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**Supplementary Materials**

# Enhanced Electropolymerization of Poly (Xanthurenic Acid)-$MoS_2$ Film for Specific Electrocatalytic Detection of Guanine and Adenine

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## S1.Choice of the ultrasonic time of $MoS_2$

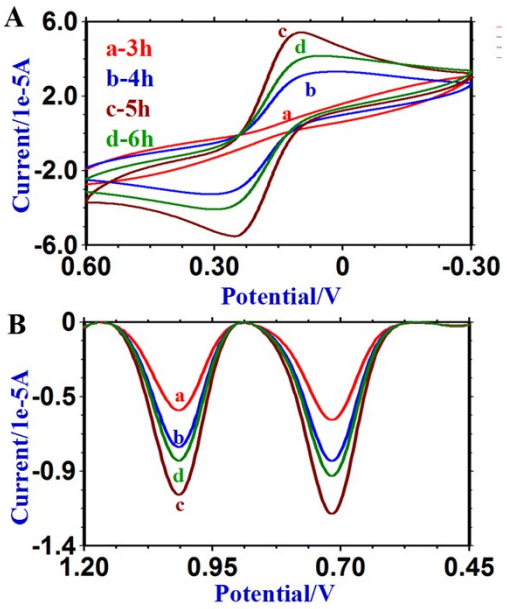


**Fig. S1** (A) CVs of $[Fe(CN)_6]^{3-/4-}$ at $MoS_2$/CPE; (B) DPVs of guanine and adenine in B-R buffer solutions (pH 7.0) recorded at $MoS_2$-PXa/CPE, where $MoS_2$ obtained from different ultrasonic time: (a) 3 h, (b) 4 h, (c) 5 h, (d) 6 h

## S2. Optimization of the concentration of $MoS_2$

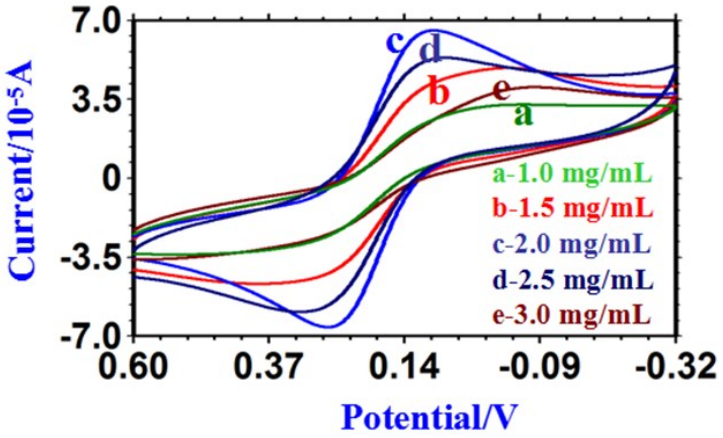


**Fig. S2** CVs of $[Fe(CN)_6]^{3-/4-}$ at PXa-$MoS_2$/CPE electropolymerized on various concentration of $MoS_2$: a (1 mg/mL); b (1.5 mg/mL); c (2 mg/mL); d (2.5 mg/mL); e (3 mg/mL).

