

SUPPORTING FIGURES, DATA and TABLES

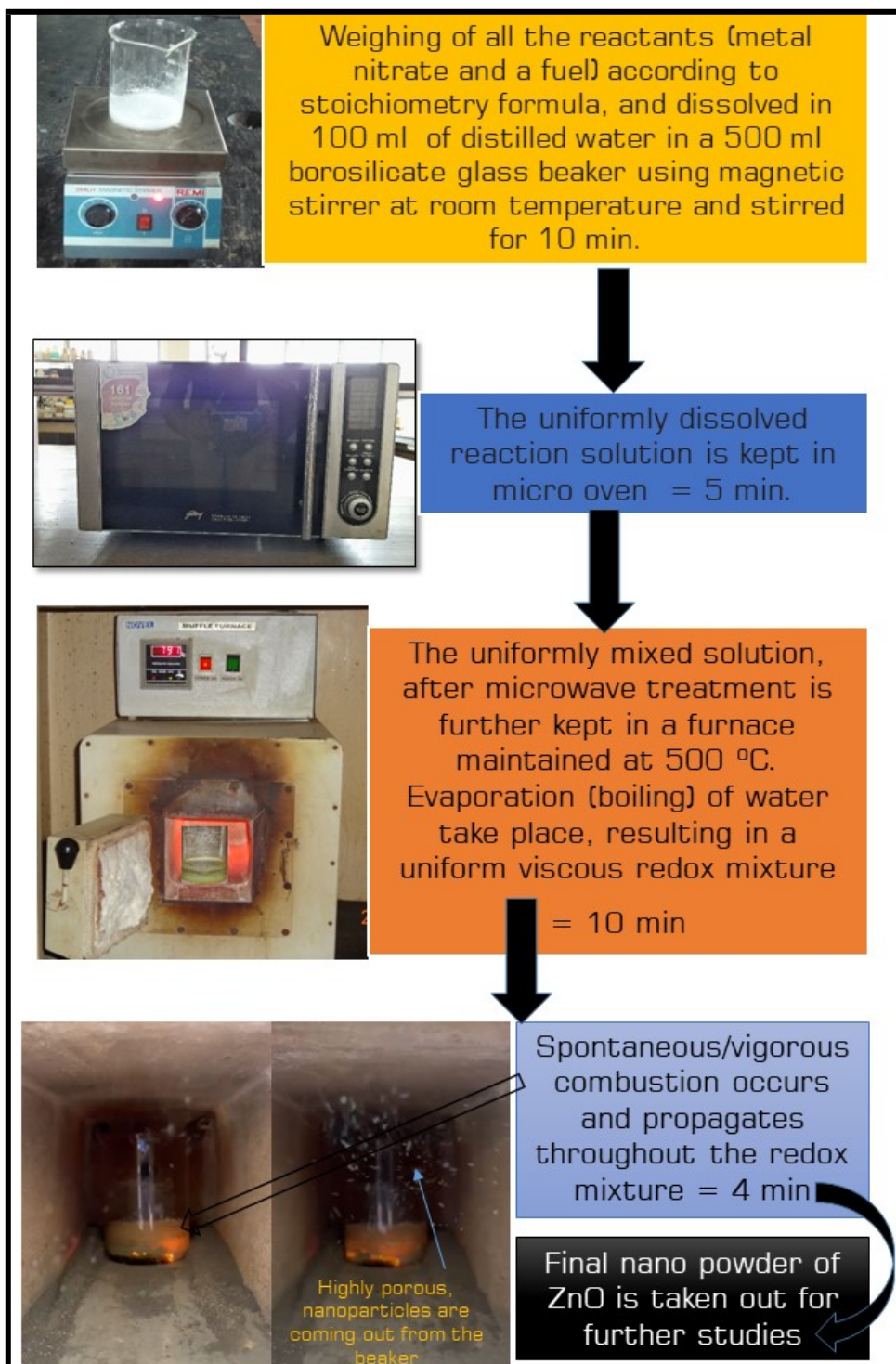


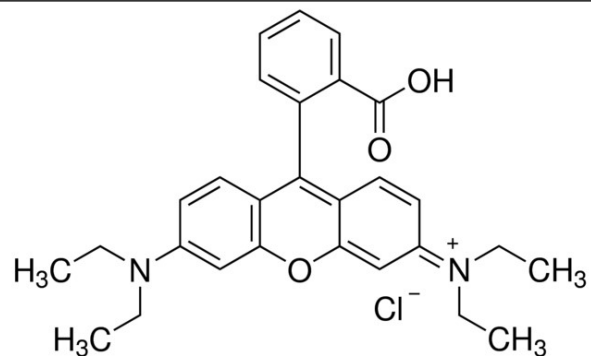
Figure S1: Schematic representation of the preparation of doped ZnO nanoparticles

