Supporting Information

Block Copolymer and Cellulose Templated Mesoporous TiO_2-SiO_2 Nanocomposite as Superior Photocatalyst

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Table S1. Physicochemical properties of the TiO_2/SiO_2 composites.

Sample	Composition (wt%)	Surface area (S_{BET}, m^2g^{-1})	Pore diameter (nm)	Pore volume (cm^3g^{-1})
TS01	SiO_2	553.31	3.42	0.65
TS73	TiO_2/SiO_2 70/30	196.52	3.71	0.44
TS82	TiO_2/SiO_2 80/20	165.93	3.79	0.38
TS91	TiO_2/SiO_2 90/10	110.49	16.46	0.47
TS10	TiO_2	53.97	16.72	0.31

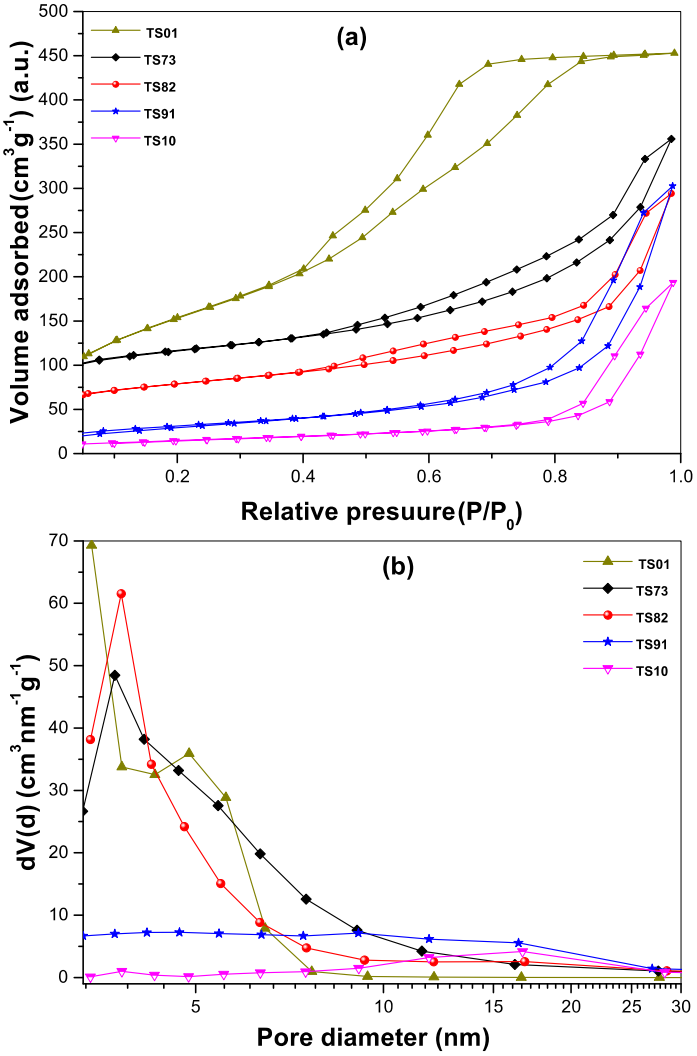

Figure S1. (a) N_2 adsorption-desorption isotherms and (b) pore size distribution plots of composite powders with different TiO_2/SiO_2 weight ratios.

