

Electronic Supplementary Information

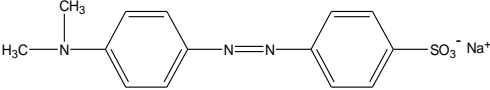
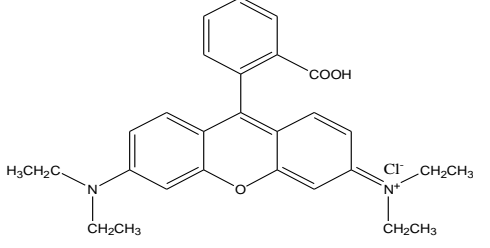
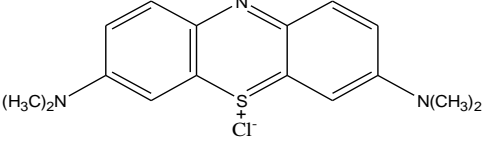
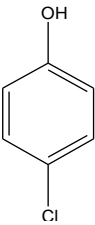
Probing photonic effect on photocatalytic degradation of dyes based on 3D inverse opal ZnO photonic crystal

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Table S1 the properties of probe molecules.

	Position of absorption peak /nm	Color	Molecular charge	Structural formula of the molecule
Methyl orange (MO)	464	orange	anionic	
Rhodamine B (RhB)	554	pink	cationic	
Methylene blue (MB)	664	blue	cationic	
4-chlorophenol (4-CP)	224	colorless	anionic	

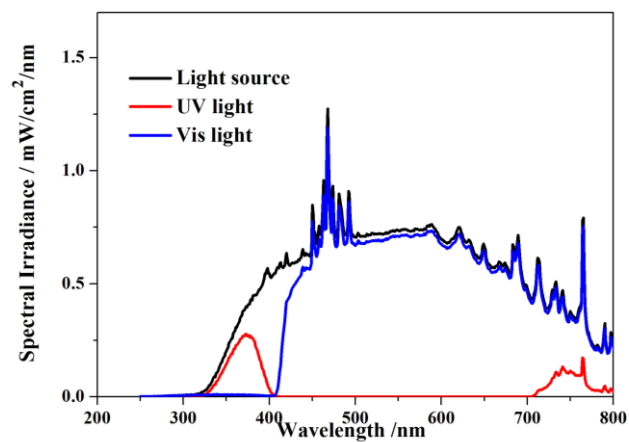


Fig. S1 The spectral intensities emitted by a light source equipped with different filters.

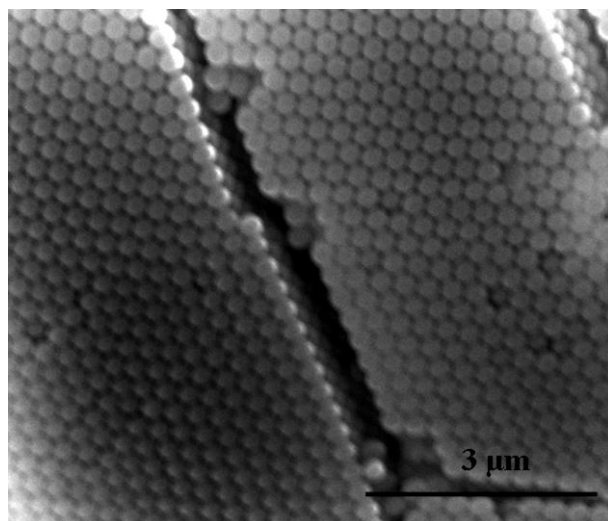


Fig. S2 SEM image of the PS opal template under cross-sectional view.

