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Supplementary material to

Electrochemical detection of illicit sibutramine adulteration in herbal weight-loss products using an AgNPs-ErGO modified electrode

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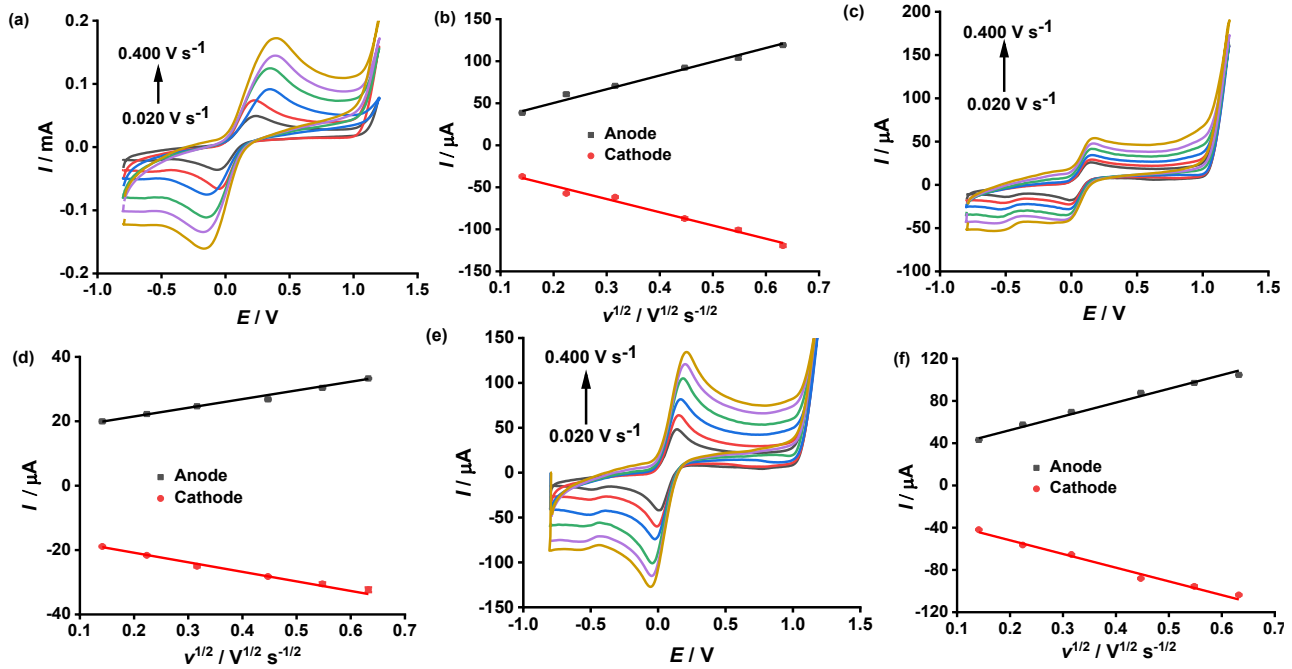

Figure S1. The cyclic voltammograms and the corresponding linear relationships between anodic/cathodic peak currents and the square root of scan rate of three different electrodes including GCE (a-b), GO/GCE (c-d), ErGO/GCE (e-f) in 5 mM $[Fe(CN)_6]^{3-}/^{4-}$ containing 0.1 M KCl used for estimating the electrochemically active surface area according to the Randles-Sevcik equation

