## A novel ascorbic acid sensor based on Fe<sup>3+</sup>/Fe<sup>2+</sup> modulated photoluminescence of CdTe quantum dots@SiO<sub>2</sub> nanobeads

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Fig.S1 Time course of the fluorescence of CdTe QDs and in the presence of Fe<sup>2+</sup> (60  $\mu$ M) or Fe<sup>3+</sup>(60  $\mu$ M).



Fig.S2 Fluorescence spectra of CdTe  $QDs@SiO_2$  nanobeads with different concentration of ascorbic acid (6.7-120  $\mu$ mol/L). The insert is the relation between the PL intensity of CdTe  $QDs@SiO_2$  nanobeads and the concentration of ascorbic acid. F<sub>0</sub> and F are the fluorescence intensity in the absence and presence of ascorbic acid, respectively.



Fig.S3 Fluorescence spectra of CdTe QDs@SiO<sub>2</sub> nanobeads with different concentration of  $H_2O_2$ (3.3-70 µmol/L). The insert is the relation between the PL intensity of CdTe QDs@SiO<sub>2</sub> nanobeads and the concentration of  $H_2O_2$ .  $F_0$  and F are the fluorescence intensity in the absence and presence of  $H_2O_2$ , respectively.



Fig.S4 The effect of pH on the PL intensity of CdTe QDs@SiO<sub>2</sub> nanobeads.



Fig.S5 Fluorescence spectra of  $Fe^{3+}$ -CdTe QDs@SiO<sub>2</sub> nanobeads with ascorbic acid under different pH: a, pH 5.6; b, pH 6.0; c, pH 7.0; d, pH 7.4; e, pH 8.0; f, pH 9.0. The insert is the relation between the PL intensity of CdTe QDs@SiO<sub>2</sub> nanobeads and pH. F<sub>0</sub> and F are the fluorescence intensity in the absence and presence of ascorbic acid, respectively.



Fig.S6 Fluorescence spectra of  $Fe^{3+}$ -CdTe QDs@SiO<sub>2</sub> nanobeads with ascorbic acid under different ionic strength: a 0µM, b 10µM, c 100µM, d 1mM, and e 10mM. The insert is the relation between the PL intensity of CdTe QDs@SiO<sub>2</sub> nanobeads and ionic strength. F<sub>0</sub> and F are the fluorescence intensity in the absence and presence of Na<sup>+</sup>, respectively.



Fig.S7 Fluorescence spectra of  $\text{Fe}^{3+}$ -CdTe QDs@SiO<sub>2</sub> nanobeads with ascorbic acid with different reaction time: a 0min, b 5min, c 10min, d 20min, e 30min, f 50min, g 60min, and h 120min. The insert is the relation between the PL intensity of CdTe QDs@SiO<sub>2</sub> nanobeads and reaction time. F<sub>0</sub> and F are the fluorescence intensity in the absence and presence of ascorbic acid, respectively.