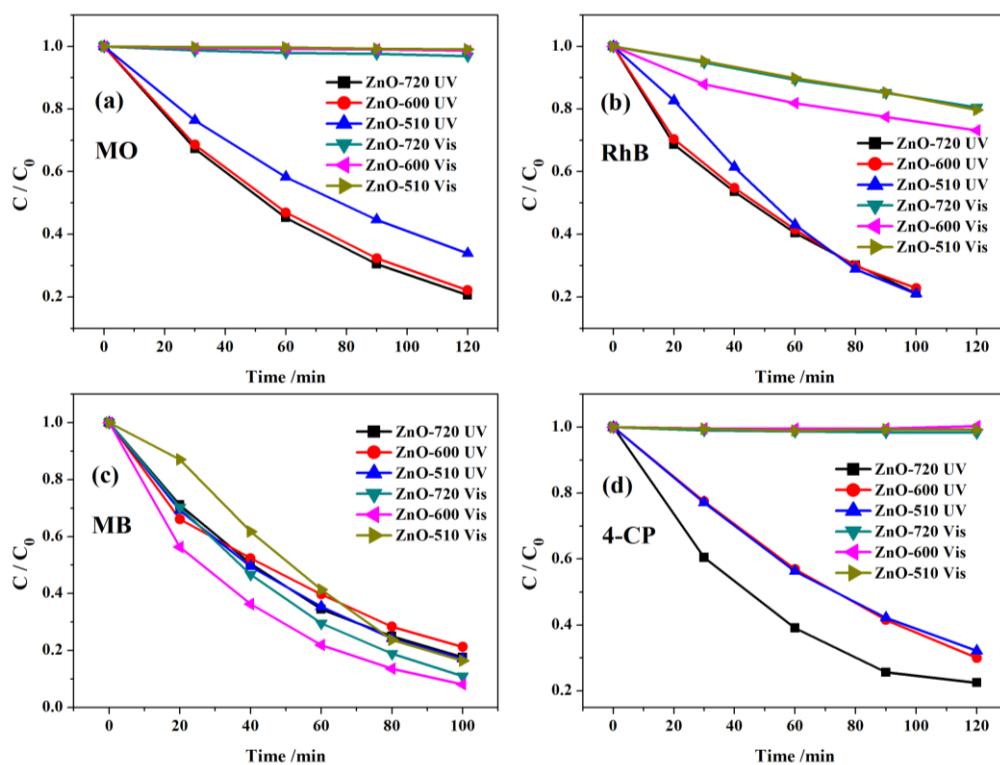


Fig. S3 Probe molecules degradation over the as-prepared ZnO-PCs under UV light and visible (Vis) light irradiation.

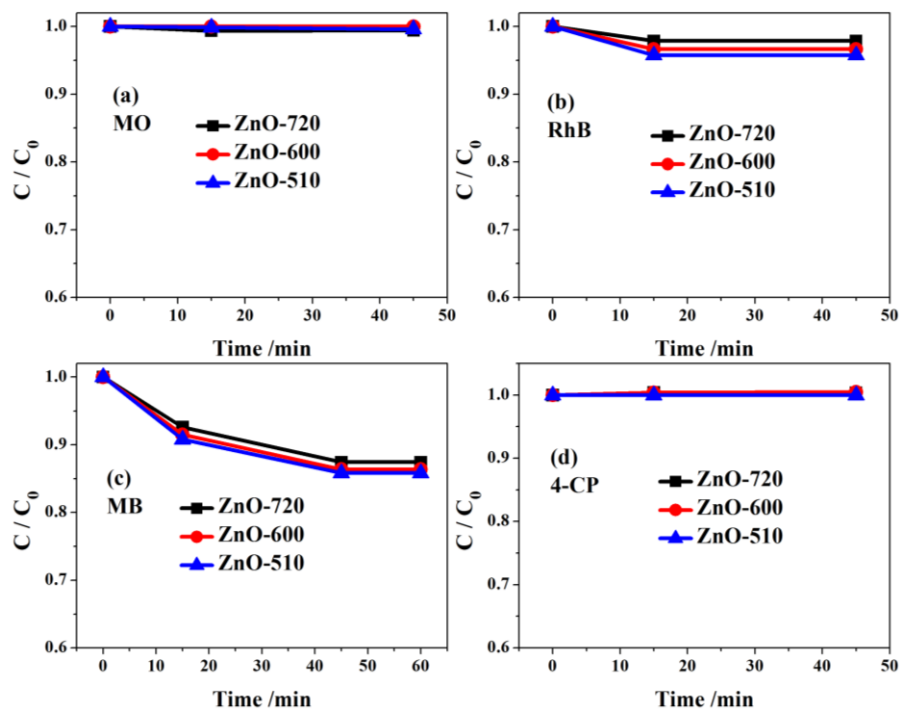


Fig. S4 Time profiles of adsorption of probe molecules over ZnO-PCs in the dark.