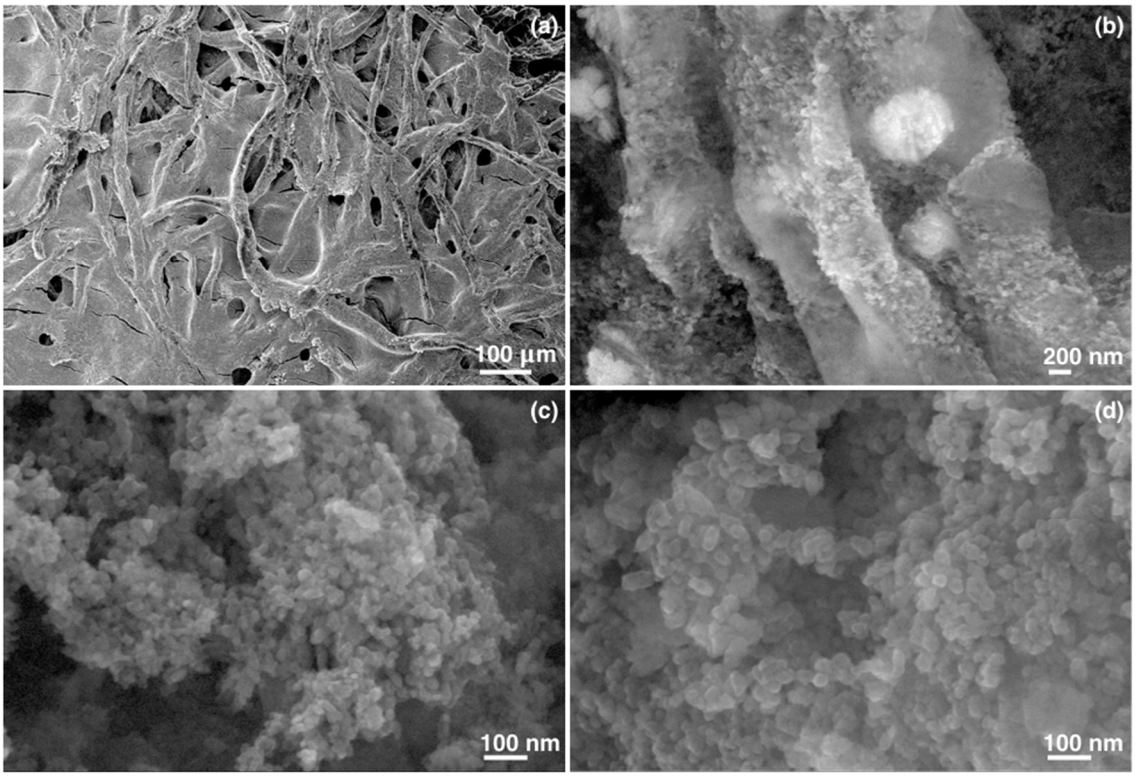

Figure S2. FESEM images of TS82C, (a, b) As prepared composite after drying, (c, d) after calcination at 550 °C.

