

Supplementary Materials

**MoS₂@Au as label for sensitive sandwich-type immunoassay of
neuron-specific enolase**

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1. Characterization results

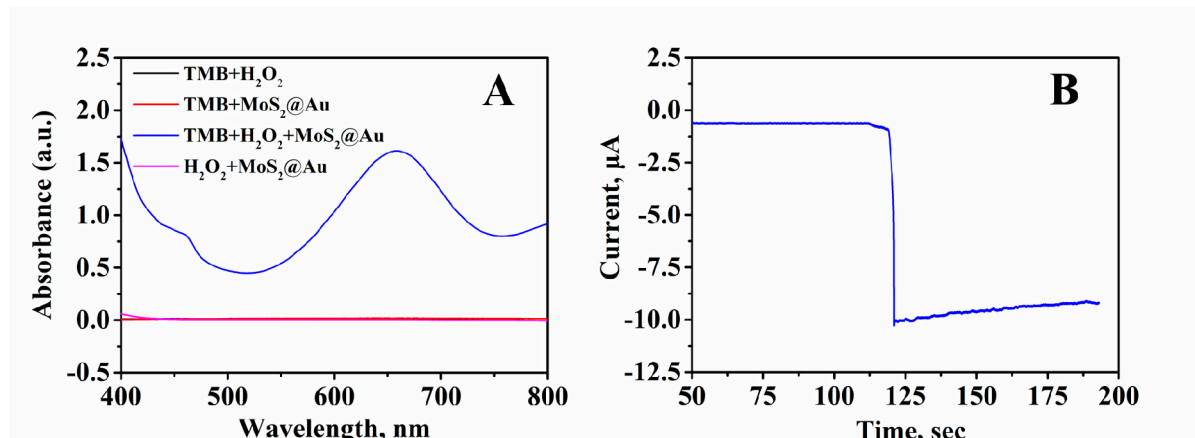


Figure S1 (A) UV - vis absorption spectra of TMB with different substrates; (B) The i-t curve of 0.5 mg·mL⁻¹ MoS₂@Au.

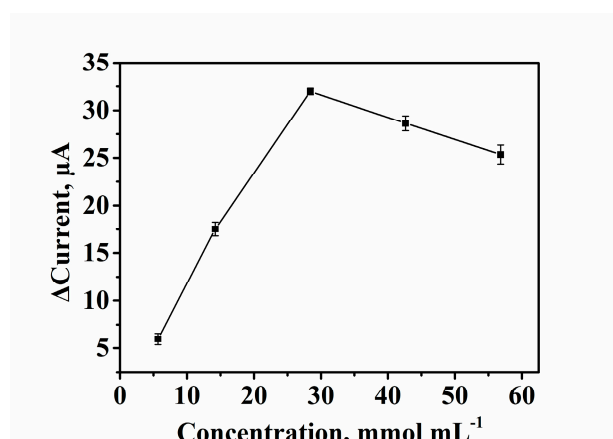


Figure S2 Effect of the concentration of Au NPs on the current responses of immunosensor.

