

## **Supplementary Information**

**Graphene-based electrochemical flow analysis device for simultaneous determination of dopamine, 5-hydroxytryptamine, and melatonin**

## Figures and Tables captions

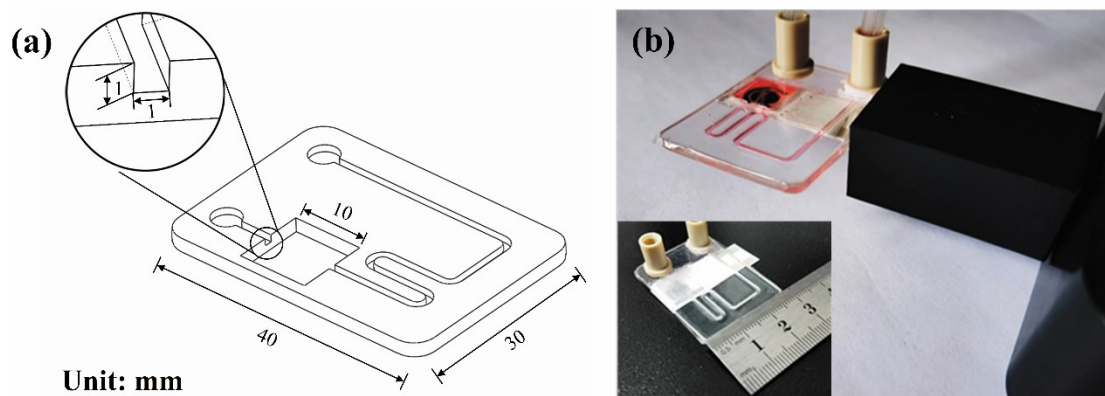
**Fig. S1.** (a) Schematic diagram of 3D-printed flow cell. (b) Photograph of the detection device.

**Fig. S2.** (a) Particle size distributions of gold nanoparticles and (b) EDS spectrum of the AuNPs@Gr.

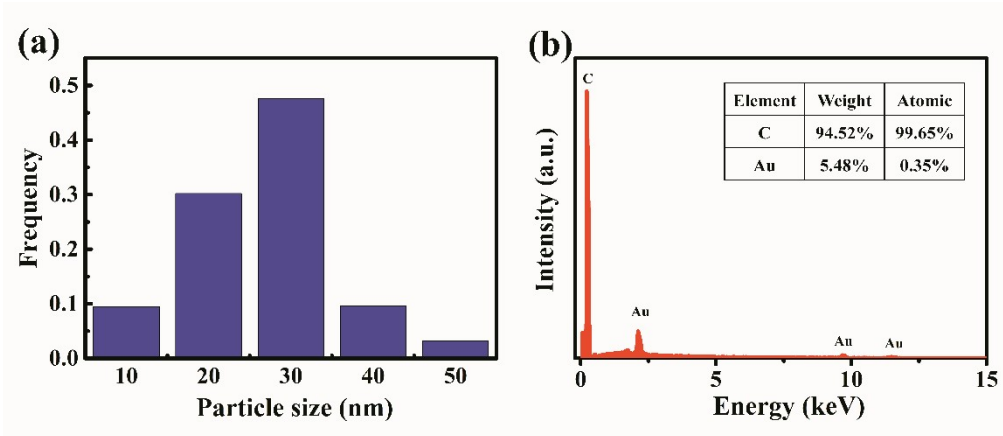
**Fig. S3.** DPV curves on the GEFAD of (a) 50  $\mu\text{M}$  DA, (b) 50  $\mu\text{M}$  5-HT, (c) 50  $\mu\text{M}$  MEL in 0.1 M PBS with pH ranging from 5.0 to 9.0. (d) DPV curves on the GEFAD in 0.1 M PBS (pH = 7.0) containing 10  $\mu\text{M}$  DA, 10  $\mu\text{M}$  5-HT, and 10  $\mu\text{M}$  MEL with different flow rates.

**Fig. S4.** DPV curves on the GEFAD in 0.1 M PBS (pH = 7.0) with (a) 0.1  $\mu\text{M}$  - 200  $\mu\text{M}$  DA, (c) 0.1  $\mu\text{M}$  - 200  $\mu\text{M}$  5-HT, (e) 0.1  $\mu\text{M}$  - 200  $\mu\text{M}$  MEL. Corresponding plots of the anodic peak current vs. concentrations for (b) DA, (d) 5-HT, and (f) MEL, respectively.