Table S2. Details of important structural features of Rhodamine B dye

Structural details of Rhodamine B (RhB) dye

Chemical Formula $C_{28}H_{31}ClN_2O_3$

Chemical Structure



Physical appearance-colour Red to violet powder



IUPAC Name [9-(2-carboxyphenyl)-6-(diethylamino)xanthen-3-ylidene]-diethylazanium;chloride

CI name / CI Number 45170

Molar mass 479.02 g/mol

Solubility ~15 g/L (20 °C)

λ_{max} 554 nm

Charge on dye Cationic

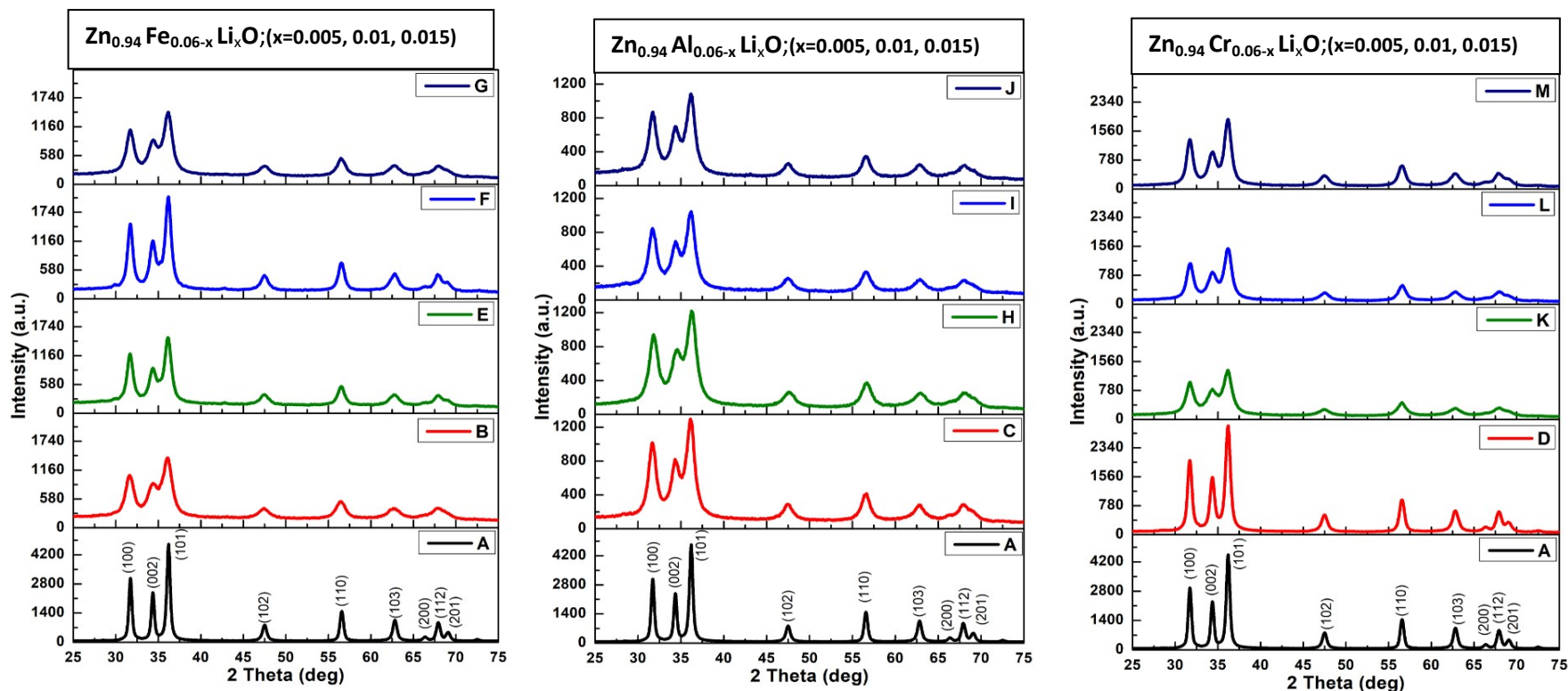


