

Supporting information

Ultrasensitive detection of mercury(II) ion on hybrid film of graphene and gold nanoparticle-modified electrode

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Fig. S1: Characterization of the as-fabricated AuNPs/ERGO/SPCE electrode by SEM. (A) deposition time: 75s, $\times 100,000$; (B) deposition time 50s, $\times 100,000$.

Fig. S2: Optimization of the fabrication conditions of AuNPs/ERGO/SPCE electrode. (A) Effects of the AuNPs deposition potential, (B) Effect of the AuNPs deposition time, (C) Effect Hg deposition potential and (D) Effect of Hg deposition time toward 5 $\mu\text{g/L}$ Hg^{2+} detection in buffer solution.

Table S1: Comparison of our electrochemical method with previously reported methods by others for the detection of Hg^{2+} in aqueous phase.

References cited.

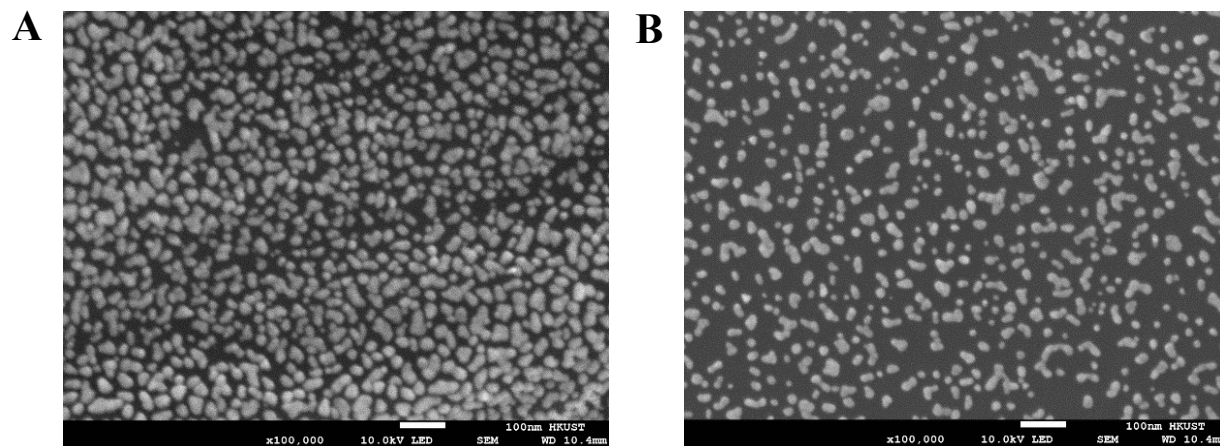


Fig. S1 SEM images of the surface of AuNPs/ERGO/SPCE with different deposition time. (A) 75s, $\times 100,000$; (B) 50s, $\times 100,000$.

