

Supplementary information

Fabrication of PEDOT nanowhiskers for electrical connection of the hemoglobin active center for H₂O₂ electrochemical biosensing

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Contents:

- (1) The morphology of the Poly (3,4-ethylenedioxythiophene) (PEDOT) nanowhiskers-gold nanoparticles (AuNPs) composites and the PEDOT nanowhiskers-hemoglobin (Hb) composites**
- (2) The relationship between AuNPs loading and the reduction peak currents of AuNPs-Hb composites electrode.**

(1) The morphology of the PEDOT nanowhiskers-Hb composites and the PEDOT nanowhiskers-AuNPs composites

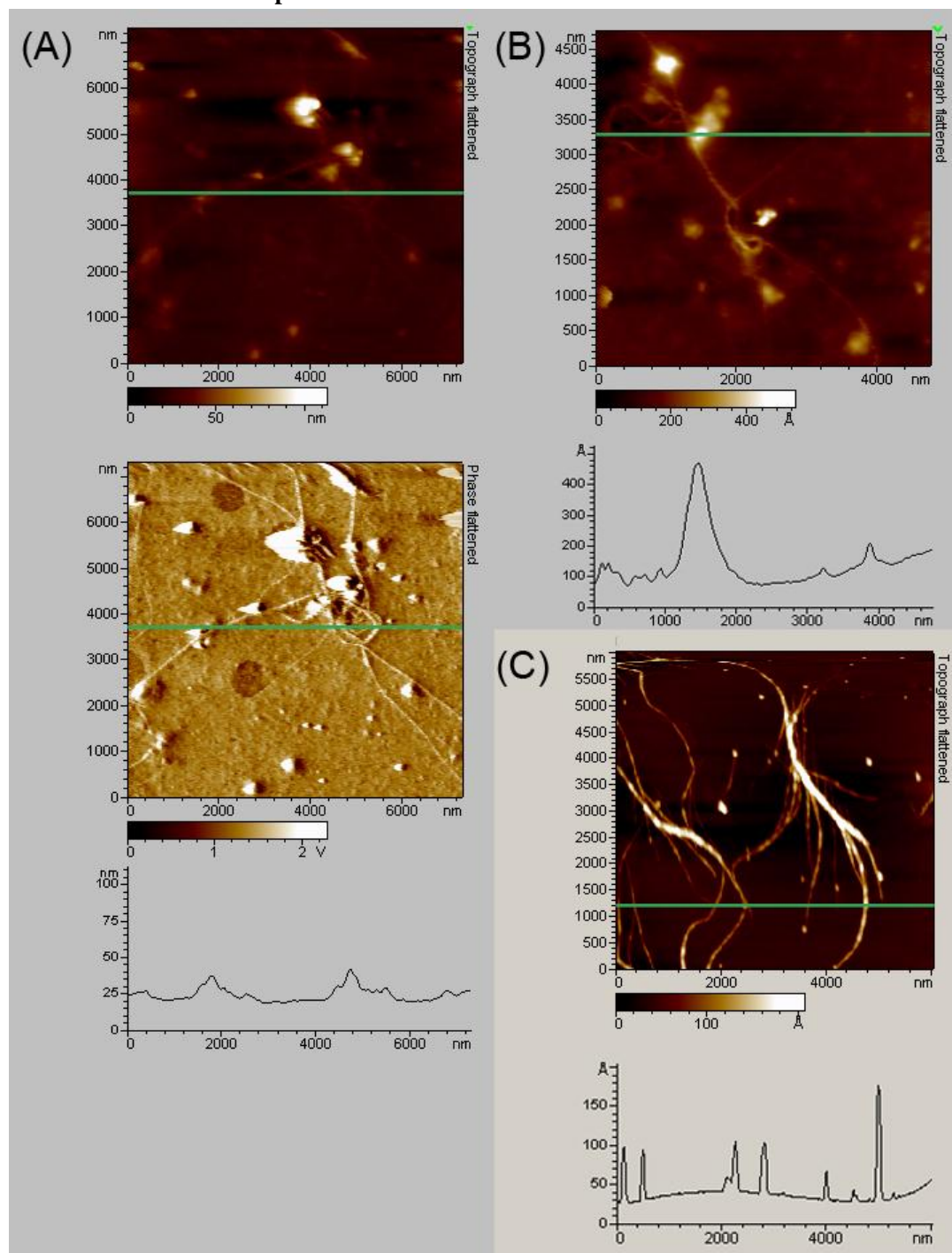


Fig. S1 (A and B) AFM images of PEDOT nanowhiskers-Hb composites. Fig. S1A includes both of the topograph and phase images. (C) AFM image of PEDOT nanowhiskers-AuNPs composites.

The morphology of the PEDOT nanowhiskers-Hb composites and the PEDOT nanowhiskers-AuNPs composites were studied by AFM. Fig. S1A~S1B clearly show that PEDOT nanowhiskers are directly attached to the Hb surface. Fig. S1C displays that the PEDOT nanowhiskers can also connect to the AuNPs.¹

(2) The relationship between AuNPs loading and the reduction peak currents of AuNPs-Hb composites electrode.

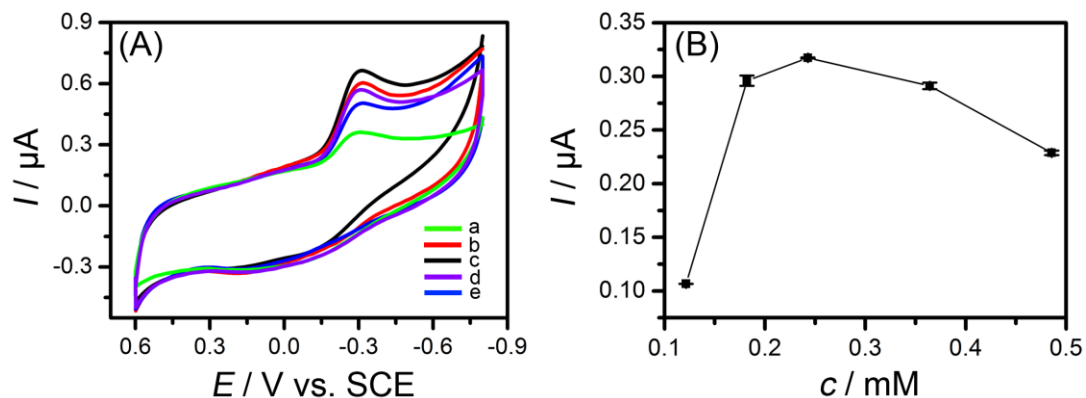


