## Silica cross-linked nanoparticles encapsulating phenothiazine-derived Schiff base for selective detection of Fe (III) in aqueous media

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Scheme S1 Detail synthesis route of EDDP



Figure S1<sup>1</sup>H NMR of EDDP

**EDDP** <sup>1</sup>**H NMR** (CDCl<sub>3</sub>, 300 MHz, ppm), δ = 9.610 (1 H, -CH=N), 7.68-6.82 (12 H, Ar-H), 3.121 (2 H, -CH<sub>2</sub>-), 2.464 (3 H, -CH<sub>3</sub>), 1.798 (3 H, -CH<sub>3</sub>), 1.56-1.23 (20 H, -CH<sub>2</sub>-), 0.865 (3 H, -



**Figure S2** Size distribution of EDDP-SCMNPs (24nm, left) measured by DLS and XRD pattern of dried EDDP-SCMNPs (right). The nanoparticles assemble into a low ordered mesostructure during dry process.



Figure S3 Absorption spectra of free EDDP (black line) and EDDP-SCMNPs (red line)



Figure S4 Normalized absorbance of free EDDP (black line), EDDP with 2.6ppm of Fe<sup>2+</sup> (red line) or 17ppm of Fe<sup>3+</sup> (green line)



Figure S5 The NMR change of free EDDP resulted from Fe<sup>3+</sup>: (left: pure EDDP; right: EDDP

## solution containing 170 ppm Fe<sup>3+</sup>)





Figure S7 Normalized absorbance of free EDDP (black line), EDDP-SCMNPs (red line) and EDDP-SCMNPs with 32ppm of Fe<sup>2+</sup> (blue line) or Fe<sup>3+</sup> (green line)



**Figure S8** Fluorescence emission spectra of EDDP-SCMNPs (EDDP  $1 \times 10^{-5}$  M) added with a increasingly amount of Fe<sup>2+</sup> (340 ppm to 1700 ppm)



**Figure S9** Fluorescence emission spectra of EDDP and EDDP-SCMNPs with  $Fe^{3+}$  and the mixture of  $Fe^{3+}$  and EDTA (molar ratio  $Fe^{3+}/EDTA = 1$ )



Figure S10 Fluorescence 3D spectra of free EDDP (left) and EDDP-SCMNPs (right)



**Figure S11** Kinetic curve of EDDP-SCMNPs (EDDP  $1 \times 10^{-5}$  M, Fe<sup>3+</sup> 70 ppm) fluorescence emission intensity at 527nm