MnO_2-DNA Nanomaterials towards: Dual Signal Detection of Micropollutants P-aminophenol

Xiang-Ling Li, Zi-Heng Wang, Qin Zhang, Dan Luo and Jing jing Xie*

a. State Key Laboratory of Materials-Oriented Chemical Engineering, College of Biotechnology and Pharmaceutical Engineering, Nanjing Tech University, Nanjing 211816, P.R. China;

* Corresponding author. E-mail address: xiej@njtech.edu.cn (J.-J. Xie), Tel/Fax: +86-25-58139939.

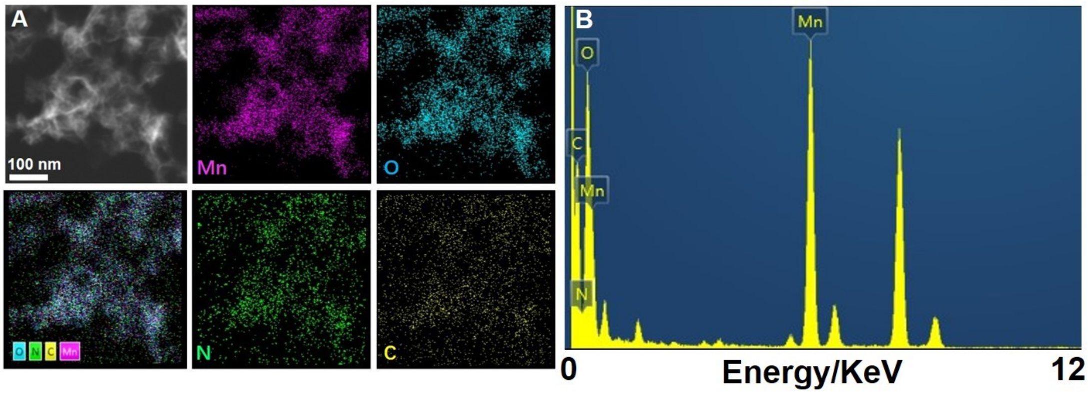

Fig.S1 (A)STEM−EDS chemical element mapping of the MnO_2-DNA nanocomposites, (B) the energy dispersive spectrum of the MnO_2-DNA nanocomposites, scale bar:100 nm.

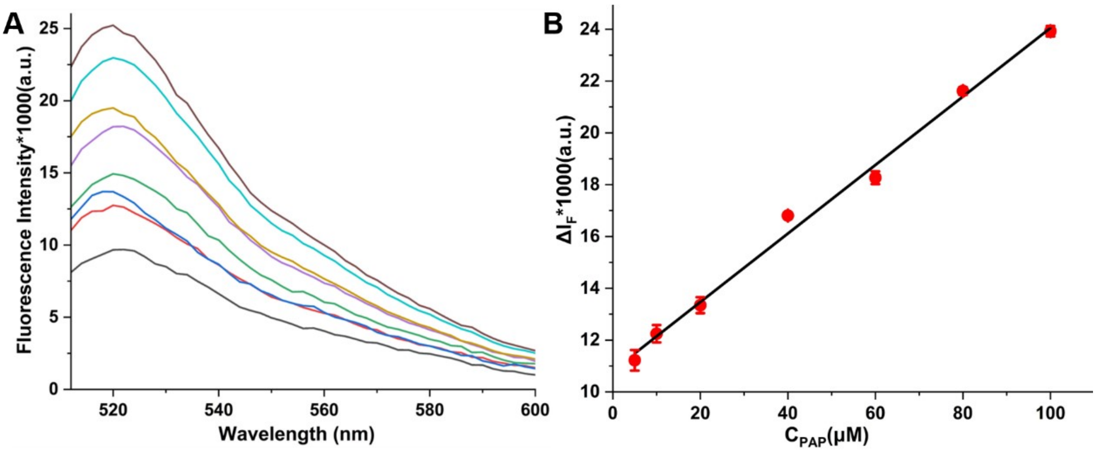

Fig.S2 (A) Fluorescence spectra of MnO_2-DNA assemblies for different PAP concentrations (2, 5, 10, 20, 40, 60, 80, 100 μM); (B) The linear relationship between fluorescence intensity and the concentrations of PAP.

Table S1. Compare the various methods for PAP analysis.

Analyte	Methods	Performances	Ref
	UV–Vis spectrometer	LOD[a]: 0.32 μM LDR[b]: 0-85 μM	1
	Electrochemistry method	LOD: 0.17 μM LDR: 0.1 μM-1 μM	2
	Electrochemistry method	LOD: 3.0 μM LDR: 10.0 μM~1000 μM	3
PAP	Electrochemistry method	LOD: 0.1 μM	4

	LDR: 0.7 μM~30.0 μM	
Spectrofluorimetry	LOD: 0.02 μM LDR: 0.05 μM~50 μM	5
Electrochemistry method	LOD: 1.2 μM LDR: 4 μM~320.0 μM	6
Spectrophotometry& Spectrofluorimetry	LOD: 0.31 nM LDR: 0.5 nM~1 μM	This work

[a] LDR：linear detection range; [b]LOD: Limit of detection

Table S2. Recoveries of PAP Spiked in Soil and River Water Sample Based on the MnO_2-DNA assemblies.

Methods	Samples	Added	Measured	Recovery(%)	RSD(n=3, %)
UV-Vis	river water	10 μM	0.300	95.25	2.479
		50 μM	0.380	98.52	0.529
	soil	10 μM	0.310	98.42	0.435
		50 μM	0.379	98.34	0.479
Fluorescence	river water	10 μM	1.254×10^{4}	103.33	0.466
		50 μM	1.747×10^{4}	100.2	0.976
	soil	10 μM	1.206×10^{4}	99.33	0.491
		50 μM	1.719×10^{4}	98.6	1.399

Reference:

(1) Shaban, S. M.; Moon, B. S.; Kim, D. H. *Environ. Technol. Inno*. **2021**, *22,* 2352.

(2) De Souza, J. C.; Zanoni, M. V.; Oliveira-Brett, A. M.; *J. Electroanal. Chem.* **2020**, *872,* 1572.

(3) Zhang, C.-Y.; Fan, L.-F.; Zhang, G.-J.; Wang, G.-Z.; Guo, Y.-J.; Dong, C. *J. Anal. Sci.* **2019**, *35*, 139.

(4) Kuang, Y.-F.; Zou, J.-L.; Feng, Y.-L.; Deng, P.-H.; Cai, Z.-J.; Li, W.; Yang, Y.-Q.; Qu, J.-N.; Liu, M.-Q. *Chin. J. Anal. Lab.* **2010**, *29*, 47.

(5) Lu, X.-L.; Wei, F.-D.; Xu, G.-H.; Wu, Y.-Z.; Yang, J.; Hu, Q. *J. Fluoresc*. **2018**, *27*,181.

(6) Mehretie, S.; Admassie, S.; Hunde, T.; Tessema, M.; Solomon, T. *Talanta* **2011**, *85*, 1376.