Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

1. Characterization

All ^{1}H NMR spectra and ^{13}C NMR spectra were recorded on a Bruker AVANCEIII^{TM} 500 spectrometer (500 MHz) by using $CDCl_3$ as a solvent. GPC data was obtained from Waters GPC system equipped with a 2414 refractive index (RI) detector, a Waters 1515 isocratic HPLC pump, and two Waters' HPLC columns. THF (HPLC grade) was used as the solvent for polymers and eluent for gel permeation chromatography (GPC) with a flow rate of 1 mL/min at room temperature. The GPC instrument was calibrated with narrowly dispersed linear polystyrene standards. Transmission electron microscopy (TEM) images were obtained using a JEM-2100F TEM instrument. Samples were prepared by dip-coating a 400 mesh carbon-coated copper grid from the dilute sample solution allowing the solvent to evaporate. A Quantachrome Autosorb IQ surface area and porosity analyzer was utilized to study the pore structure of the samples. Before measurements, the polymer samples were degassed for more than10 h at 120°C. The Brunauer-Emmett-Teller (BET) surface area and themicropore surface area were determined by the BET equation and thet-plot equation, respectively. The pore size distribution was analyzed by original density functional theory (DFT).FT-IR spectra were recorded on a Thermo NICOLET is50 spectrometer using pressed KBr pellets to measure the chemical bonding of the products from 400 to 4000

cm^{-1}.Thermogravimetric analyses (TGA) were carried out with a NETZSCH STA449F3 simultaneous thermal analyzer at a heating rate of 10 K/min from 30 to 800 °Cin a nitrogen atmosphere.UV-Vis tests were performed by using an UV-Vis spectrophotometer (UV-2400). The absorbance spectra were collected within the range of 200-800 nm wavelengths.Magnetic properties were collected using a vibrating sample magnetometer (VSM) at room temperature by cycling the field from -15000 to 15000 Oe.The powder X-ray diffraction (XRD) analyses of all samples were recorded on an X-ray diffractometer; a continuous scan mode was used to collect 2θ data from 20 to 70° at a constant rate of 4°/min.

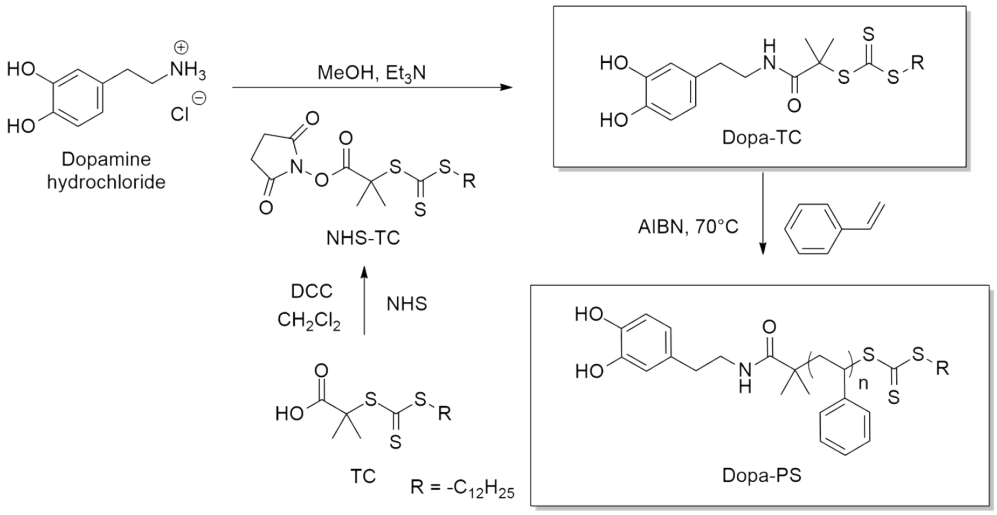


Fig S1. Synthetic route of polymer ligands (Dopa-PS).

