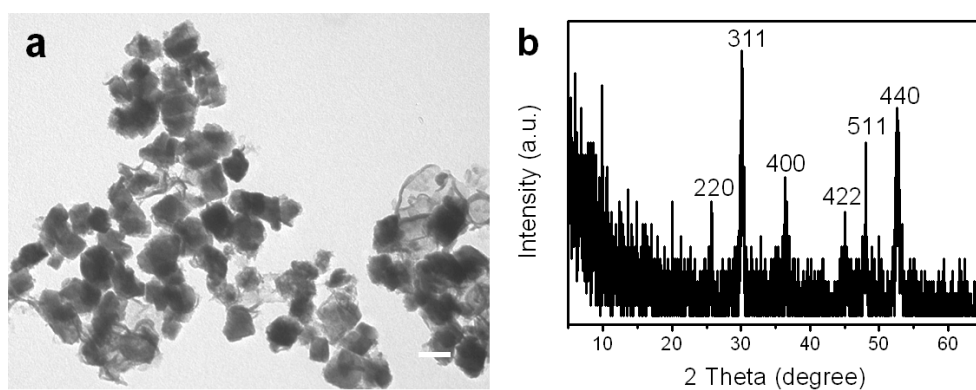
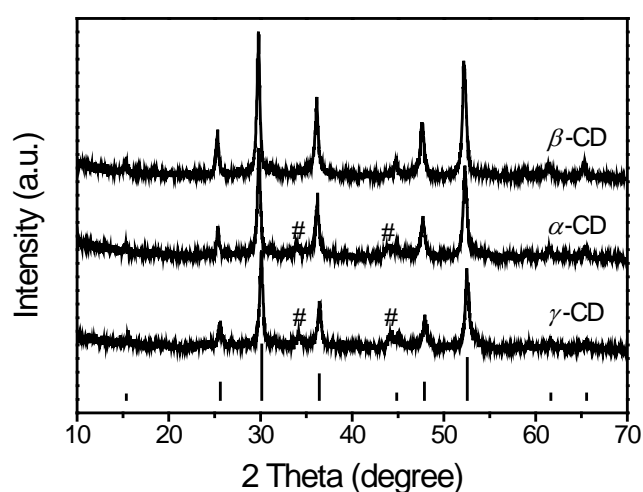


## Bioinspired greigite magnetic nanocrystals: chemical synthesis and biomedicine applications

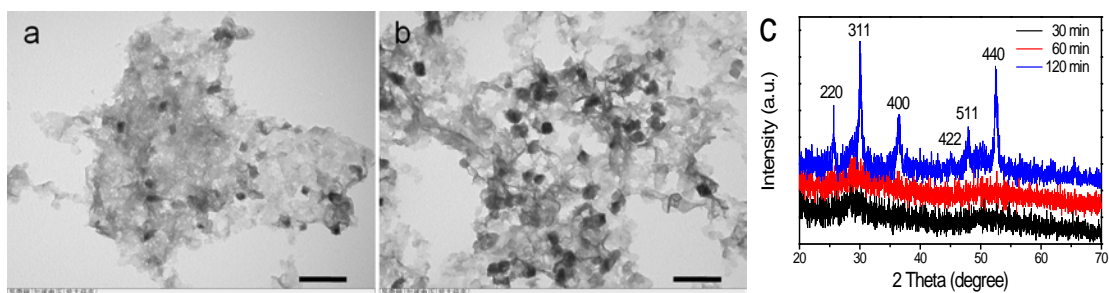
Mei Feng,<sup>†</sup> Yang Lu,<sup>†</sup> Yuan Yang, Meng Zhang, Yun-Jun Xu, Huai-Ling Gao, Liang Dong, Wei-Ping Xu,  
Shu-Hong Yu\*



