

## Supporting Information for

### **A magnetic/fluorometric bimodal sensor based on carbon dots- MnO<sub>2</sub> platform for glutathione detection**

Yang Xu,<sup>a</sup> Xi Chen,<sup>a</sup> Ran Chai,<sup>b</sup> Chengfen Xing,<sup>b</sup> Huanrong Li\*<sup>a</sup> and Xue-bo Yin \*<sup>c</sup>

<sup>a</sup> School of Chemical Engineering and Technology, Hebei University of Technology, GuangRong Dao 8, Hongqiao District, Tianjin 300130, China. Email: lihuanrong@hebut.edu.cn;

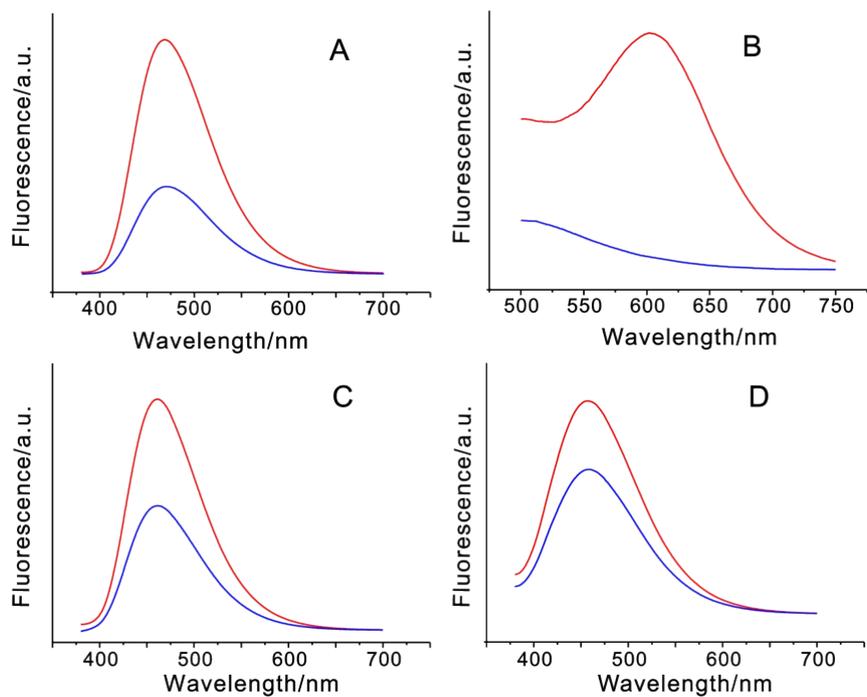
<sup>b</sup> Key Laboratory of Hebei Province for Molecular Biophysics, Institute of Biophysics, Hebei University of Technology, Tianjin 300130, China.

<sup>c</sup> State Key Laboratory of Medicinal Chemical Biology, Collaborative Innovation Center of Chemical Science and Engineering(Tianjin), and Research Center for Analytical Sciences, College of Chemistry, Nankai University, Tianjin, 300071, China. Email: xbyin@nankai.edu.cn

