Supplementary Information

Environmentally Friendly Screen-Printed Electrodes for the Selective Detection of 4-Bromo-2,5-Dimethoxyphenethylamine (2C-B) in Forensic Analysis

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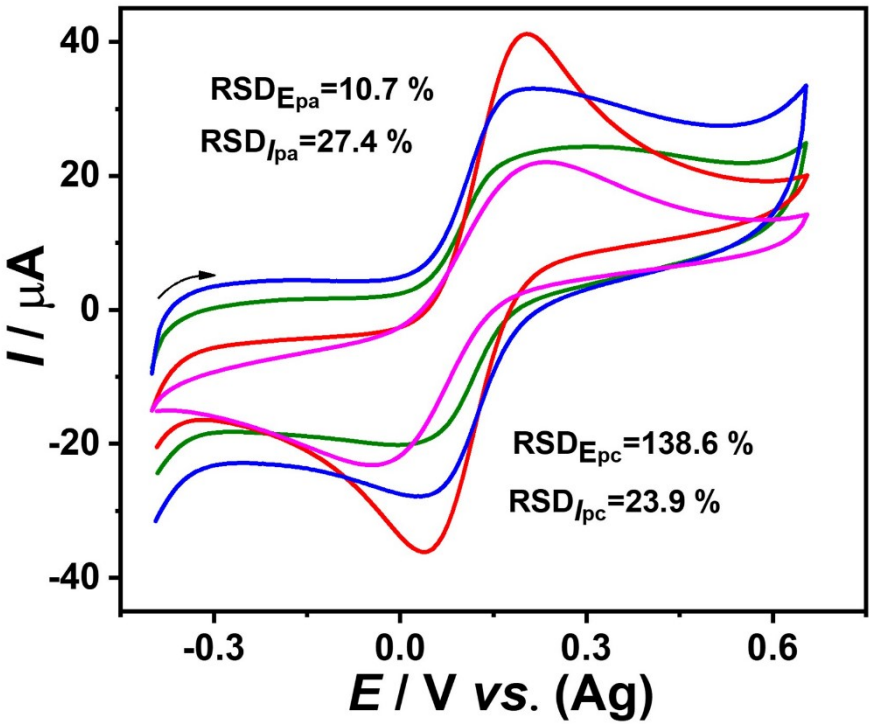

Figure S1. Voltammograms obtained for 1.0 mmol L^{-1} $[Fe(CN_6)]^{3-/4-}$ at 50 mV s^{-1}, in four different SPEs-Gr superficially cleaned with acetone.

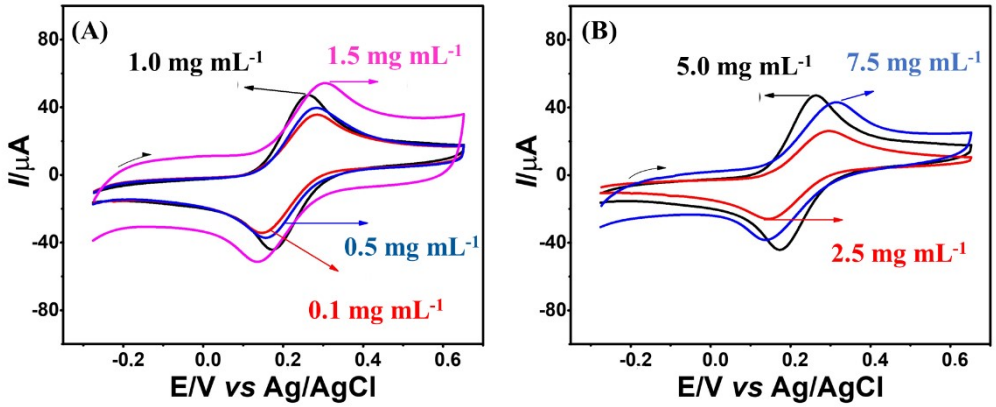

Figure S2. CVs obtained using 1.0 mmol L^{-1} [Fe (CN)6]3-/4- solution in 0.1 mol L^{-1} KCl at a scan rate of 50 mV s^{-1} on SPE-Gr/CTS (A) while maintaining a constant graphene (Gr) concentration at 5 mg mL^{-1} and varying chitosan (CTS) concentrations at (a) 0.1, (b) 0.5, (c) 1.0, and (d) 1.5 mg mL^{-1} or (B) maintaining a fixed CTS concentration of 1.0 mg mL^{-1} while varying Gr concentrations at (a) 2.5, (b) 5.0 and (c) 7.5 mg mL^{-1}.

