ELECTRONIC SUPPLEMENTARY INFORMATION

Ionic Liquid-Based Solvent-Induced Shape-Tunable Small-Sized ZnO Nanostructures with Interesting Optical Properties and Photocatalytic Activities

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Table S1. Hansen solubility parameters for different solvents used in the synthesis of ZnO NPs.

* These values are obtained from the liner combination of the respective properties of the solvent mixtures.

Solvents	Dispersion	Polar	Hydrogen
MeOH	14.7	12.3	22.3
DMF	17.4	13.7	11.3
Dioxane	19	1.8	7.4
THF	16.8	5.7	8.0
DMSO	18.4	16.4	10.2
Dioxane: MeOH = 1:1	16.85*	7.05*	14.85*
Dioxane: DMF=1:1	18.2*	7.75*	9.35*
Dioxane:DMF:DMSO = 45: 45: 10	18.22*	8.615*	9.435*

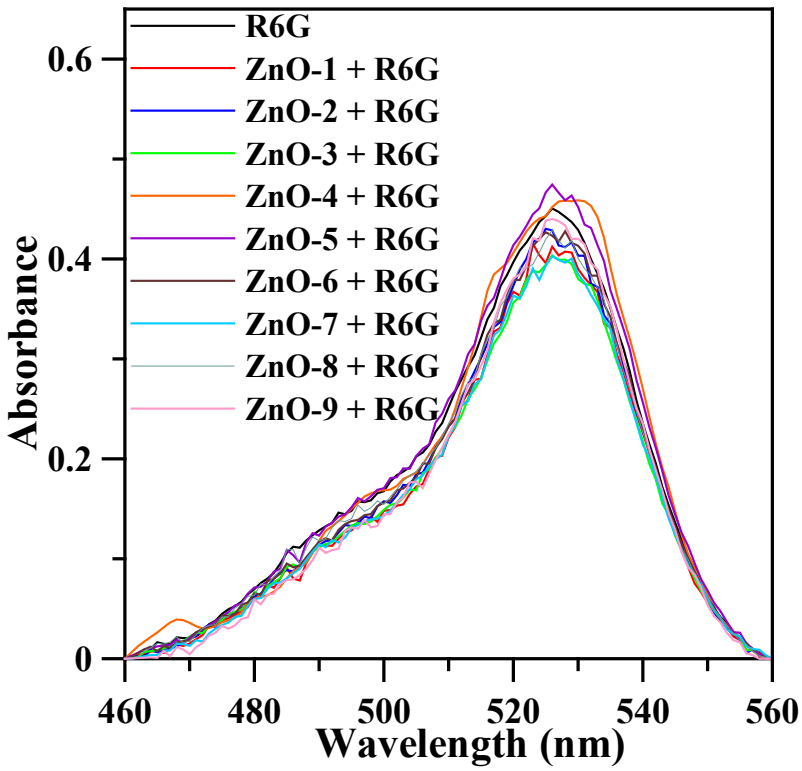


Figure S1. Plot showed the variation of absorbance Rhodamine 6G after mixing with different ZnO nanostructures before photodegradation. From the plots, it is clear that all ZnO nanostructures adsorbed small amount of rhodamine 6G before photodegradations. In all cases the amount of ZnO is taken ~ 1 mg.

