Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supplementary material:

Thermal vacuum de-oxygen fabrication of a new building pigment: $SiO_2@TiO_{2-x}$ amorphous photonic crystals for formaldehyde removals

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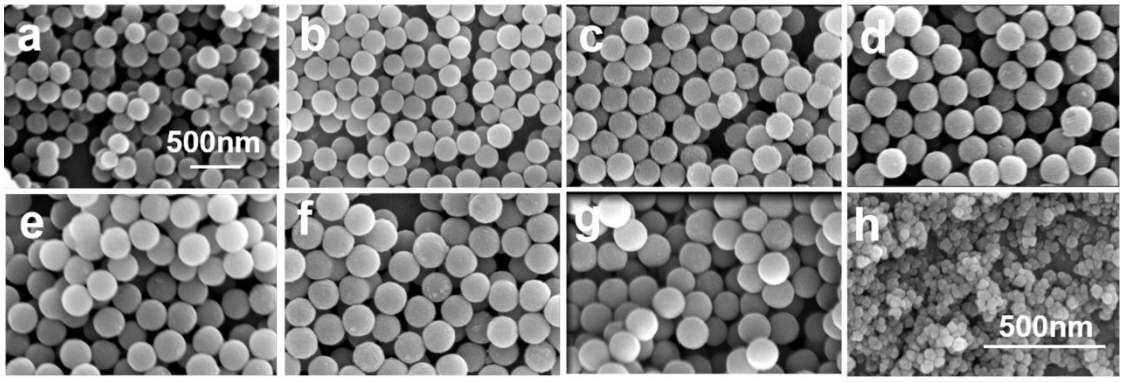

Fig. S1 SEM of images of SiO_2@TiO_2 different diameters: (a) 187 nm, (b) 204 nm, (c) 216 nm, (d) 237 nm, (e) 254 nm, (f) 276 nm and (g) 298 nm. (h) 25nm black TiO_2 nanoparticles.

Table S1 Z-fit equivalent circuit data of samples.

Sample	Rs(Ω)	Q(x10^{-5}Ssec^{n})	n	Rt(Ω)
SiO_2@TiO_2	21.77	1.399	0.8566	850.7
1-SiO_2@TiO_{2-x}	17.26	1.615	0.8694	384.81
2-SiO_2@TiO_{2-x}	17.18	1.823	0.8528	307.9
3-SiO_2@TiO_{2-x}	14.74	2.516	0.8331	62.21

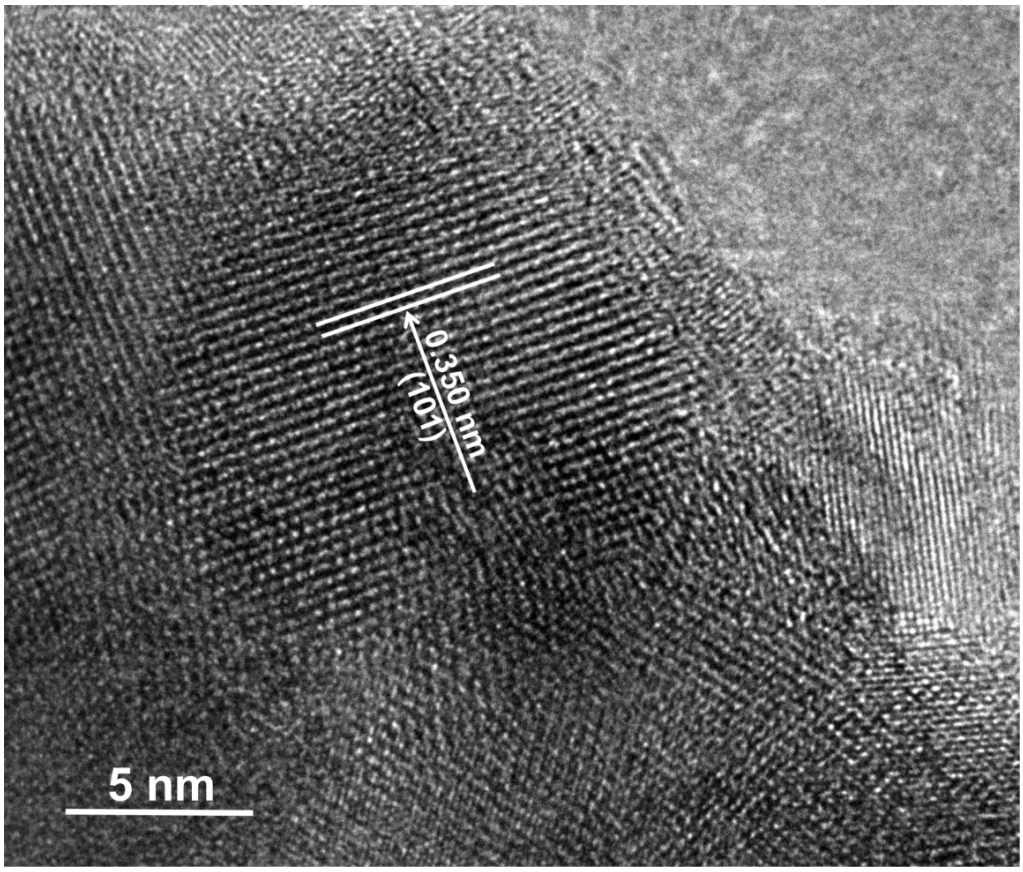

Fig. S2 SiO_2@TiO_2 nanospheres after calcination at 550 ℃ for 2 h in air.