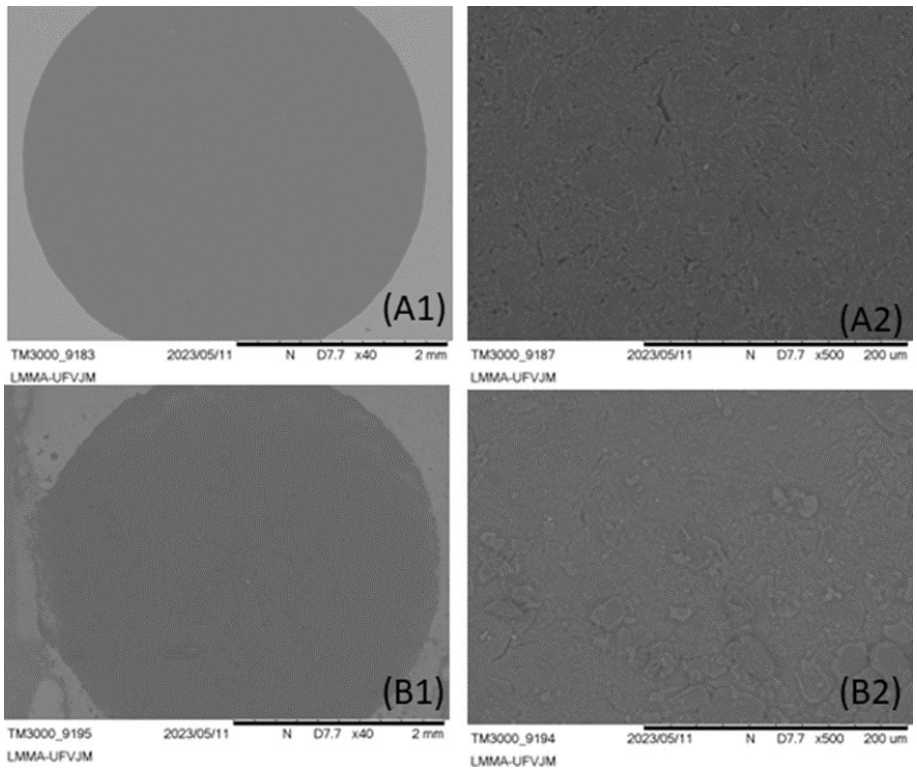

Figure S3. Scanning electron microscopy images of the surface morphology of (A) a new SPE-Gr and (B) a modified SPE-Gr/CTS working electrode surfaces at 40x (A1, B1) and 500x (A2, B2) magnification.