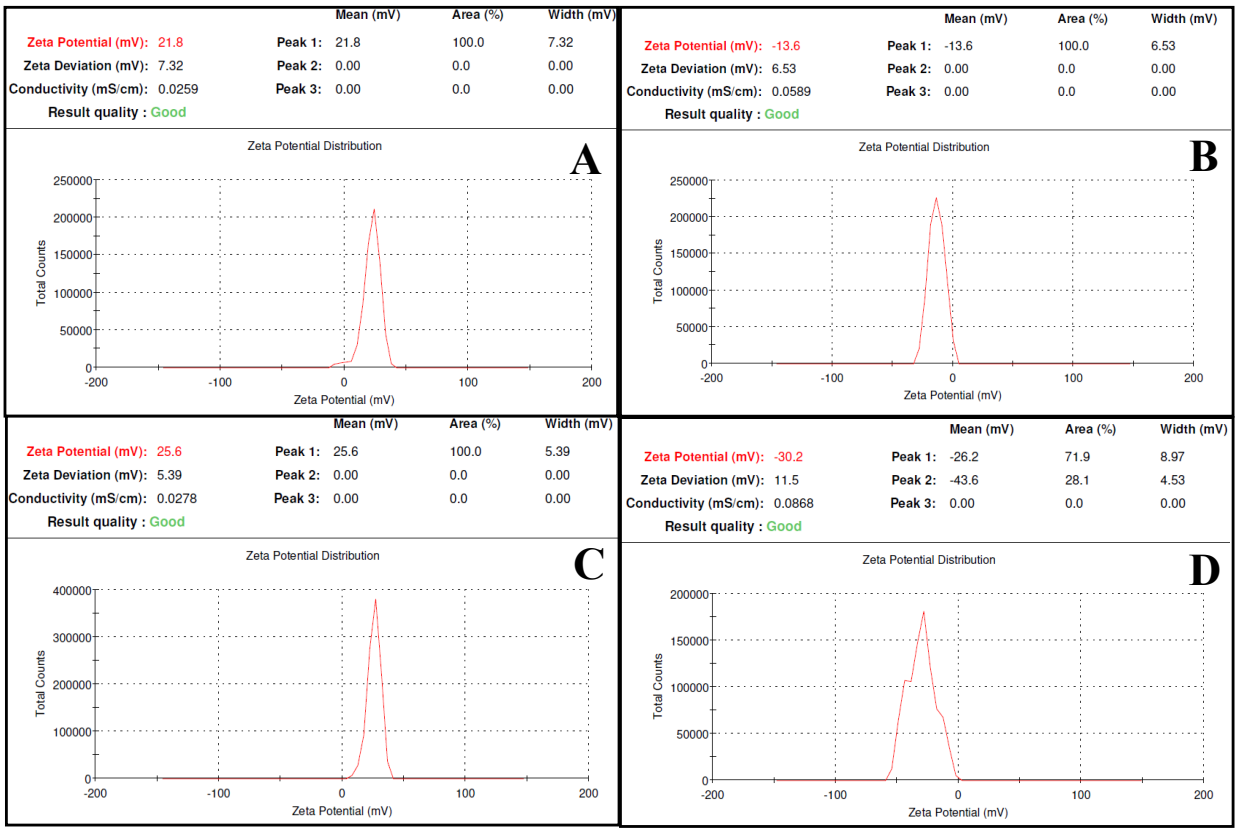
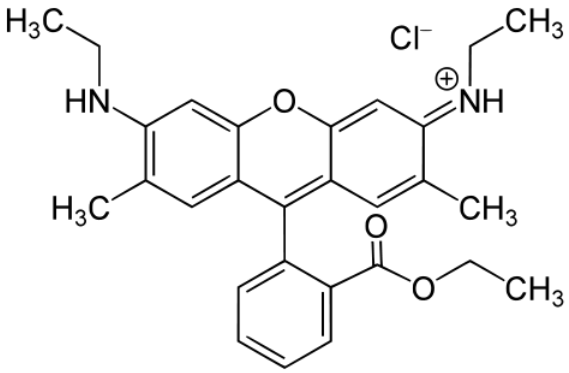
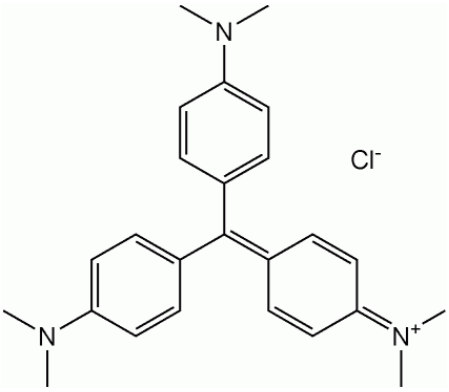


Figure S2. Plot showed the variation of zeta potential at different pH values; (A) ZnO-2 at pH = 7.5; (B) ZnO-2 at pH = 10.5 (C) ZnO-3 at pH = 7.5 and (D) ZnO-3 at pH = 10.5

Rhodamine 6G: λ_{max} = 526 nm



Crystal Violet: λ_{max} = 590 nm



Methylene Blue: λ_{max} = 663 nm

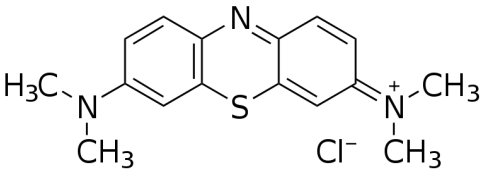


Figure S3. The chemical structures of the different organic dyes used for the photocatalytic study using different as-synthesized ZnO nanostructures.