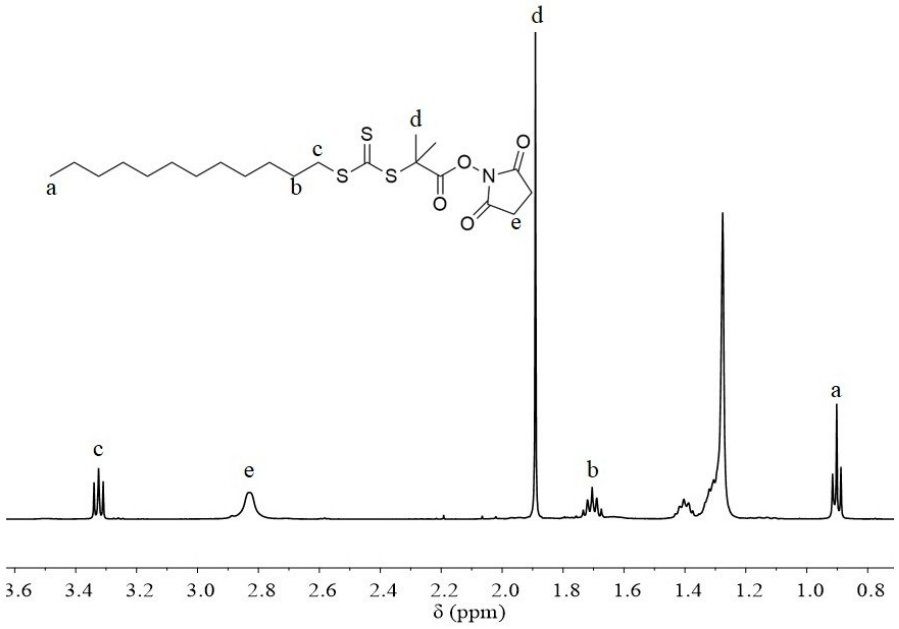


Fig S2. ^{1}H NMR spectrum of NHS-TC (500 MHz, $CDCl_3$).

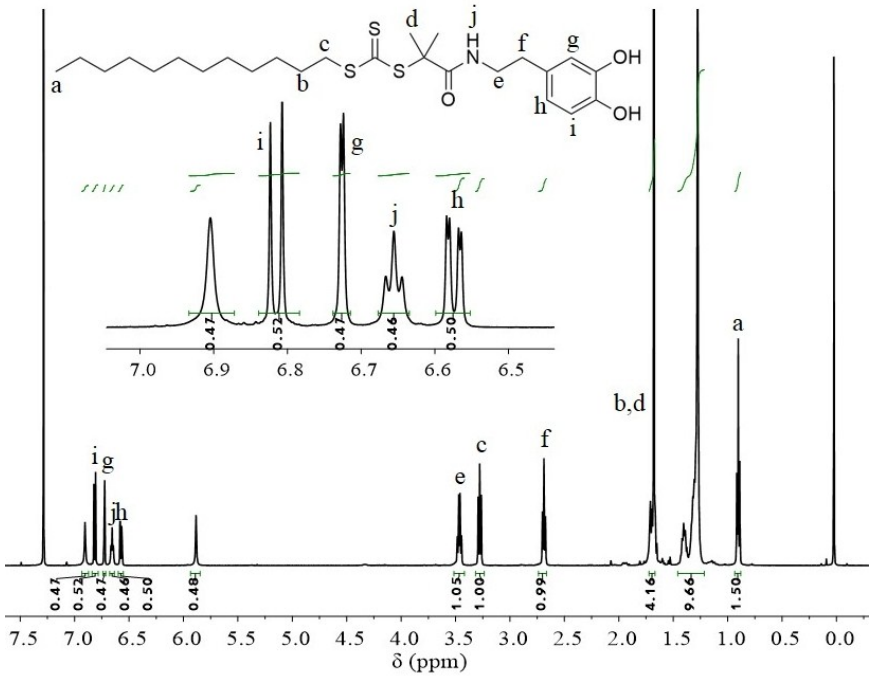


Fig S3. ^{1}H NMR spectrum of the Dopa-TC (500 MHz, $CDCl_3$).