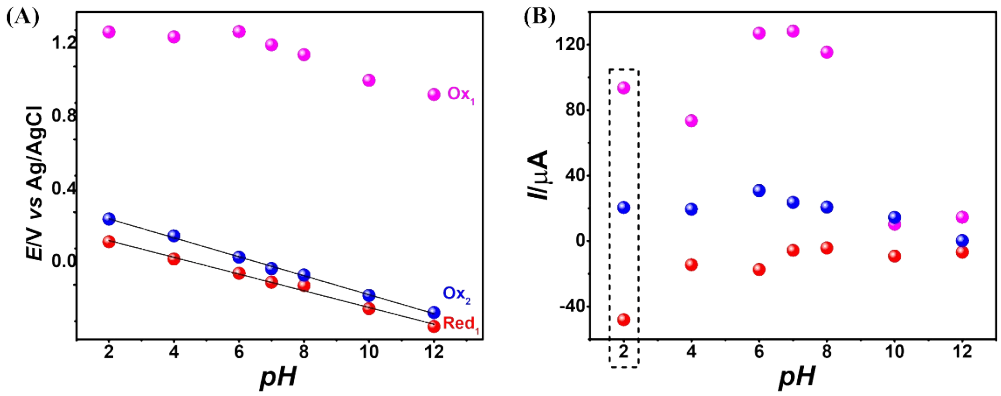

Figure S4 Plots of (**A**) E_p *vs.* pHs and (**B**) I_p *vs.* pH obtained from data presented in Fig. 5, for the first oxidation (pink dots), reduction (red dots), and second oxidation (blue dots).

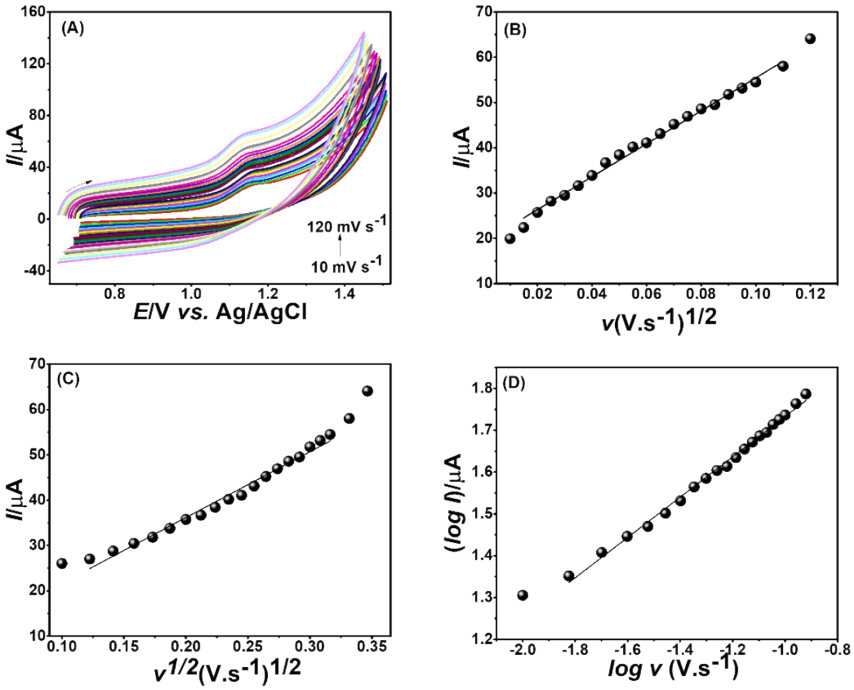

Figure S5 (**A**) CVs of 1.0 m mol L^{-1} 2C-B in 0.1 mol L^{-1} BR buffer solution at pH 2.0 on SPE-Gr/CTS. Each potential scans started at 0.0 V, moving in the anodic direction (arrow), with scan rates (v) ranging from 5 mV s^{-1} to 300 mV s^{-1}. Linear regressions of (**B**) I_p *vs.* v, (**C**) I_p *vs.* $v^{1/2}$, and (**D**) logarithm I_p *vs.* logarithm v.

