Supplementary Information

Charge carrier dynamics and photocatalytic behavior of TiO_2 nanopowders submitted to hydrothermal or conventional heat treatment

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1. Rietveld analysis of XRD diffraction patterns

Rietveld analyses of the XRD patterns were caried out using the FullProf software (ILL). Fittings were adjusted using the Thompson-Cox-Hastings pseudo-Voigt and Axial divergence asymmetry function. The results are shown in Figures S1, S2 and S3, respectively for TiO_2-1, TiO_2-2 and TiO_2-P25 catalysts. The main fitting parameters are shown in Table S1.

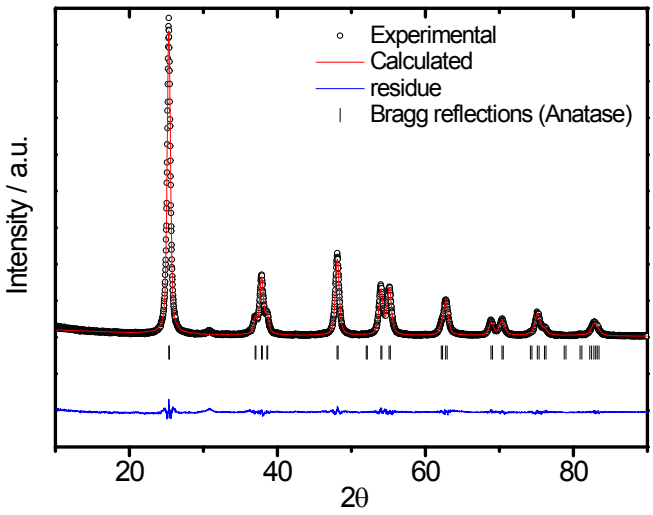

Figure S1. Rietveld analysis of XRD patterns of TiO_2-1 catalyst.

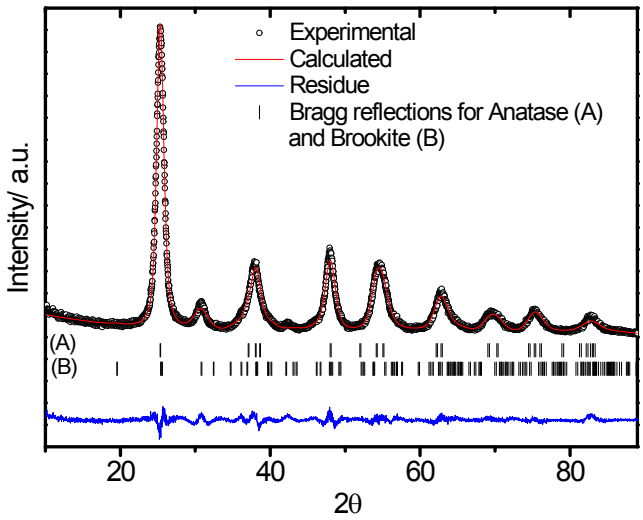

Figure S2. Rietveld analysis of XRD patterns of TiO_2-2 catalyst.

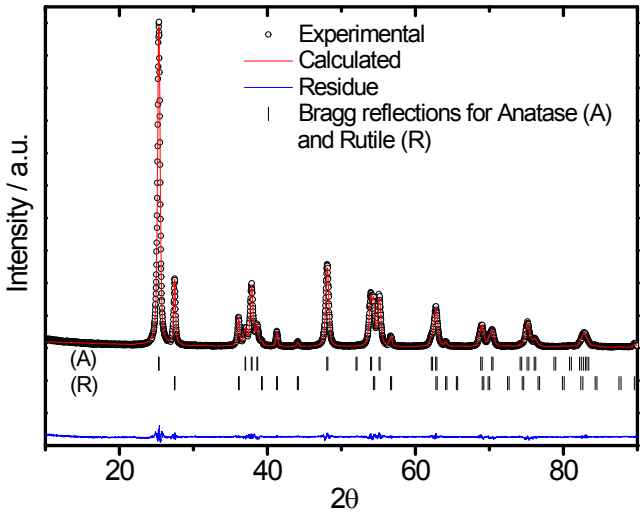

Figure S3. Rietveld analysis of XRD patterns of TiO_2-P25 catalyst.

Table S1. Fitting Parameters for Rietveld Analyses of the respective TiO_2 XRD patterns along with their standard deviations. The letters A, B and R refer respectively to Anatase, Brookite and Rutile.

