Supporting Information for

Electrochemiluminescent detection of cardiac troponin I based on the Au-Ag alloy nanou

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Comparison of Analytical performance

As shown in the Table S1, the sensitivity of our H_2O_2 sensor is competitive with or is better than these of other previous reports.

Table S1. Analytical performance comparison of our Au-Ag Alloy NUs modified electrode and other methods.

Analytical technique	Materials	LDR/μM	LOD/μM	Ref
Electrochemistry	Au-Ag Alloy NUs	0.1-200	0.045	This work
	PtAu/G-CNTs	2-8561	0.6	1
	AgNP/F-SiO_2/GO	100-260000	4	2
	OMCN	4-40	1.52	3
Flourescence	HRP-Au NCs	0.1-100	0.03	4
Colorimetry	CoFe-LDHs	1-10	0.6	5

Electrochemical detection of hydrogen peroxide

The CVs of Au-Ag Alloy NUs /GCE modified with different volume of Au-Ag Alloy NUs solution were shown in Fig. S1, and 6 μL is chosen as the optimum volume according to the

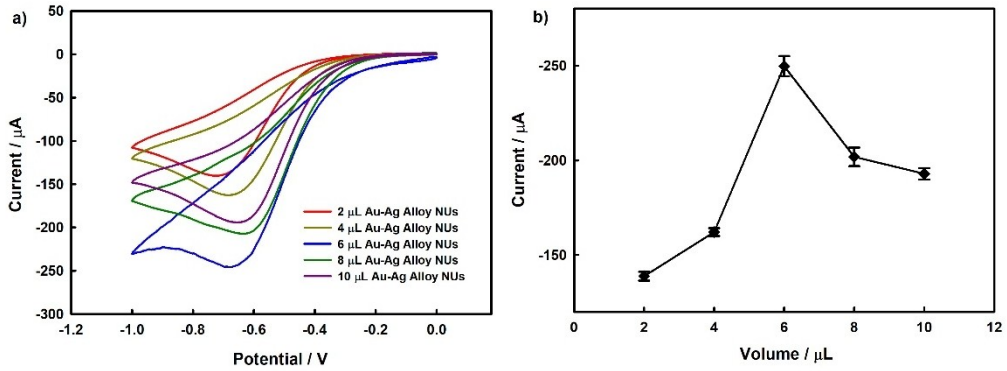

Fig. S1 Effect of drop volume of Au-Ag Alloy NUs solution on GCE. The cyclic voltammetry curves were carried out in 10 mM H_2O_2 PBS solution at the scan rate of 100 mV/s.

peak current.

The chitosan film was used for the immobilization of Au-Ag Alloy NUs and fabrication of H_2O_2 sensor in this system. CVs of Au-Ag alloy/GCE before and after modification of chitosan were shown in Fig. S2, which proved that the chitosan film didn't affect the electrochemical performances of the sensor obviously in this condition. Moreover, the chitosan film could improve the stability and reproducibility of Au-Ag alloy/GCE. As shown in Fig. S2, the CV of CS/Au-Ag alloy/GCE didn't change a lot after the disturbance of N_2 bubbling in solution, while the reduction current decreased dramatically for the electrode without chitosan modification

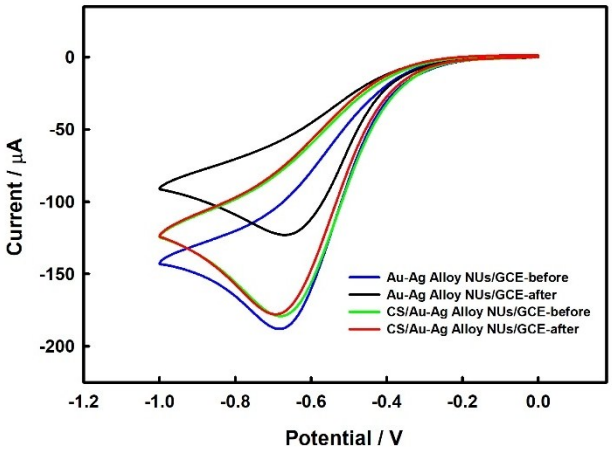

Fig. S2 The CVs of Au-Ag Alloy NUs/GCE with and without modification of chitosan in 10 mM H_2O_2 PBS solution at the scan rate of 50 mV/s.