## S3. Optimization of solution pH

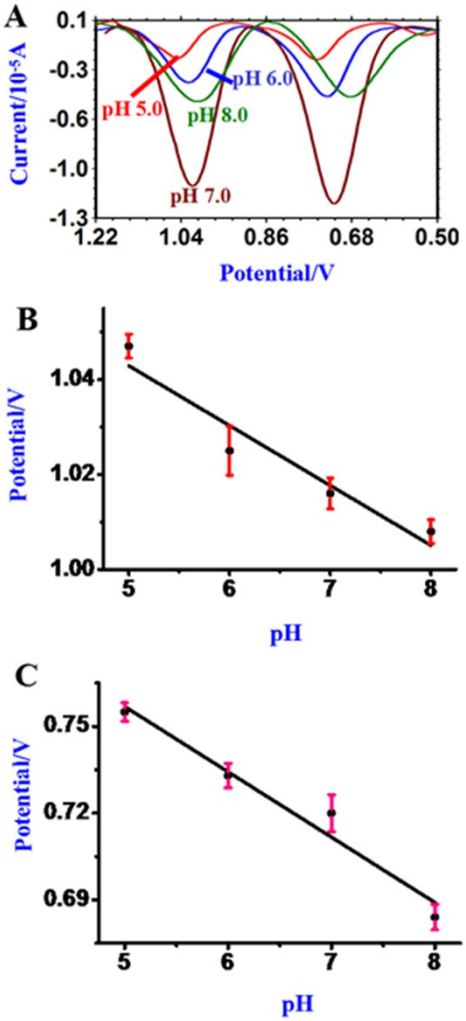


**Fig. S3** (A) DPV of guanine and adenine recorded in B-R buffer solution with different values of pH ( 5.0, 6.0, 7.0, 8.0); Calibration plots of the oxidation peak potential of guanine (B) and adenine (C) versus different values of pH.

## S4. Determination of sole guanine

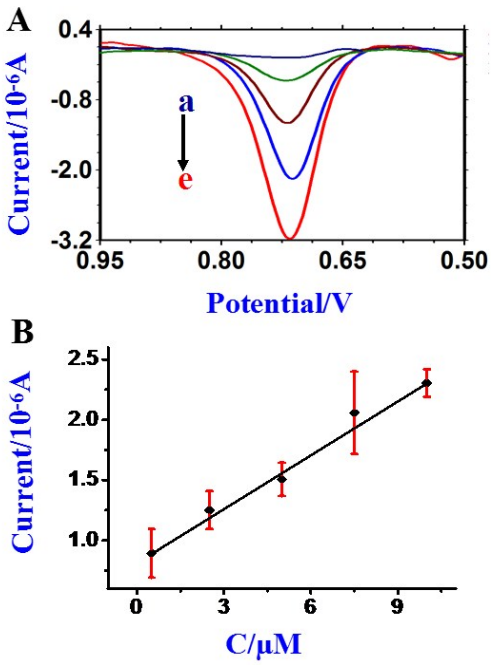


**Fig. S4** (A) DPVs of different guanine concentration at the electrodes modified by PXa-$MoS_2$.; (B) Calibration plots of the oxidation peak current versus different concentration of guanine: a to e: 0.5, 2.5, 5, 7.5, 10 μM.

## S5. Determination of sole adenine

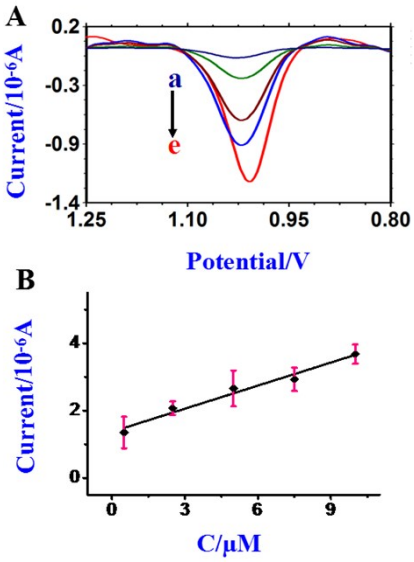


**Fig. S5** (A) DPVs of different adenine concentration at the electrodes modified by PXa-$MoS_2$.; (B) Calibration plots of the oxidation peak current versus different concentration of adenine: a to e: 0.5, 2.5, 5, 7.5, 10 μM.