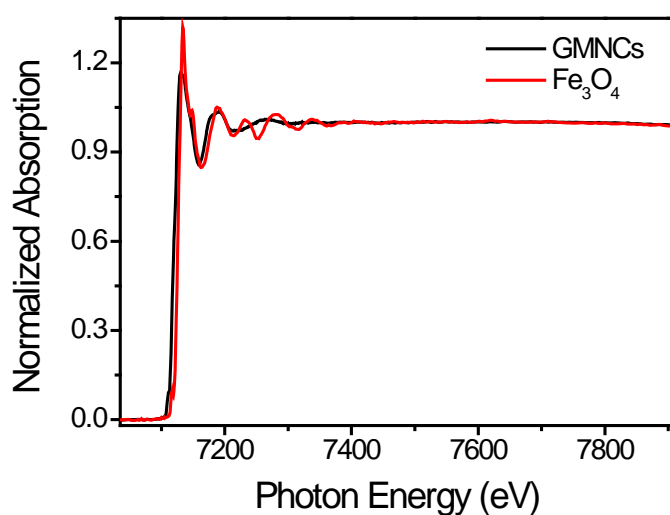
**Figure S1.** **a**, SEM image and **b**, XRD pattern of the NCs only in the presence of  $\beta$ -CD. The results showed the pure phase of  $\text{Fe}_3\text{S}_4$  NCs with the diameter of about 100 nm, poor crystallization and some sheet-like byproducts.



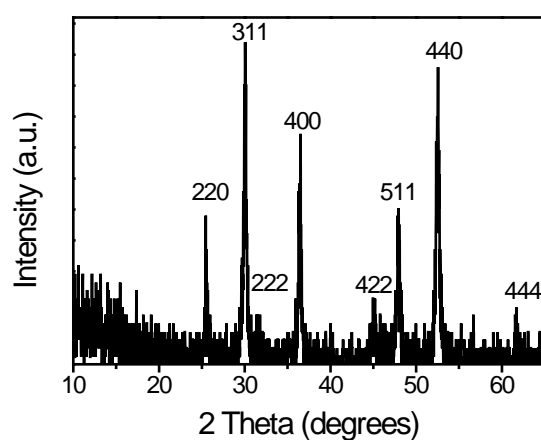
**Figure S2.** XRD patterns of the as-prepared samples when cooperating the three kinds of cyclodextrins including  $\alpha$ ,  $\beta$  and  $\gamma$ -CD with PEG (4000) molecules during the synthesis process. Note: #, monoclinic  $\text{Fe}_7\text{S}_8$ .