The interference of oxygen reduction was also investigated, and the result shown in Fig. S3 indicated that the oxygen dissolved in solution caused a reduction current at -0.2 to -0.8 V.

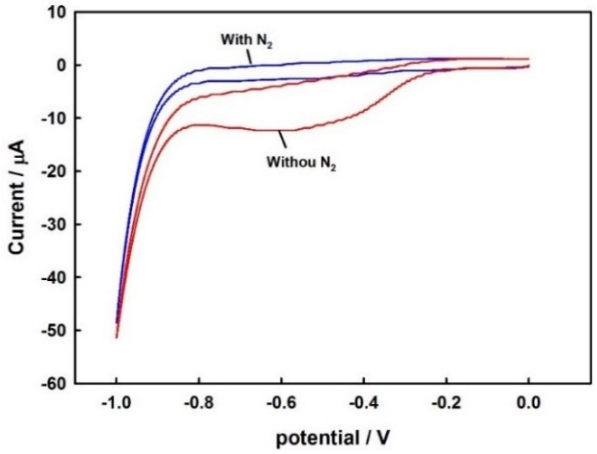

Fig. S3 The CV curves of Au-Ag Alloy NUs modified GCE in 0.1 M PBS solution with and without N_2 atmosphere.

In order to determine the optimum potential, the amperometric responses to the successive addition of 10 μM H_2O_2 in PBS at different applied potentials (-0.4 to -0.7 V) were carried out. As shown in Fig. S4, considering the sensitivity and stability, -0.6 V was chosen as the optimum potential.

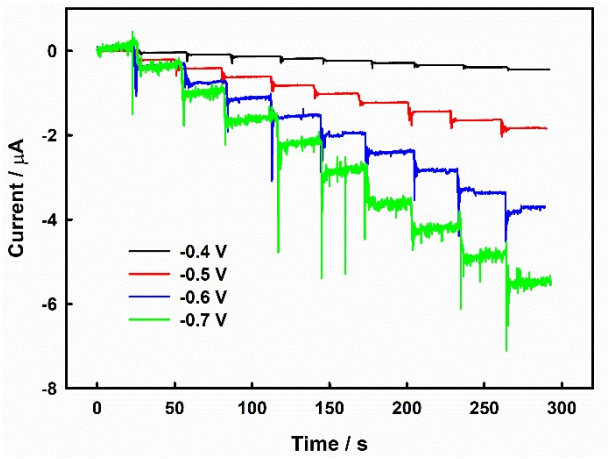

Fig. S4 Amperometric responses to the successive addition of 10 μM H_2O_2 in PBS at different applied potentials (-0.4 to -0.7 V).

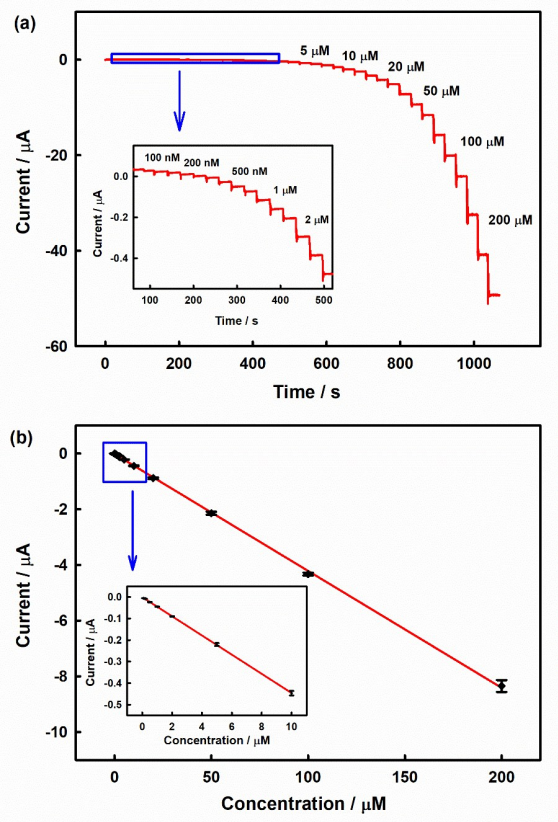

Fig. S5 (a) Amperometric responses to the successive addition of various concentrations of H_2O_2 at -0.6 V in PBS. The inset shows the partial magnification of current response with the H_2O_2 concentration ranging from 0.1 to 2 μM. (b) The calibration curve for H_2O_2 detection. The inset shows a closer look of linear plot of 0.1 to 10 μM.

