

## Supporting Information

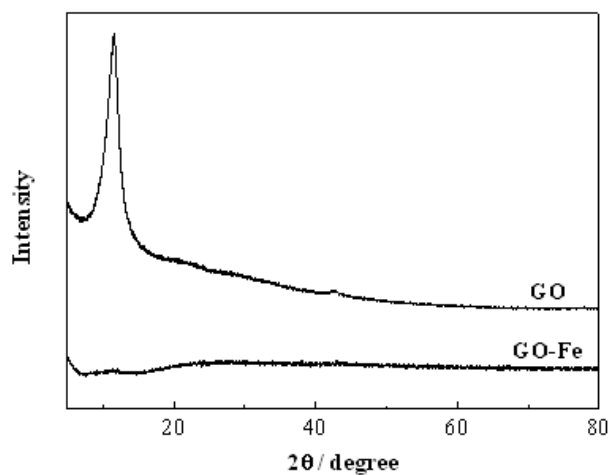
### **Graphene oxide-iron complex: synthesis, characterization and visible-light-driven photocatalysis**

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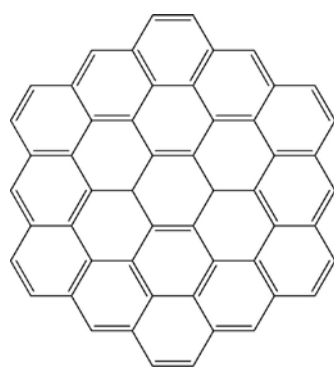
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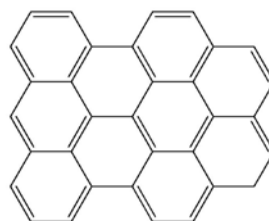
**Fig. S1** XRD patterns of GO and GO-Fe.

**Table S1** Atomic concentration from XPS and TGA.

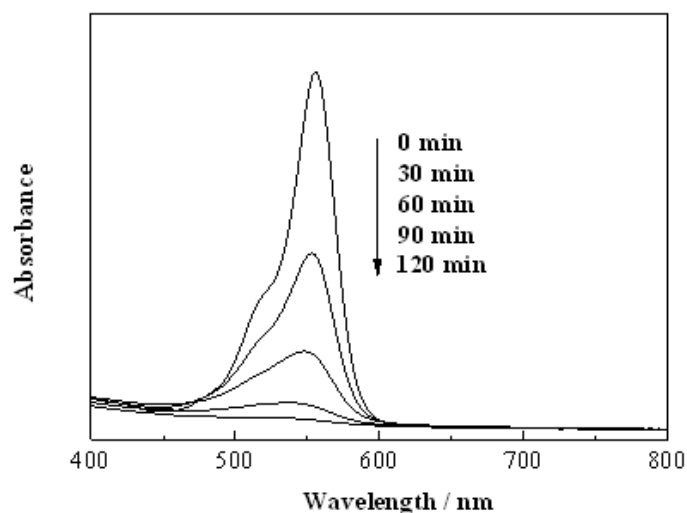
	C	O	Fe	C/Fe
XPS	69.83%	28.87%	1.30%	54
TGA	69.27%	28.63%	2.10%	33



