Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information for

Ascorbic acid-coated Fe3O4 nanoparticles as a novel heterogeneous catalyst of persulfate for improving the degradation of 2,4-dichlorophenol

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Summary

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TEXT S1 The concentrations of ferrous ions and total dissolved iron were measured colorimetrically with 1,10-phenanthroline through the absorption intensity at λmax = 510 nm with a UV-visible spectrophotometer (Evolution 201, Thermo Scientific). The sample (0.5 mL) was mixed with 4.5 mL water, and then hydrochloric acid (hydrochloric acid: water = 1:1) was added to make the Congo red test paper become red. 0.5 mL 1,10-phenanthroline (0.12%) as chromogenic agent and the right amount of ammonia water (ammonia: water = 1:1) that makes test paper become blue was added. The concentration of total dissolved iron was quantified when 1 mL hydroxylamine hydrochloride (10 %) after the addition of hydrochloric acid. The remaining steps were the same as the description above. As space is limited, we put this method into the supporting information. We hope that our reply is satisfactory to the reviewer.

TEXT S2 A nitroxide spin-trapping agent DMPO was used in the EPR process. The chemical solutions of PS, H_2A/Fe_3O_4 and DMPO were mixed for 20 seconds. And then the sample solution was transferred into a 100 μL capillary tube which was then fixed in the cavity of the EPR spectrometer. The EPR spectrum was measured with an EPR spectrometer (JES-FA spectrometer/X band) under the following experimental conditions: X-field sweep; center field 323.30 mT; sweep width 5.00 mT; modulation amplitude, 2.0 mT; sweep time, 1.0 min; microwave frequency, 9051.854 MHz; microwave power, 2.00 mW.

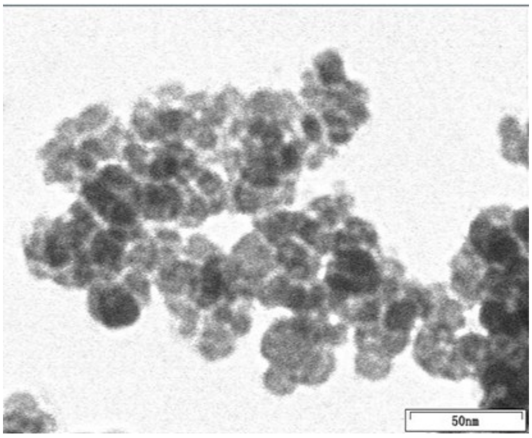


Figure S1 Transmission electronic microscopy (TEM) of fresh Fe_3O_4

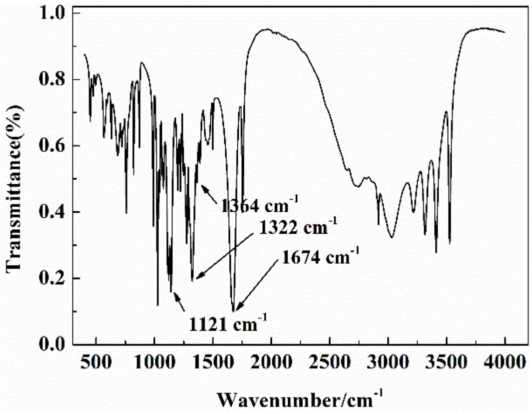


Figure S2 FTIR spectra of H_2A

Table S1 Standard spectral peak list of H_2A

number	Wavenumber/cm^{-1}	Transmittance (%)	FWHM (cm^{-1})	Peak difference (%)
1	1110	22	27	18
2	1132	12	26	31
3	1316	20	69	35
4	1354	50	22	6
5	1670	9	71	67

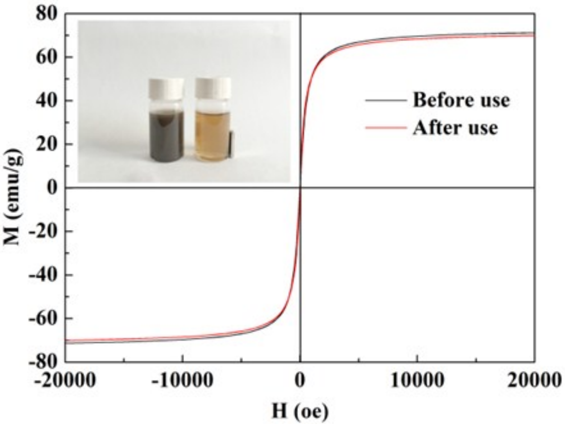
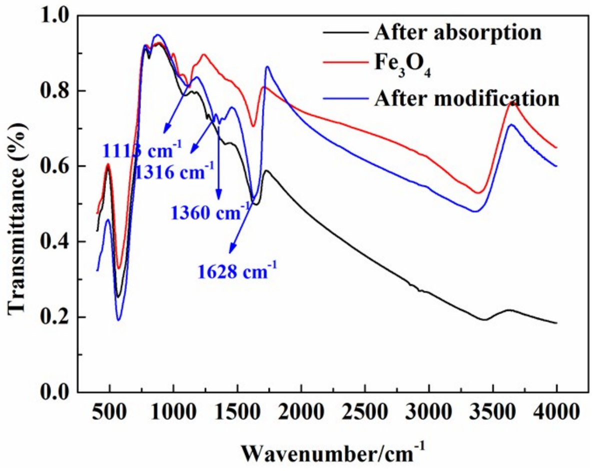


Figure S3 Magnetization curves measured at room temperature for the synthesized H_2A/Fe_3O_4 before (black line) and after five reaction cycles (red line)



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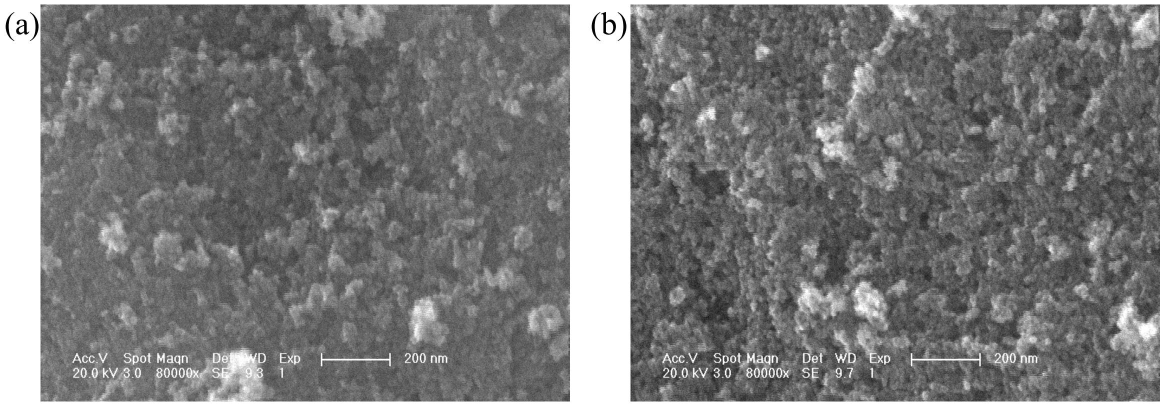

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