Parameter	**TiO_2-1**	**TiO_2-2**	**TiO_2-P25**
R_p	7.11	8.48	6.14
R_{wp}	10.40	10.90	8.91
R_{exp}	7.08	7.12	6.67
S*	1.46	1.53	1.33
χ^2	3.39	2.34	2.57
Volume	135.929	135.745 / 259.102	136.105 / 62.376
Phase composition (%)	100.00 (A)	55.37 (A) 44.63 (B)	83.42 (A) 16.58 (R)
R_b	2.09	1.15 / 2.59	1.97 / 2.95
R_f	1.70	1.08 / 1.18	1.73 / 3.01
Crystallite size (nm)	26.243 (0.989)	15.001 (2.023) (A) 4.016 (1.027) (B)	35.517 (2.054) (A) 45.984 (6.727) (R)
Strain (%)	23.1098 (4.0873)	126.443 (2.208) (A) 251.982 (21.509) (B)	21.562 (0.014) (A) 15.418 (0.004) (R)
Lattice parameters for the Anatase phase			
a (3.782)**	3.7829	3.7878	3.7843
b (3.782)**	3.7829	3.7878	3.7843
c (9.502)**	9.4989	9.4615	9.5038

* $S = \frac{R_{wp}}{R_{exp}}$; ** Standard values (U. Diebold, *Surf. Sci. Rep.* **48** (2003) 53-229).

2. UV-Vis spectroscopy

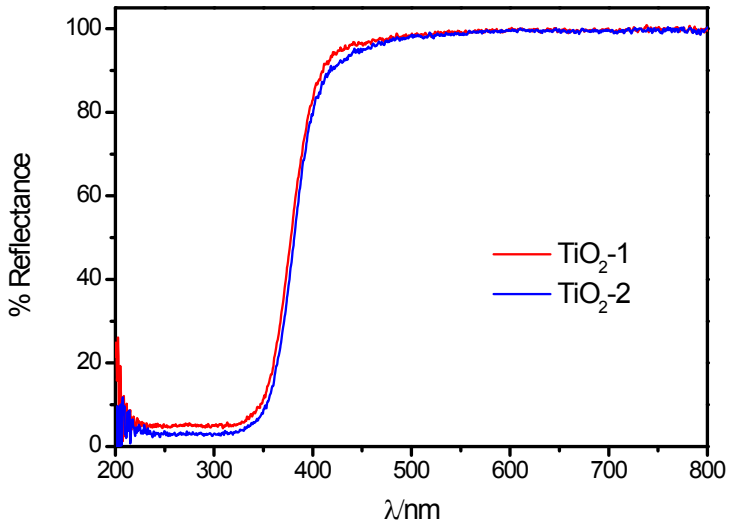

Figure S4. UV-Vis reflectance spectra of the TiO_2 samples prepared.

4. N_2 adsorption/desorption isotherms

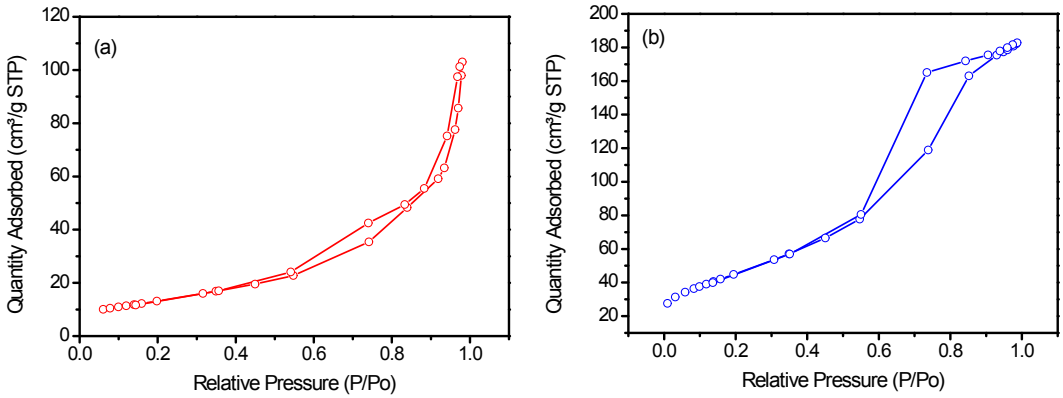

Figure S5. N_2 adsorption/desorption isotherms of TiO_2-1 (a) and TiO_2-2 (b).