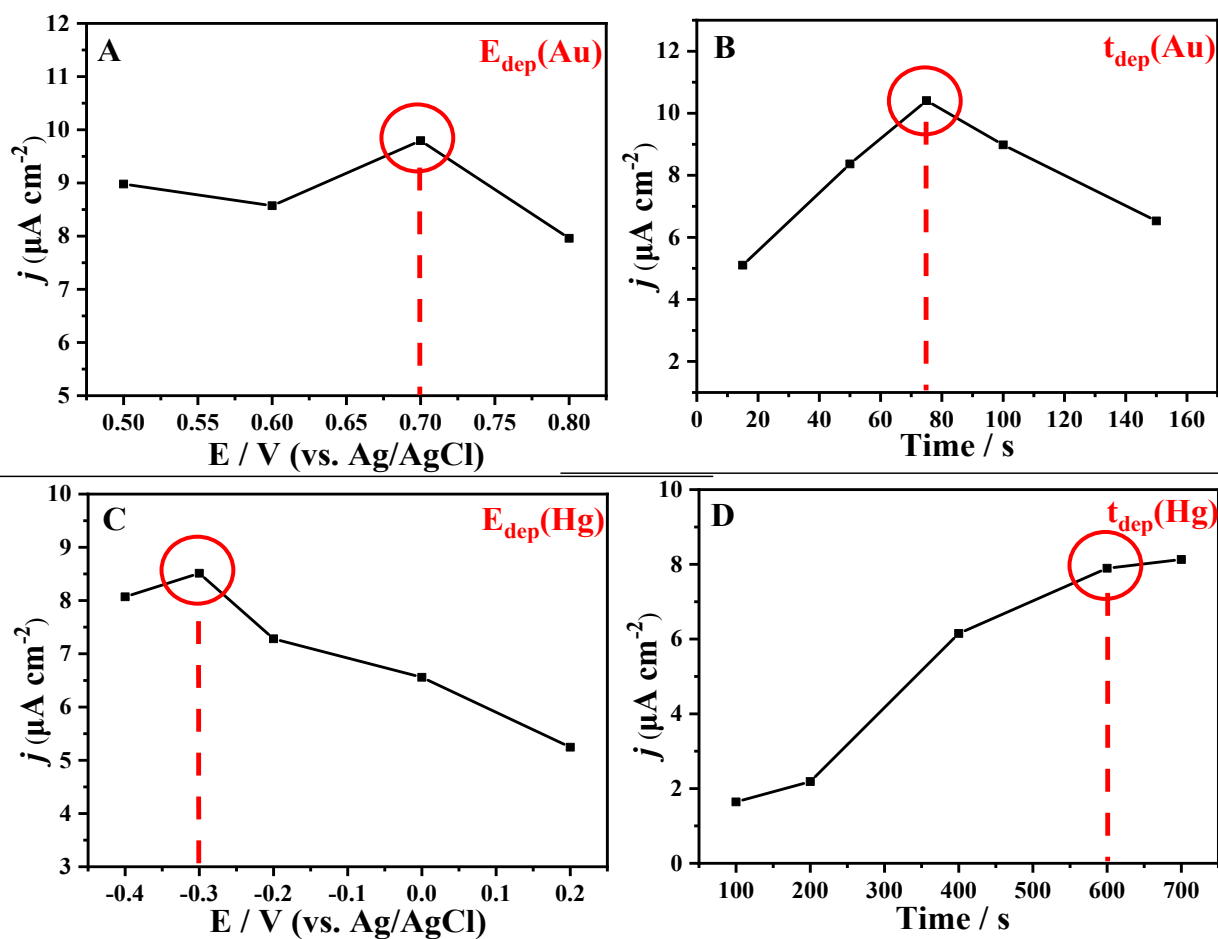


Fig. S2 (A) Effects of the AuNPs deposition potential, (B) Effect of the AuNPs deposition time, (C) Effect Hg deposition potential and (D) Effect of Hg deposition time toward $5 \mu\text{g/L Hg}^{2+}$ detection in buffer solution.

Table S1: Comparison of our electrochemical method with several previously reported methods by others for the detection of Hg²⁺.

Probe	Method	Linear range (µg/L)	LOD (µg/L)	R ²	Ref.
Thiol-functionalized AgNPs	SERS	2-400	0.48	0.996	1
Quantum dot/DNA/AuNPs ensemble	Fluorometry	0.4-12	0.4	0.997	2
N-acetyl-L-cysteine/AuNPs	Colorimetry	4-20	1.98	0.986	3
g-C ₃ N ₄ /CQDs composites	ICP-MS	0.01–100	0.008	0.993	4
This study	Electrochemistry	0.5-10	0.06	0.998	/

References:

1. Y. Chen, L. Wu, Y. Chen, N. Bi, X. Zheng, H. Qi, M. Qin, X. Liao, H. Zhang and Y. Tian, *Microchimica Acta*, 2012, **177**, 341-348.
2. A. M. Ashrafi and K. Vytřas, *Talanta*, 2011, **85**, 2700-2702.
3. J. Tang, P. Wu, X. D. Hou and K. L. Xu, *Talanta*, 2016, **159**, 87-92.
4. J. Zhou, Y. Tian, X. Wu and X. Hou, *Microchemical Journal*, 2017, **132**, 319-326.