

Electronic Supplementary Information

**Hydrothermal synthesis and enhanced photocatalytic activity of ternary
 $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ nanocomposite through cascade electron transfer**

Jyoti Prakash Dhal^a, Braja Gopal Mishra^b and Garudadhwaj Hota^{c,*}

Department of Chemistry, National Institute of Technology, Rourkela,
Odisha-769008, India

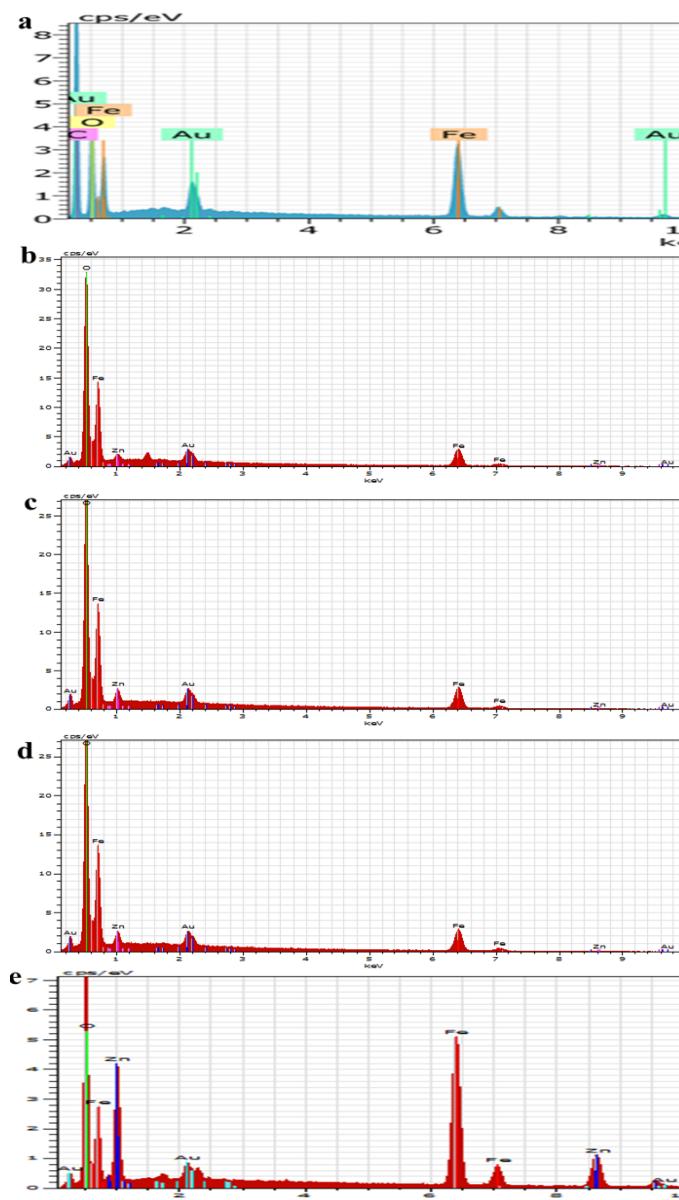


Fig. S1 EDAX patterns of a) α - Fe_2O_3 , b) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4$ (Fe:Zn=90:10), c) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4$ (Fe:Zn=80:20), d) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=70:30) and e) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=60:40)

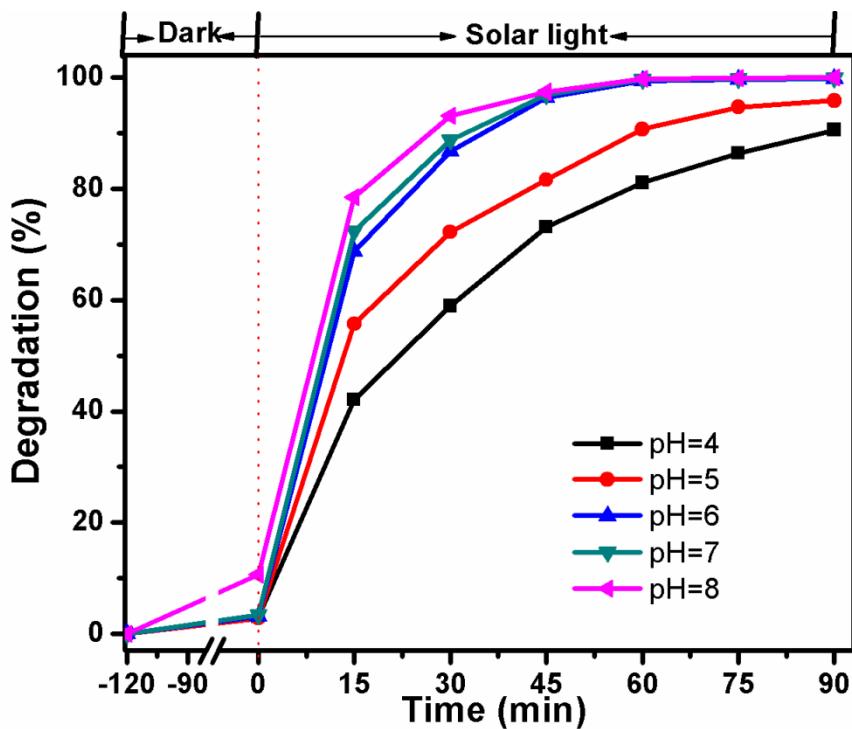


Fig. S2 Variation of percentage degradation of 100 ml of 20 mg L^{-1} MG with different pH using 0.1 g of $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=70:30) nanocomposite under solar light irradiation.