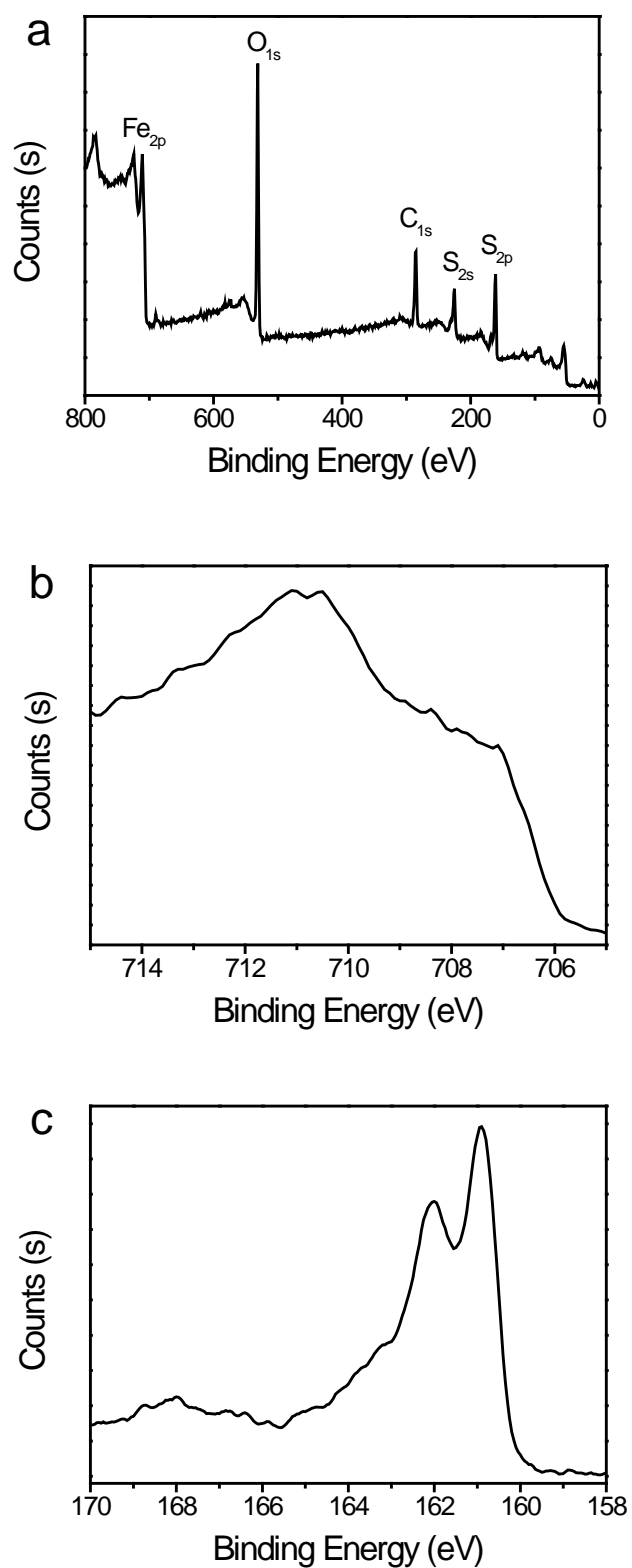
**Figure S3.** TEM images of the as-prepared samples for the reaction time of **a**, 30 min and **b**, 60 min. Note: the scale bars are 200 nm; **c**, XRD patterns of the samples for the different reaction time after the injection of TAA. All peaks have been indexed.



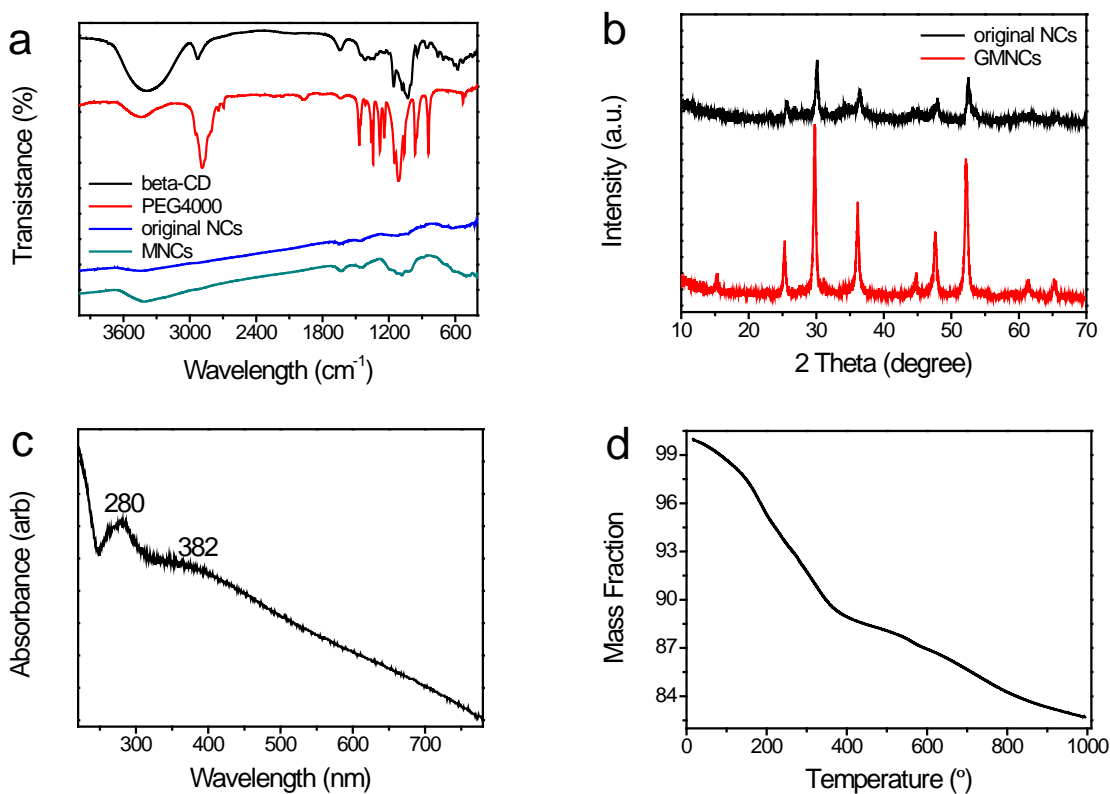
**Figure S4.** Normalized iron *K*-edge XAFS spectrum of the as-prepared GMNCs and the referenced  $\text{Fe}_3\text{O}_4$  samples.