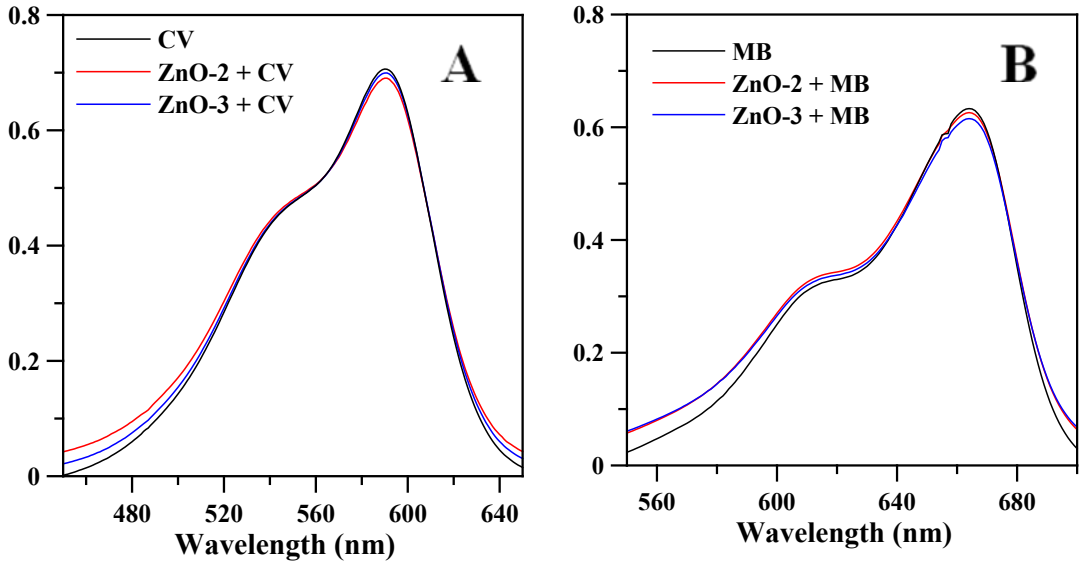


Figure S4. (A) Absorbance spectra of CV of 3mg/L in presence of ~1 mg of ZnO-2 and ZnO-3. (B) Absorbance spectra of MB of 3mg/L in presence of ~1 mg of ZnO-2 and ZnO-3.