Fig. S2 (A) CVs of the AuNPs-Hb composites electrodes prepared with different AuNPs concentrations: (a) 0.121, (b) 0.182, (c) 0.243, (d) 0.364, and (e) 0.486 mM. The scan rate was 50 mV s^{-1} . (B) Plot of the reduction peak currents *versus* various AuNPs concentrations from 0.121 mM to 0.486 mM. Every point was an average value of three independent measurements.

The cyclic voltammograms (CVs) of the AuNPs-Hb composites electrodes prepared with different AuNPs concentrations were studied. In preparation of the AuNPs-Hb composites, the Hb concentration was kept at 10 mg mL^{-1} , which the concentration of the AuNPs was changed from 0.121 mM to 0.486 mM. As shown in Fig. S2A, the reduction peak currents increased when the concentration of AuNPs was from 0.121 mM to 0.243 mM, and the maximal reduction peak current reached to $0.3172 \pm 0.0005 \mu\text{A}$ ($n=3$) as shown in Fig. S2B. However, the reduction peak currents decreased when the concentration of AuNPs was higher than 0.243 mM. Therefore, 0.243 mM was selected as the optimal concentration of AuNPs for the fabrication of AuNPs-Hb composites.

Reference

- 1 J. Coetzee, W. F. Gabrielli, K. Coetzee, O. Schuster, S. D. Nogai, S. Cronje and H. G. Raubenheimer, *Angew. Chem.,-Int. Ed.*, 2007, **46**, 2497-2500.