

Supporting Information

A signal-on electrochemiluminescence aptasensor based on the quenching effect of manganese dioxide for sensitive detection of carcinoembryonic antigen

Ying He, Yaqin Chai*, Haijun Wang, Lijuan Bai, Ruo Yuan

*Key Laboratory of Luminescent and Real-Time Analytical Chemistry, Ministry of Education,
College of Chemistry and Chemical Engineering, Southwest University, Chongqing 400715, People's
Republic of China*

Characterization of MnO₂-GO composite

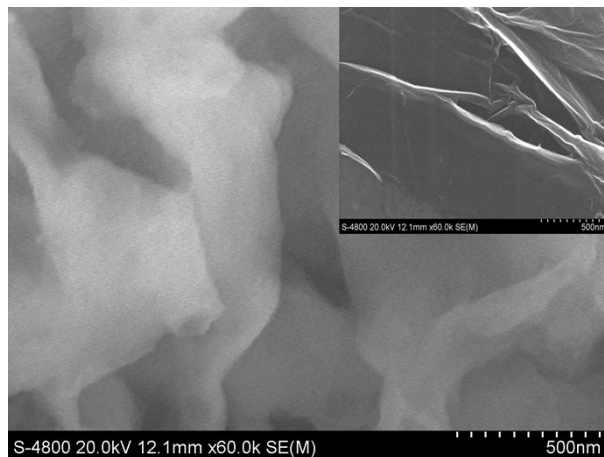


Fig. S1 SEM images of MnO₂-GO composite. Insert in B: SEM images of GO.

The morphologies of different nanomaterials were characterized by scanning electron microscopy (SEM) at an acceleration voltage of 20 kV. As shown in Fig. S1, the image of the MnO₂-GO composite

* Corresponding author. Tel.: +86-23-68252277; Fax: +86-23-68253172.
E-mail address: yqchai@swu.edu.cn (Y. Q. Chai)

displayed a large plate-like and loose curling morphology. In comparison to the blank GO (Fig. S1, inset), the MnO₂-GO composite had a much rougher surface, indicating that some carbon atoms of the GO sheets have been replaced by other elements. In addition, no obvious nanosheets aggregations were observed, suggesting graphene nanosheets and MnO₂ assemble freely.

Table S1

Comparisons of the proposed ECL aptasensor with other reported sensor for CEA detection.

Analytical method	Detection limit (pg mL ⁻¹)	Linear range (ng mL ⁻¹)	Ref.
Electrochemical	4.4	0.010 ~ 50.0	1
Electrochemiluminescence	0.8	0.001 ~ 10	2
Laser-Induced fluorescence	90	0.30 ~ 100	3
Fluorescence	----	0.10 ~ 10	4
Electrochemical	1.0	0.01 ~ 80	5
Superparamagnetic beads	3500	10.0 ~ 800.0	6
Electrochemiluminescence	0.0253	0.0001 ~ 20	Our work

References

1. B. Jeong, R. Akter, O. H. Han, C. K. Rhee and M. A. Rahman, *Anal. Chem.*, 2013, **85**, 1784.
2. M. Zhang, S. G. Ge, W. P. Li, M. Yan, X. R. Song, J. H. Yu, W. Xua and J. D. Huang, *Analyst*, 2012, **137**, 680.
3. Q. L. Yu, X. F. Zhan, K. P. Liu, H. Lv and Y. X. Duan, *Anal. Chem.*, 2013, **85**, 4578.
4. Z. Y. Lin, G. Y. Zhang, W. Q. Yang, B. G. Qiu and N. Chen, *Chem. Commun.*, 2012, **48**, 9918.
5. J. Tang, D. P. Tang, R. Niessner, G. N. Chen and D. Knopp, *Anal. Chem.*, 2011, **83**, 5407.
6. X. Yu, H. S. Xia, Z. D. Sun, Y. Lin, K. Wang, J. Yu, H. Tang, D. W. Pang and Z. L. Zhang, *Biosens. Bioelectron.*, 2013, **41**, 129.