

Supporting Information

A Non-enzymatic Electrochemical Biosensor Based on SiO₂-Au Nanoparticles for Hemoglobin Detection

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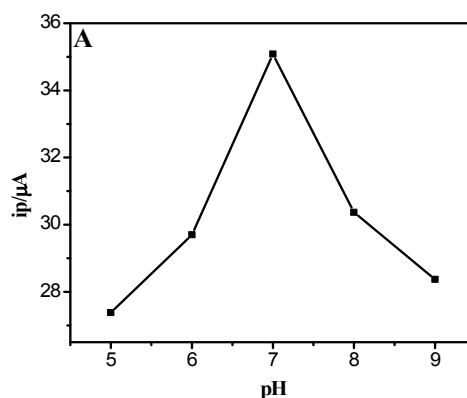
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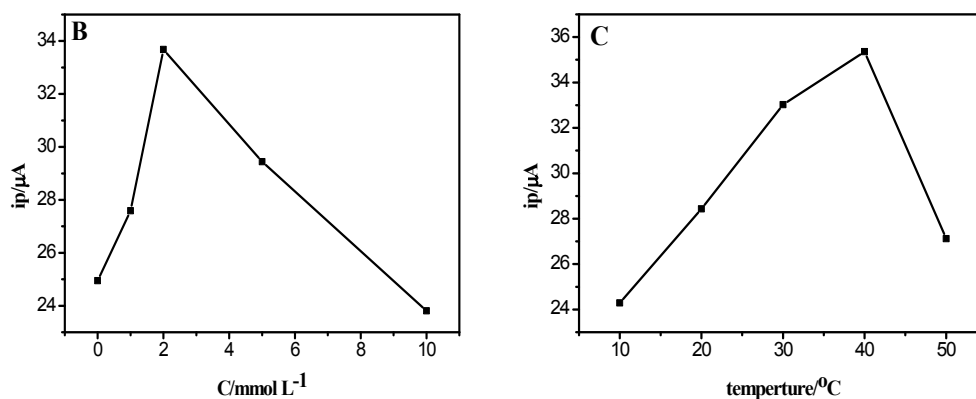


Fig. S1 The plot for the relationship of (A) the pH value, (B) the concentration of H AuCl_4 and (C) temperature with electrochemical signal of Hb in 0.1 M PBS (pH=7.0) containing 5 mM $[\text{Fe}(\text{CN})_6]^{3-/4-}$ (1:1) solution and 0.1 M KCl.

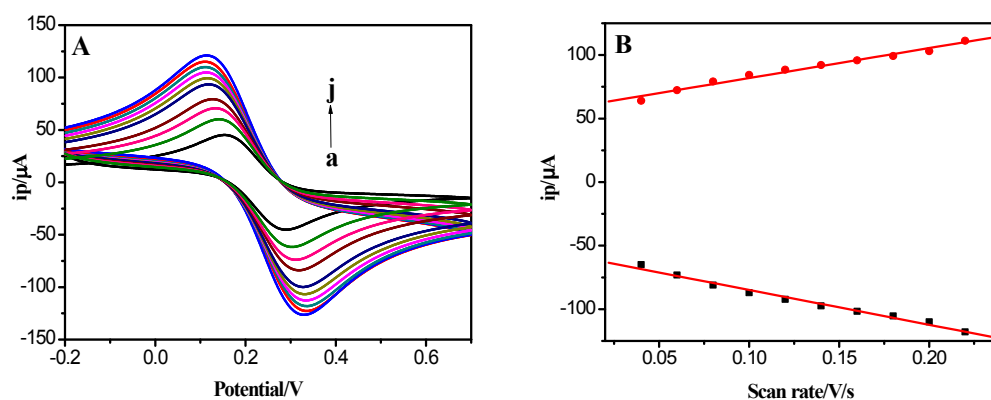


Fig. S2 CVs of $\text{SiO}_2\text{-Au}/\text{GCE}$ in 0.1 M PBS (pH=7.0) containing 5 mM $[\text{Fe}(\text{CN})_6]^{3-/4-}$ (1:1) solution and 0.1 M KCl at different scan rates. Scan rate (from a to j): 0.04, 0.06, 0.08, 0.1, 0.12, 0.14, 0.16, 0.18, 0.2, 0.22 V/s. (B) Plots of peak current vs. scan rate.

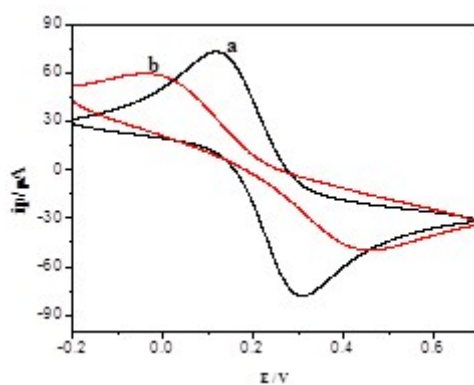


Fig. S3 (A) CVs of SiO₂-Au/GCE in 0.1 M PBS (pH = 7.0) containing 5 mM [Fe(CN)₆]^{3-/4-} (1:1) solution and 0.1 M KCl with no Hb (a) and with 0.1 mg/mL Hb (b). Scan rate: 0.1 V/s.

Table S1 The recovery of Hb at different concentrations

| Samples | Found before adding (mg/mL) | Added (mg/mL) | Found after adding (mg/mL) | Recovery (%) | RSD (% <i>n</i> =3) |
|----------|-----------------------------|---------------|----------------------------|--------------|------------------------|
| Sample 1 | 0.0139 | 0.3 | 0.314 | 100.7 | 0.72 |
| Sample 2 | 0.0139 | 0.1 | 0.113 | 93.5 | 0.29 |
| Sample 3 | 0.0139 | 0.04 | 0.0533 | 95.7 | 0.89 |

Table S2. Comparison of analytical performance of biosensor and other determination methods

| Determination methods | Linear Range | Detection limit | R | Slope | Ref. |
|---------------------------------------|---------------------|-----------------------------|------------------------|---------|-----------|
| Pencil lead electrode | 0.0102-0.146 mg/mL | 7.48×10 ³ ng/mL | 0.9955 | 0.2701 | 43 |
| Bromide-modified silver electrode | 0.34-4.76 mg/mL | 1.36 ×10 ⁵ ng/mL | / | / | 44 |
| PVP/PB NPs modified electrode | 0.0068-0.816 mg/mL | 2.72×10 ³ ng/mL | 0.9993 | 0.7330 | 45 |
| Photothermal angular light scattering | 3.5-179 mg/mL | <1.2×10 ⁶ ng/mL | / | / | 46 |
| Liquid-liquid microinterface array | 0.00068-0.034 mg/mL | 326.4 ng/mL | 0.9960 | 7.46 | 47 |
| SiO ₂ -Au/GCE | 0.005-0.5 mg/mL | 204.46 ng/mL | R ² =0.9979 | 83.1411 | This work |

/ represents relevant data which were not provided in these references.