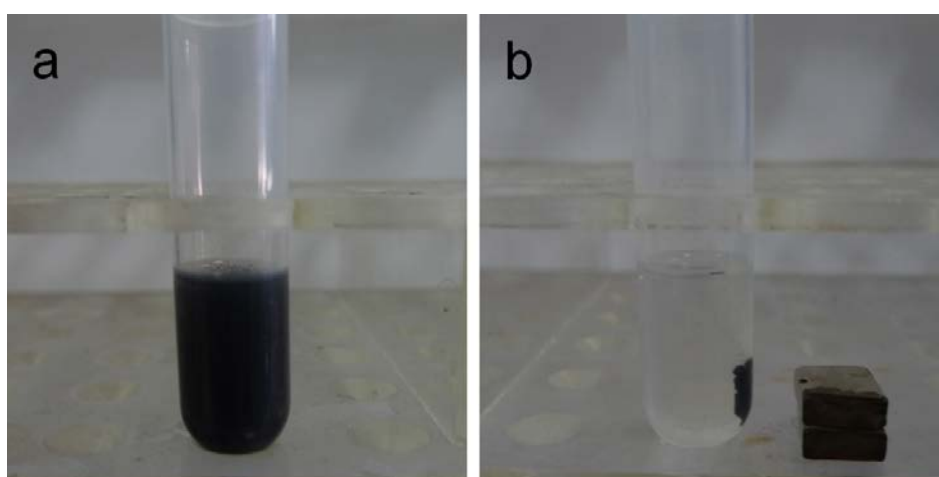
**Figure S5.** XRD patterns of the samples after maintained in the ambient atmosphere for more than six months showed the good stability. All peaks have been indexed.



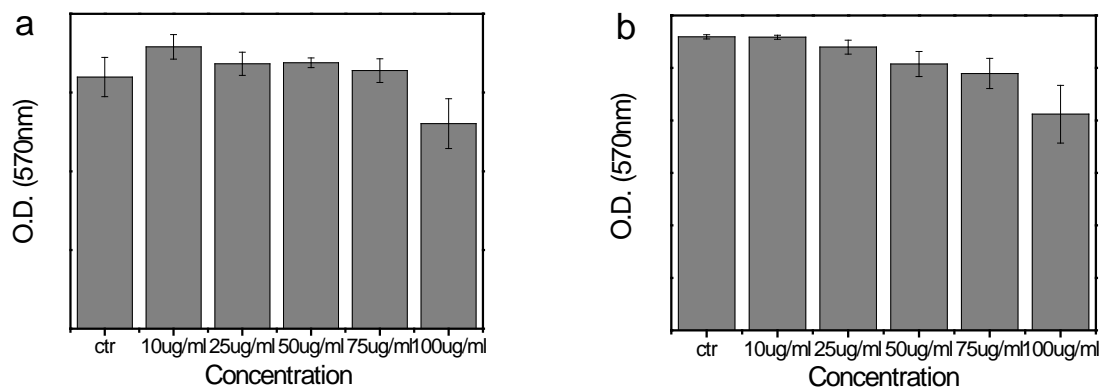
**Figure S6.** XPS spectra of the products maintained in the ambient atmosphere for about one week showed the stability and detailed compositions. **a**, a survey spectrum; **b**, Fe ( $2p_{3/2}$ ) spectrum; **c**, S ( $2p$ ) spectrum.



