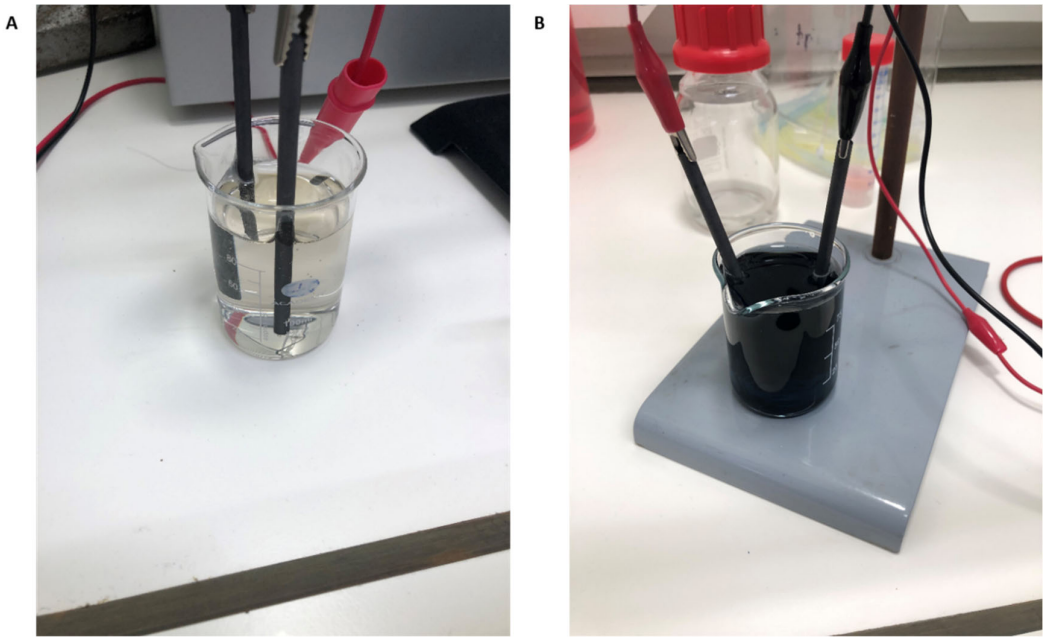

Figure S1. Photograph of (A) Graphite rods in PSS electrolyte at the beginning of the electrochemical exfoliation (B) After the electrochemical exfoliation process.

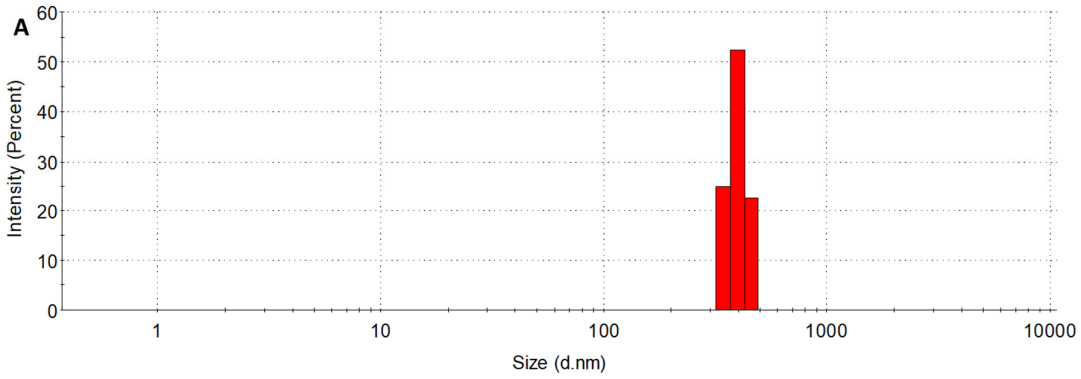

Figure S2. Particle size analysis results of synthesised electrochemically exfoliated graphene (EEFGH).