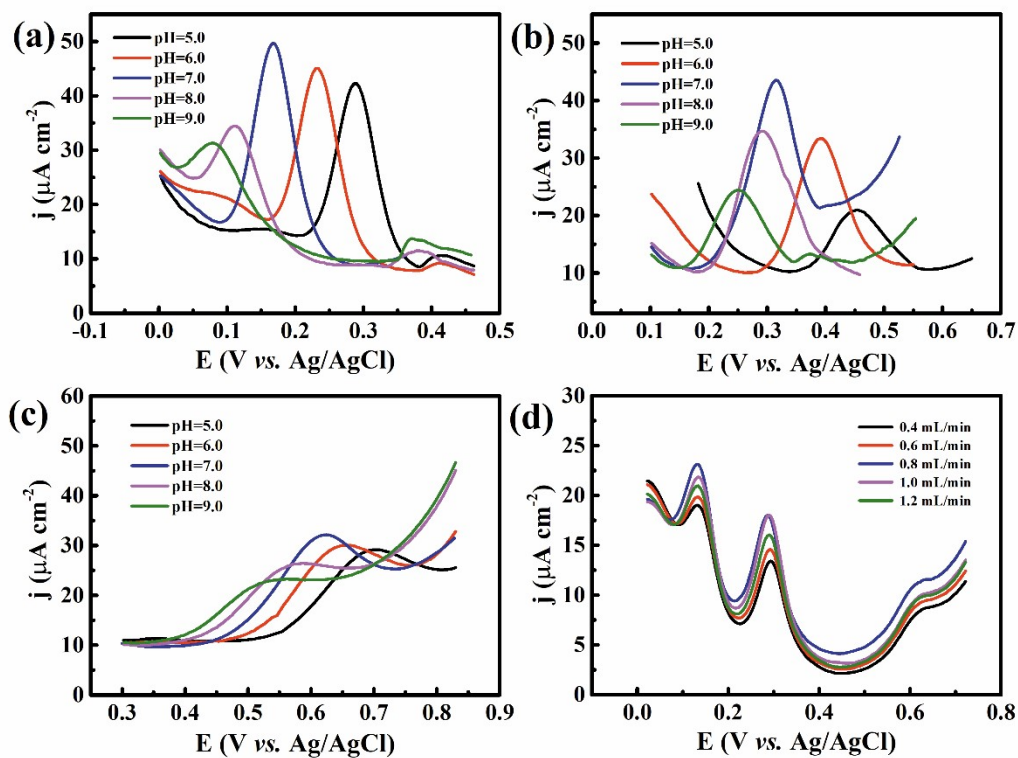
**Fig. S5.** (a) DPV curves of the GEFAD in 0.1 M PBS (pH = 7.0) containing 10  $\mu\text{M}$  DA, 10  $\mu\text{M}$  5 HT, and 10  $\mu\text{M}$  MEL before and after the maximum flow rate (6 mL/min) flushing. DPV continuously recorded with GEFAD for 10 times in 0.1 M PBS of pH = 7.0 containing (b) 5  $\mu\text{M}$  DA, (c) 10  $\mu\text{M}$  5-HT, and (d) 20  $\mu\text{M}$  MEL, respectively.