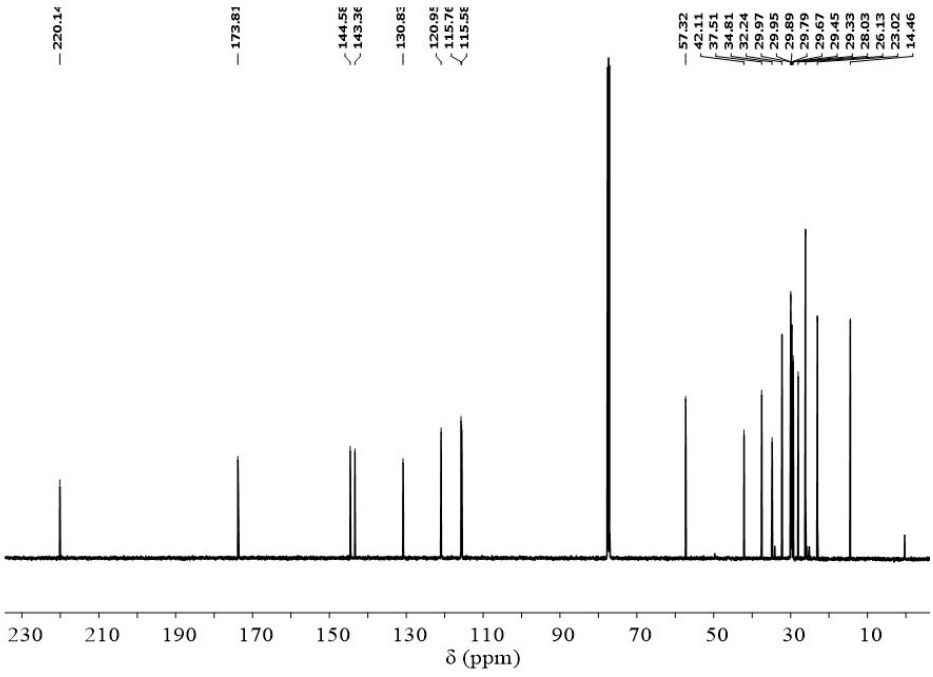
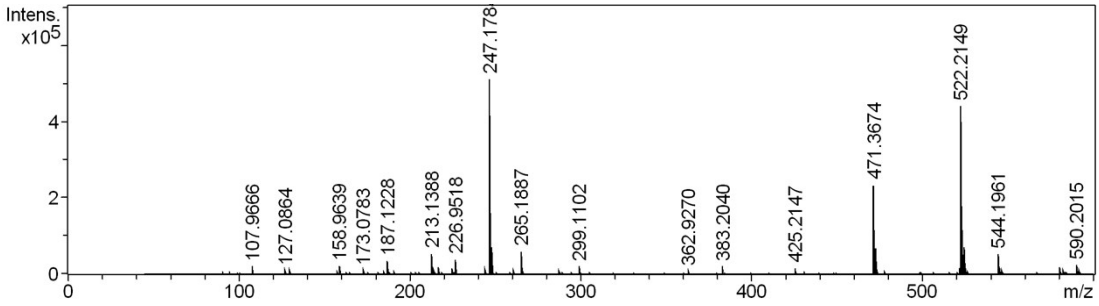


Fig S4. ^{13}C NMR spectrum of the Dopa-TC (125 MHz, $CDCl_3$).



ESI-MS (m/z): $C_{25}H_{41}NO_3S_3Na$ for +, calculated 522.2141, found 522.2149.

Fig S5. Mass spectrogram of Dopa-TC.

