Supporting Information

Redox cycling-amplified electrochemical immunosensor for α-fetoprotein sensitive detection via polydopamine nanolabels

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1. Characterization of nano-gold electrode

![CV curves in 0.5 M H₂SO₄ solution at bare gold electrode and nano-gold electrode.](image)

**Fig. S1** CV curves in 0.5 M H₂SO₄ solution at bare gold electrode and nano-gold electrode.

2. Electrochemical characterization of PDANPs

![CV curves in PBS (0.01 M, pH 8.5) containing FDM (0.5 mM) with the addition of different concentration of PDANPs.](image)

**Fig. S2** CV curves in PBS (0.01 M, pH 8.5) containing FDM (0.5 mM) with the addition of different concentration of PDANPs.
3. Oxidation charge transfer amplification mechanism

Fig. S3 Electrochemical reactions of FDM taking place on the working electrode surface.

Fig. S4 Amount of FDM⁺ reduced on electrode surface decreases in the presence of QH₂.
4. XPS-related characterization

Fig. S5 Full XPS spectra for PDANPs.

Fig. S6 High-resolution XPS spectra of C 1s regions for (A) PDANPs, (B) PDANPs electrochemically treated by CV for 5000 cycles in PBS (0.01 M, pH 8.5) without FDM and (C) PDANPs treated using CV for 5000 cycles in PBS (0.01 M, pH 8.5) containing FDM (0.5 mM).

Fig. S7 High-resolution XPS spectra of N 1s regions for (A) PDANPs, (B) PDANPs electrochemically treated by CV for 5000 cycles in PBS (0.01 M, pH 8.5) without FDM and (C) PDANPs treated using CV for 5000 cycles in PBS (0.01 M, pH 8.5) containing FDM (0.5 mM).