Synthesis of Carbon-coated, Porous and water-dispersive Fe$_3$O$_4$ Nanocapsules and Their Excellent Performance for Heavy Metal Removal Applications

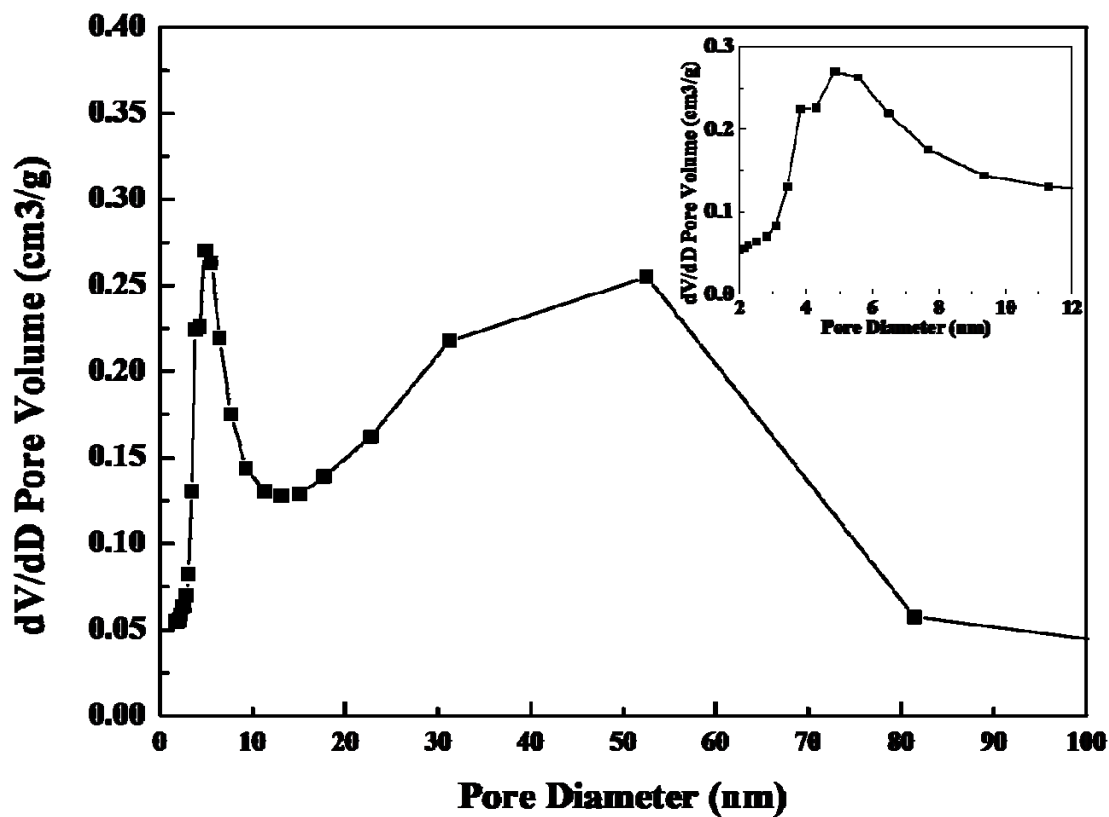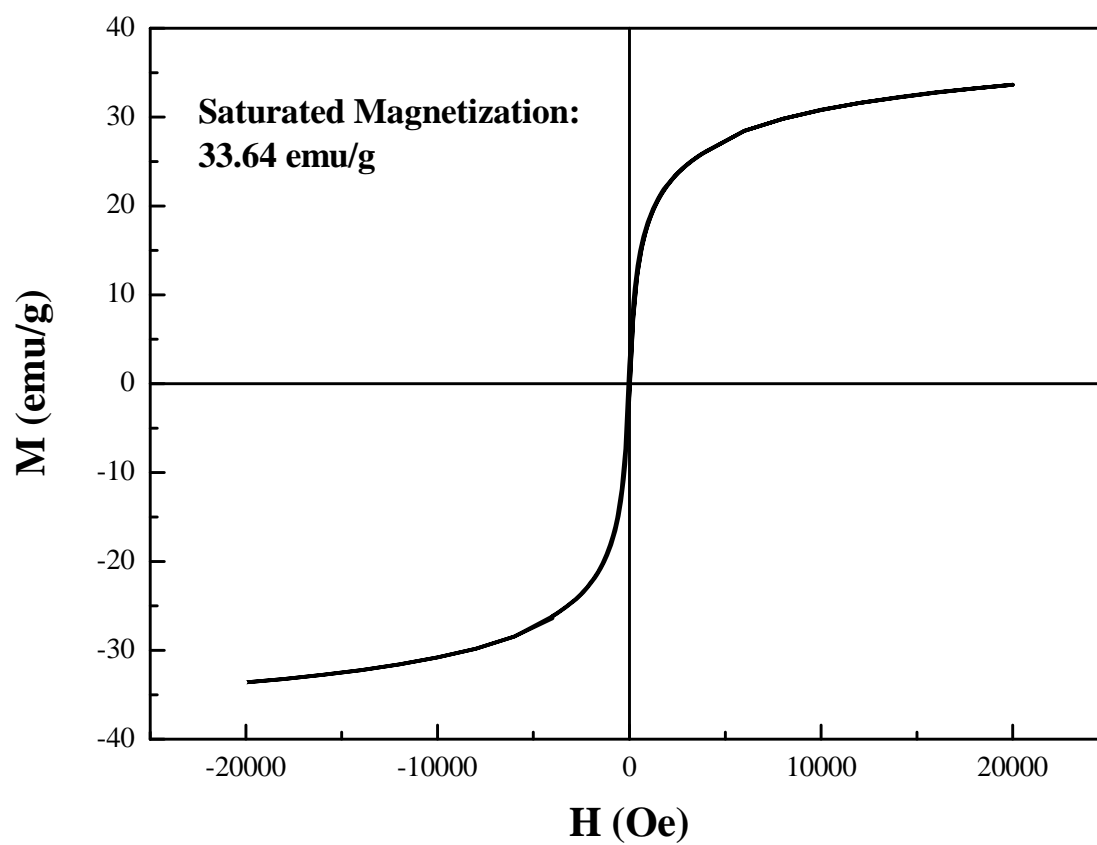Kai Cheng, Yu-Mei Zhou, Qian-Wang Chen, Hai-Bo Hu, Hao Zhong, Xianyi Hu, Xiang-Kai Kong