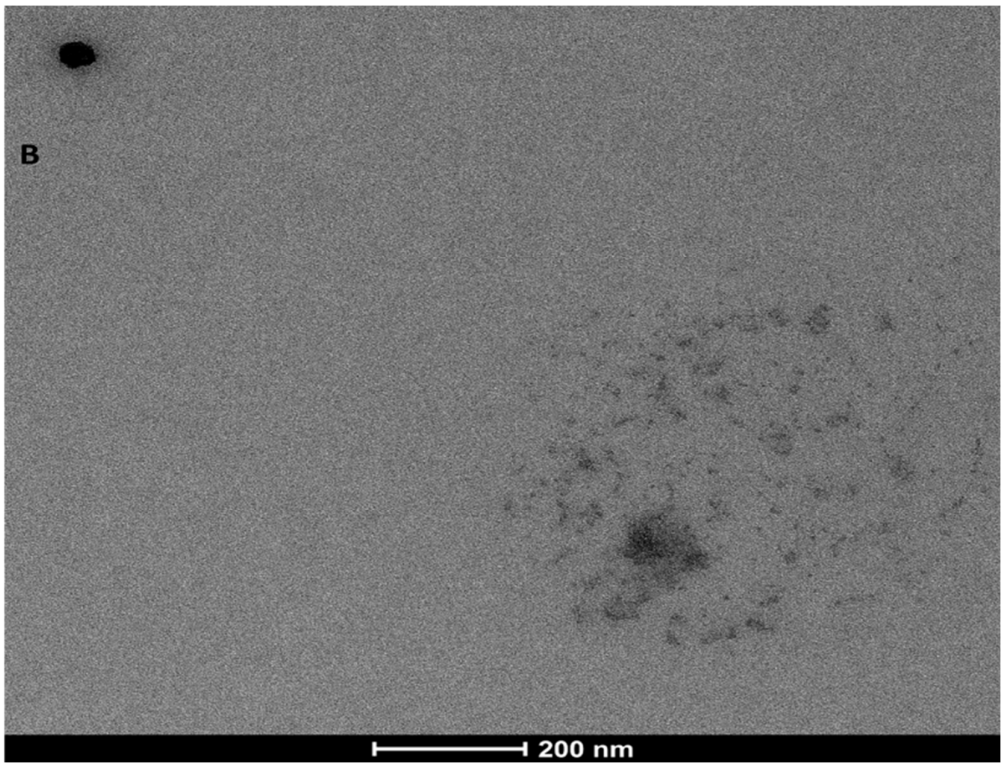

Figure S3. TEM image of electrochemically exfoliated graphene. Scale bar: 200 nm.

