Electronic Supplementary Information

Three dimensional Pt nanodendrites/graphene/MnO_2 nanoflowers modified electrode for sensitive and selective detection of dopamine

Beibei Yang[a], JinWang[a], Duan Bin[a], Mingshan Zhu[*b], Ping Yang[a], Yukou Du[*a]

[a] *College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, P.R. China.*
E-mail: duyk@suda.edu.cn; Fax: +8651265880089; Tel: +86 512 65880361
[b] *Department Chemistry, University of Toronto, Toronto M5S 3H6, Canada*
E-mail: mingshanzhu@yahoo.com

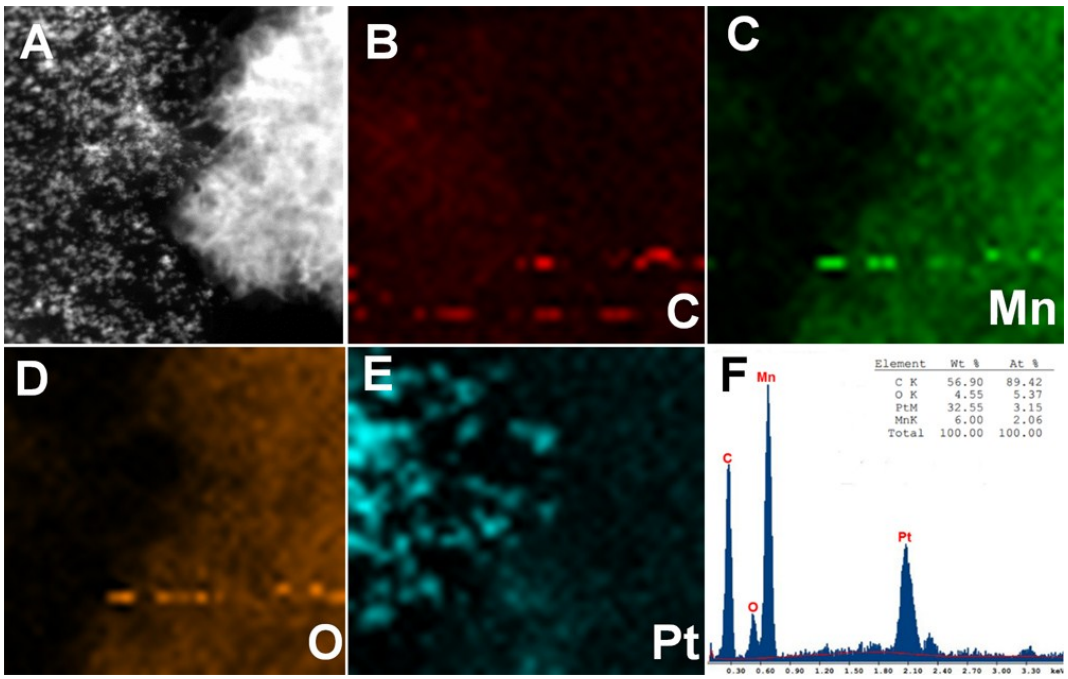

Fig. S1. (A) TEM image of the 3D Pt/RGO/MnO_2 nanocomposites. (B~E) C, Mn, O and Pt element mapping images of the 3D Pt/RGO/MnO_2 nanocomposites on image (A), respectively. (F) EDX spectrum of the 3D Pt/RGO/MnO_2 nanocomposites.

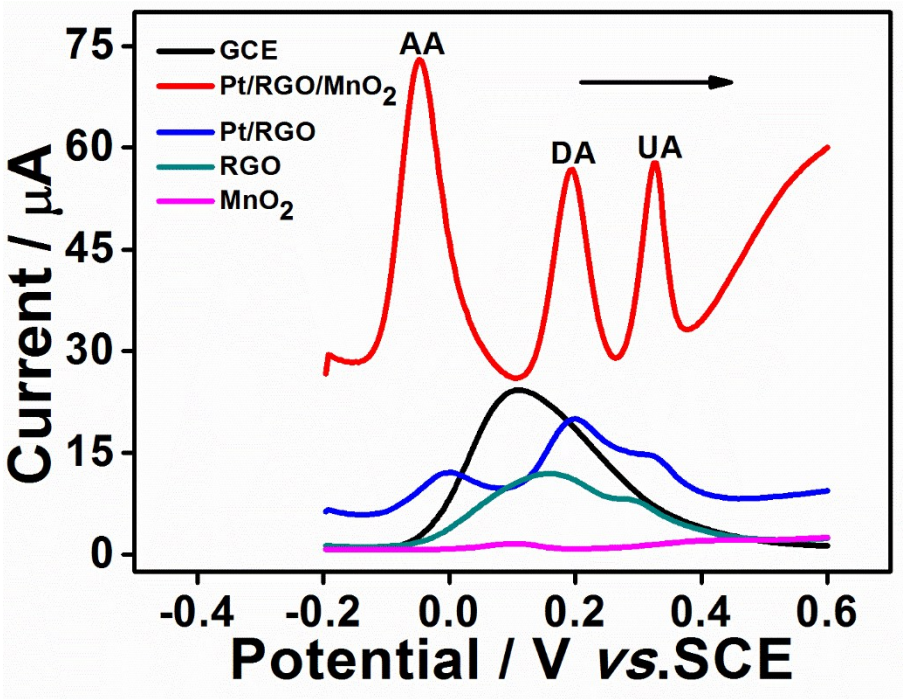

Fig. S2. DPV curves of Pt/RGO/MnO_2, Pt/RGO, MnO_2, RGO and GCE electrodes recorded in 0.1 M PBS (pH=7.0) containing 5 mM AA, 0.05 mM UA and 0.05 mM DA.