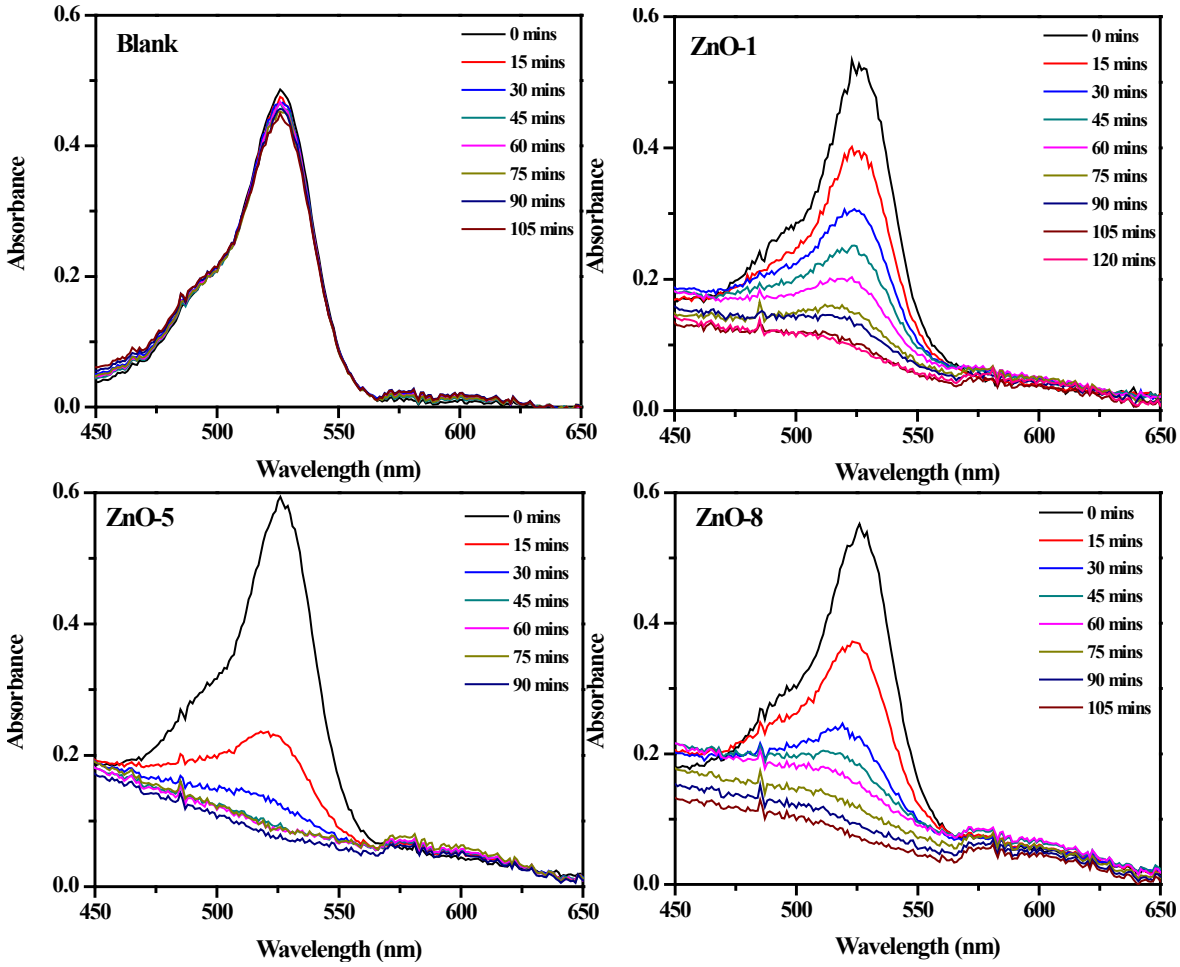


Figure S5. Plot showed the variation of absorbance with wavelength at different time for the during the photocatalytic degradation of rhodamine 6G without and with the presence of different ZnO samples at RT.(As representative case, only the spectra of Blank, ZnO-1, ZnO-5 and ZnO-8 were given.)