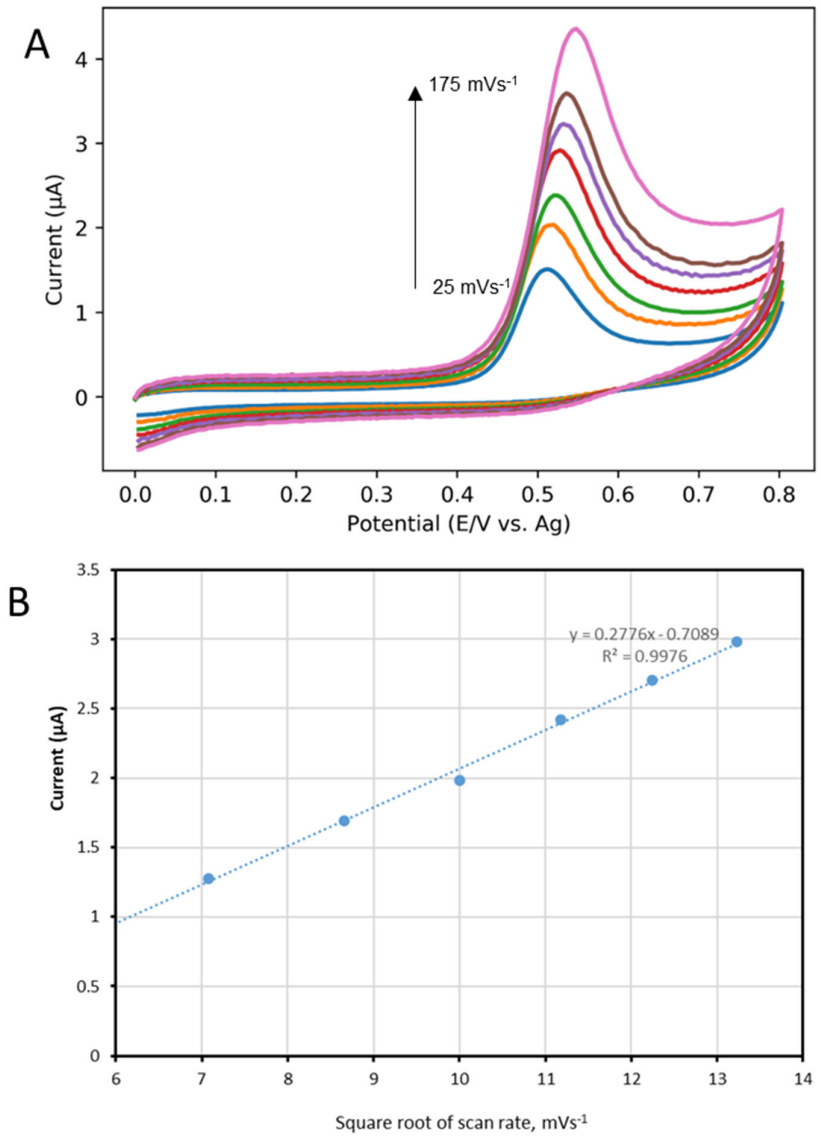

Figure S4. (A) Cyclic voltammetry electrochemical profile of estradiol of 3D-GFSPE in 20 µM estradiol PBS pH 7.0 at scan rates (25 - 175 mV·s−1), (B) Plot of Ipa versus square root of scan rate ($\upsilon^{1/2}$).

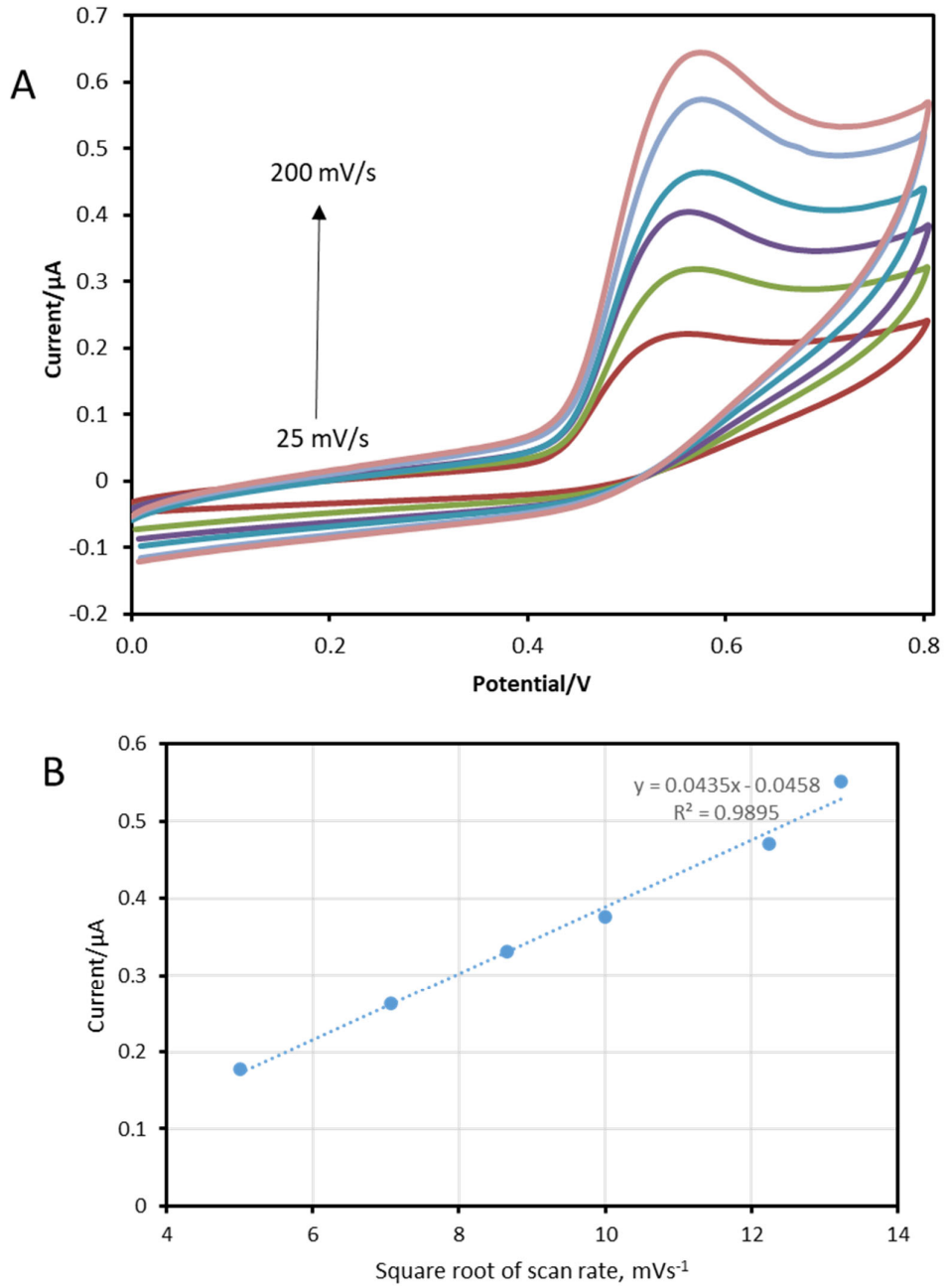

Figure S5. (A) Cyclic voltammetry electrochemical profile of estradiol of GHPSPE in 20 µM estradiol PBS (pH 7) at scan rates (25 - 175 $mV \cdot s^{-1}$), (B) Plot of Ipa versus square root of scan rate ($\upsilon^{1/2}$).