Fig. S1 BJH pore plot of the nanocapsules.

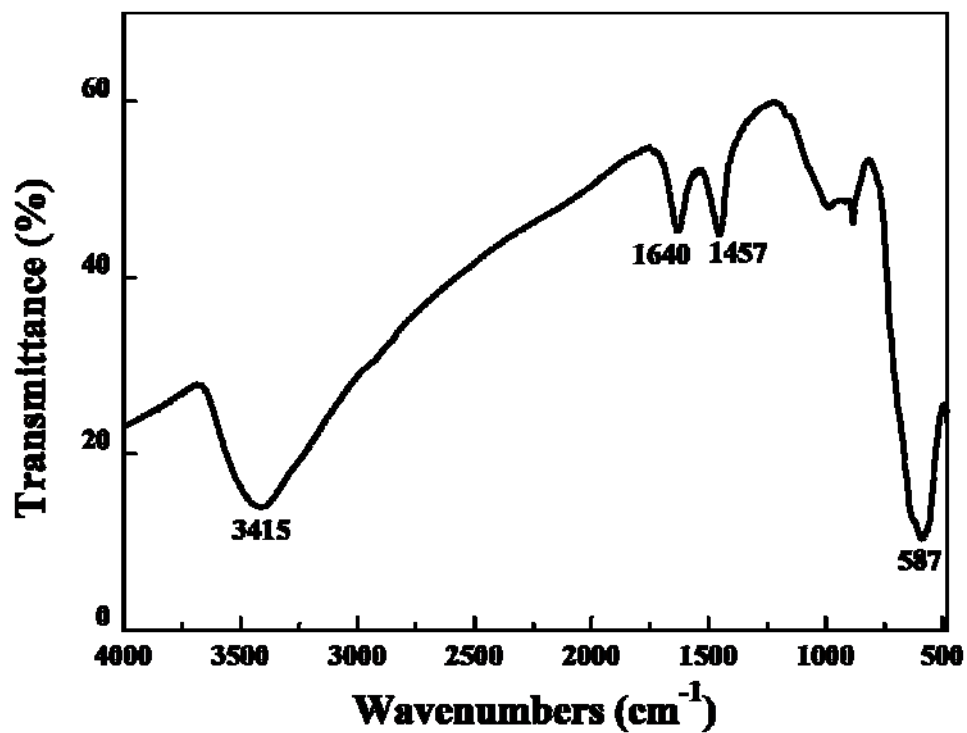**Fig. S2** M-H hysteresis loops of the SiO2@Fe3O4@C nanoparticles.