3. Dye degradation measurements

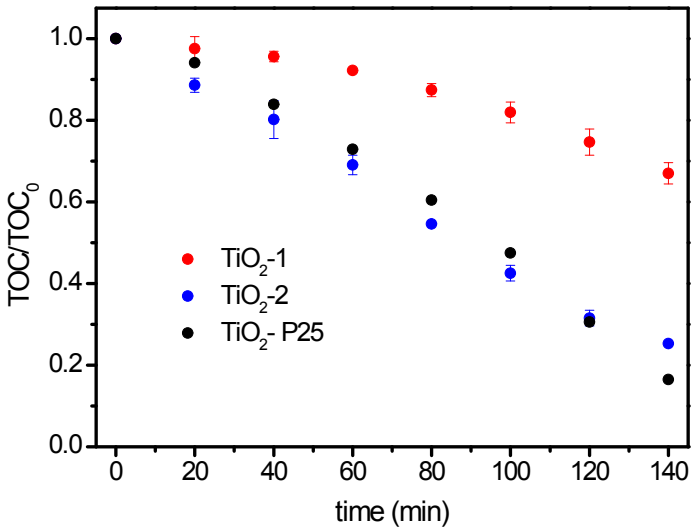

Figure S6. Time profile curves for mineralization of Pounceau 4R solutions under UVA irradiation in the presence of different TiO_2 catalysts.