Figure S3. XRD patterns of (A) Pure ZnO, (B) 6 mol% Fe³⁺ doped ZnO (FZO); (C) 6 mol% Al³⁺ doped ZnO (AZO); (D) 6 mol% Cr³⁺ doped ZnO (CZO), (E) 0.5 mol% Li⁺ ion co-doped FZO, (F) 1 mol% Li⁺ ion co-doped FZO, (G) 1.5 mol% Li⁺ ion co-doped FZO, (H) 0.5 mol% Li⁺ ion co-doped AZO, (I) 1 mol% Li⁺ ion co-doped AZO, (J) 1.5 mol% Li⁺ ion co-doped AZO, (K) 0.5 mol% Li⁺ ion co-doped CZO, (L) 1 mol% Li⁺ ion co-doped CZO, and (M) 1.5 mol% Li⁺ ion co-doped CZO.

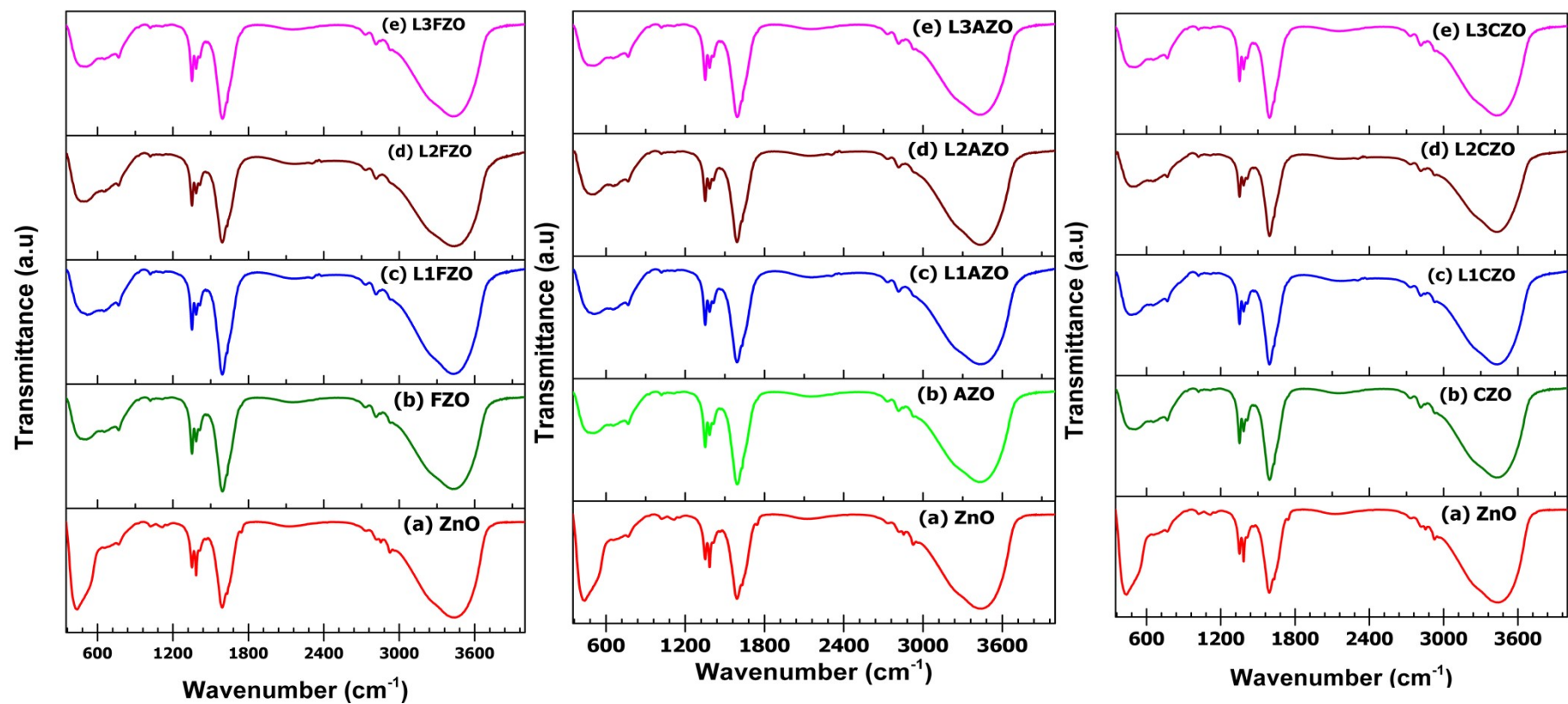


Figure S4. FTIR spectra of Li co-doped (a) FZO, (b) CZO (c) AZO photocatalyst with different Li⁺ ion concentrations

