

Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

**β -Cyclodextrin Functionalized 3D Reduced Graphene Oxide Composite-Based
Electrochemical Sensor for the Sensitive Detection of Dopamine**

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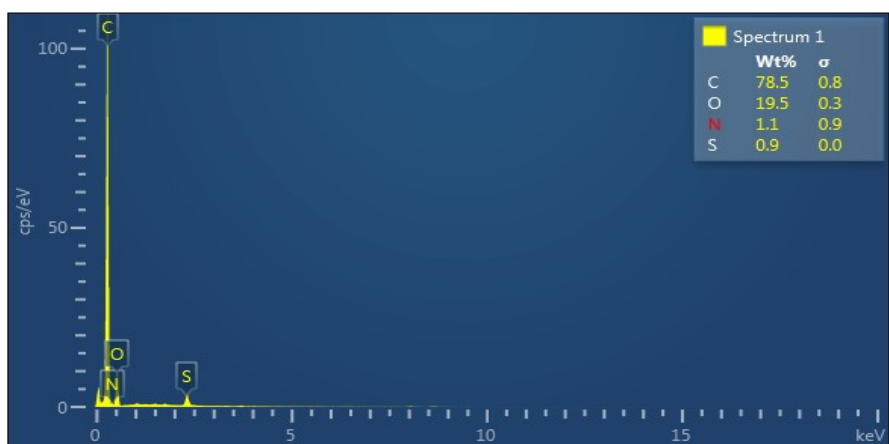


Fig. S1. EDS of 3D-rGO/ β -CD composites.

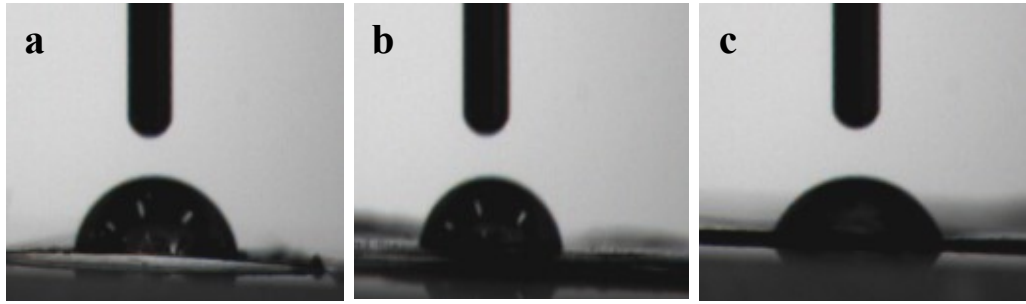


Fig. S2 Contact-angle photographs of GO (a), 3D-rGO (b) and 3D-rGO/ β -CD (c) modified substrates

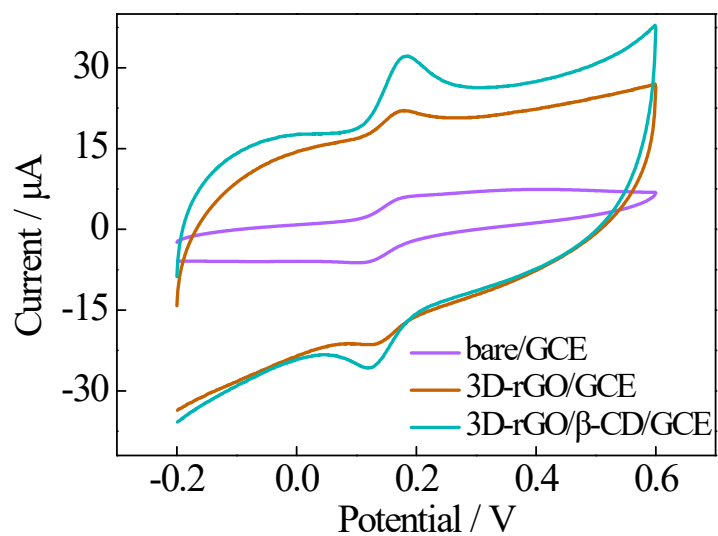


Fig. S3 CV curves of various modified electrodes with bare GCE, 3D-rGO/GCE, and 3D-rGO/ β -CD/GCE were recorded in the 0.1 M PB solution of contained DA (100.0 μM) (pH 7.0). Scan rate: 0.1 V/s; working potential: -0.2 V - 0.6 V (vs SCE)

Method for calculating of limit of detection (LOD) ¹⁻³.

LOD is calculated using the following relation based on the linear calibration equation according to IUPAC definition, S/N=3 (signal-to-noise ratio). $LOD = 3S/b$, where S is the standard deviation of the blank experiment (namely, standard deviation of background current at the peak position via running parallel determination for ten times in blank electrolytes at 3D-rGO/ β -CD/GCE), and b is slope of calibration plot of DA ($0.296 \mu\text{A } \mu\text{M}^{-1}$). Putting the values in the above formula gives the LOD.

References

1. Y. Wang, Y. Q. Chen, H. Bian, Y. W. Sun, L. J. Zhu, D. H. Xia, *Sens. Actuators B-Chem.*, 2021, 341, 130044.
2. P. Lei, Y. Zhou, R. Q. Zhu, Y. Liu, C. Dong, S. M. Shuang, *Biosens. Bioelectron.*, 2020, 147, 111735.
3. M. Zheng, Y. Wang, C. Wang, W. Wei, S. Ma, X. Sun, J. He, *Spectrochim. Acta A.*, 2018, 19, 315-321.