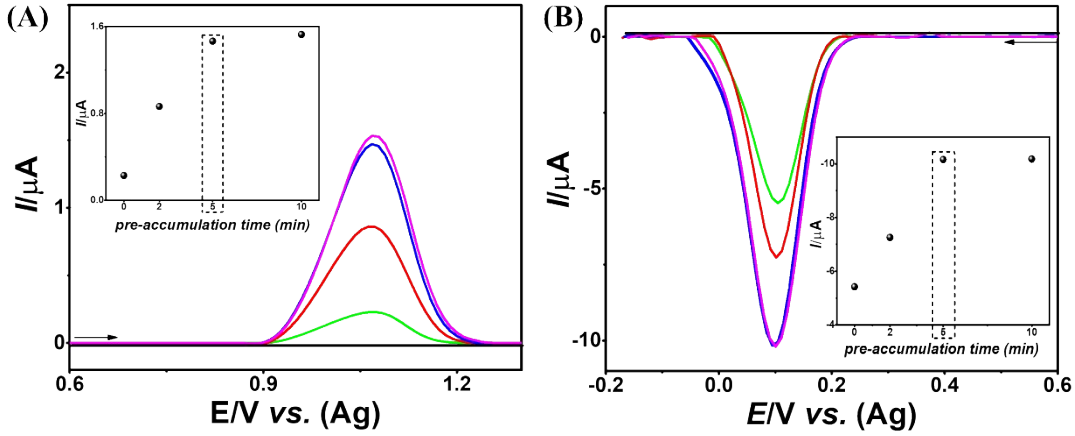

Figure S6 SWAdSV voltammograms of 2C-B at a concentration of 7.5 μmol L^{-1} in 0.1 mol L^{-1} BR buffer solution at pH 2.0 on SPE-Gr/CTS, showing the electrochemical processes for oxidation (**A**) and reduction (**B**) separately. Experimental conditions: amplitude of 80 mV, step potential of 10 mV, frequency of 30Hz. The pre-accumulation time ranged from 0 to 10 min. The inset illustrates the dependency of electrochemical behavior on the duration of the *pre-accumulation time*.

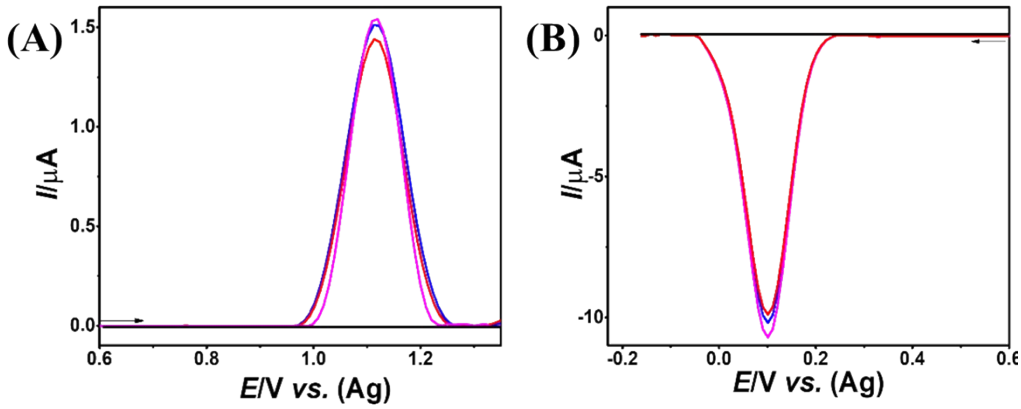

Figure S7 SWAdSV voltammograms of 2C-B at concentration of 7.5 μmol L^{-1} in 0.1 mol L^{-1} BR buffer solution at pH 2.0 on SPE-Gr/CTS, showing the electrochemical processes without application of potential (magenta line) during pre-accumulation, with application of 0.5V for 30s (blue line), and with application of -0.5V for 30s (red line), shown separately for (**A**) anodic and (**B**) cathodic scan. Experimental conditions: amplitude of 80 mV, step potential of 10 mV, frequency of 30Hz, pre-accumulation time of 5min.