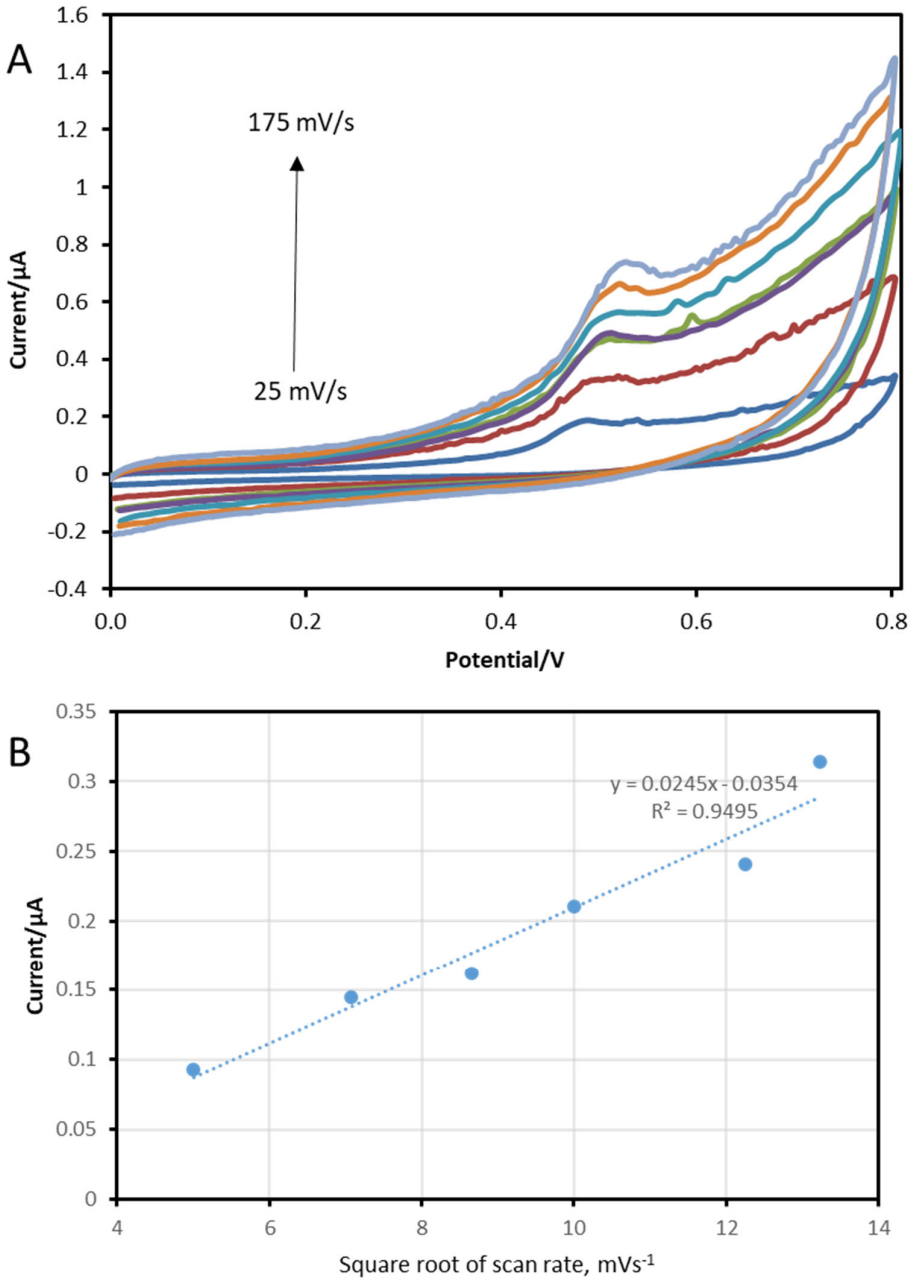

Figure S6. (A) Cyclic voltammetry electrochemical profile of estradiol of EEFGHSPE in 20 µM estradiol PBS (pH 7) at scan rates (25 - 175 mV·s^{-1}), (B) Plot of Ipa versus square root of scan rate ($\upsilon^{1/2}$).

