

Novel gold-decorated polyaniline derivatives as redox-active species for simultaneous detection of three biomarkers of lung cancer

Liyuan Wang^a, Na Liu^{a,b}, Zhanfang Ma^{a*}

^aDepartment of Chemistry, Capital Normal University, Beijing, 100048, China

^bCollege of Life Science, Capital Normal University, Beijing, 100048, China

E-mail: mazhanfang@cnu.edu.cn

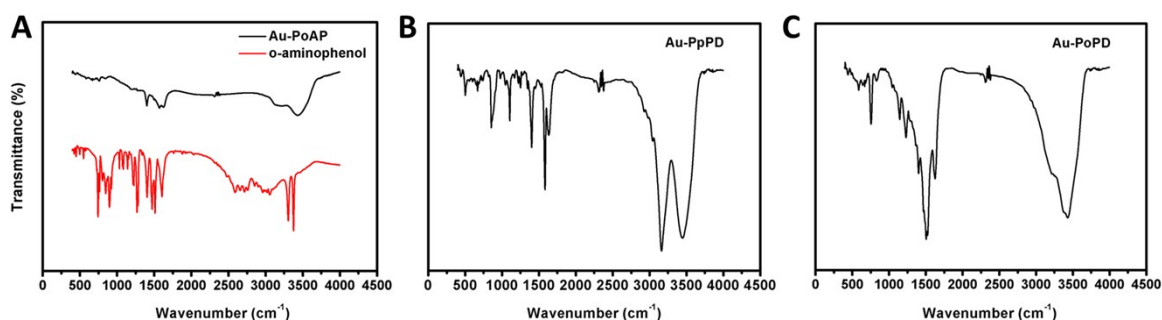


Fig. S1. FTIR spectrum of (A) Au-PoAP and o-aminophenol, (B) Au-PpPD, and (C) Au-PoPD.

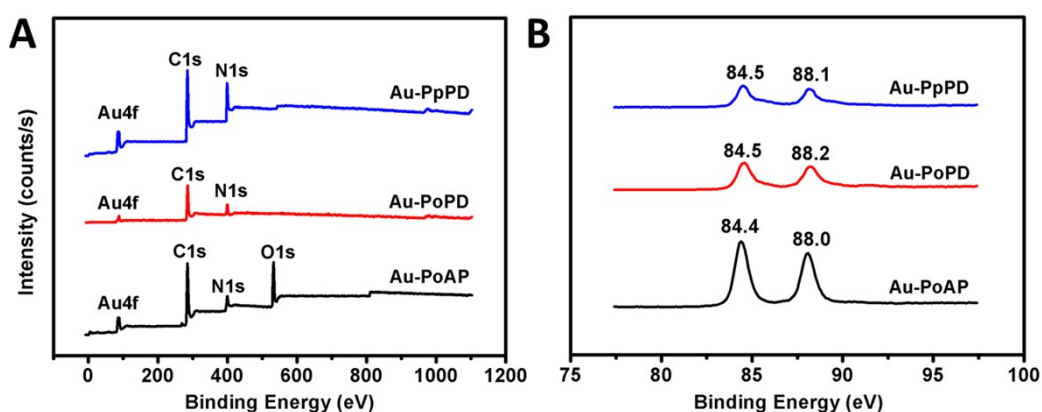


Fig. S2. XPS spectrum of (A) Au-PoPD, Au-PoAP and Au-PpPD, high-resolution XPS of (B) Au 4f spectrum of Au-PANI derivatives.

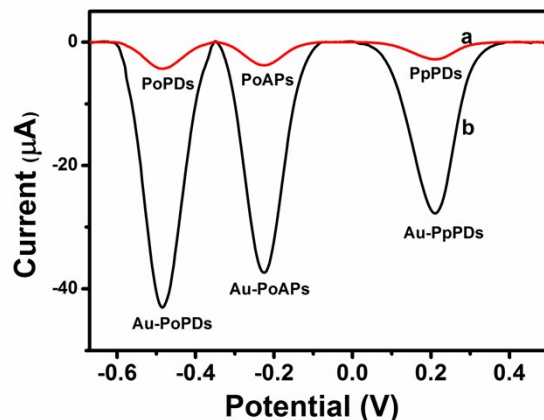


Fig. S3 SWV response to PoPD, PoAP and PpPD (curve a), and Au-PoPD, Au-PoAP and Au-PpPD (curve b).

