Electronic Supplementary Information

Highly sensitive electrochemical detection of mercuric ion based on sequential nucleic acid amplification and guanine nanowire formation

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Table S1. DNA sequences used in this work

Oligonucleotide	Sequences (from 5' to 3')
H1	NH_2-$(CH_2)_6$-AAAAGGGAGGGGAGGGTGGGGTTTATrA↓G GTGTGTCACCCTCCC
S1	**GGGTTTAACATGGGTGATCGCTGTGCTGAGG***TTTG GAGGGTACATTT*
S2	ACACACAGCGATCACCCATGTTAAACCC
c-myc	AGGGTGGGGAGGGTGGGG

Note: the underlined part represent the complementary sequences of the stem arm of the H1; The rA in red denotes adenosine ribonucleotide at that position; the arrow indicates the nicking position of Mg^{2+}-dependent DNAzymes; (2) the black bold letters in S1 is complementary to the S2; the red bold letters GCTGAGG is complementary sequence to the recognition sequence of Nt.BbvCI; the italic part in S2 could form theT-Hg^{2+}-T mismatch DNA duplexes.

The SEM of the electrodeposited AuNPs

As can be seen from Figure S1, the SEM of the electrodeposited AuNPs presented a flower shape with the average size of 740 nm, which provided valuable data about the real shapes of the deposited AuNPs.

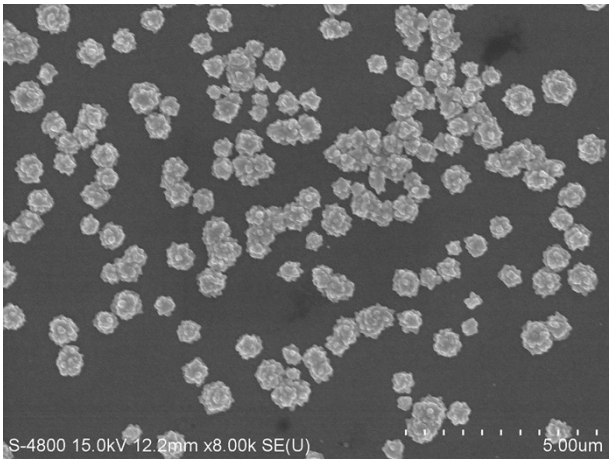

Figure S1. the SEM of the electrodeposited AuNPs

Optimization of the pH value of the detection buffer

The pH value of the detection buffer (HEPES buffer, 20 mM, 50 mM KCl, 200 mM NaCl,) has great influence on the performance of the biosensor. Therefore, we studied the influence of pH on the behavior of the proposed biosensor. It could be seen from Figure S2, the HEPES buffer with pH of 8.0 showed the biggest electrochemical signal. Thus, the HEPES buffer with pH of 8.0 was selected as supporting electrolyte for the whole DPV detection.

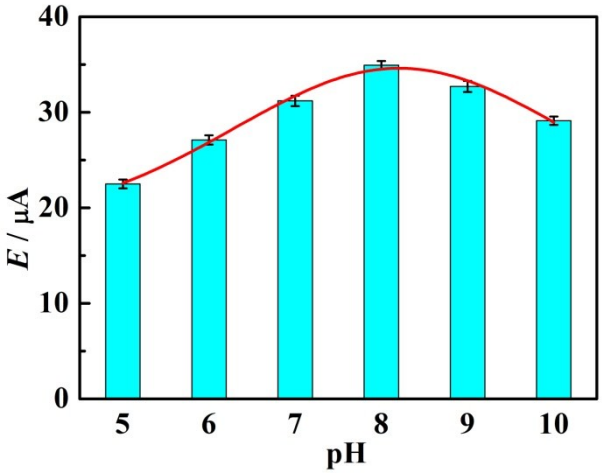

Figure S2 The electrochemical signal of the proposed biosensor in HEPES buffer with different pH.

Table S2. The analytical performance of the proposed method compared with other Hg^{2+} detection method.

Analytical method	Detection limit	Linear range	Ref.
DPV	0.5-80 nM	0.2 nM	1
DPV	1-200 nM	0.33 nM	2
DPV	0.0002-35 nM	0.12 pM	3
DPV	0.01-100 nM	4.2 pM	4
DPV	0.01-2.5 nM	3.6 pM	5
DPV	0.0002-100 nM	0.097 pM	This work

Reference

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