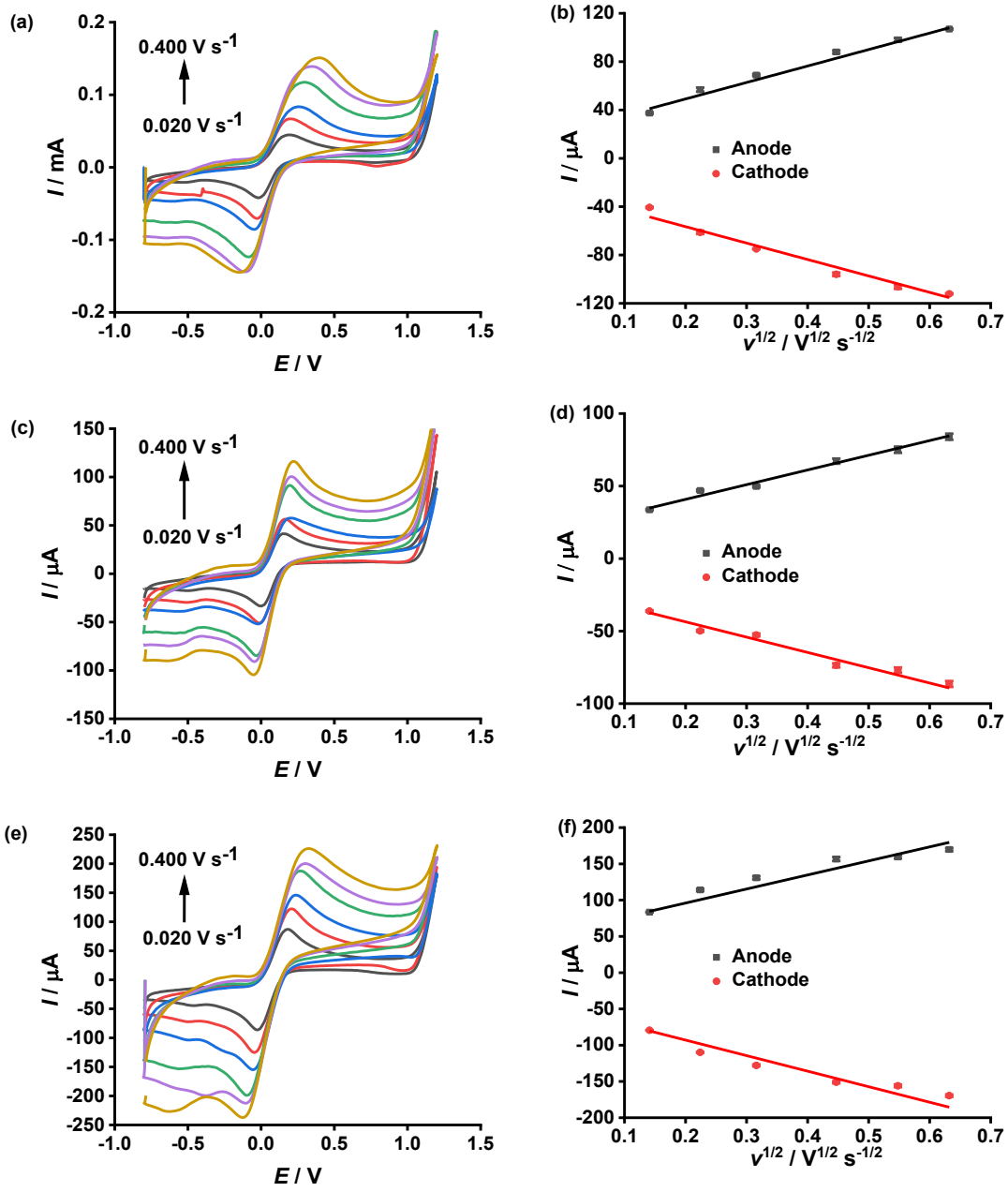

Figure S2. The cyclic voltammograms and the corresponding linear relationships between anodic/cathodic peak currents and the square root of scan rate of three different electrodes including AgNPs/GCE (a-b), AgNPs-GO/GCE (c-d) and AgNPs-ErGO/GCE (e-f) in 5 mM $[Fe(CN)_6]^{3-/4-}$ containing 0.1 M KCl used for estimating the electrochemically active surface area according to the Randles-Sevcik equation**.**

The electrochemically active surface area (ECSA) of the modified electrodes was estimated using the Randles-Ševčík equation for the reversible redox probe $[Fe(CN)_6]^{3-/4-}$ at 5 mM in 0.1 M KCl. The ECSA values calculated from the anodic peak current for GCE, GO/GCE, ErGO/GCE, AgNPs/GCE, AgNPs-GO/GCE, and AgNPs-ErGO/GCE were 0.042, 0.007, 0.034, 0.037, 0.027, and 0.045 cm^2, respectively. Similar values were obtained from the cathodic peak current, namely 0.043, 0.007, 0.034, 0.039, 0.027 and 0.046 cm^2, respectively.

The accumulation potential (E_{acc}) significantly affected the stripping signal of SIB (Figure S3). As E_{acc} increased from -0.3 to 0.0 V (*vs.* Ag/AgCl, 3 M KCl), the peak current increased and reached a maximum value of 44.32 ± 1.78 µA (RSD = 4.02 %, n = 3) at 0.0 V. Further increasing E_{acc} to +0.3 V caused a gradual decrease in the signal. Therefore, 0.0 V was selected as the optimal accumulation potential because it provided the highest and most well-defined stripping peak, favorable for improving analytical sensitivity and LOD determination.