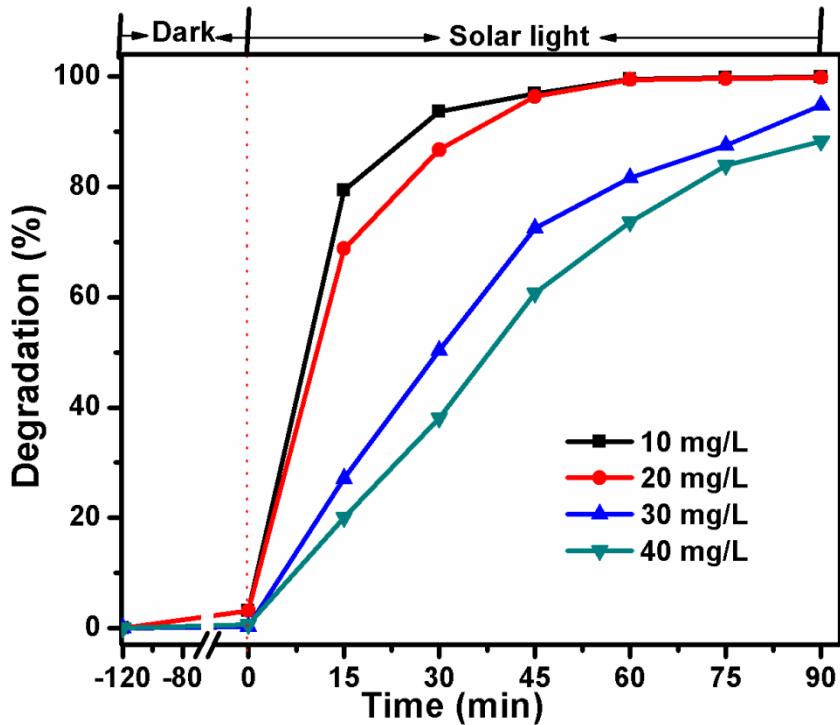


Fig. S3 Variation of percentage degradation of 100 ml of MG with different concentration using 0.1 g of $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=70:30) nanocomposite under solar light irradiation.

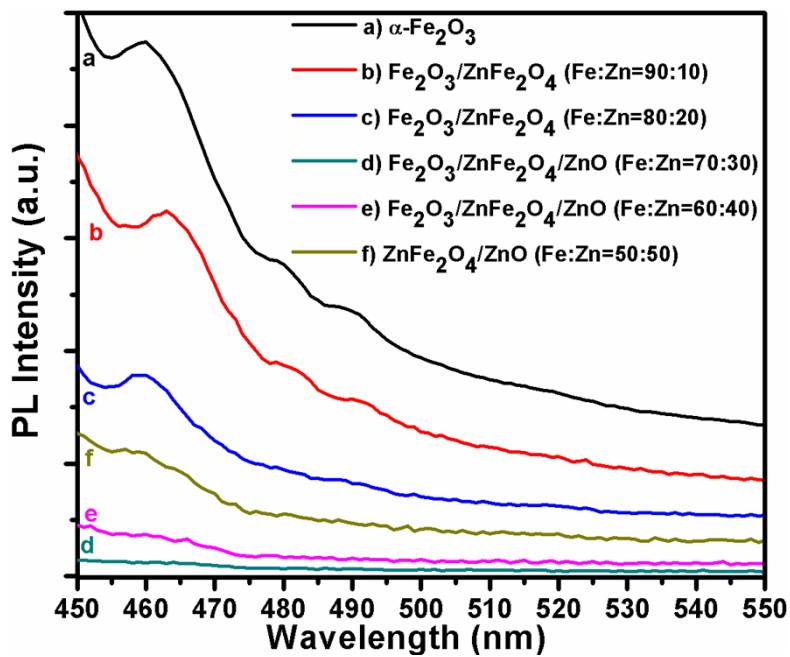


Fig. S4 Photoluminescence emission spectra of a) $\alpha\text{-Fe}_2\text{O}_3$ nanoparticle, b) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4$ (Fe:Zn=90:10), c) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4$ (Fe:Zn=80:20), d) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=70:30), e) $\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=60:40), f) $\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=50:50) nanocomposites at an excitation wavelength of 420 nm.

Table ST1 Elemental composition of nanocomposites obtained from EDAX analysis

Elements	$\alpha\text{-Fe}_2\text{O}_3$		$\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4$ (Fe:Zn=90:10)		$\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4$ (Fe:Zn=80:20)		$\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=70:30)		$\text{Fe}_2\text{O}_3/\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=60:40)		$\text{ZnFe}_2\text{O}_4/\text{ZnO}$ (Fe:Zn=50:50)	
	Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%
O	36.66	66.89	28.25	58.08	23.02	51.91	16.08	41.05	20.24	47.83	20.24	47.83
Fe	63.34	33.11	63.80	37.93	59.71	38.57	61.38	44.88	49.06	33.35	39.06	26.35
Zn	-----	-----	07.95	03.99	17.26	09.52	22.53	14.07	30.71	18.82	40.71	25.82
Total	100	100	100	100	100	100	100	100	100	100	100	100