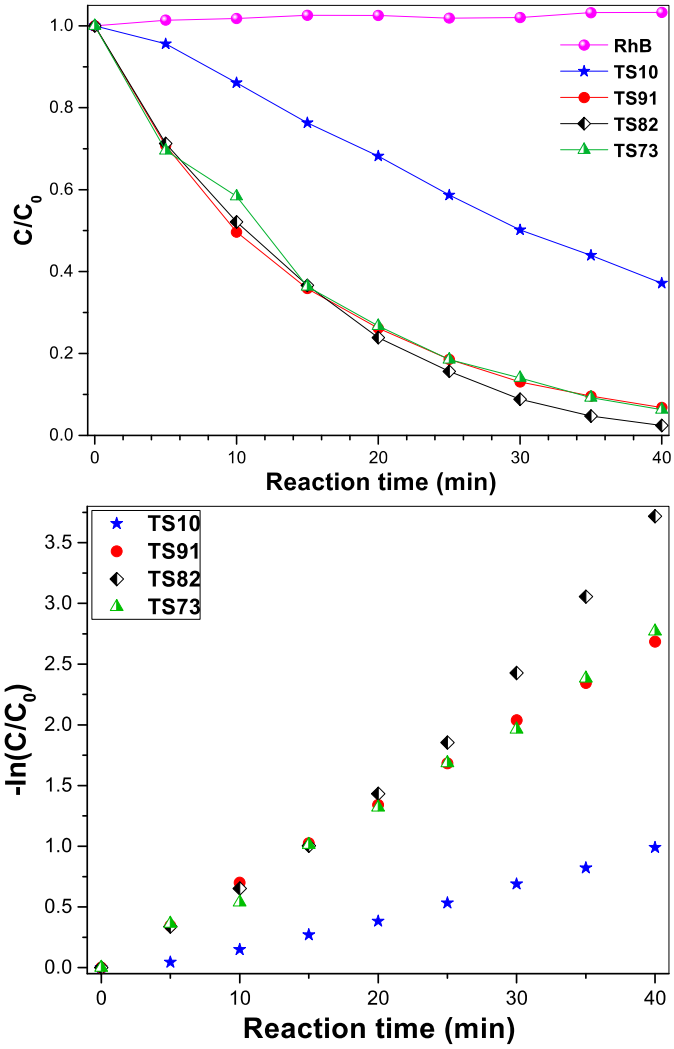

Figure S3. Photocatalytic degradation of RhB dye (15×10^{-6} M) with different TiO_2/SiO_2 photocatalysts.

Table S2. Parameters of RhB dye degradation kinetics with different TiO_2/SiO_2 composites.

Sample	**Rate constant (K, min^{-1})**	**Adj. R^2**
TS10	0.025	0.97
TS91	0.067	0.99
TS82	0.092	0.98
TS73	0.068	0.99

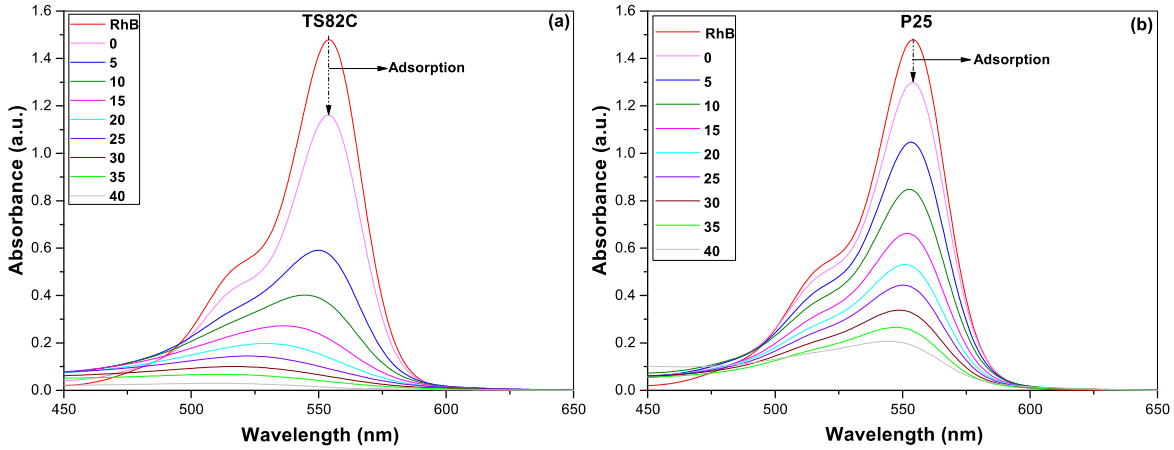

Figure S4. Optical absorption spectra of RhB dye (15×10^{-6} M) with solar light exposure time performed with (a) TS82C and (b) P25 photocatalysts. The adsorption-desorption equilibrium was determined after stirring of 18 h at the dark.

