

Fig. S1. Molecular structure of the dye Acid Blue 74

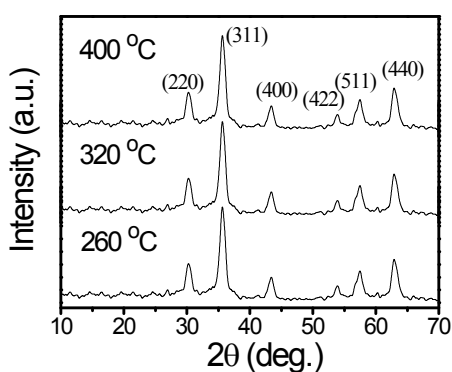


Fig. S2. XRD patterns of as-prepared  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> heated at 260 °C, 320 °C and 400 °C

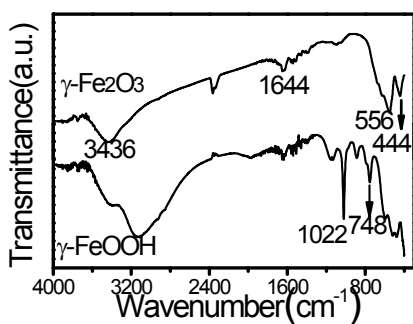


Fig. S3. IR spectrum of as-prepared  $\gamma$ -FeOOH and  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>

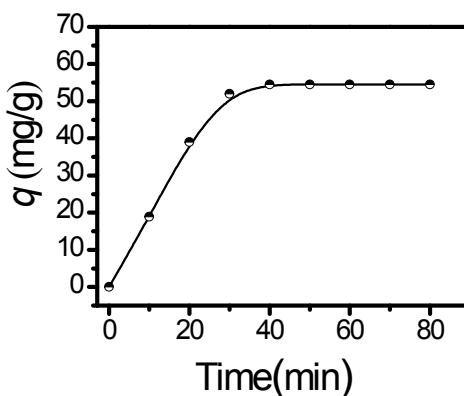


Fig. S4. The adsorption capacity of AB74 on  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> changes with time.  $c_{AB74} = 100$  mg/L, pH=4.0, the dosage of  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> is 0.6 g/L

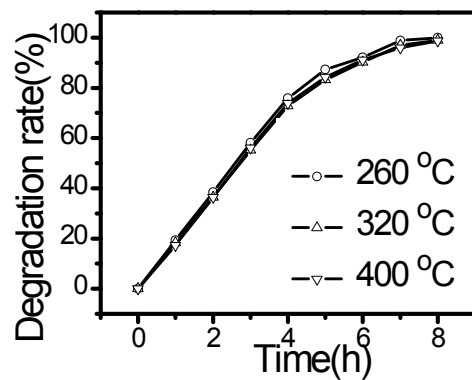


Fig. S5. The photocatalytic activity of  $\gamma\text{-Fe}_2\text{O}_3$  obtained at 260 °C, 320 °C and 400 °C

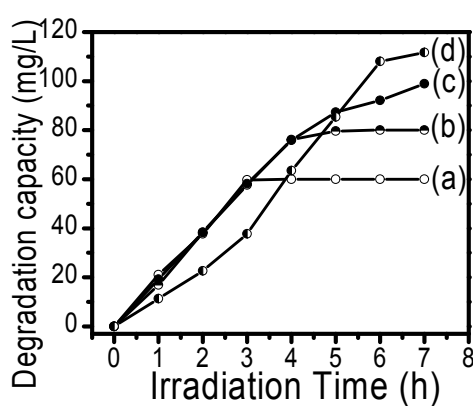


Fig. S6. Changes of the degradation capacity of AB 74 with time at pH 4 (a)  $c_{\text{AB74}}=60$  mg/L; (b)  $c_{\text{AB74}}=80$  mg/L; (c)  $c_{\text{AB74}}=100$  mg/L; (d)  $c_{\text{AB74}}=120$  mg/L

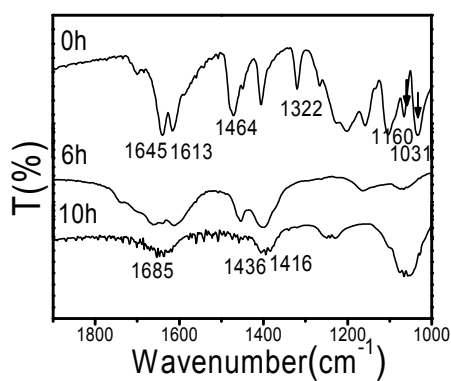


Fig. S7. FTIR spectra of the samples obtained at irradiation 0, 6, 10 h.

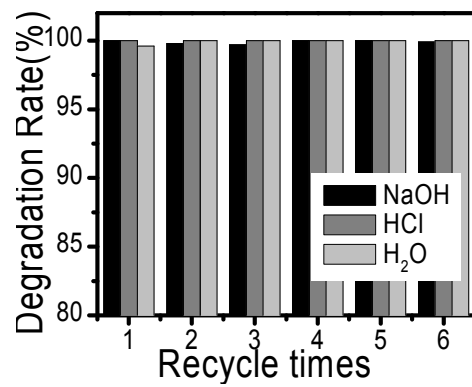


Fig. S8 The regenerated degradation capacities of the  $\gamma\text{-Fe}_2\text{O}_3$  nanoparticles at 25 °C