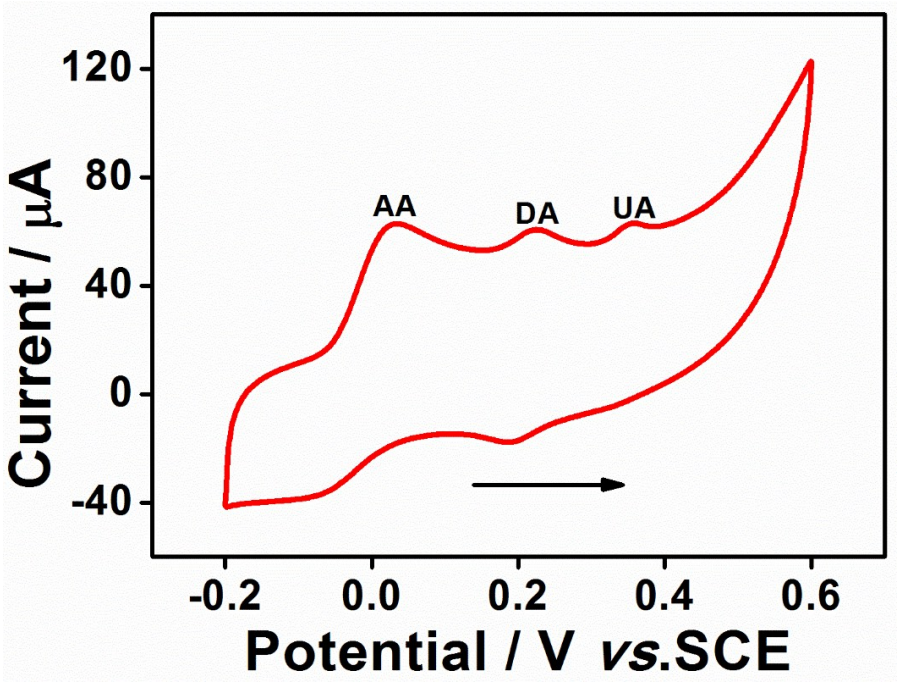

Fig. S3. CVs of Pt/RGO/MnO_2 in 0.1 M PBS (pH=7.0) containing 5 mM AA, 0.05 mM UA and 0.05 mM DA. Scan rate : 50 mV s^{-1}.

Table S1. Comparison of our present work with other techniques for DA detection

Electrode	Linear range (μM)	LOD (μM)	Sensitivity (μA mM^{-1})	Reference
Graphene/GCE	4–100	2.64	65.9	[1]
RGO/Pd-NPs/GCE	1–150	0.233	183.4	[2]
Graphene oxide/GCE	1–15	0.27	554.5	[3]
Modified Pt /CNS/GCE	0.8–100	0.12	658.6	[4]
graphene–AuNPs/GCE	5–1000	1.86	35.7	[5]
CTAB-GO/MWNT/GCE	5–500	1.5	217.4	[6]
Fe_3O_4/RGO/GCE	0.5–100	0.7	2869	[7]
GEF/CFE	0.7–45.21	0.5	1910	[8]
graphene/Pt-modified GCE	0.03–8.13	0.03	969.5	[9]
MnO_2/Pt/RGO/GCE	1.5-215.56	0.1	1916.2	This work

CNS: carbon nanosheet. AuNPs: Au nanoparticles. MWNT: multiwalled carbon nanotube. GEF: graphene flowers, CFE: carbon fiber electrode.

Table S2. Assay results of rat serum samples using the proposed and reference methods.

Samples	1	2	3	4	5
Added (μM)	1	5	10	50	100
Proposed method found (μM)	0.98	4.68	10.43	49.09	105.5
Reference method found (μM)	1.07	5.03	10.06	51.4	99.81
Relative error (%)	-8.41	-6.96	3.68	-4.49	5.7

References

[1] Y. R. Kim, S. Bong, Y. J. Kang, Y. Yang, R. Mahajan, J. Kim, H. Kim, *Biosens. Bioelectron.,* 2010, **25**, 2366.

[2] S. Palanisamy, S. Ku, S. M. Chen, *Microchim Acta,* 2013, **180**, 1037.

[3] F. Gao, X. Cai, X. Wang, C. Gao, S. Liu, F. Gao, Q. Wang, *Sens. Actuators, B,* 2013, **186**, 380.

[4] Z. Wang, M. Shoji, H. Ogata, *Analyst*, 2011, **136**, 4903.

[5] J. Li, J. Yang, Z. Yang, Y. Li, S. Yu, Q. Xu, X. Hu, *Anal. Methods,* 2012, **4**, 1725.

[6] Y. Yang, W. Li, *Biosens. Bioelectron.,* 2014, **56**, 300.

[7] T. P. See, A. Pandikumar, H. N. Ming, L. H. Ngee, Y. Sulaiman, *Sensors,* 2014, **14** 15227.

[8] J. Du, R. Yue, F. Ren, Z. Yao, F. Jiang, P. Yang, Y. Du, *Biosens. Bioelectron.,* 2014, **53**, 220.

[9] C. L. Sun, H. H. Lee, J. M. Yang, C. C. Wu, *Biosens. Bioelectron.,* 2011, **26**, 3450.