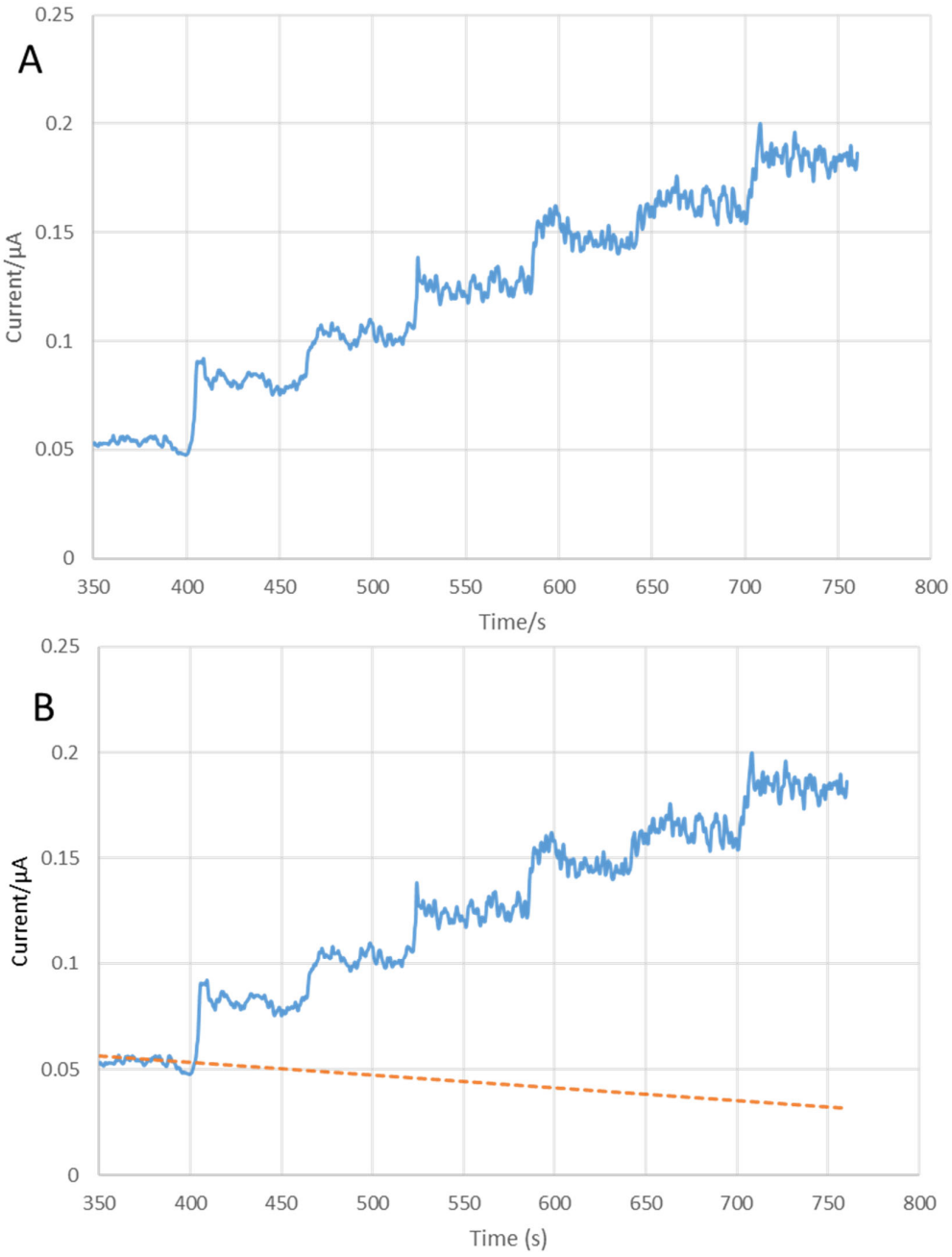

Figure S7. (A) Raw amperometric data for 3D-GFSPE Figure 5A (main text), without the application of smoothing or baseline correction. B: Example of baseline correction; the solid line represents the raw data and the dashed line the fitted baseline.