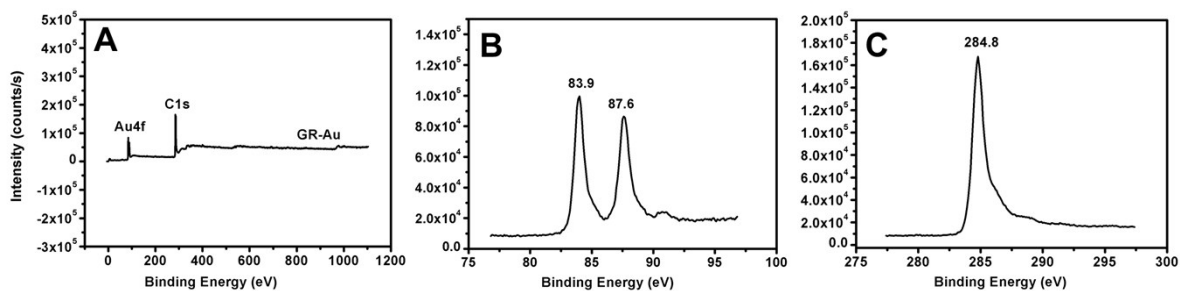


Fig. S4. XPS spectrum of (A) GR-Au nanocomposite, high-resolution XPS of (B) C 1s spectrum and (C) Au 4f spectrum.

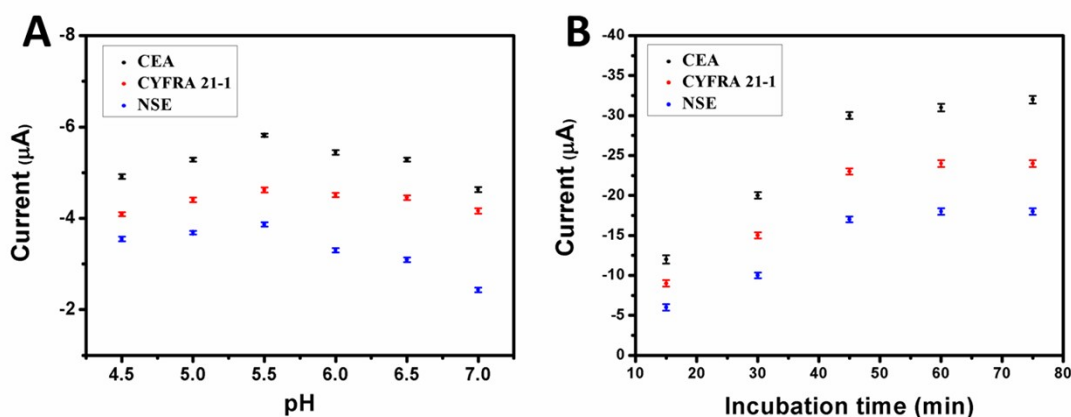


Fig. S5. Effect of (A) pH of detection solution on SWV responses to 0.02 ng mL⁻¹ CEA, CYFRA21-1 and NSE and (B) incubation time on SWV responses to 20 ng mL⁻¹ CEA, CYFRA21-1 and NSE at the immunosensor array.