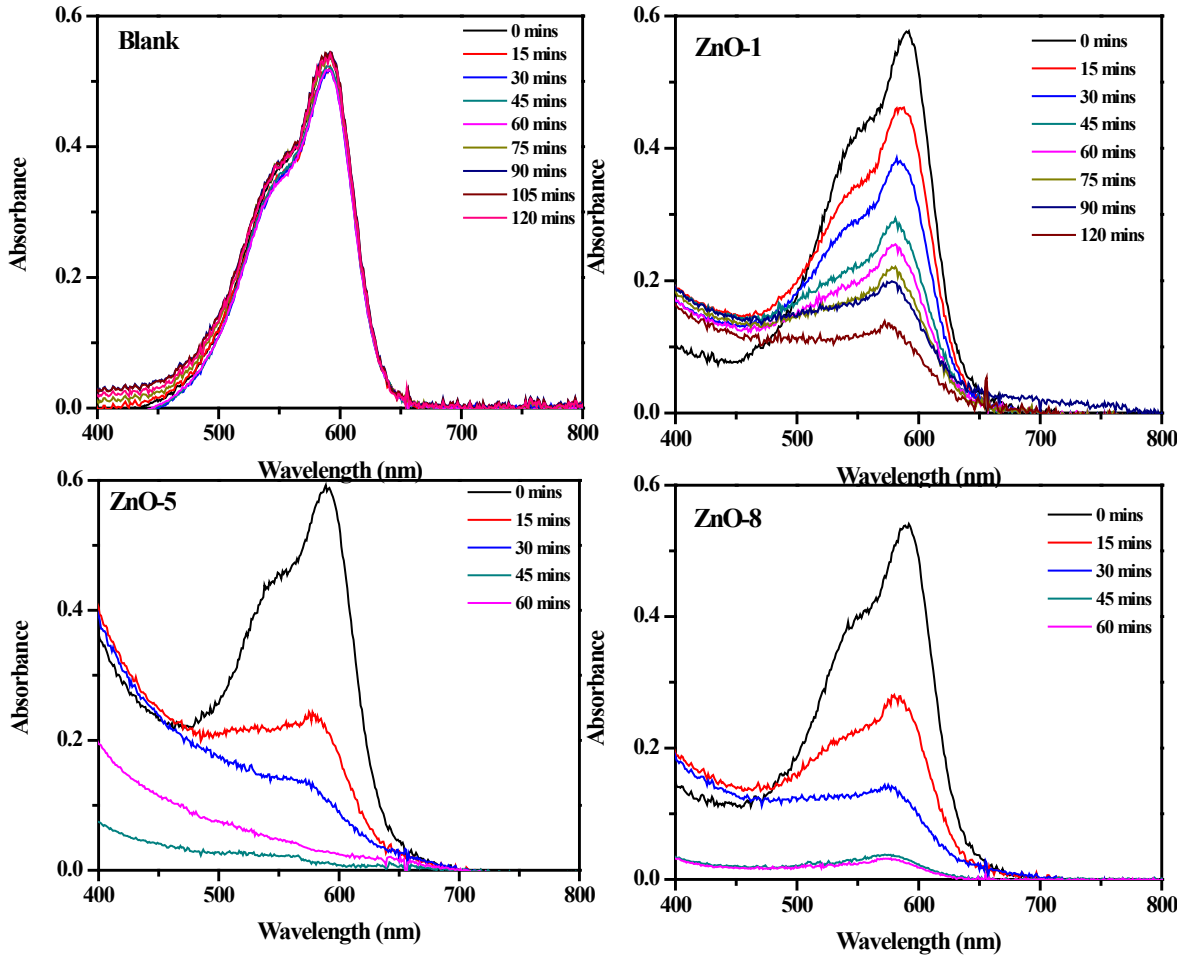


Figure S6. Plot showed the variation of absorbance with wavelength at different time for the during the photocatalytic degradation of crystal violet without and with the presence of different ZnO samples at RT.(As representative case, only the spectra of Blank, ZnO-1, ZnO-5 and ZnO-8 were given.)

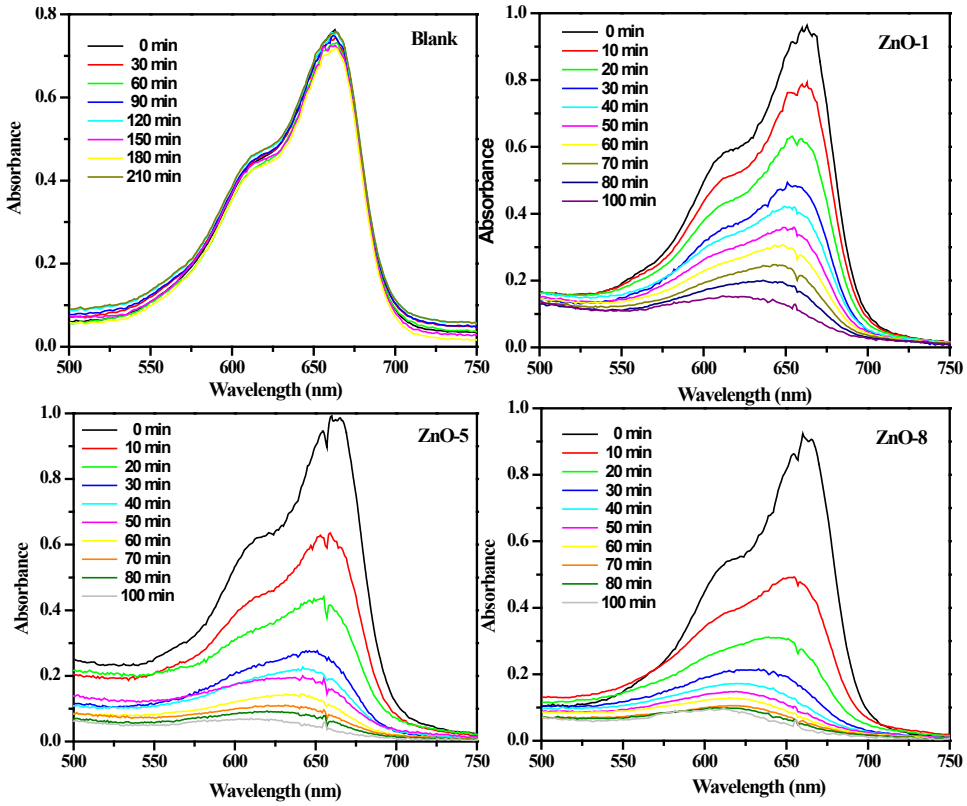


Figure S7. Plot showing the variation of absorbance at different UV irradiation time during the photocatalytic degradation of methylene blue without and with the presence of different ZnO samples at RT.(As representative case, only the spectra of Blank, ZnO-1, ZnO-5 and ZnO-8 were given.)