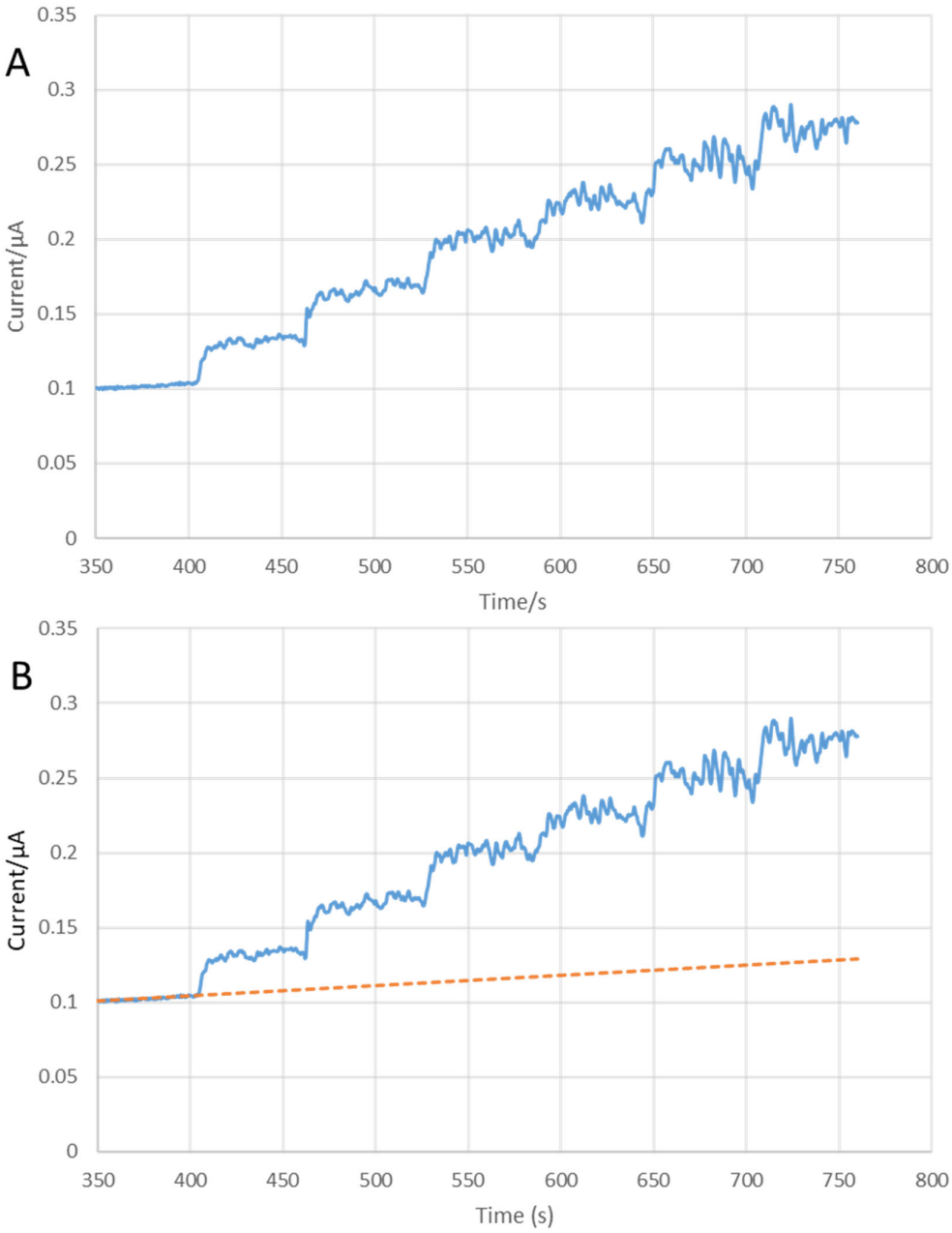

Figure S8. (A) Raw amperometric data for GHPSPE Figure 5B (main text), without the application of smoothing or baseline correction. B: Example of baseline correction; the solid line represents the raw data and the dashed line the fitted baseline.