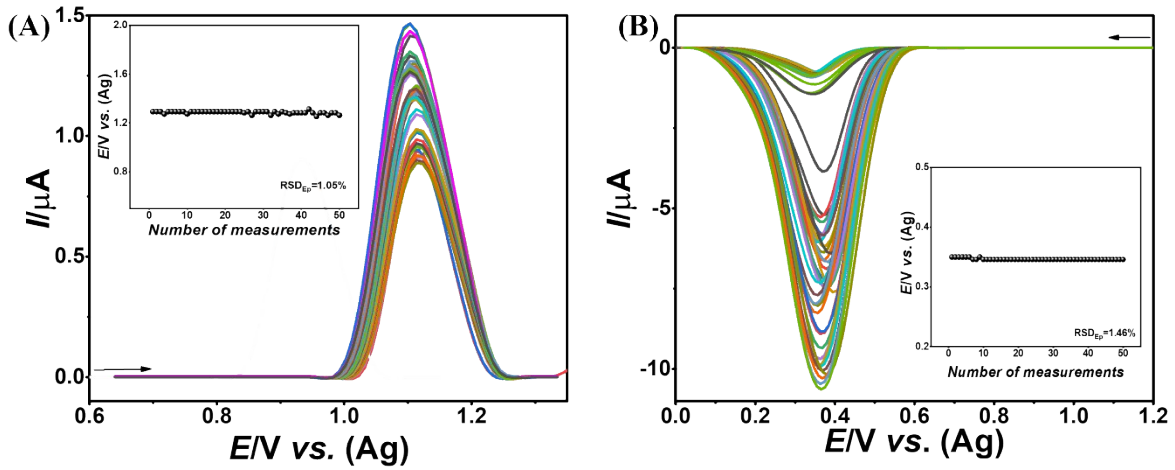

Figure S8 Voltammograms profiles from 50 consecutive measurements of 7.5 µmol L^{-1} 2C-B in 0.1 mol L^{-1} BR buffer pH 2.0 on the same SPE-Gr/CTS, showing separately for (**A**) anodic and (**B**) cathodic scans. Experimental conditions are the same as in Fig.4. Insets are plots of Epa_2 and Epc_1 *vs*. the *number of measurements* performed on SPE-Gr/CTS, highlighting the stability and reproducibility of the electrode's performance over repeated use.

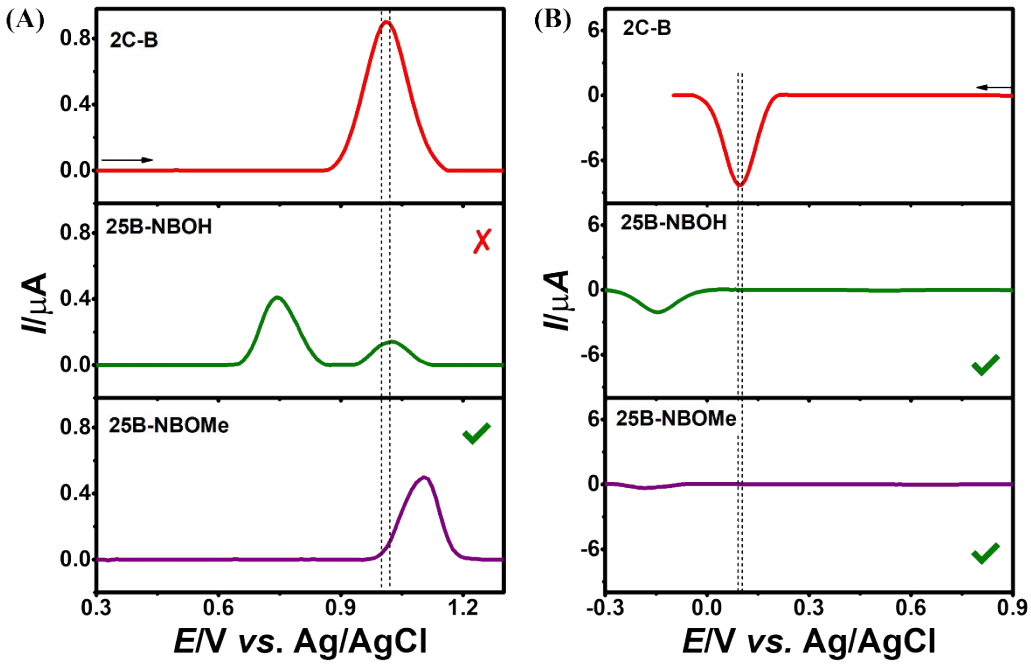

Figure S9 Voltammograms profiles on SPE-Gr/CTS for 2C-B (red-line), 25B-NBOH (olive line), 25B-NBOMe (purple line) at a concentration of 5 µmol L^{-1} in 0.1 mol L^{-1} BR buffer at pH 2.0, displayed for both (**A**) anodic and (**B**) cathodic scans. Experimental conditions are the same as in Fig. 6.