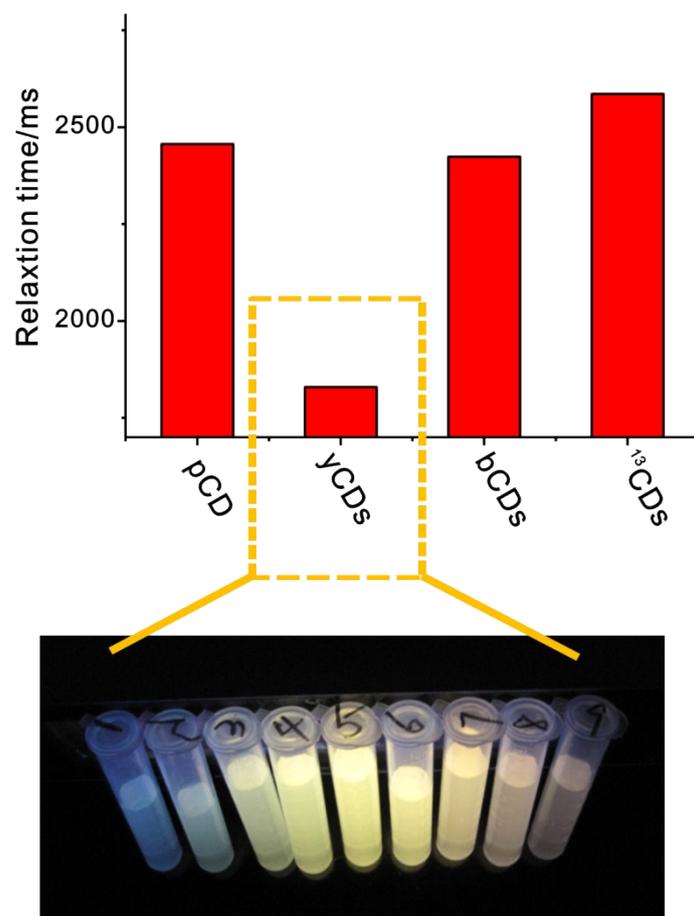
## Results and discussions

**Table S1.** The zeta-potentials of MnO<sub>2</sub> and CDs.

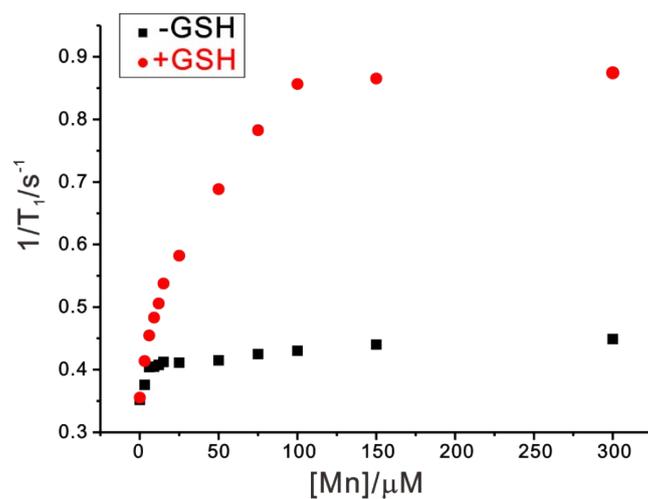
<b>Materials</b>	<b><math>\xi</math>-potential</b>
<b>MnO<sub>2</sub></b>	<b>-19.7 mV</b>
<b>pCDs</b>	<b>+5.58 mV</b>
<b>bCDs</b>	<b>-22.5 mV</b>
<b><sup>13</sup>CDs</b>	<b>-32.2 mV</b>
<b>yCDs</b>	<b>+8.49 mV</b>



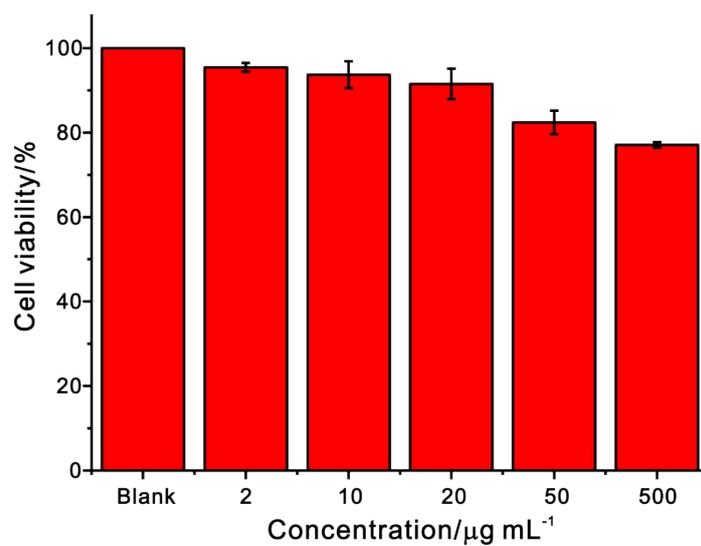
**Figure S1.** The fluorescence spectra of CDs (red lines), and CDs-MnO<sub>2</sub> (blue lines): (A) pCDs; (B) yCDs; (C) bCDs; (D) <sup>13</sup>CDs.



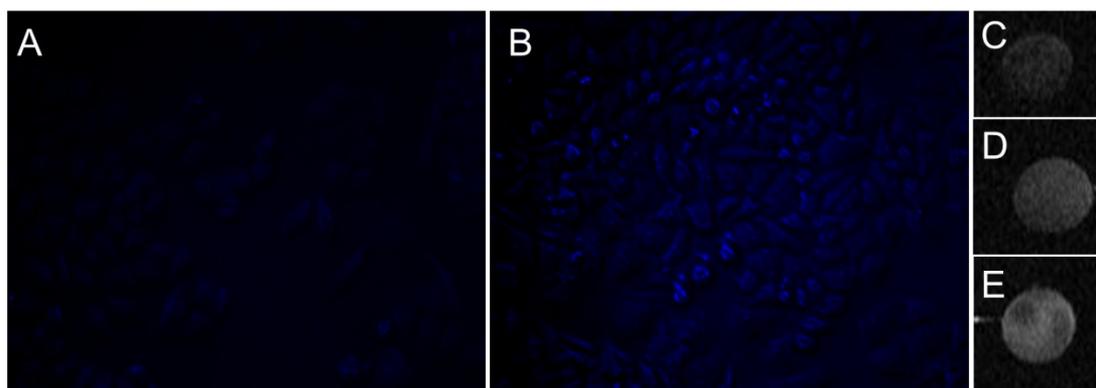
**Figure S2.** The longitudinal relaxation time of different kinds of CDs-MnO<sub>2</sub> platform. The fluorescent images of nine fractions separated from yCDs upon UV light excitation.



**Figure S3.** The  $1/T_1$  versus  $MnO_2$  concentration curves of pCDs- $MnO_2$  solution in the absence and presence of GSH.



**Figure S4.** Cell viability of HeLa cells incubated with pCD- $MnO_2$ . Data were presented as the mean  $\pm$  the standard deviation (SD).



**Figure S5.** The fluorescence images of (A) HeLa cells and (B) HeLa cells incubated with pCDs-MnO<sub>2</sub> (50 μg mL<sup>-1</sup>) for 4 h. Fluorescence images acquired with 325-375 nm excitation and 435-485 nm emission. (C) The MR images of pCD-MnO<sub>2</sub> solution. The MR images of cell lysis solution: (D) HeLa cells and (E) MCF-7 cells incubated with pCDs-MnO<sub>2</sub>.

Table S2. The GSH concentrations of HeLa cells and MCF-7 cells measured by GSH commercial assay kit and pCDs-MnO<sub>2</sub>. The cell lysis solutions were diluted by 20 times.

	GSH commercial assay kit (μM)	pCDs-MnO <sub>2</sub> in fluorescence mode (μM)	pCDs-MnO <sub>2</sub> in MR mode (μM)
HeLa cells	6.4	7.9	9.5
MCF-7 cells	7.6	8.8	11