3. Time- resolved absorption data.

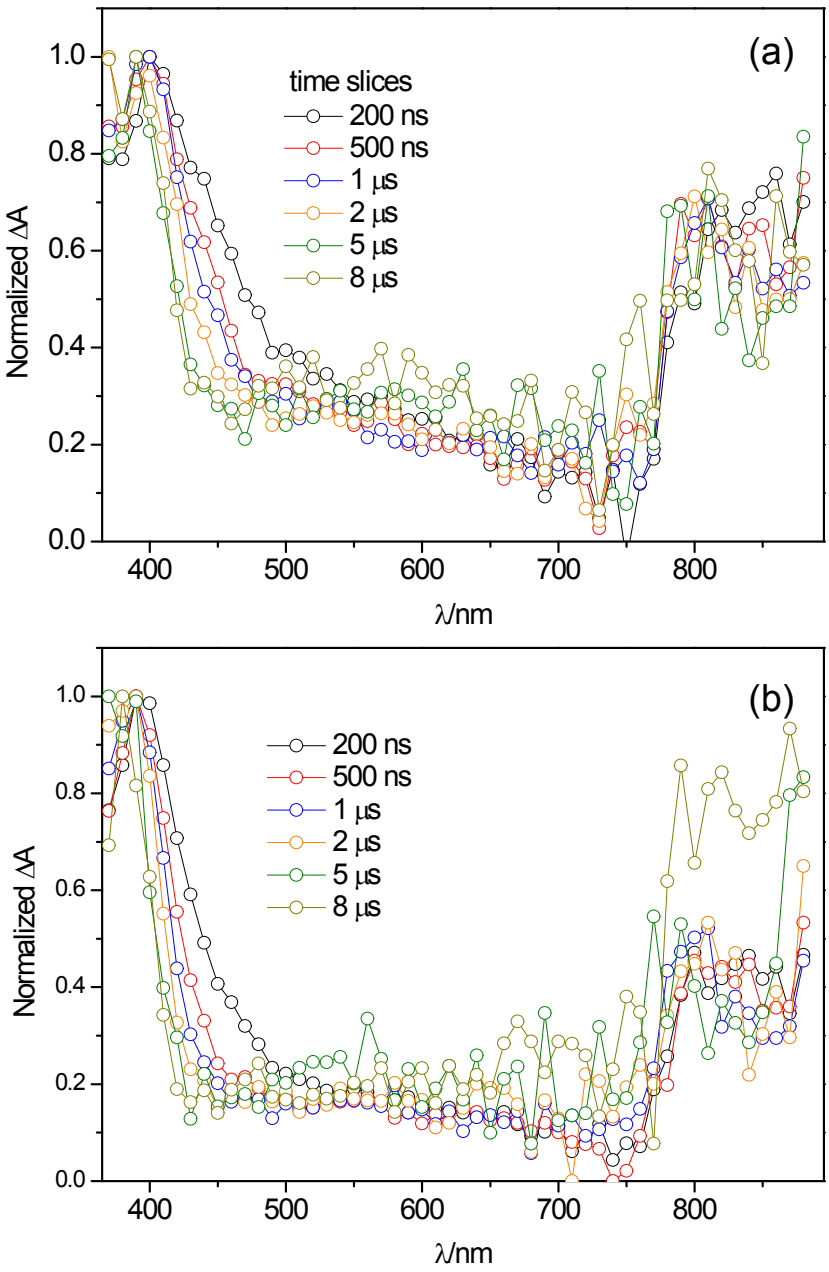

Figure S7. Normalized time-resolved absorption spectra at different time slices for the bare catalysts; (a) TiO_2-1 and (b) TiO_2-2

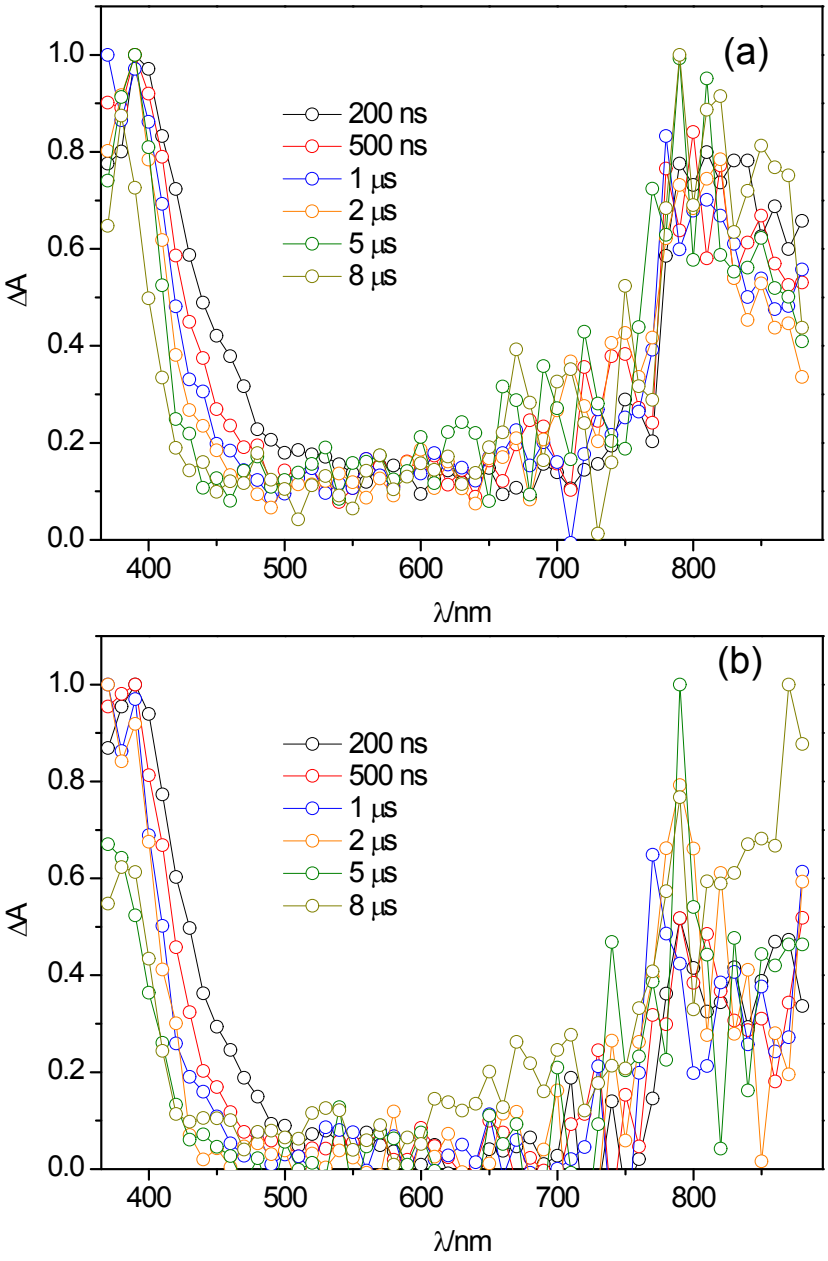

Figure S8. Normalized time-resolved absorption spectra at different time slices for the catalysts having 0.5% wt. platinum; (a) TiO_2-1-Pt and (b) TiO_2-2-Pt