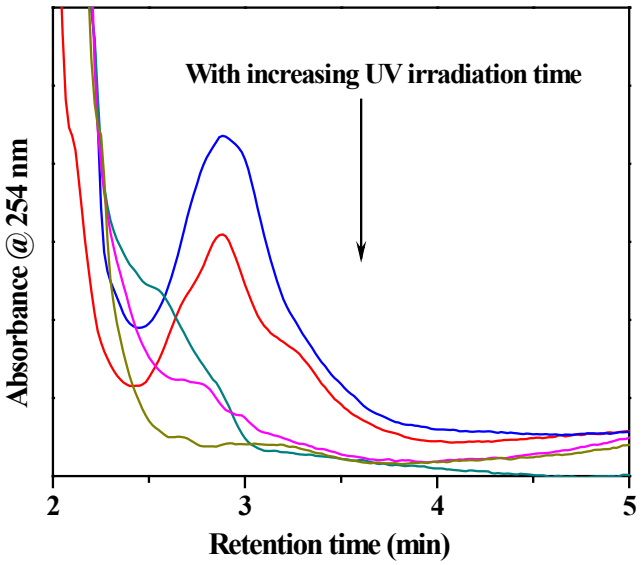


Figure S8. Successive HPLC traces of R6G during its photocatalytic degradation in the presence of ZnO-3 samples at RT.