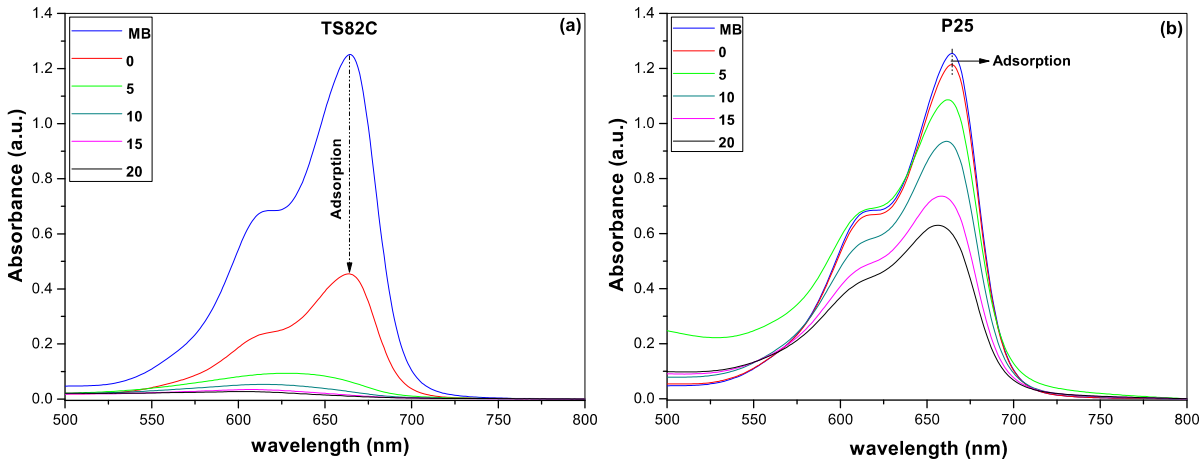

Figure S5. Optical absorption spectra of MB dye (15×10^{-6} M) with solar light exposure time performed with (a) TS82C and (b) P25 photocatalysts. The adsorption-desorption equilibrium was determined after stirring of 18 h in dark.

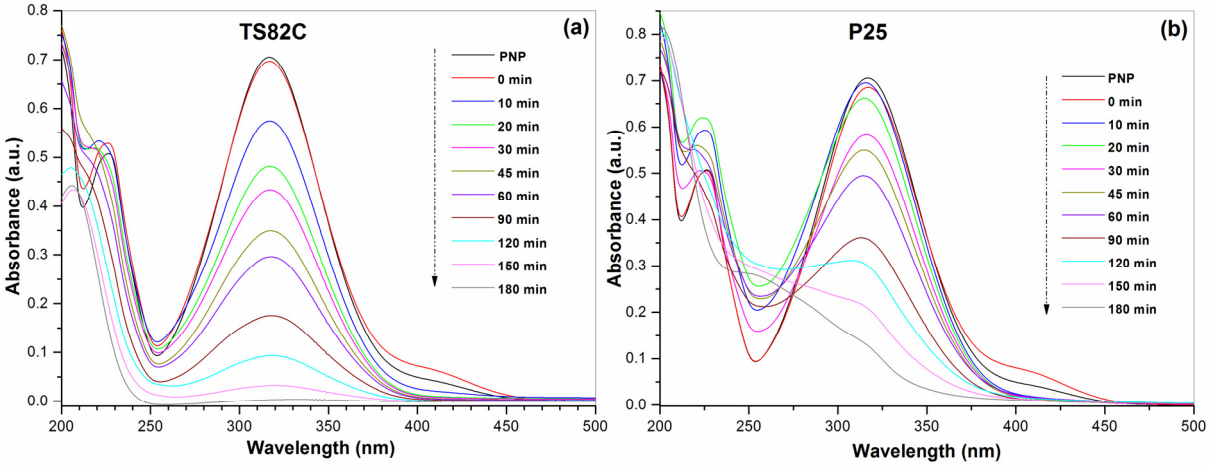

Figure S6. Optical absorption spectra of 4NP compound (15×10^{-6} M) with solar light exposure time performed with (a) TS82C and (b) P25 photocatalysts. The adsorption-desorption equilibrium was determined after stirring of 18 h in dark.