Table S2 Kinetic constants (k) and regression coefficients (R^2) of pollutants degradation under UV and visible (Vis) light irradiation.

		ZnO-510		ZnO-590		ZnO-700	
		k / min^{-1}	R^2	k / min^{-1}	R^2	k / min^{-1}	R^2
MO	UV	0.009	1	0.01256	1	0.01319	1
	Vis	8E-5	0.9211	1E-4	0.9235	5E-4	0.9457
RhB	UV	0.01646	0.9815	0.01462	0.9979	0.01501	0.9961
	Vis	0.0019	0.9996	0.00223	0.9694	0.00179	0.9987
MB	UV	0.01762	0.9996	0.01508	0.9943	0.01744	0.9997
	Vis	0.01905	0.9687	0.02477	0.9990	0.02208	0.9945
4-CP	UV	0.0101	0.9974	0.00957	0.9990	0.01281	0.9579
	Vis	-		-		-	

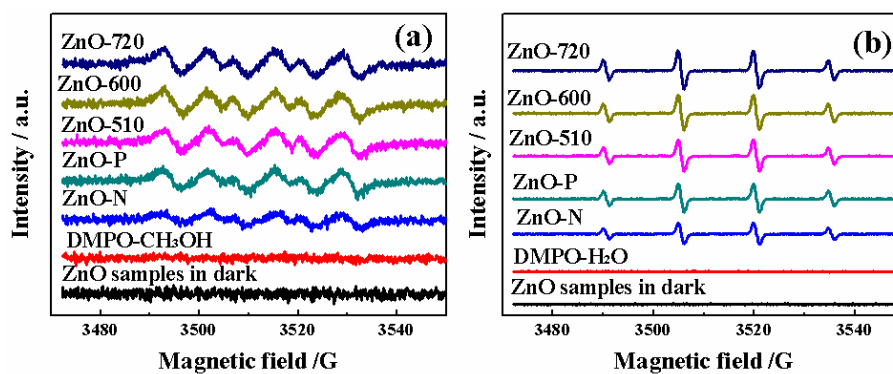


Fig. S5 ESR spectra of radical adducts trapped by DMPO in ZnO samples dispersions under UV light: (a) $\text{DMPO}\cdot\text{O}_2^-$ formed in methanol dispersion; (b) $\text{DMPO}\cdot\text{OH}$ formed in aqueous dispersions.