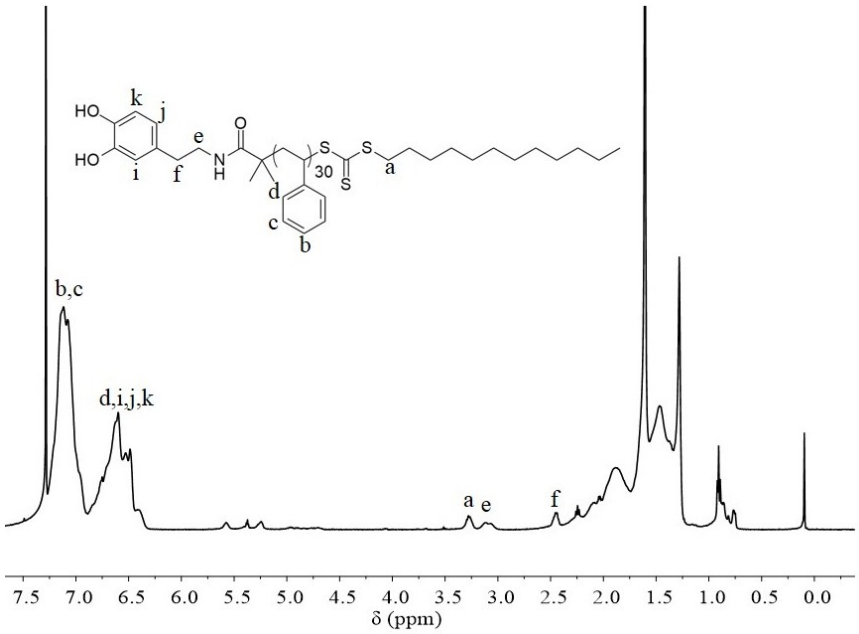


Fig S6. ^{1}H NMR spectrum of the Dopa-PS (500 MHz, $CDCl_3$).

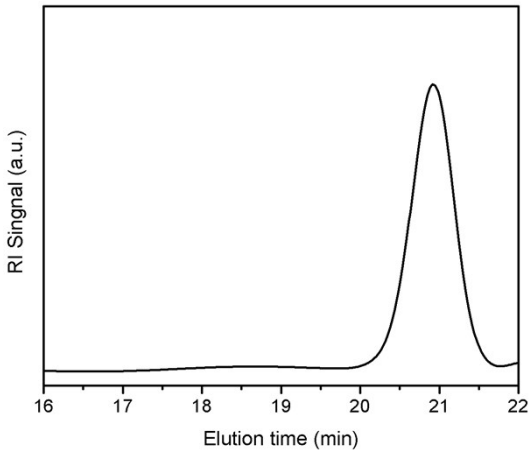


Fig S7. GPC curve of Dopa-PS.

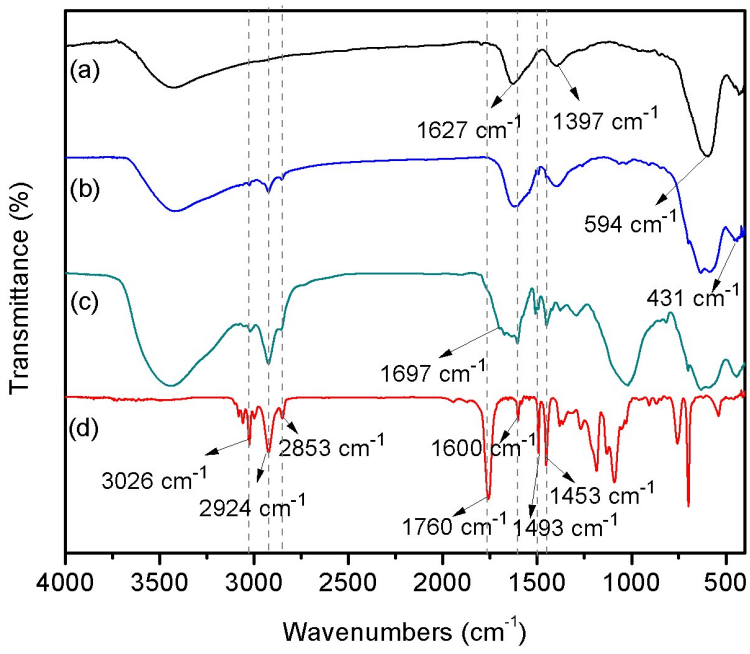


Fig S8. FTIR spectra of (a) Fe_3O_4-Cit, (b) Fe_3O_4@Dopa-PS, (c) Fe_3O_4-MONNs and (d) PGM-*g*-(PLA-b-PS).