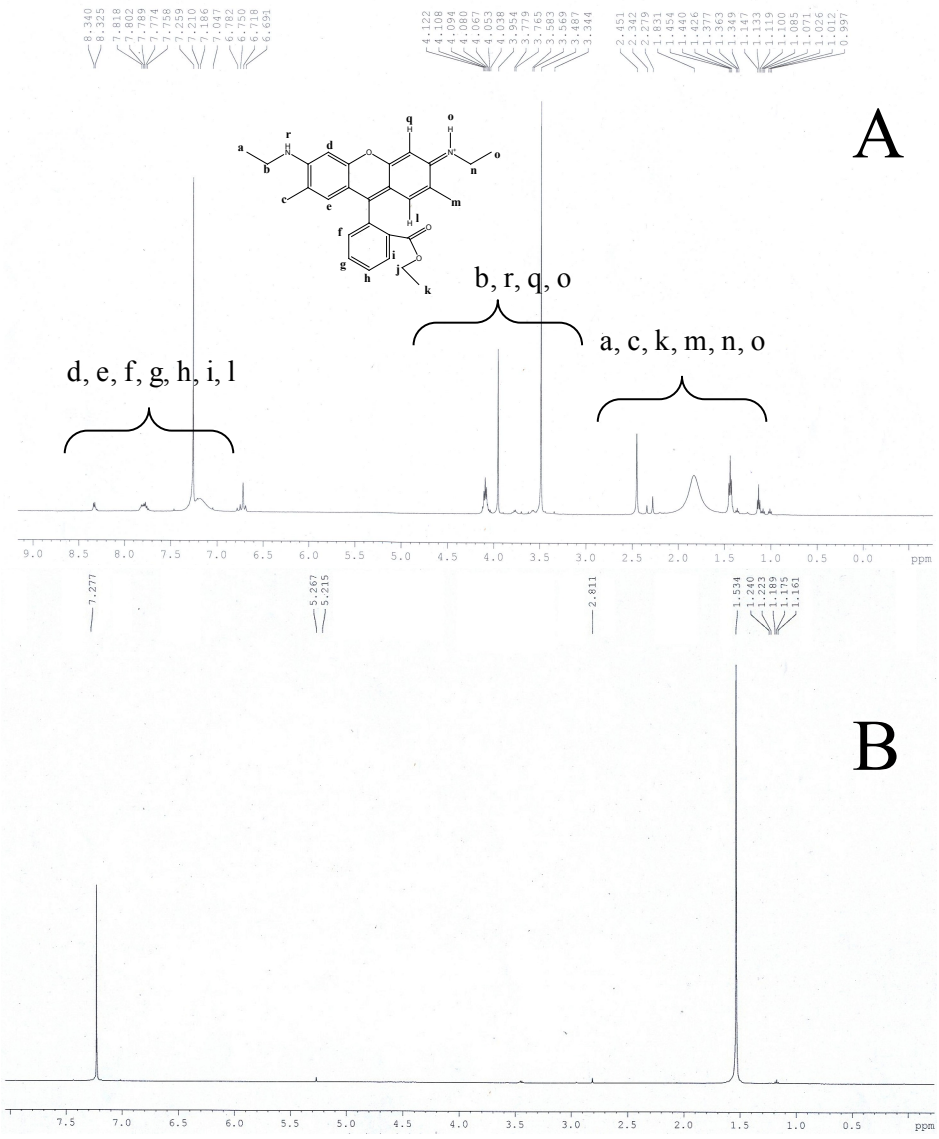


Figure S9. (A) ^{1}H NMR spectrum of R6G in $CDCl_3$. (B) ^{1}H NMR spectrum of R6G after complete photo degradation in $CDCl_3$.

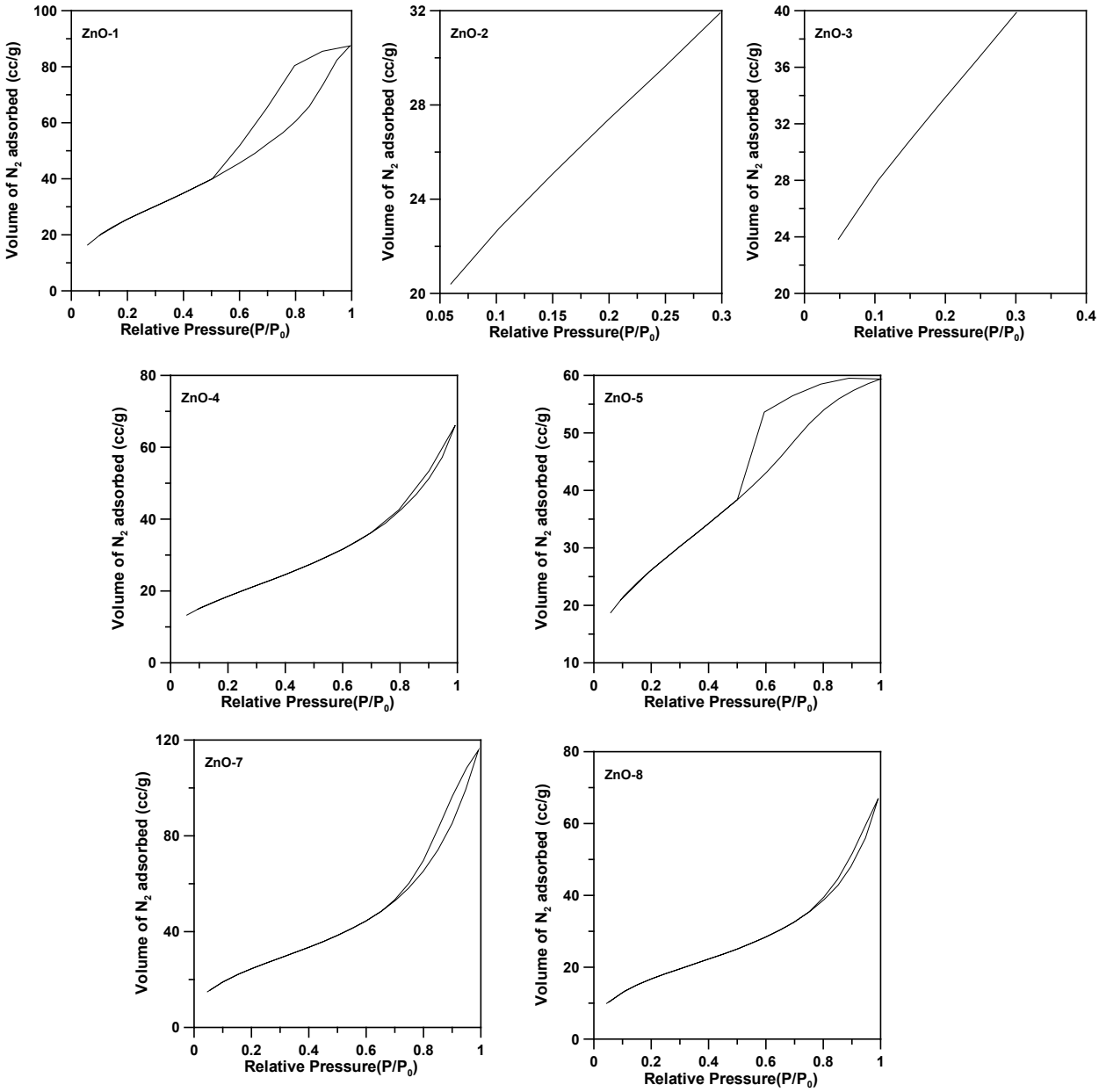


Figure S10. N_2 adsorption/desorption BET-isotherm of ZnO samples.