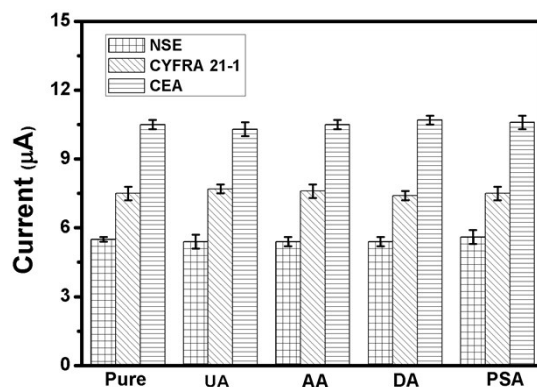


Fig. S6. The specificity of the immunosensor to 0.1 ng mL^{-1} CEA, CYFRA21-1 and NSE; 0.1 ng mL^{-1} CEA, CYFRA21-1 and NSE + 10 ng mL^{-1} UA; 0.1 ng mL^{-1} CEA, CYFRA21-1 and NSE + 10 ng mL^{-1} AA; 0.1 ng mL^{-1} CEA, CYFRA21-1 and NSE + 10 ng mL^{-1} DA; 0.1 ng mL^{-1} CEA, CYFRA21-1 and NSE + 10 ng mL^{-1} PSA (the error bars are standard deviations for $n=3$).

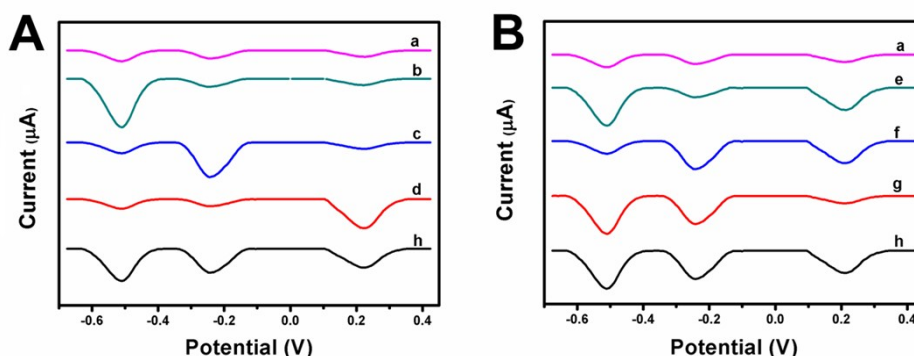


Fig. S7. Typical SWV responses for the investigation of cross-reactivity. (A) Solutions containing: (a) 0 ng mL^{-1} CEA, 0 ng mL^{-1} CYFRA21-1 and 0 ng mL^{-1} NSE, (b) 0.1 ng mL^{-1} CEA, (c) 0.1 ng mL^{-1} CYFRA21-1, (d) 0.1 ng mL^{-1} NSE, (e) 0.2 ng mL^{-1} CEA, 0.2 ng mL^{-1} CYFRA21-1 and 0.2 ng mL^{-1} NSE; (B) Solutions containing: (a) 0 ng mL^{-1} CEA, 0 ng mL^{-1} CYFRA21-1 and 0 ng mL^{-1} NSE, (b) 1 ng mL^{-1} CEA and 1 ng mL^{-1} NSE (c) 1 ng mL^{-1} CYFRA21-1 and 1 ng mL^{-1} NSE, (d) 1 ng mL^{-1} CEA and 1 ng mL^{-1} CYFRA21-1, (e) 2 ng mL^{-1} CEA, 2 ng mL^{-1} CYFRA21-1 and 2 ng mL^{-1} NSE.

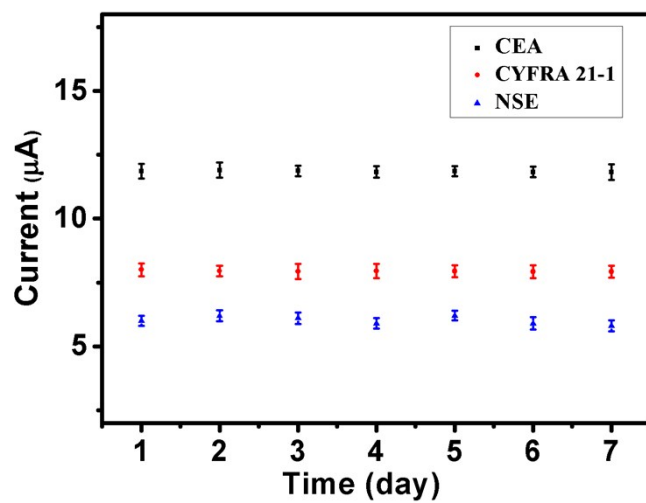


Fig. S8. The stability of the immunosensor for the detection of 0.1 ng mL^{-1} CEA, CYFRA21-1 and NSE.