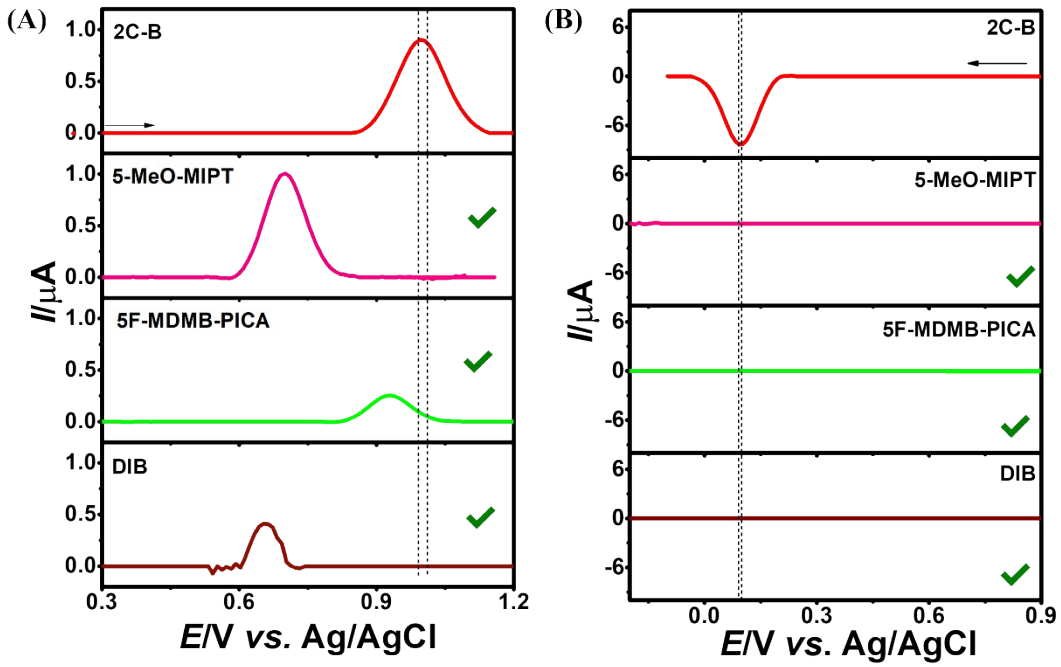

Figure S10 SWAdSV voltammograms on SPE-Gr/CTS for 2C-B (red line), 5-MeO-MIPT (pink line), 5F-MDMB-PICA (green line), and dibutylone (brown line) at a concentration of 5 µmol L^{-1} in 0.1 mol L^{-1} BR buffer at pH 2.0, displayed for both (**A**) anodic and (**B**) cathodic scans. The experimental conditions are the same as in Fig.6. All drugs.

