

Supplementary Information for
Enhanced photocatalytic activity of g-C₃N₄-LaFeO₃ for water reduction reaction through
mediator free Z-scheme mechanism

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Scavenger test involving the reactive species responsible for Rhodamine B (RhB) degradation reaction

To investigate the reactive species responsible for RhB degradation, different scavenger test has been performed viz. IPA, P-BQ, EDTA, DMSO for hydroxyl radical, superoxide radical, hole and electron respectively. To perform this experiment, a mixture of 20 mL of 20 ppm RhB, 0.02 g of 2CNLFO and 5 mM scavenging solution was exposed to visible light for 1 h under stirring condition. Prior to this the above mixture was kept in dark for 30 min to develop adsorption-desorption equilibrium. Figure S1 shows the species involved in the RhB degradation reaction. From the figure S1 it can be found that, by using P-BQ as trapping agent the photocatalytic reaction decreases drastically which shows that superoxide radical plays an important role in the photodegradation of the dye. Somehow the electron also plays a role in the photocatalytic RhB degradation reaction as by using DMSO as the scavenging agent the activity decreases. But by using IPA and EDTA as the scavengers, the photocatalytic activity almost remains close to that of 2CNLFO (without scavenger). The data obtained from the scavenger test has been deduced in table S1. From the above experiment it is concluded that super oxide radical plays a major role in the photocatalytic degradation RhB. But for the formation of superoxide radical the minimum potential required is -0.33 eV whereas the CB of LaFeO₃ lies at -0.03 eV, so from this one can confirm that RhB degradation reaction takes place either at CB of g-C₃N₄ or through the z-scheme. But the RhB degraded using neat g-C₃N₄ is much less than that of composite. So it can be conclude that the photocatalytic reaction involves the z-scheme mechanism.

Table S1: The values of C and C/C₀ of RhB in presence of scavengers

Scavenger	Species involved	Concentration C (ppm)	C/C ₀
IPA	•OH ⁻	4.8	0.24
EDTA	h ⁺	11.45	0.57
P-BQ	•O ₂ ⁻	17.75	0.88
DMSO	e ⁻	15.25	0.76

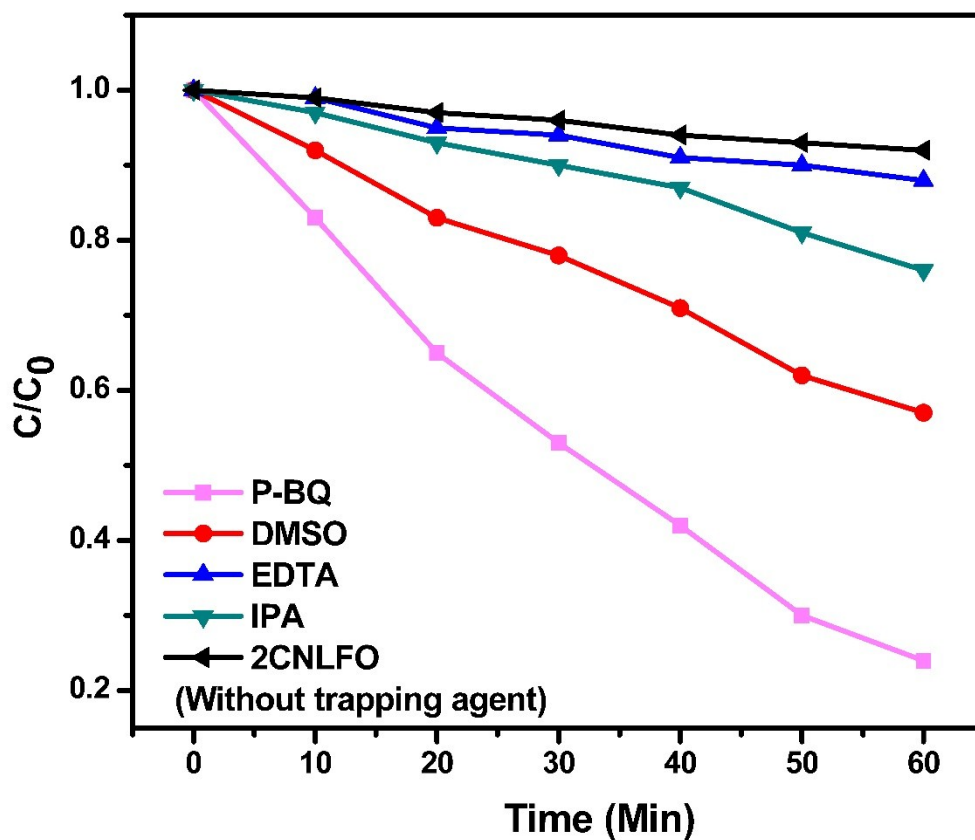


Figure S1: effect of different scavengers on the de-colorization of RhB over 2CNLFO