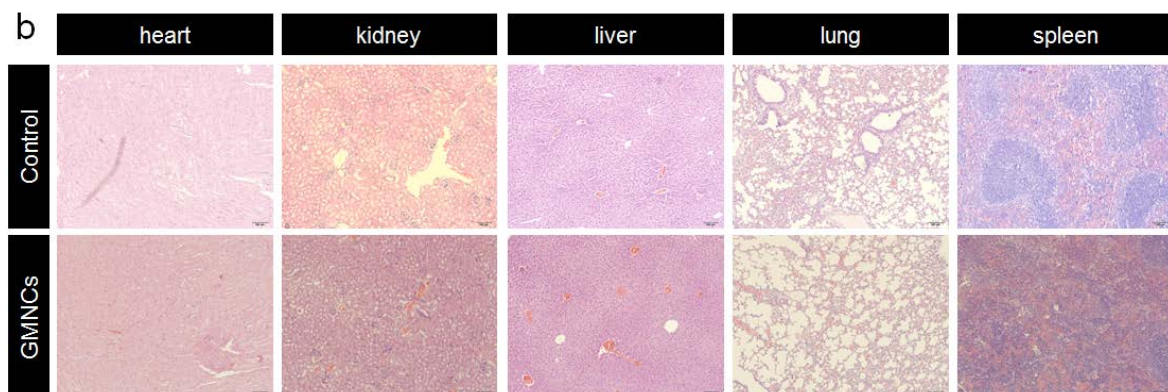
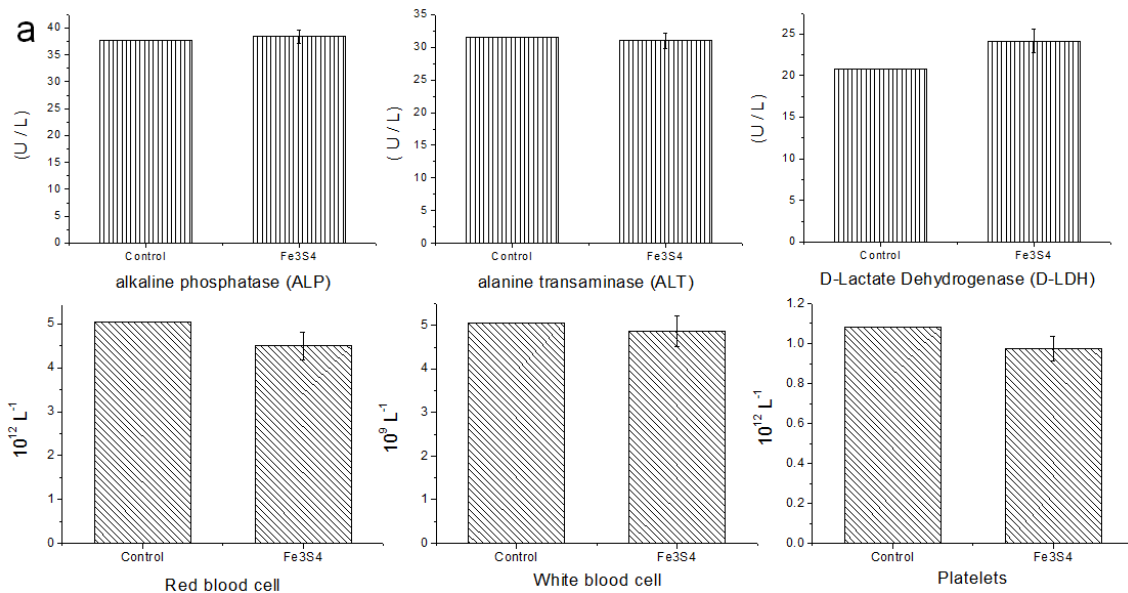
**Figure S7.** **a**, FT-IR spectra of the original NCs and the as-prepared GMNCs suggested the existence of the  $\beta$ -CD and PEG molecules; **b**, XRD patterns of the original F<sub>3</sub>S<sub>4</sub> NCs and the as-prepared GMNCs showed the cooperation the two organic molecules; **c**, UV-vis spectrum of the as-synthesized GMNCs showed two absorption bands at 280 and 382 nm, respectively; **d**, TGA curve of the as-prepared GMNCs showed 17.3 wt% losses.