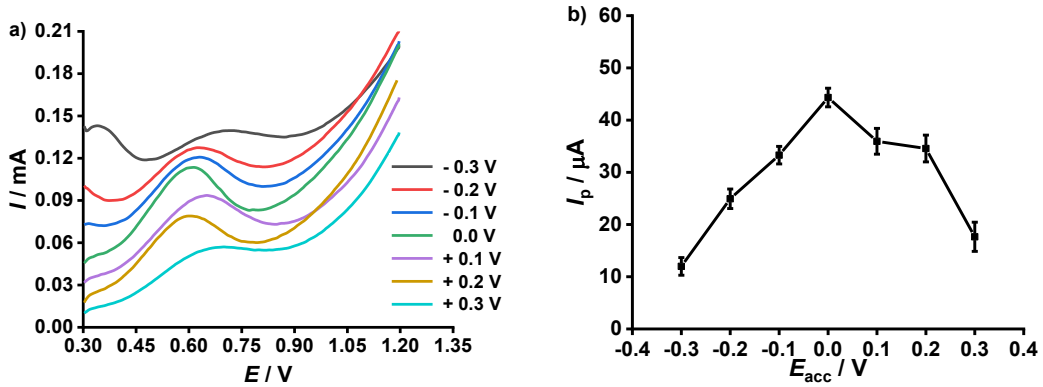

Figure S3. (a) LSV curves of AgNPs-ErGO/GCE in 0.05 M BR (pH 7) containing 9.9 mg L^{-1} and (b) I_p values at different accumulation potentials (accumulation time: 120 s; scan rate: 0.100 V s^{-1}; time step: 0.016 s; potential scan range from 0.3 to 1.2 V)

The accumulation time (t_{acc}) significantly affected the stripping response of SIB (Figure S4). As t_{acc} increased from 30 to 180 s, the peak current increased linearly, while a further increase to 240 s caused the signal to approach saturation. Therefore, 150 s was selected as the optimal accumulation time because it provided a high analytical response while reducing the overall analysis time.

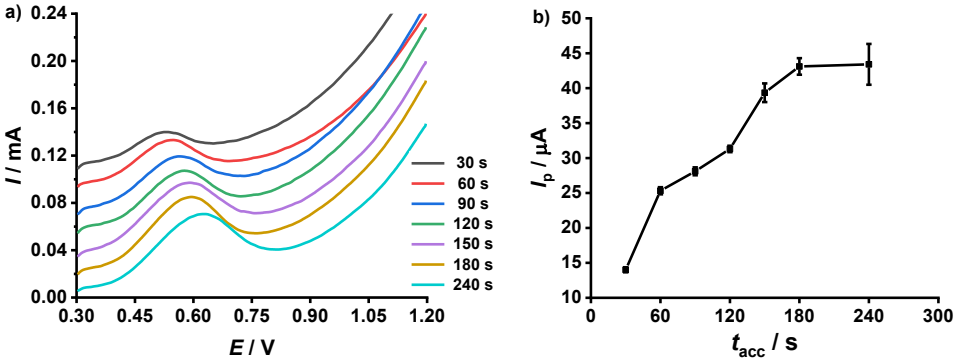

Figure S4. (a) LSV curves of AgNPs-ErGO/GCE in 0.05 M BR (pH 7) containing 9.9 mg L^{-1} and (b) I_p values at different accumulation times (accumulation potential: 0 V; scan rate: 0.100 V s^{-1}; time step: 0.016 s; potential scan range from 0.3 to 1.2 V)

As the scan rate increased from 0.010 to 0.300 V s^{-1}, the oxidation peak current of SIB increased remarkably, while the oxidation peak potential shifted toward more positive values, indicating an irreversible or quasi-reversible electrochemical process (Figure S5). At a scan rate of 0.100 V s^{-1}, the obtained peak current was sufficiently high for quantitative analysis, and the voltammetric peak still remained sharp and well-defined. Although higher scan rates produced larger signals, they also increased the capacitive current and broadened the peaks. Therefore, a scan rate of 0.100 V s^{-1} was selected for subsequent experiments.

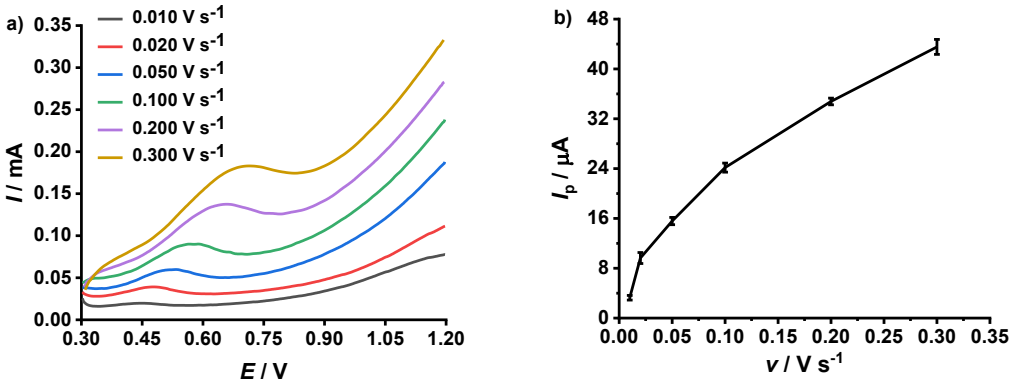

Figure S5. (a) LSV curves of AgNPs-ErGO/GCE in 0.05 M BR (pH 7) containing 9.9 mg L^{-1} and (b) I_p values at different scan rates from 0.010 V to 0.300 V s^{-1} (accumulation potential: 0 V; accumulation time: 150 s; time step: 0.016 s; potential scan range from +0.3 V to +1.2 V)