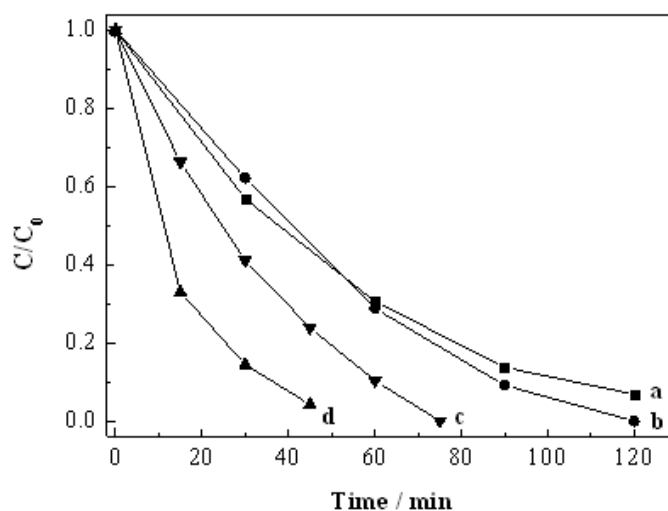
**54C/1Fe (XPS)**



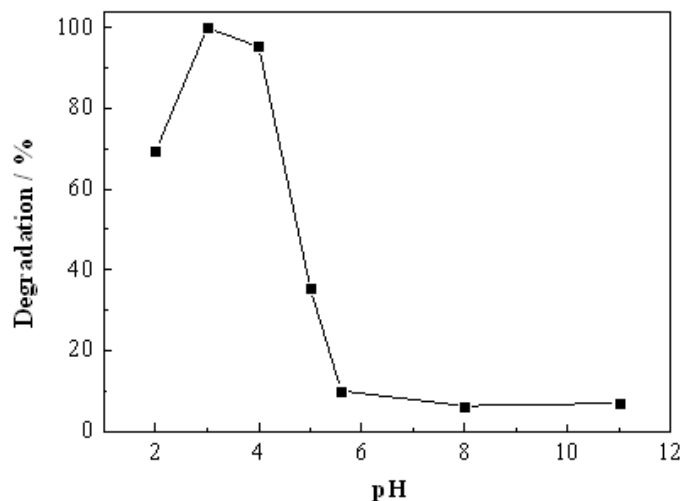
**33C/1Fe (TGA)**



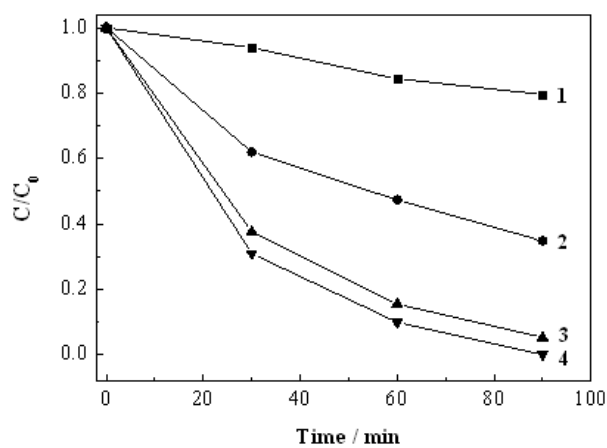
**Fig. S2** UV-visible absorption spectra change of RhB as a function of irradiation time with visible light. The initial concentrations of the reaction solution: RhB (10  $\mu\text{M}$ ), GO-Fe (5 mg/L), and  $\text{H}_2\text{O}_2$  (2 mM). pH = 3.



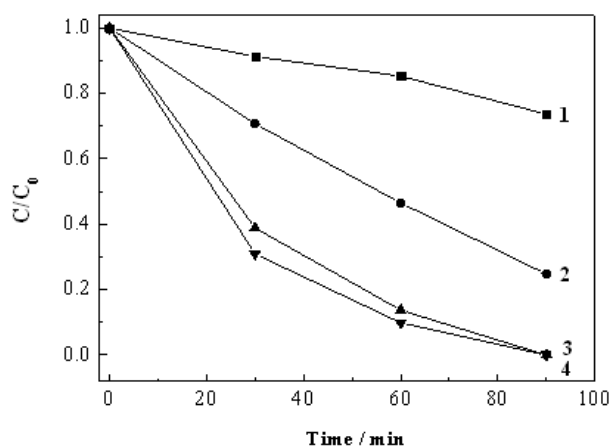
**Fig. S3** Concentration changes of organic compounds as a function of reaction time. 5 mg/L GO-Fe, 2 mM  $\text{H}_2\text{O}_2$  under visible-light irradiation, pH = 3: (a) 20  $\mu\text{M}$  Crystal Violet, (b) 10  $\mu\text{M}$  Malachite Green, (c) 40  $\mu\text{M}$  Orange II, (d) 20  $\mu\text{M}$  Methylene Blue.