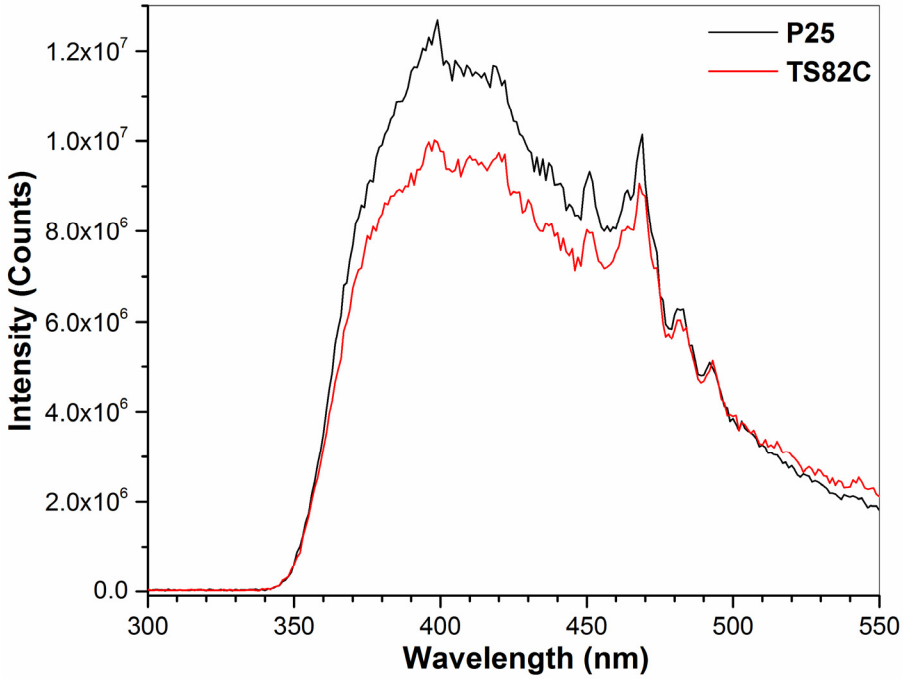

Figure S7. Photoluminescence (PL) spectra of TS82C nanocomposite (Red line) and P25 TiO_2 (Black line) measured on Horiba JOBIN YVON Fluoromax-P PL spectrophotometer using 365 nm as the excitation wavelength.

Table S3. Comparative study of the photocatalytic activity with different TiO_2/SiO_2 photocatalysts.

Catalyst	Catalyst dose	Pollutant	Pollutant dose/volume	Light source	Photocatalytic efficiency
TiO_2-SiO_2 aerogel[1]	0.6g/L	Methylene Blue	48 mg/L, 200 mL	100W Mercury lamp	K=0.0681 min^{-1}/70 min (96%)
TiO_2@SiO_2 NPs[2]	0.5–1.0 g/L	Methylene Blue	10 mg/L	Sunlight/8W UV lamp	120 min (98%)/240 min (95%)
3D hollow SiO_2@TiO_2 spheres[3]	0.3 g/L	Rhodamine B	20 mg/L, 50 mL	300W Hg lamp	K=0.0465 min^{-1}/105 min^{-1} 82.24%
SiO_2@TiO_2 core@shell NPs[4]	0.428 g/L	Crystal Violet	20 mg/L, 35 mL	Xe arc lamp (18.5 mW/cm^2@365 nm)	50 min (≥90%)
TiO_2-SiO_2 hollow nanospheres[5]	2.5 g/L	Methylene Blue	50 mg/L, 20 mL	Hg UV lamp@365 nm	140 min (~ 90%)
TiO_2-SiO_2 nanocomposite[6]	1 g/L	Methylene Blue	10 mg/L, 500 mL	9W/78 UVA lamp (1.5 W; 315–400 nm)	K=0.056 min^{-1} 120 min (~ 95%)
TiO_2/SiO_2 powder[7]	0.5 g	4-Nitrophenol	20 mg/L	125 W Hg lamp, 10.8 mW/cm^2	240 min (~ 100%)
Hollow TiO_2-SiO2 microspheres[8]	1 g/L	Methyl Orange	10 mg/L	300 W Xe arc lamp	100 min (~ 100%)
This work	1 g/L	Methylene Blue	15 x 10^{-6} M (~ 5 mg/L)	300 W Tungsten lamp (41.4 W/m^2, 380–780 nm)	K=0.188 min^{-1} 20 min (~ 100%)

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