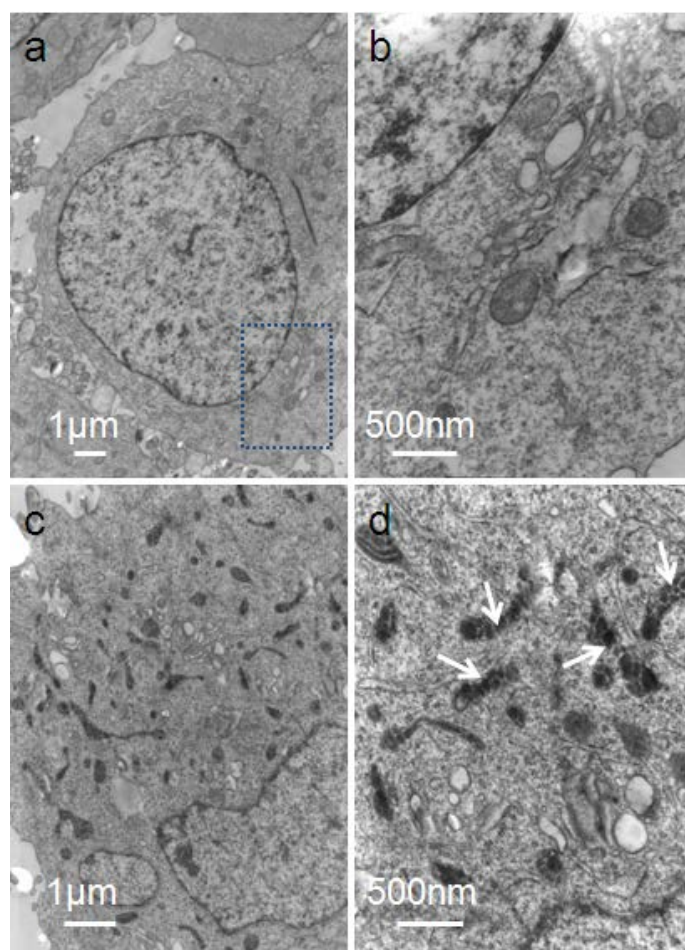
**Figure S8.** Optical photos for the water-solubility test, illuminating high hydrophilicity and water-solubility of the as-synthesized GMNCs.



**Figure S9.** MTT cytotoxicity assay of **a**, MEF cells and **b**, HeLa cells exposed to greigite MNCs with varying concentrations (10-100 µg/mL).



**Figure S10.** After 2 weeks intravenous injection of GMNCs (5 mg/kg dose) into mice, (a) Blood test parameters including the platelet count, the red blood cell count, the white blood count and enzyme activities in serum including ALP, ALT and D-LDH for control and GMNCs injection groups and (b) Histological analysis in the liver, spleen, heart, kidney, and lung. Sections were stained with H&E and observed under a light microscope at 100x magnification.



**Figure S11.** Bio-TEM images of HeLa cells: (a, b) untreated control and (c, d) treated with MNCs for 1 day. The internalized MNCs were indicated by white arrows.