Electrochemiluminescent detection of hydrogen peroxide

Before the ECL measurement, the effect of H_2O_2 concentration was investigated. As shown in Fig. S5, the ECL signal reached the highest when the H_2O_2 concentration was 8 mM.

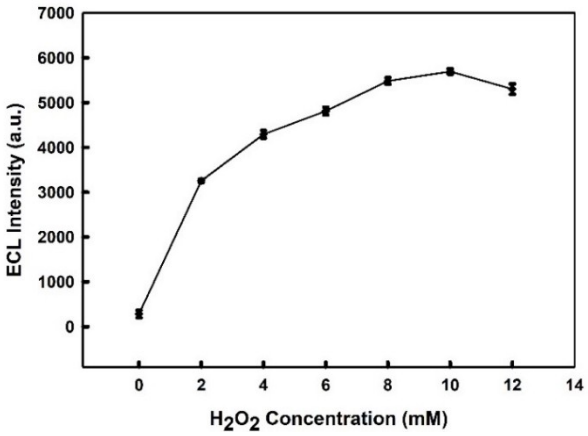

Fig. S6 The influence of H_2O_2 concentration on the ECL intensity of the Au-Ag Alloy NUs modified electrode. All the experiments were carried out in 0.1 M PBS containing 10 μM luminol. Scan rate was 50 mV/s.

As shown in Fig. S6, the electrochemical characterizations, including cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS), were carried out step by step in $Fe(CN)_6^{3-/4-}$ solution.

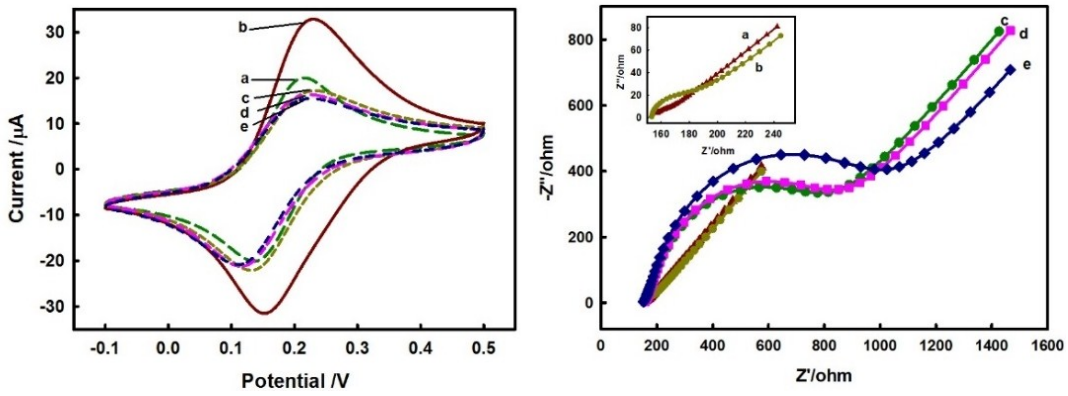

Fig. S7 CV and EIS at (a) bare GCE, (b) Au-Ag Alloy NUs/GCE, (c) Ab/Au-Ag Alloy NUs/GCE, (d) BSA/Ab/Au-Ag Alloy NUs/GCE, (e) cTnI/BSA/Ab/Au-Ag Alloy NUs/GCE in 0.1 M PBS containing 2.0 mM $K_4Fe(CN)_6$. Scan rate: 50 mV/s. EIS: 100 kHz~1 Hz, 5 mV rms, 0.21 V vs SCE.

As shown in Table S2, recovery experiments were also performed by standard addition methods in human serum, and the acceptable recoveries (91.1%-113.0%) were obtained.

Table S2. Recovery experiments for cTnI in the human serum by the proposed immunosensor.

Serum samples	Added (pg/mL)	Measured (pg/mL)	RSD (%)	Recovery (%)
1	500	455.6	7.8	91.1
2	1000	1133	2.9	113.0
3	10000	9289	6.8	93.0

References

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