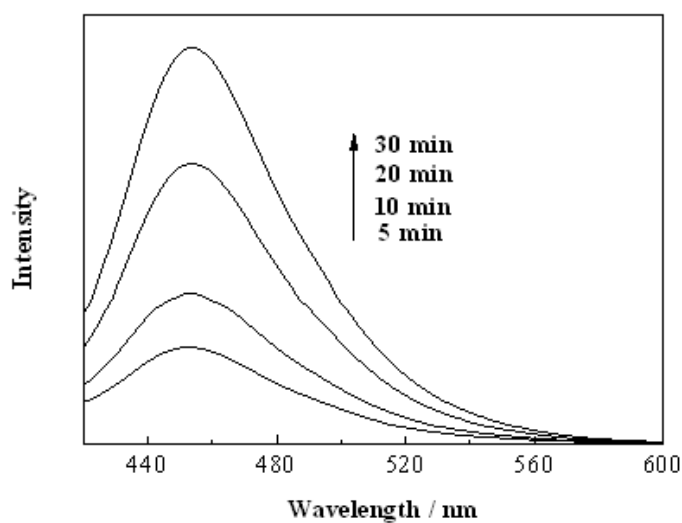
**Fig. S4** Effect of pH on the photodegradation of RhB (10  $\mu$ M) within 2 h of visible-light irradiation containing GO-Fe (5 mg/L) and H<sub>2</sub>O<sub>2</sub> (2 mM).



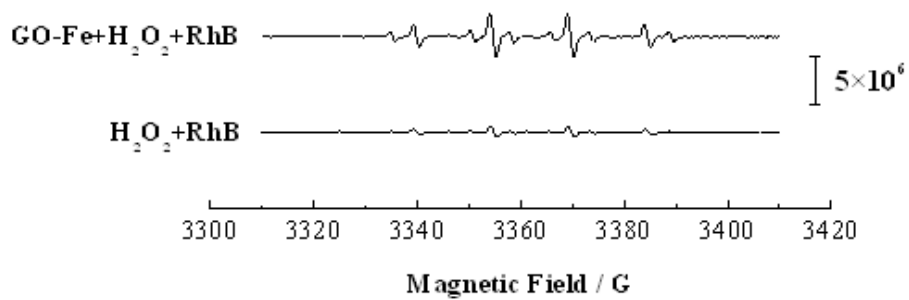
**Fig. S5** Effect of adding fluoride ions (F<sup>-</sup>) at different concentration to the reaction system containing RhB (10  $\mu$ M), GO-Fe (10 mg/L), and H<sub>2</sub>O<sub>2</sub> (2 mM) on the degradation rate of RhB. The initial concentration of KF: (1)  $5 \times 10^{-3}$  M, (2)  $5 \times 10^{-4}$  M, (3)  $5 \times 10^{-5}$  M, and (4) no KF. pH = 3.



**Fig. S6** Effect of adding isopropanol at different concentration to the reaction system containing RhB (10  $\mu$ M), GO-Fe (10 mg/L), and H<sub>2</sub>O<sub>2</sub> (2 mM) on the degradation rate of RhB. The initial concentration of isopropanol: (1)  $5 \times 10^{-3}$  M, (2)  $5 \times 10^{-4}$  M, (3)  $5 \times 10^{-5}$  M, and (4) no isopropanol. pH = 3.



**Fig. S7** Fluorescence spectra change of coumarin (0.5 mM, pH 3) as a function of irradiation time with visible light. Excitation wavelength is 345 nm.



**Fig. S8** DMPO spin-trapping ESR signals for GO-Fe+H<sub>2</sub>O<sub>2</sub>+RhB and H<sub>2</sub>O<sub>2</sub>+RhB systems. [GO-Fe] = 10 mg/L; [H<sub>2</sub>O<sub>2</sub>] = 2 mM; [RhB] = 10 μM; pH = 3.