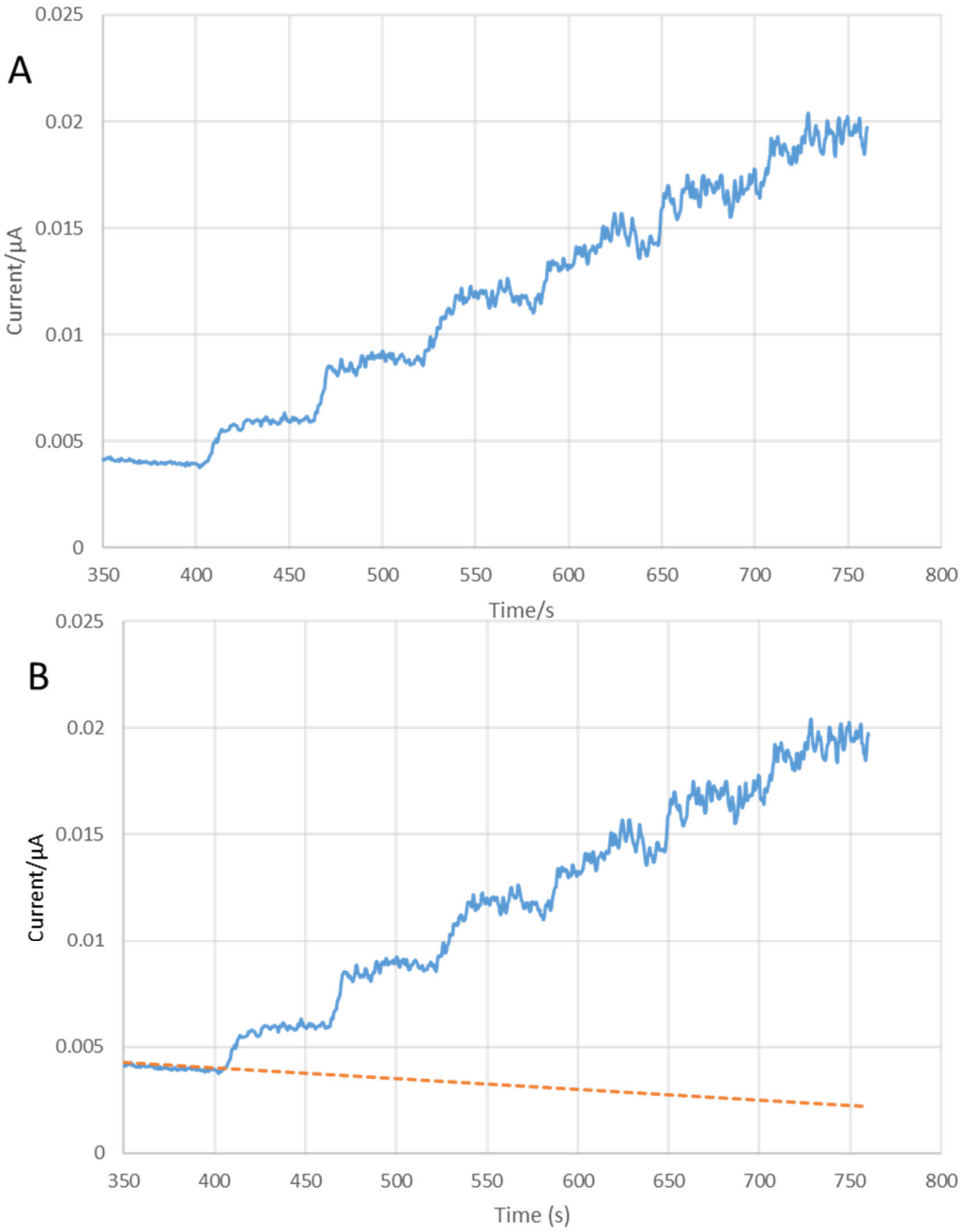

Figure S9. (A) Raw amperometric data for EEFGHSPE Figure 5C (main text), without the application of smoothing or baseline correction. B: Example of baseline correction; the solid line represents the raw data and the dashed line the fitted baseline.