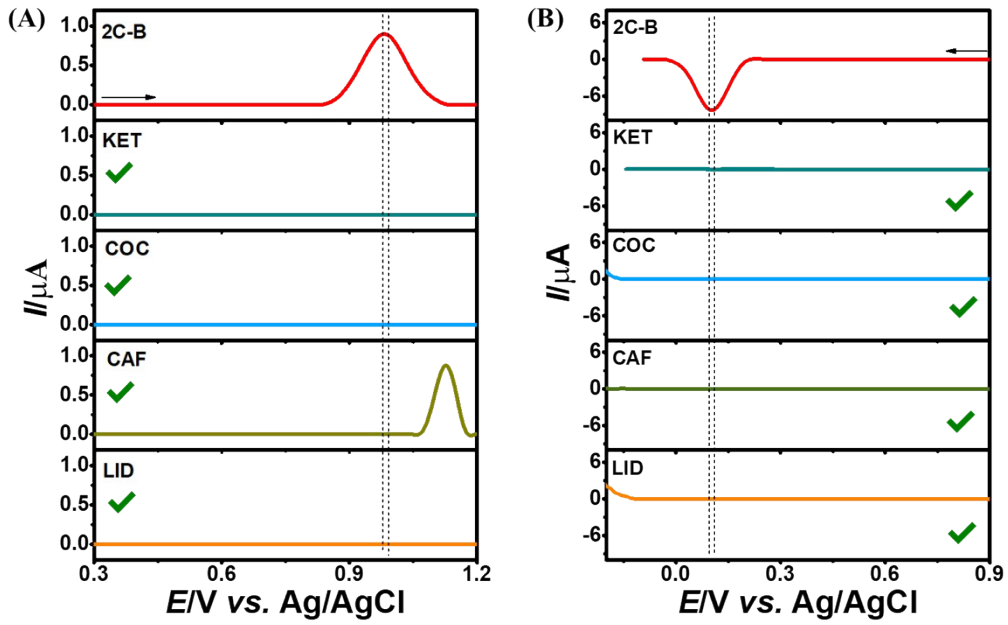

Figure S11. SWAdSV voltammograms on SPE-Gr/CTS for 2C-B (red line), ketamine (light gray line), cocaine (light blue line), caffeine (light brown line), and lidocaine (dark yellow line) at a concentration of 5 μmol L^{-1} in 0.1 mol L^{-1} BR buffer at pH 2.0, displayed for both (**A**) anodic and (**B**) cathodic scans. The experimental conditions are the same as in Fig. 6.

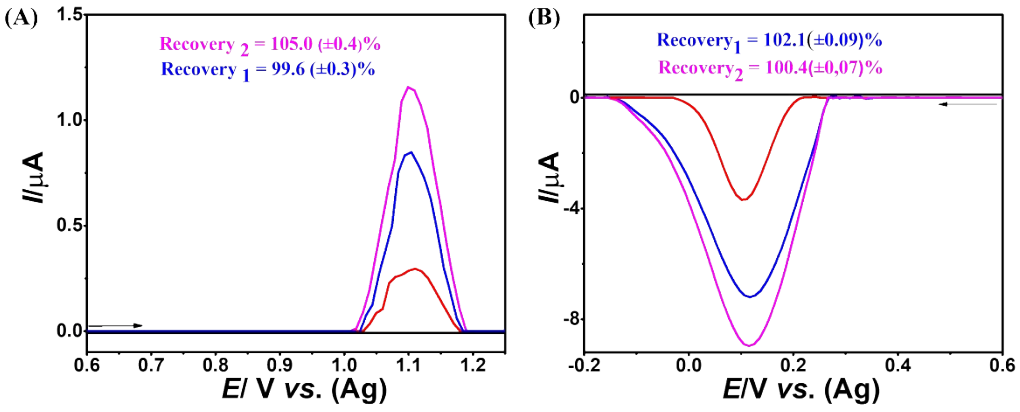

Figure S12 Voltammograms profiles in 0.1 mol L^{-1} BR buffer solution at pH 2.0 on SPE-Gr/CTS: before (black lines) and after the addition of a real seized sample (red lines), and following the addition of standard solutions of 2C-B at concentrations of 2.5 µmol L^{-1} (blue

lines) and 3.5 μmol L^{-1} (magenta lines), using both (**A**) anodic and (**B**) cathodic scans. Experimental conditions are the same as in Fig. 6. Insets are the obtained recovery values.

Figure S13. SWAdSVs profiles in 0.1 mol L^{-1} BR buffer solution at pH 2.0 on SPE-Gr/CTS: before (black lines) and after the addition of a real oral fluid sample (red lines) and following the addition of standard solutions of 2C-B at concentrations of 2.5 μmol L^{-1} (blue lines) and

5.0 μmol L^{-1} (magenta lines), using both (**A**) anodic and (**B**) cathodic scans. Experimental conditions are the same as in Fig. 6. Insets are the obtained recovery values.