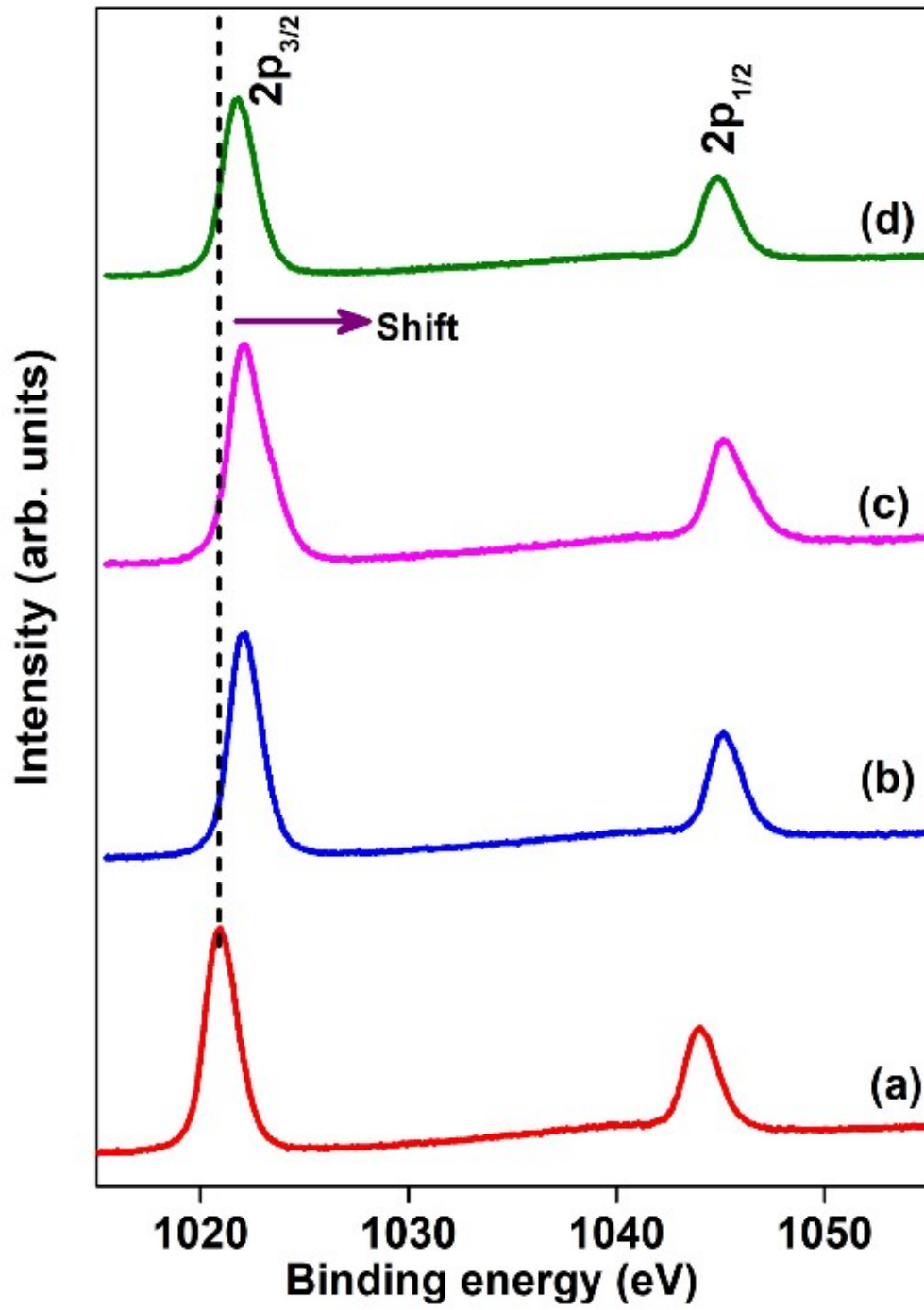


Figure S5: Zn 2p spectra of (a) pure ZnO, (b) FZO, (c) AZO and (d) CZO photocatalyst

