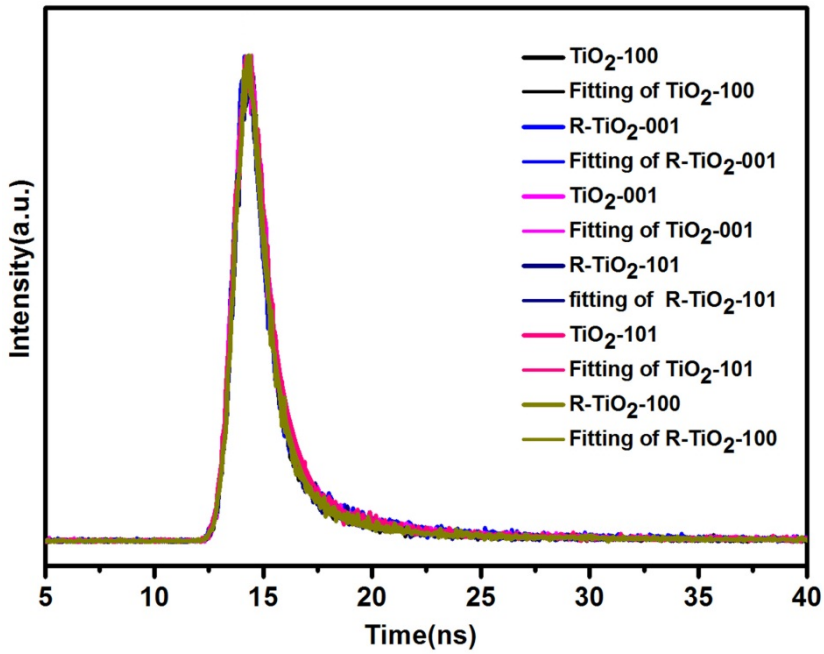

Figure S12. Time-resolved fluorescence decay spectra of prepared TiO_2 samples.