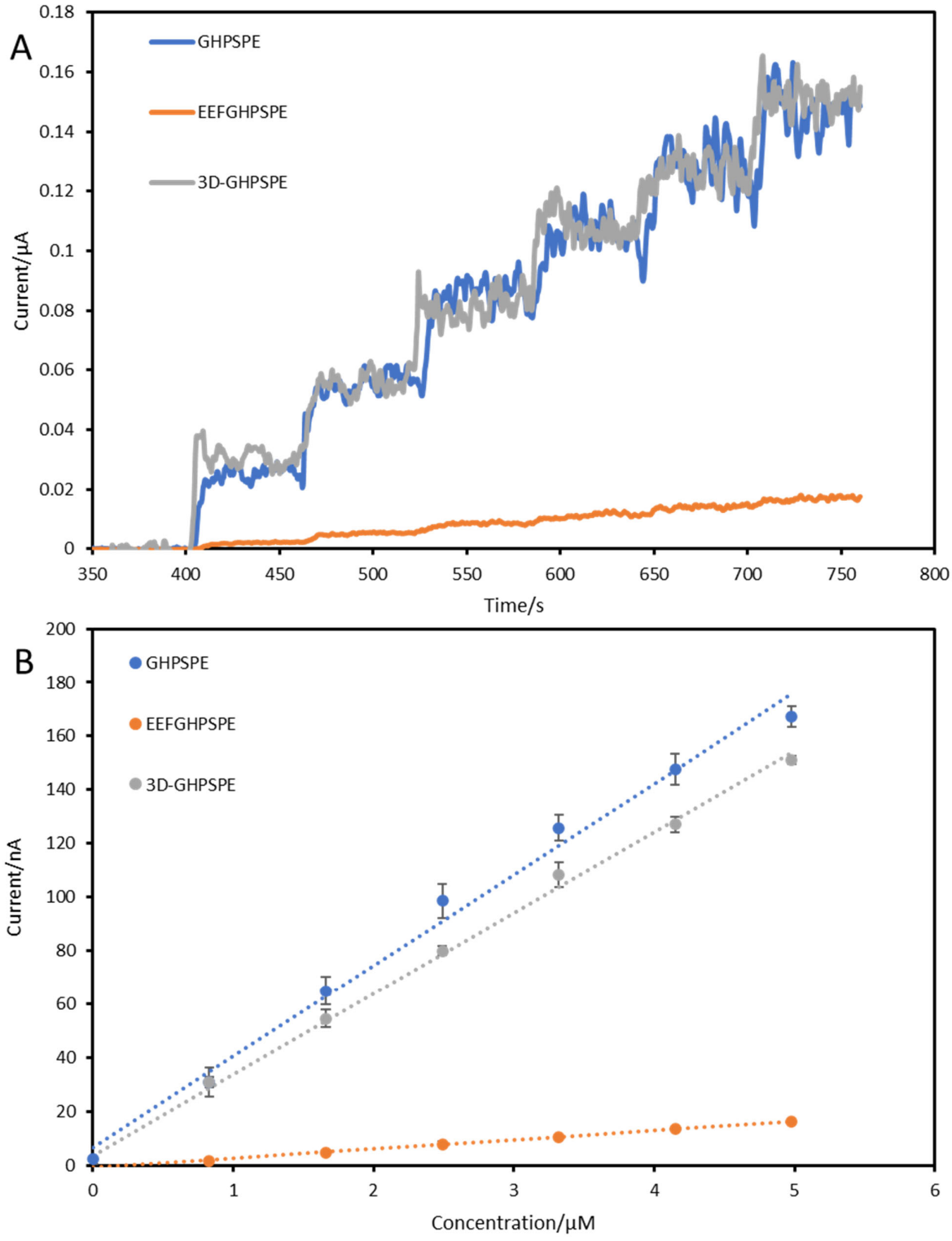

Figure S10. A) Plot of amperometric response obtained for three graphene-based electrodes: 3D-GFSPE, GHSPE, and EEFGHSPE for estradiol with injection of (50 µl at 0.5 mM) are injected at 60s intervals. B) Mean of plateau current against E2 concentration. Error bars represent three standard deviations.

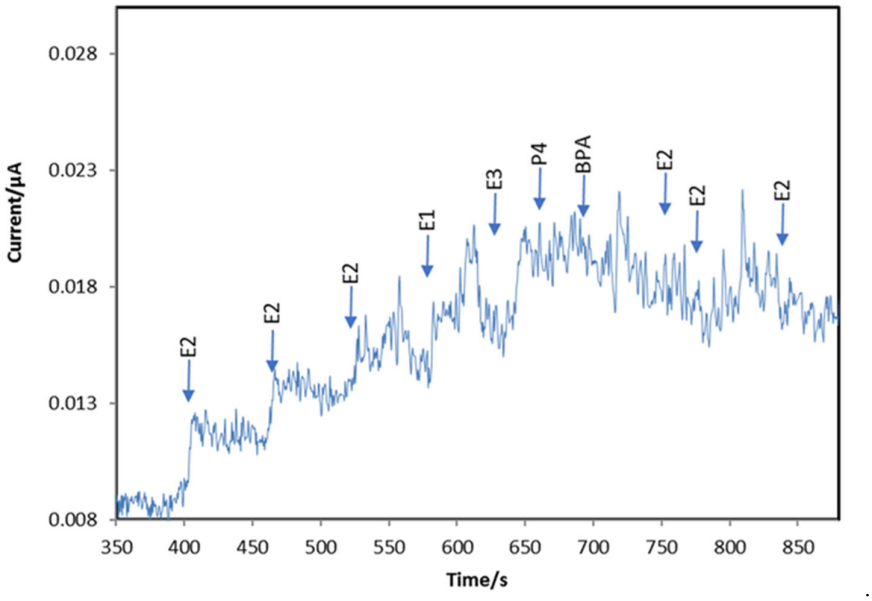

Figure S11. Amperometric response demonstrating the interference in sensing of estradiol. Estrone (E1), Estriol (E3), progesterone (P4) and Bisphenol A (BPA) of 0.5 mM each.