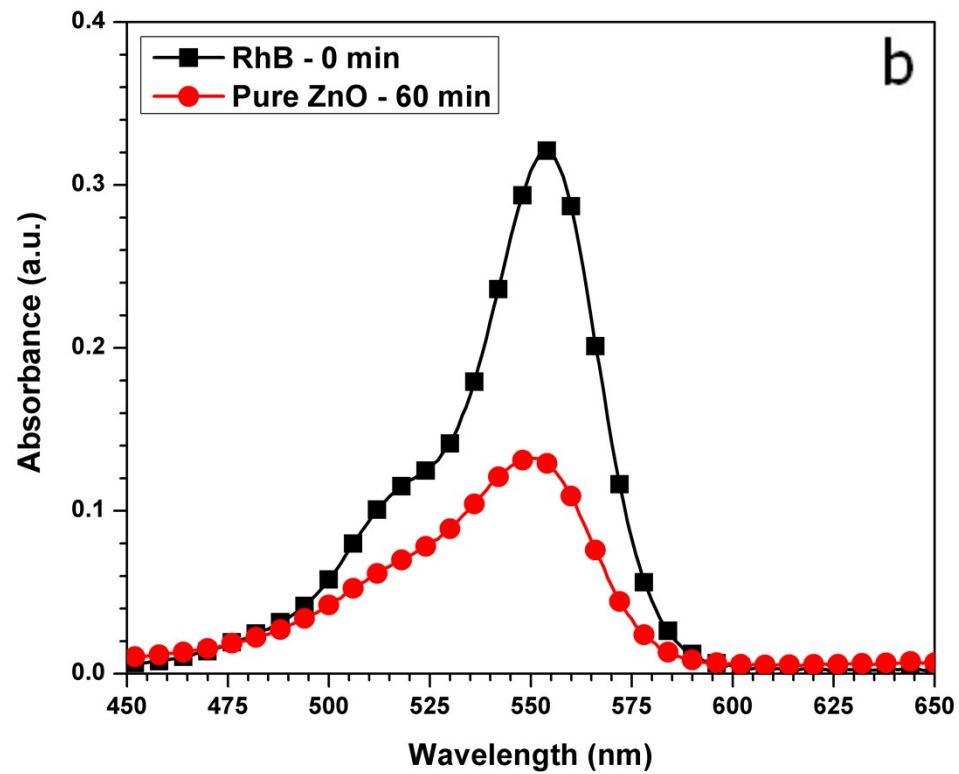
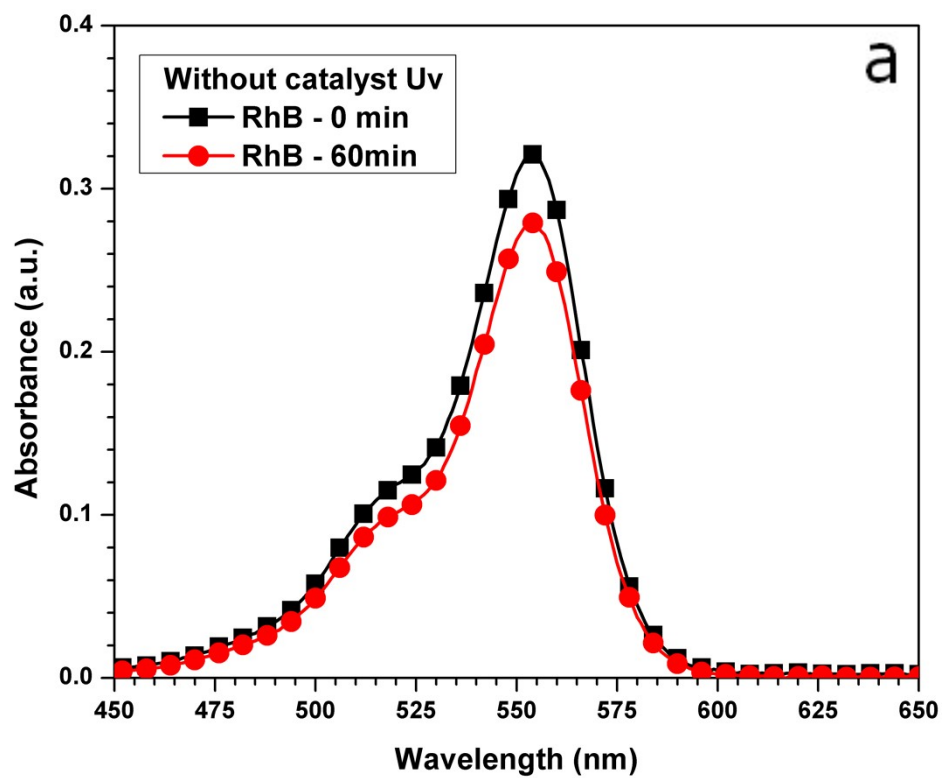


Figure S6: The absorbance spectra of RhB solution recorded at 0 min and after 60 min of UV light irradiation (a) Absence of catalyst, and (b) Presence of ZnO catalyst.