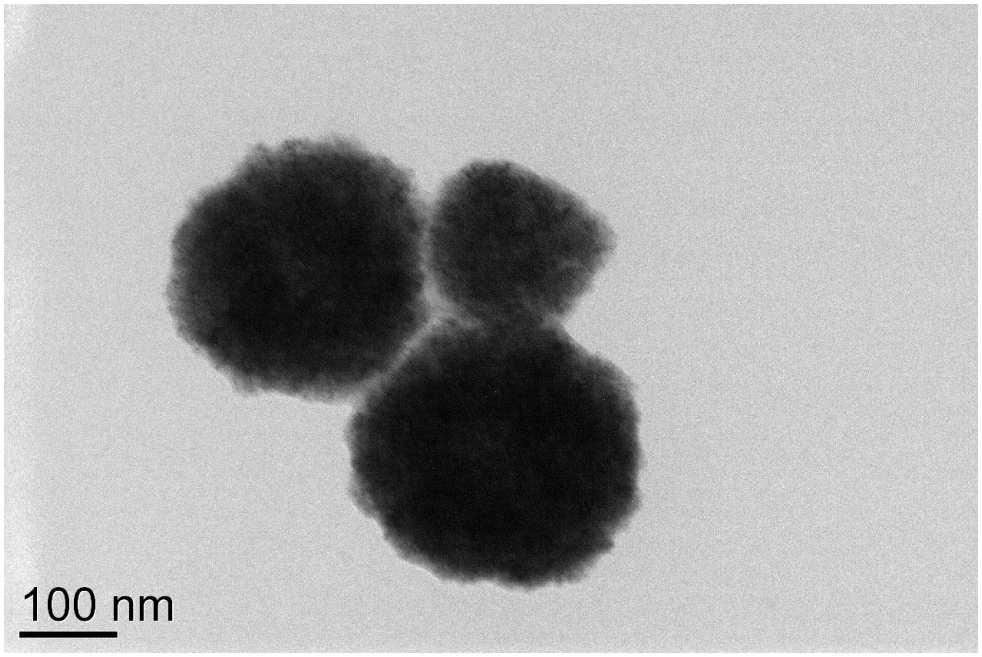


Fig S9. TEM image of Fe_3O_4@Dopa-PS nanoparticles.

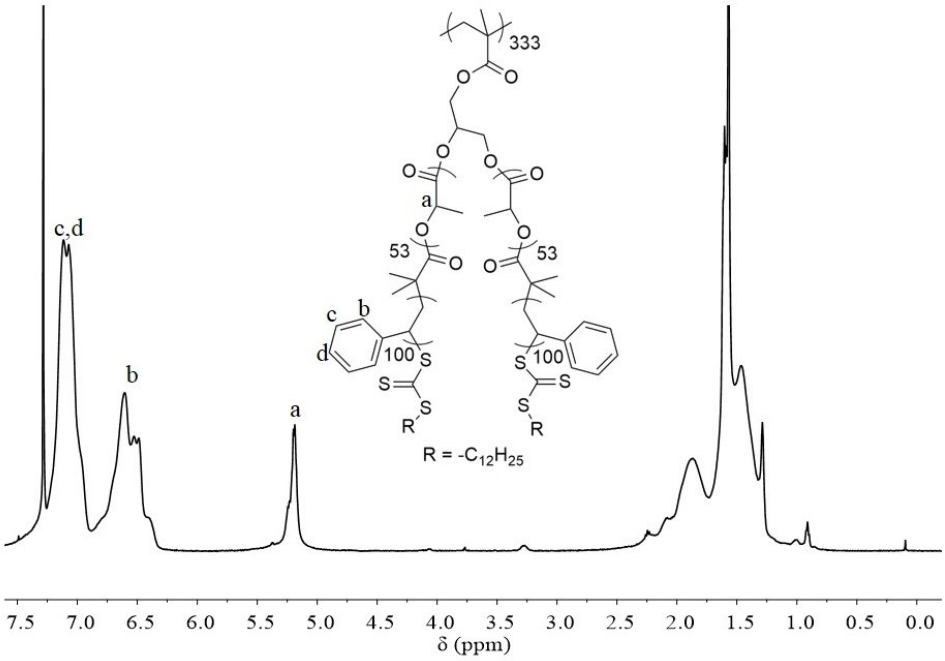


Fig S10. ^{1}H NMR spectra of PGM-*g*-(PLA-*b*-PS) bottlebrush.