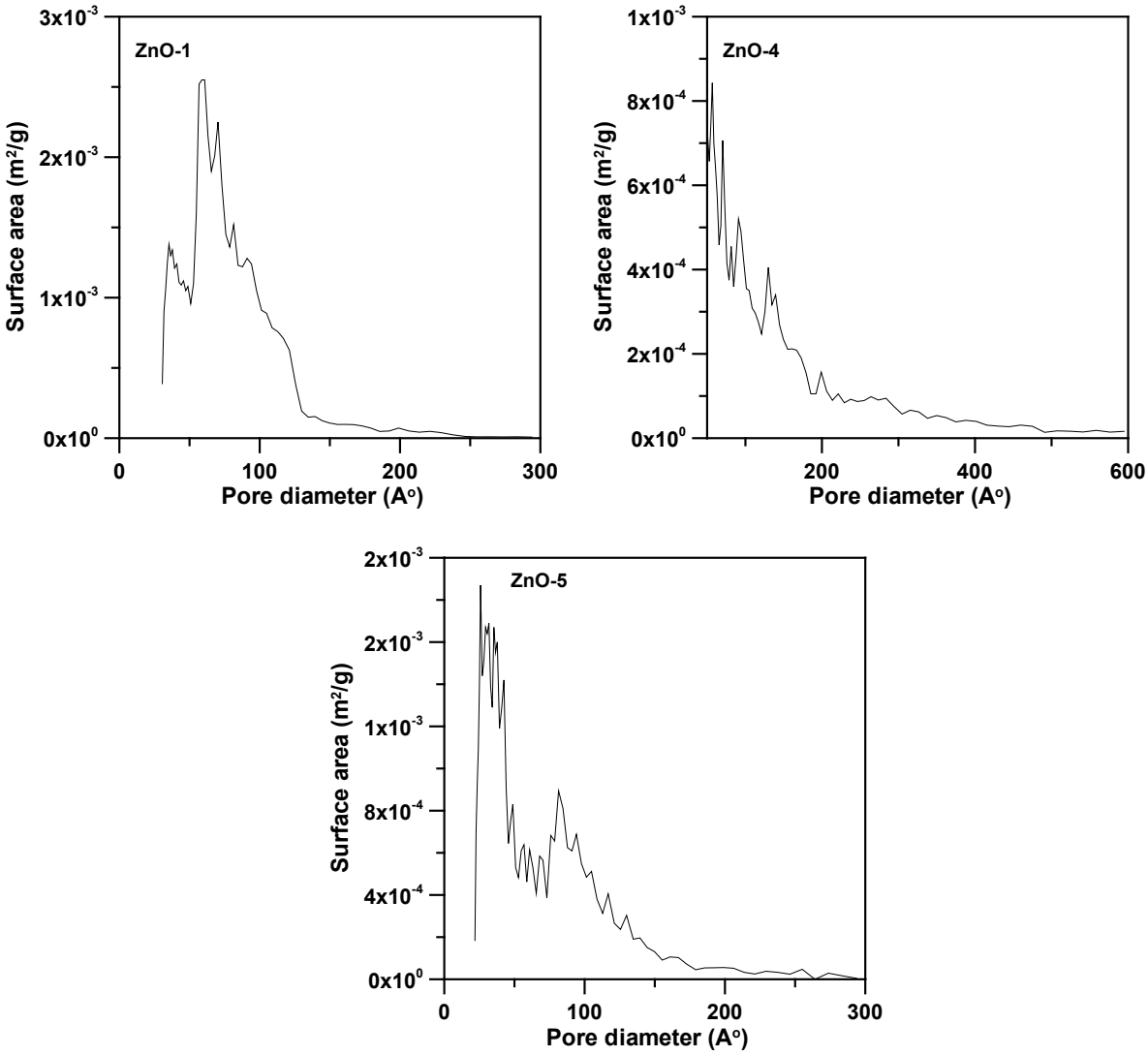


Figure S11. Pore-size distribution of ZnO samples.