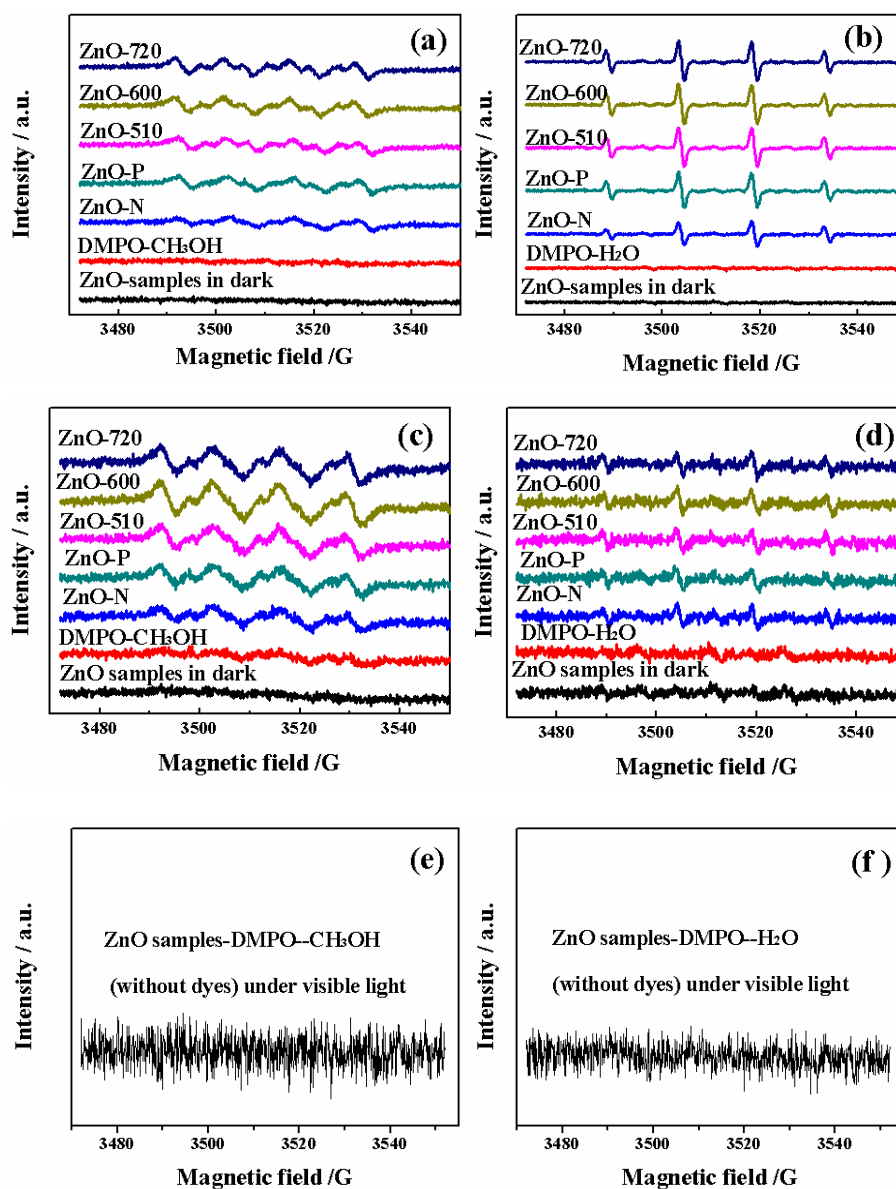


Fig. S6 ESR spectra of radical adducts trapped by DMPO in ZnO adsorbed dye dispersions under visible light irradiation: (a) DMPO-·O₂⁻ formed in ZnO/RhB methanol dispersion; (b) DMPO-·OH formed in ZnO/RhB aqueous dispersions with pH 4. (c) DMPO-·O₂⁻ formed in ZnO/MB methanol dispersion; (d) DMPO-·OH formed in ZnO/MB aqueous dispersions with pH 4. (e) DMPO-·O₂⁻ formed in ZnO samples (no adsorbed dyes) methanol dispersion; (f) DMPO-·OH formed in ZnO samples (no adsorbed dyes) aqueous dispersions with pH 4.

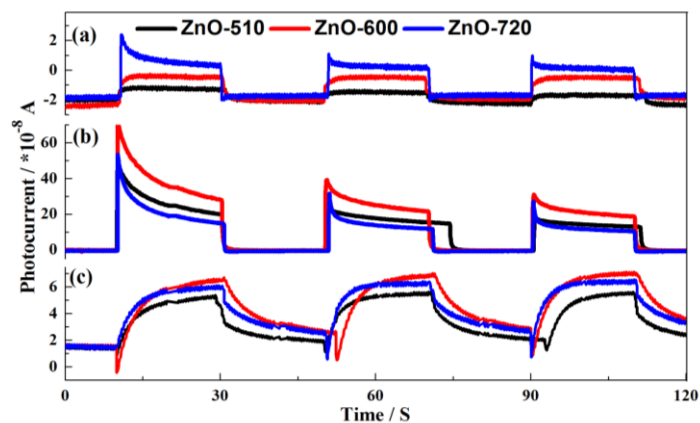


Fig. S7 Photocurrent responses of ZnO-PCs in (a) 0.1 M Na_2SO_4 , (b) 0.1 M Na_2SO_4 contained 2.4 ppm RhB, and (c) 0.1 M Na_2SO_4 contained 2 ppm MB aqueous solutions under visible light irradiation, respectively.