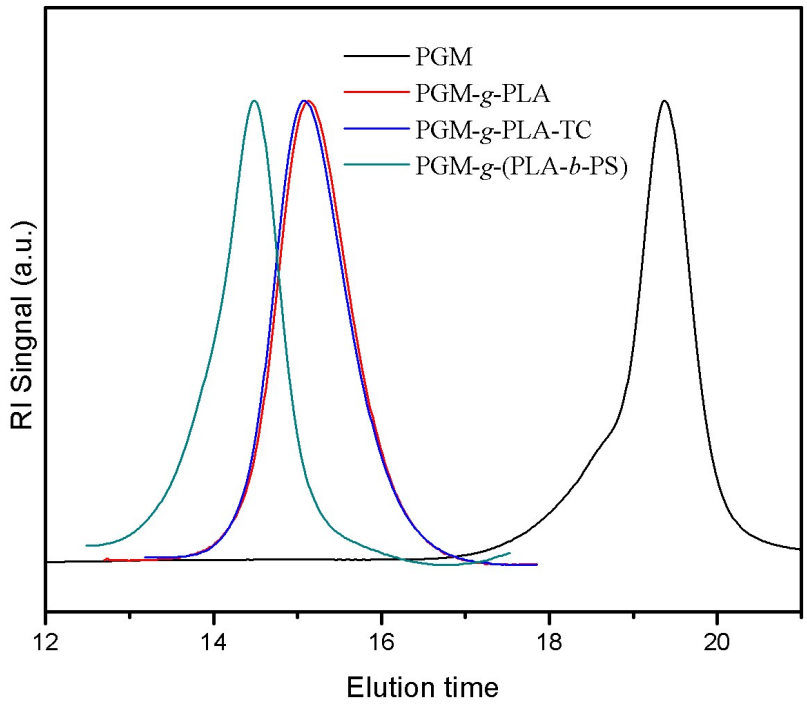


Fig S11. GPC curves of PGM, PGM-*g*-PLA, PGM-*g*-PLA-TC and PGM-*g*-(PLA-*b*-PS).

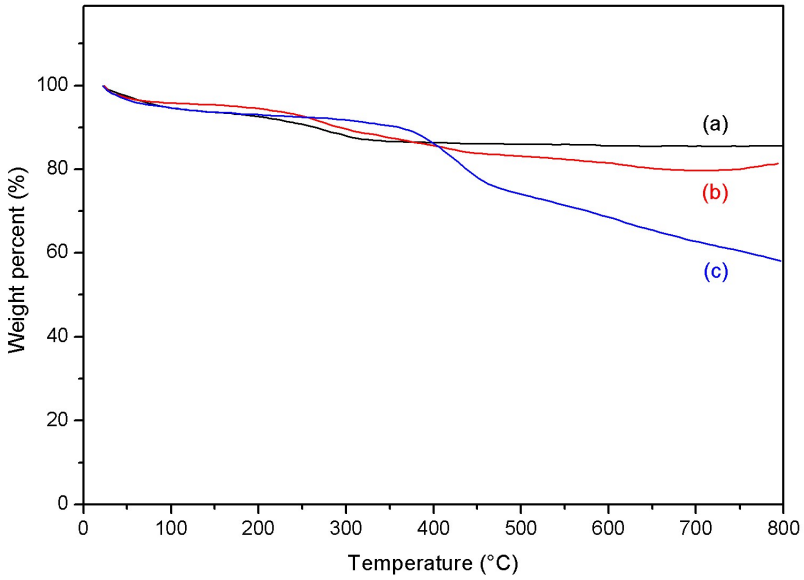


Fig S12. TGA curves of (a) Fe_3O_4-Cit, (b) Fe_3O_4@Dopa-PS and (c) Fe_3O_4-MONNs.