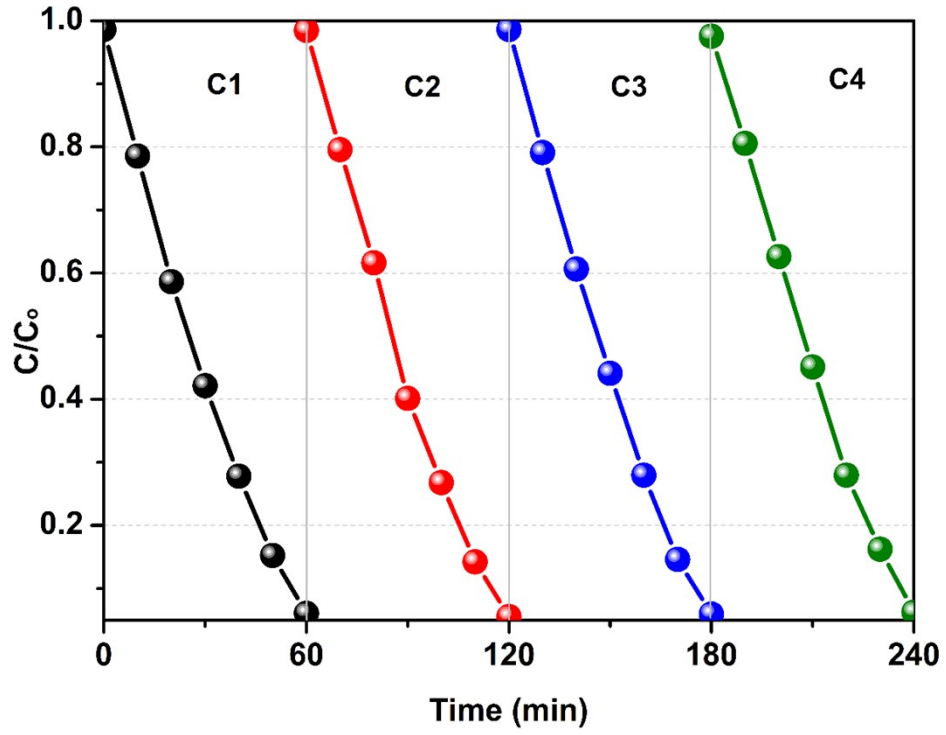

Fig. S3 photodegradation of RhB by recovered 2-SiO_2@TiO_{2-x} showed recyclability in

the repeated photocatalytic cycle.

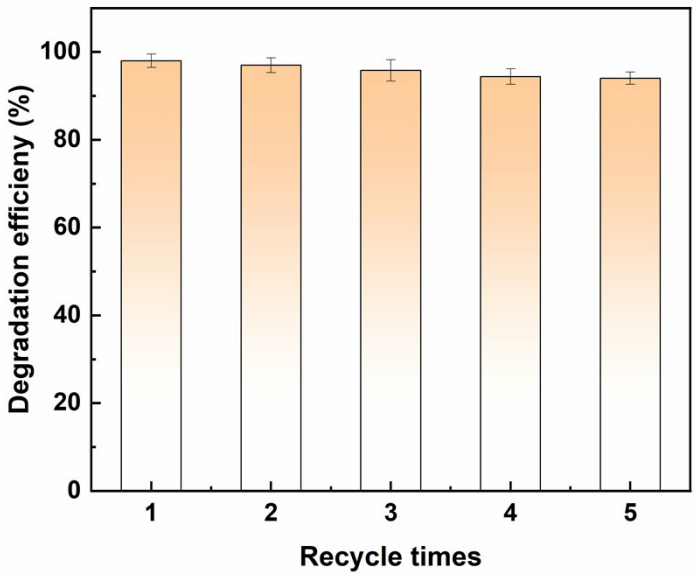

Fig. S4. Cycling tests for 2-SiO_2@TiO_{2-x} amorphous photonic crystals, at conditions as: 200 mg of catalysts, 120 min irradiation.

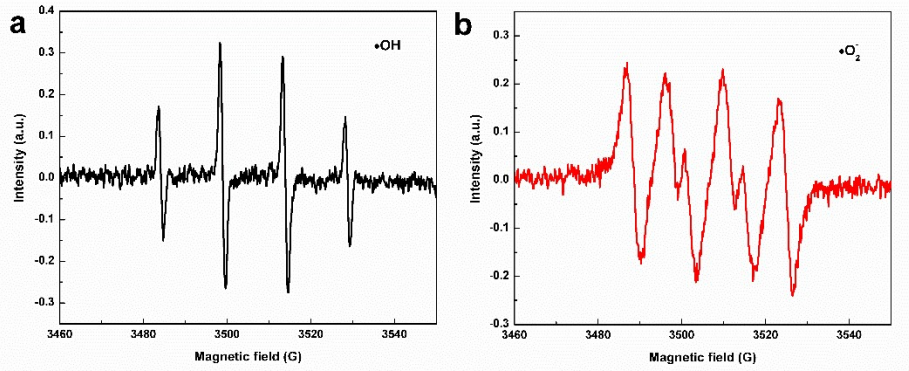

Fig. S5. ESR spectra from 2-SiO_2@TiO_{2-x} amorphous photonic crystals showing hydroxyl radical (•HO) and superoxide ($•O_2^-$) generation