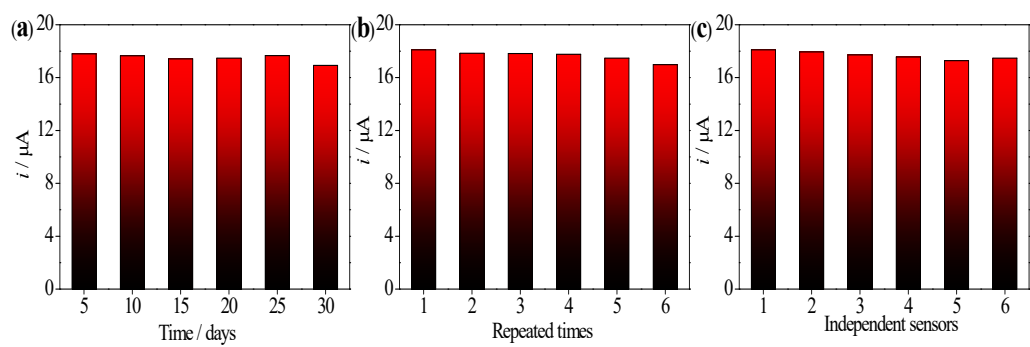


Fig. S4 The cartograms of (a) storage stability (b) repeatability and (c) reproducibility of the 3D-rGO/ β -CD/GCE sensor.

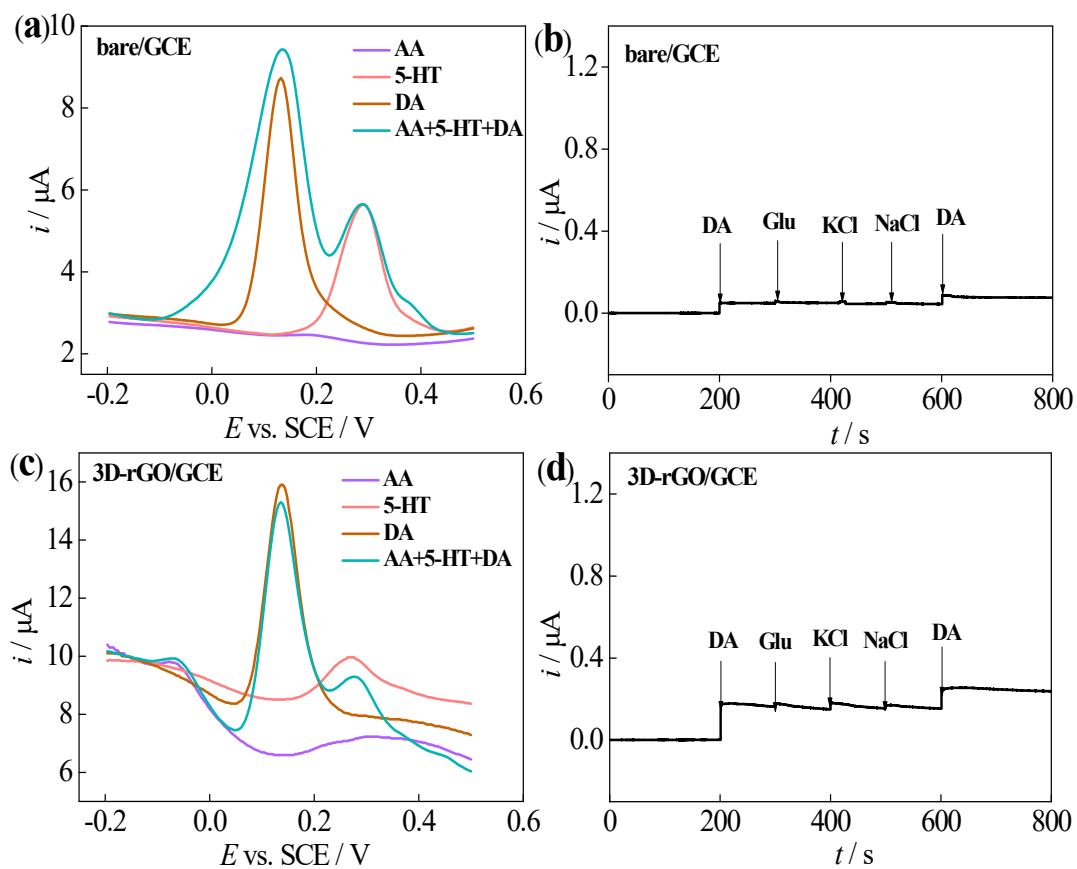


Fig. S5 (a) DPV responses of bare/GCE (a), 3D-rGO/GCE (c) in 0.1 M PB solution (pH =7.0) for 1 mM AA, 100 μM DA, 100 μM 5-HT and the mixture of 1 mM AA, 100 μM DA and 100 μM 5-HT. (b) Amperometric responses of the bare/GCE (b), 3D-rGO/GCE (d) for the addition of 100 μM DA and 200 μM glucose, 200 μM KCl and 200 μM NaCl in 0.1 M PB solution (pH = 7.0).

Table S1. Determination of DA in human serum and urine samples by DPV

Samples	Original (μM)	Spiked (μM)	Found (μM)	Recovery (%)	RSD* (%)
Serum samples	^a Not Found	5.00	5.12	102.4	2.63
		10.00	10.05	100.5	2.14
		20.00	19.88	99.40	1.99
		30.00	30.09	100.3	1.45
		50.00	49.89	99.78	2.08
Urine samples	^b 0.72	5.00	5.66	98.8	2.35
		10.00	10.89	101.7	2.71
		20.00	20.78	100.3	1.98
		30.00	30.65	99.8	2.51
		50.00	50.84	100.2	3.39

^a Dilute 5 times with PB (0.1 M, pH=7.0).

^b Dilute 2 times with PB (0.1 M, pH=7.0).

* RSD value reported is for n=5.