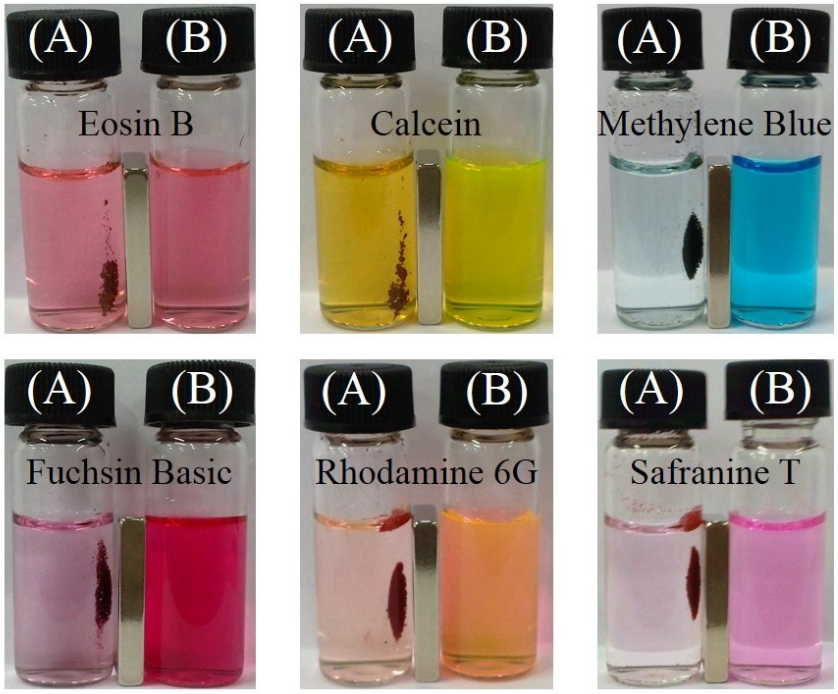


Fig S13. The photographs of adsorption behaviors and magnetic separation of the six dyes. (A) dye solutions after adsorption by the Fe_3O_4-MONNs for 3 min and then left under the magnet for 10 s and (B) initial dye solutions. Between two bottles is the magnet. All the initial dye concentration of the six dyes is 0.01 mg/mL and the volume of the dye solutions is 3 mL.

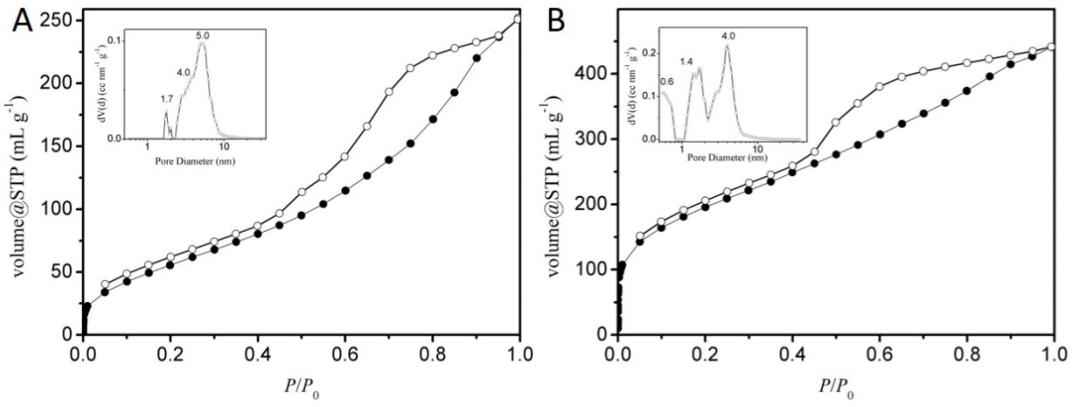


Fig S14. Nitrogen adsorption-desorption isotherms and pore size distribution of Fe_3O_4-MONNs after adsorption of ST (A) and desorption of ST (B).