## S6. Comparison of different modified electrodes with previous reports for guanine and adenine.

**Tab. S1**. Comparison of different modified electrodes for guanine (G) and adenine (A) detection.

| Electrodes | Bases | Methods | Potential (V) | Linear rang (μmol/L) | Detection limit (μmol/L) | Stability | Reproducibility (RSD) |
|---|---|---|---|---|---|---|---|
| er-GO/GCE[1] | G+A | DPV | 0.74 (G) | 0.4-16 (G) | 0.15 (G) | 96.1% (G) | |
| | | | 1.01 (A) | 0.6-20 (A) | 0.20 (A) | 95.9%(A) | |
| GS/IL/CS/GCE[2] | G+A | DPV | 0.74 (G) | 2.5-225 (G) | | 91.0% | 2.3% (G) |
| | | | 1.04 (A) | 3.5-125 (A) | | 91.0% | 1.3% (A) |
| PAR/Graphene/GCE[3] | G+A | DPV | 0.62 (G) | 2.5-22.5 (G) | | 94.9% | 3.2% (G) |
| | | | 0.91 (A) | 5-45 (A) | | 96.3% | 2.1% (A) |
| $TiO_2$-graphene/GCE[4] | G+A | DPV | 0.97 (G) | 0.5-20,20-200 (G) | 0.15(G) | 92.0% | 4.1% (G) |
| | | | 1.26 (A) | 0.5-20,20-200 (A) | 0.10 (A) | 92.0% | 4.6% (A) |
| graphene-Nafion/GCE[5] | G+A | DPV | 0.82 (G) | 4-200 (G) | | 3.3% (G) | 4.2% (G) |
| | | | 1.18 (A) | 8-150 (A) | | 2.1% (A) | 3.7% (A) |
| PTH/NPAu/MWNTs/GCE[6] | G+A | DPV | 0.60 (G) | 0.05-5 (G) | 0.010 (G) | | 2.8%(G) |
| | | | 0.90 (A) | 0.05-5 (A) | 0.008 (A) | | 2.8%(A) |
| PXa-ERGNO/GCE (PPM)[7] | G+A | DPV | 0.65 (G) | 1-10,10-300 (G) | 0.55 (G) | 91.1% | 7.6%(G) |
| | | | 0.95 (A) | 1-10,10-300 (A) | 0.73 (A) | 87.8% | 7.6%(A) |
| PXa-ERGNO/GCE (CV)[8] | G+A | DPV | 0.70 (G) | 0.5-10,10-300 (G) | 0.045 (G) | 96.3% | 6.5% (G) |
| | | | 1.02 (A) | 0.5-10,10-300 (A) | 0.083 (A) | 96.1% | 6.2% (A) |
| PXa-$MoS_2$/CPE | G+A | DPV | 0.72 (G) | 0.5-10 (G) | 0.017 (G) | 97.54% | 5.4% (G) |
| (CV, this work) | | | 1.06 (A) | 0.5-10 (A) | 0.03 (A) | 96.23% | 5.9% (A) |

## S7. The primary detection of dGTP

Fig. S7 shows the oxidation signals of detecting dGTP at the various electrodes in 0.3 mol/L PBS (pH 7.0). Compared with the signal of PXa-$MoS_2$/CPE (curve a), $MoS_2$/CPE (curve b) and CPE (curve c) show lower signals of oxidation peaks. The enhanced current could be attributed to the synergistic effect between PXa and $MoS_2$, which obviously improved the activity of catalyzing dGTP. In addition, if dGTP is absent in PBS (pH 7.0), no obvious oxidation peak appeared, which is shown in Fig. S8 curve a.

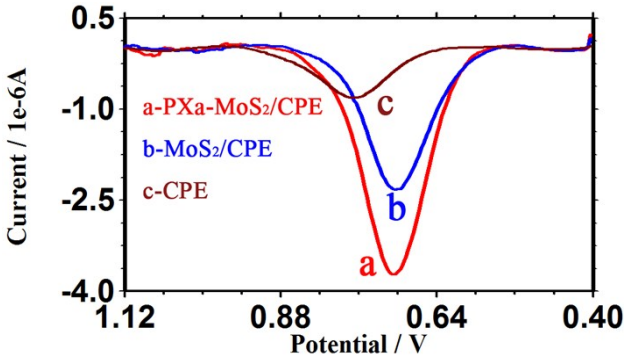


**Fig. S7** DPVs of dGTP in PBS (pH 7.0) recorded at different electrodes: (a) PXa-$MoS_2$/CPE, (b) $MoS_2$/CPE, (c) CPE.

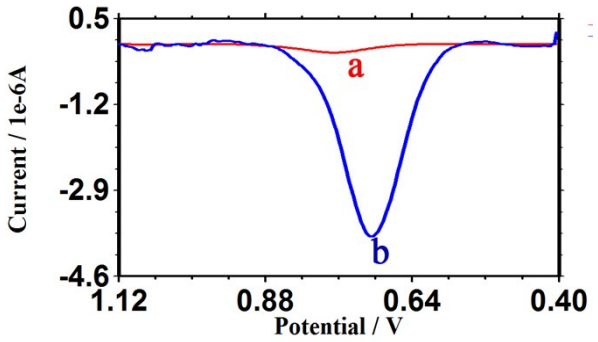


**Fig. S8** DPVs of PXa-$MoS_2$/CPE recorded in the absence (a) and presence of dGTP (b) in PBS (pH 7.0).

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