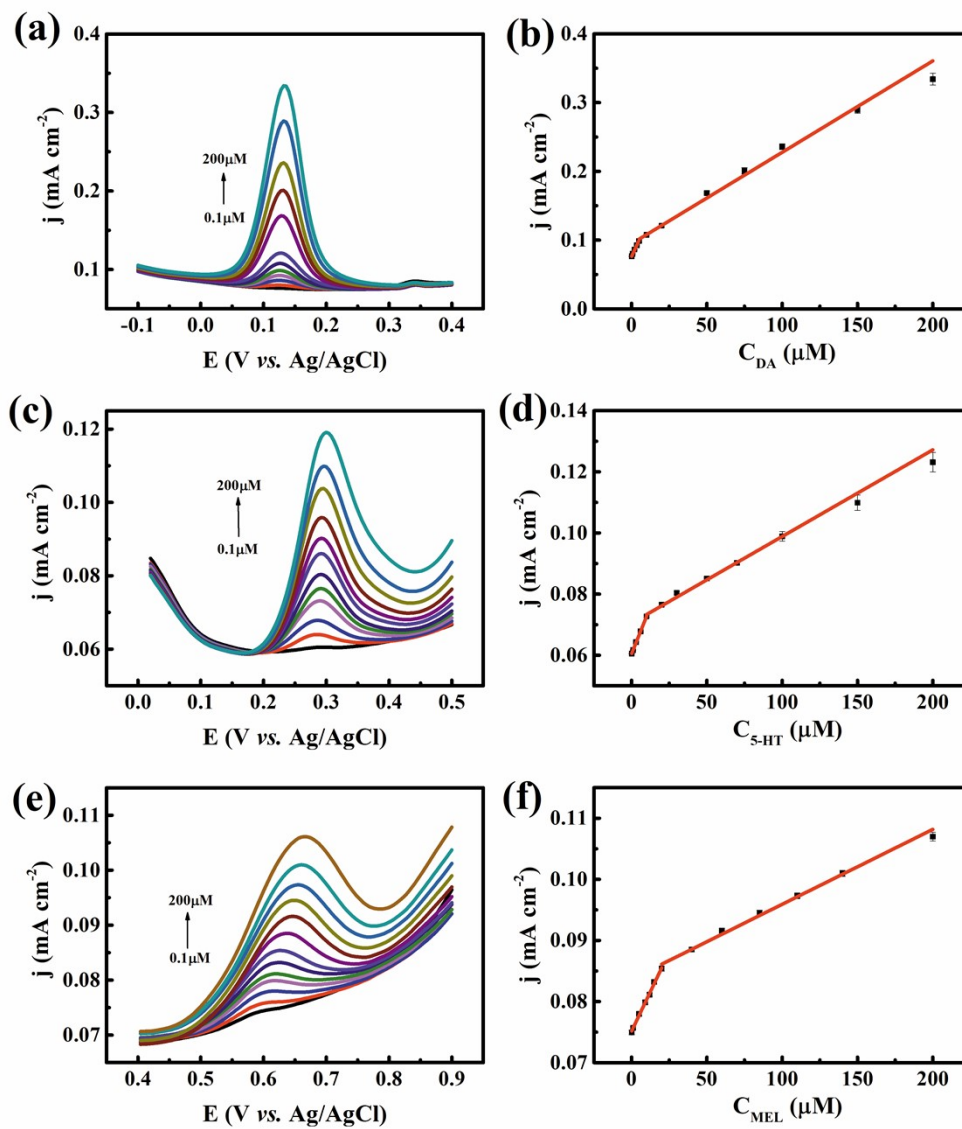
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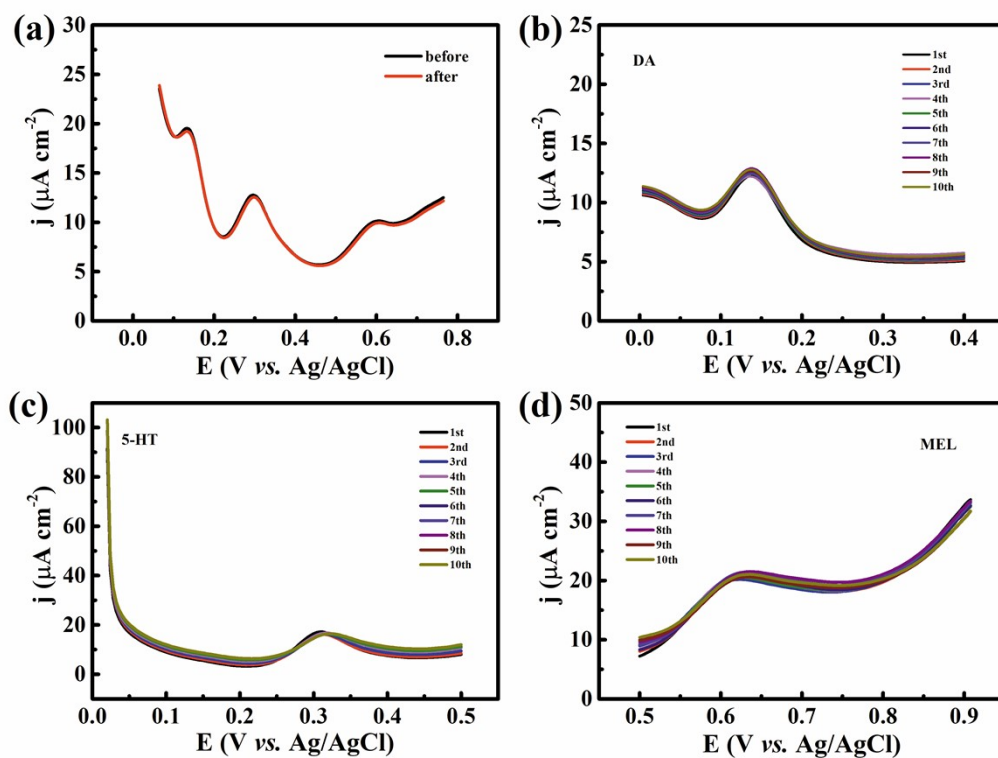
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**Fig. S4.** DPV curves on the GEFAD in 0.1 M PBS (pH = 7.0) with (a) 0.1 μM - 200 μM DA, (c) 0.1 μM - 200 μM 5-HT, (e) 0.1 μM - 200 μM MEL. Corresponding plots of the anodic peak current vs. concentrations for (b) DA, (d) 5-HT, and (f) MEL, respectively.



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