Fig. S3 FT-IR spectra of as prepared sample.

| Metal	Pb	Cd	Zn	Cu	Ni	Co	Mn
C_o (mg/L)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
C_t (mg/L)	$<10^{-3}$	0.052	$<10^{-3}$	$<10^{-3}$	0.089	0.020	0.066

Table S1 Detailed analysis of an adsorption experiment with different heavy metals (C_o: original concentration; C_t:

concentration after treatment, detection limit by ICP-AES: 1 ppb).
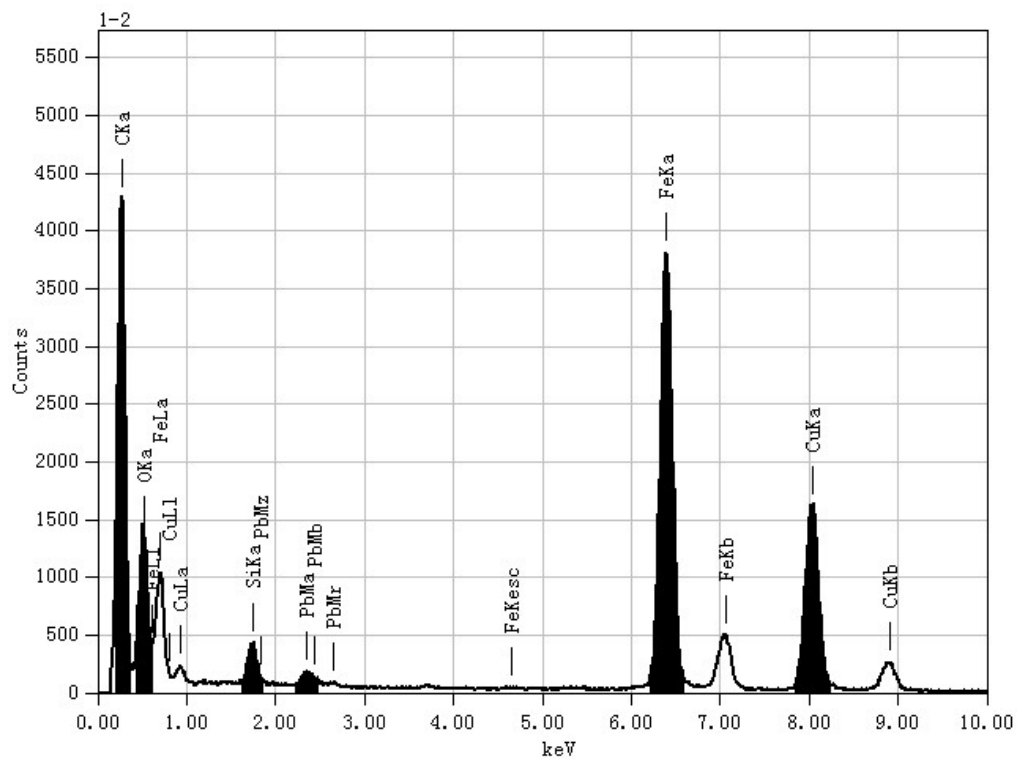
Fig. S4 EDS of single nanocapsules.
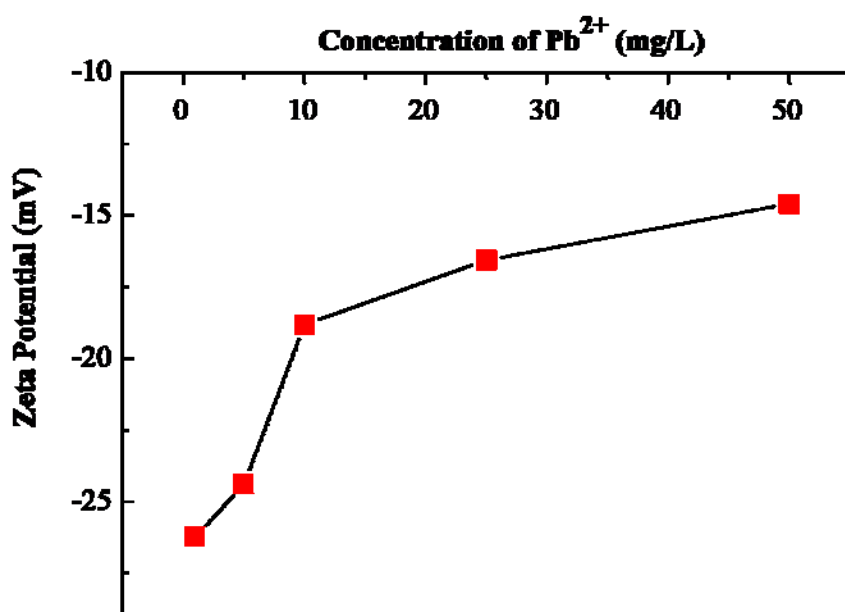
Fig. S5 zeta potential of nanocapsules after uptake different volume of Pb^{2+}.
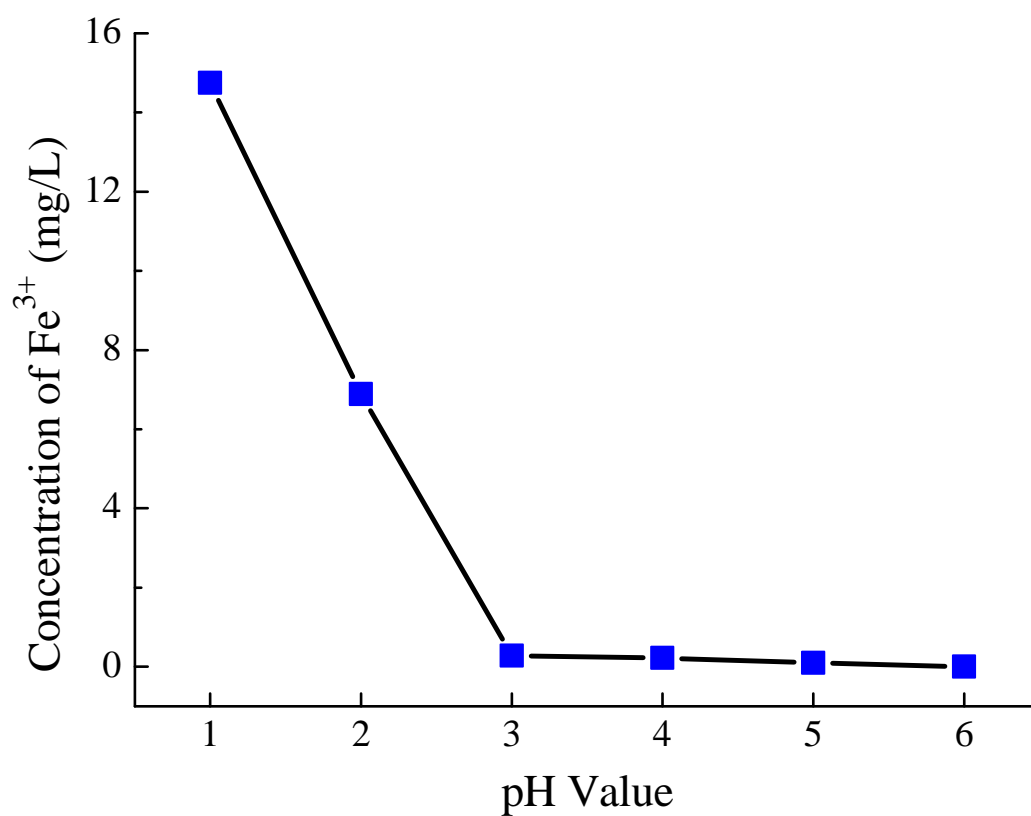
Fig. S6 The concentration of dissolved iron in different pH value solution.