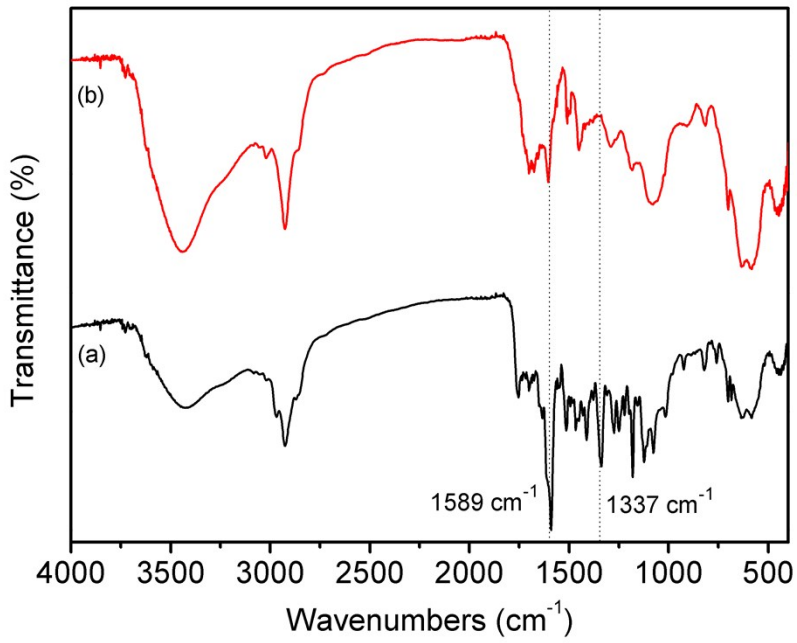


Fig S15. FTIR spectra of Fe_3O_4-MONNs after adsorption of ST (a) and desorption of ST (b).

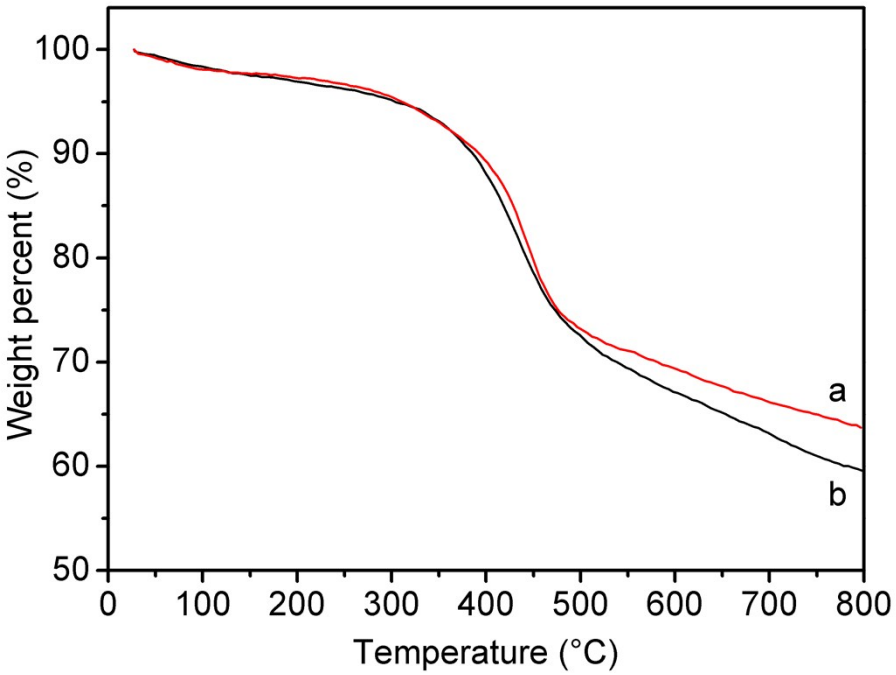


Fig S16. TGA curves of Fe_3O_4-MONNs after adsorption of ST (a) and desorption of ST (b).

Table S1. Textural parameters of as-synthesized Fe_3O_4-MONNs, Fe_3O_4-MONNs after adsorption of ST (**2**) and Fe_3O_4-MONNs after desorption of ST (**3**).

Samples	S_{BET}[a](m^2g^{-1})	S_{mico}[b](m^2g^{-1})	S_{meso}[c](m^2g^{-1})	V_{total}[d](cm^3g^{-1})
1	648	68	580	0.64
2	208	0	208	0.39
3	687	102	585	0.68

[a] BET specific surface area calculated from N_2 adsorption isotherm at 77.4 K; [b] Microporous surface area calculated from *t-plots*; [c]Mesoporous surface area; [d] Total pore volume at P/P_0 = 0.998.