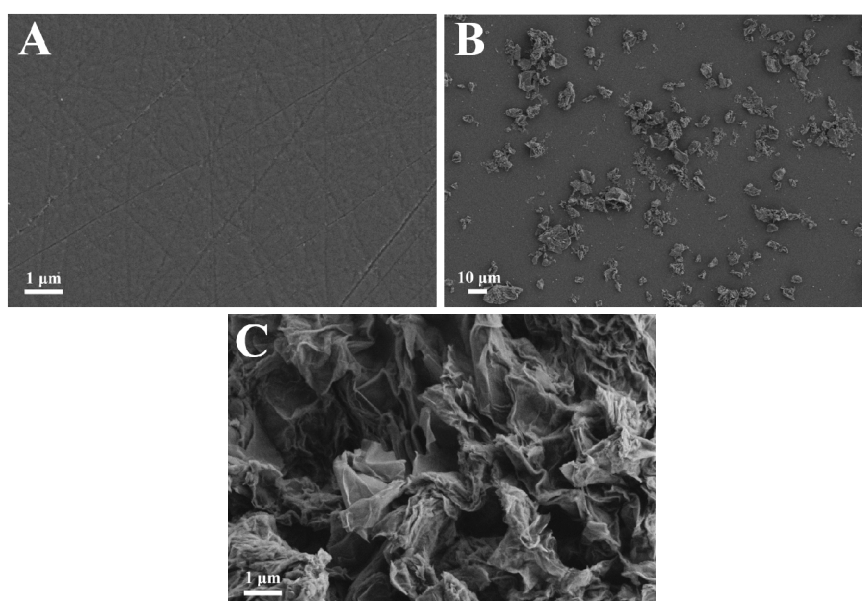


Figure S3 The SEM of bare GCE (A) and rGO-TEPA/GCE (B-C).

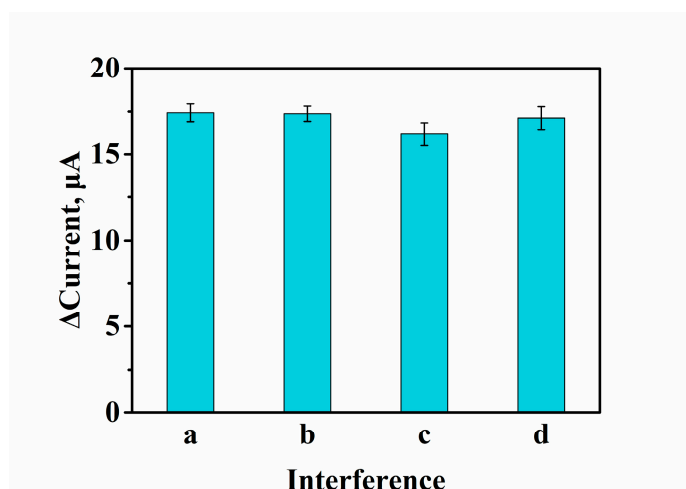


Figure S4 The response of immunosensor in detecting interference: (a) $10 \text{ ng} \cdot \text{mL}^{-1}$ CEA; (b) $10 \text{ ng} \cdot \text{mL}^{-1}$ cyfra21-1; (c) $10 \text{ ng} \cdot \text{mL}^{-1}$ BSA; (d) $10 \text{ ng} \cdot \text{mL}^{-1}$ CEA + $10 \text{ ng} \cdot \text{mL}^{-1}$ cyfra21-1 + $10 \text{ ng} \cdot \text{mL}^{-1}$ BSA.

2. Calculation of detection limit

Detection limit which was expressed as the concentration (c_L) is derived from the smallest measure (x_L) that can be detected with reasonable certainty for a given analytical procedure. The value of x_L is given by the equation $x_L = x_{bl} + k s_{bl}$, where x_{bl} is the mean of the blank measures, s_{bl} is the standard deviation of the blank measures and k is a numerical factor chosen according to the confidence level desired. A value of 3 for k in equation is strongly recommended, and it usually corresponds to a confidence level of about 90% in a practical sense. The values for x_L and s_{bl} cannot usually be determined from theory but must be found experimentally by making a sufficiently large number of measurements (at least twenty times). Therefore, the c_L corresponds to the value calculated by the calibration plot obtained from a given analytical procedure where $x_L = x_{bl} + 3 s_{bl}$. In this work, after making twenty measurements of blank, the $x_{bl} = 18.42$ and $s_{bl} = 0.06$ was obtained. Then, $x_L = 18.42 + 3 \times 0.06 = 18.60$. The calibration plot of this proposed immunosensor is $I = 3.07 \lg c + 31.79$. Therefore, the $c_L = 10^{(18.60 - 31.79)/3.07} = 0.05 \text{ pg} \cdot \text{mL}^{-1}$, where I is the $x_L = 18.60$. In conclusion, the detection limit of this proposed immunosensor is $0.05 \text{ pg} \cdot \text{mL}^{-1}$.