Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Visible-Light-Induced Photocatalysis and Peroxymonosulfate Activation over $ZnFe_2O_4$ Fine Nanoparticles for Degradation of Orange II

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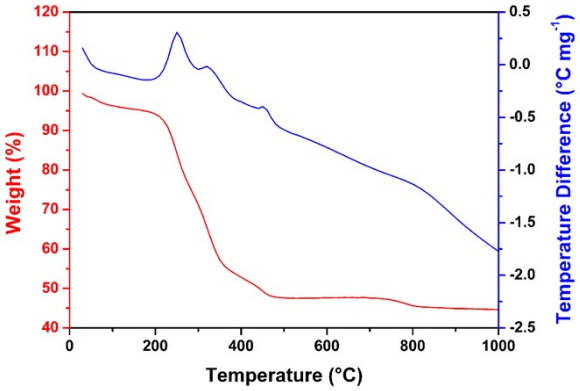

Fig. S1. TG-DSC curves of the ZnFe-120 sample.

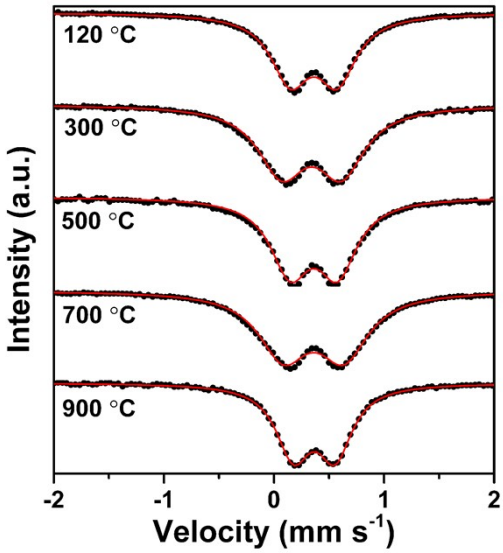

Fig. S2 Room temperature ^{57}Fe Mössbauer spectra of zinc ferrite samples calcined at different temperature.

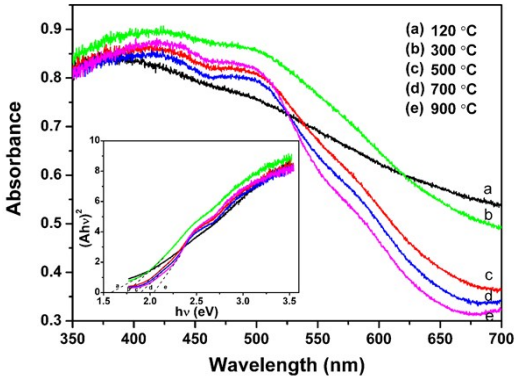

Fig. S3 UV-Vis DRS of zinc ferrites calcined at different temperature. Inset: Plots of $(Ahv)^2$ versus hv. "A" in the Y axis refers to absorbance, proportional to absorption coefficient (α).

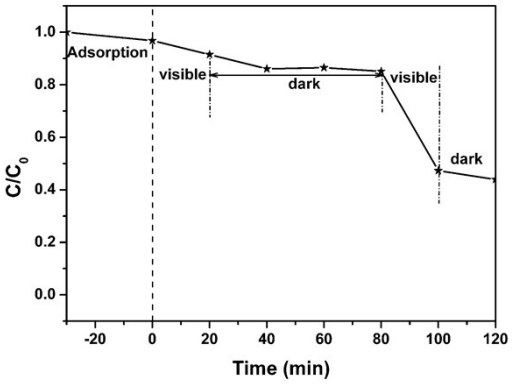

Fig. S4 Influence of visible light irradiation on the Orange II degradation performance of the ZnFe-500/PMS/vis system (Conditions: Orange II, 20 mg L^{-1}; catalyst, 0.1 g L^{-1}, PMS, 0.5 g L^{-1}; visible light, $\lambda \geq 420$ nm; ambient temperature)

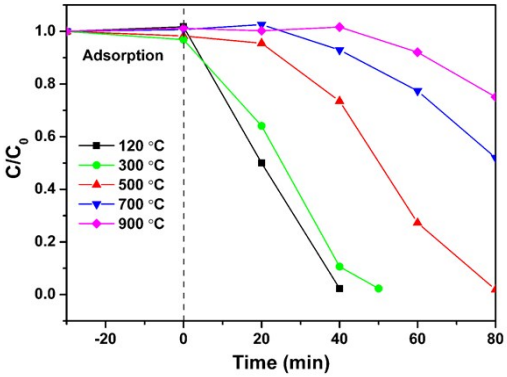

Fig. S5 Orange II degradation performance of the ZnFe-T/PMS/vis system (conditions: Orange II, 20 mg L^{-1}; catalyst, 0.1 g L^{-1}, PMS, 0.5 g L^{-1}; visible light, $\lambda \geq 420$ nm; ambient temperature).

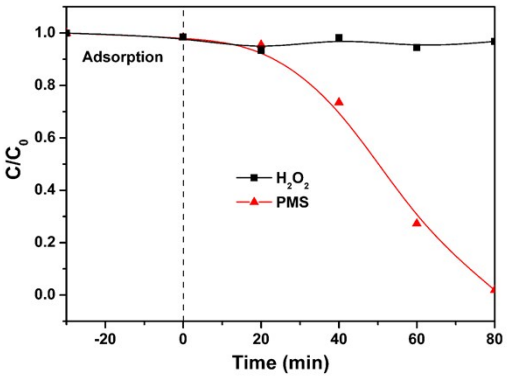

Fig. S6 Comparative activity of H_2O_2 and PMS in the ZnFe-500/vis system. (conditions: Orange II, 20 mg L^{-1}; catalyst, 0.1 g L^{-1}, oxidant concentration：0.8 mM; visible light, $\lambda \geq 420$ nm; ambient temperature)

Table S1. Several parameters of zinc ferrites calcined at different temperature.

Sample	Crystallite size	S_{BET}	E_g	Leaching (ppm)	
	(nm)	(m^2 g^{-1})	(eV)	Zn	Fe
ZnFe-120	-	22	1.61	10.26	4.330
ZnFe-300	16.7	60	1.77	9.056	0.9059
ZnFe-500	18.9	46	1.86	4.4270	0.5222
ZnFe-700	41.7	24	1.92	2.1430	0.1768
ZnFe-900	104.2	4	2.06	0.5010	0.2672

Table S2. ^{57}Fe Mössbauer parameters of zinc ferrite samples calcined at different temperature.

Sample	IS[a]	QS	Line Width
	(mm s^{-1})	(mm s^{-1})	(mm s^{-1})
ZnFe-120	0.36	0.42	0.43
ZnFe-300	0.34	0.54	0.52
ZnFe-500	0.36	0.43	0.43
ZnFe-700	0.36	0.55	0.55
ZnFe-900	0.36	0.38	0.38

a) IS is relative to α-iron.

Table S3. XPS data of the fresh ZnFe-500 sample, after one and two runs used.

Sample	**Fresh**		**After run 1**		**After run 2**	
	Atomic (%)	B.E. (eV)	Atomic (%)	B.E. (eV)	Atomic (%)	B.E. (eV)
Zn	9.89	1021.6 1022.4	8.61	1021.6 -	5.11	1021.5 -
Fe	7.91	719.1 711.8	17.16	719.1 711.7	10.77	719.4 711.6
O	44.91	530.0 531.6 536.4	49.42	530.1 531.4 -	40.28	530.1 531.8 -