

Electronic supplementary information

Enhanced electrochemical sensing of polyphenols by an oxygen-mediated surface

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Table S1 – Temperature, heating time and atmosphere used in the SPCE thermal treatments.

T /°C	100	150	200	250	300	400
Heating time/h (Air)	2	2	2; 4; 8	0.5; 1; 2	2	2
Heating time/h (Ar)			8	0.5		

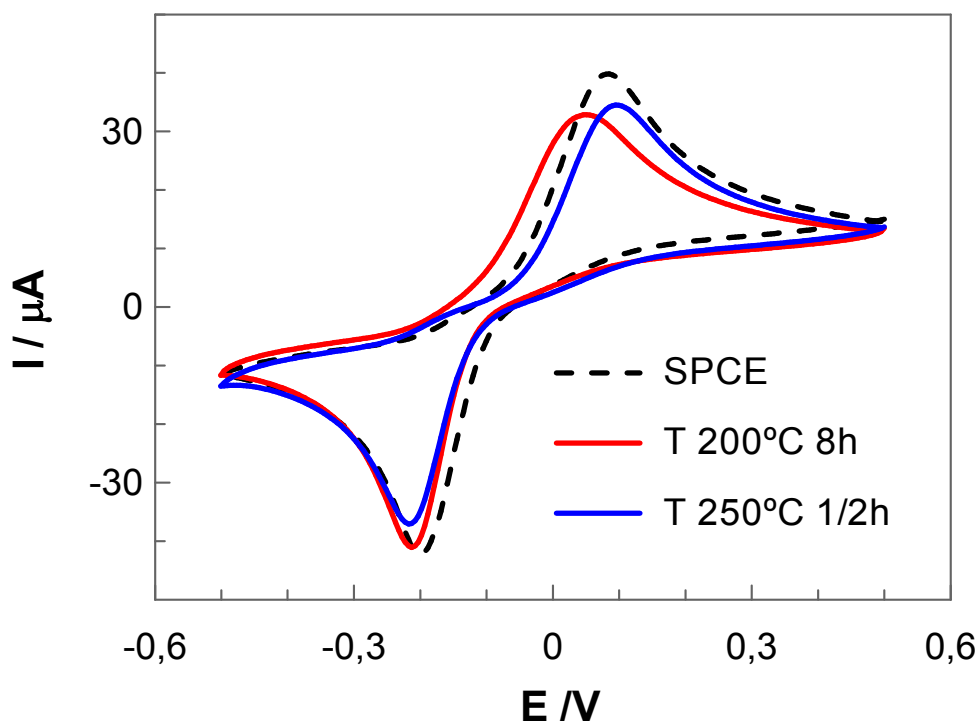


Fig. S1 - CVs showing the effect of SPCE curing temperature and time on the electrochemical measurement of 1.0 mM HQ in 0.1 M PBS pH 7.4 before (dashed black line) and after heat treatment in inert atmosphere (Ar): 200°C for 8 hours (red line) and 250°C for 30 minutes (blue line). All voltammograms were recorded at 100mVs⁻¹.

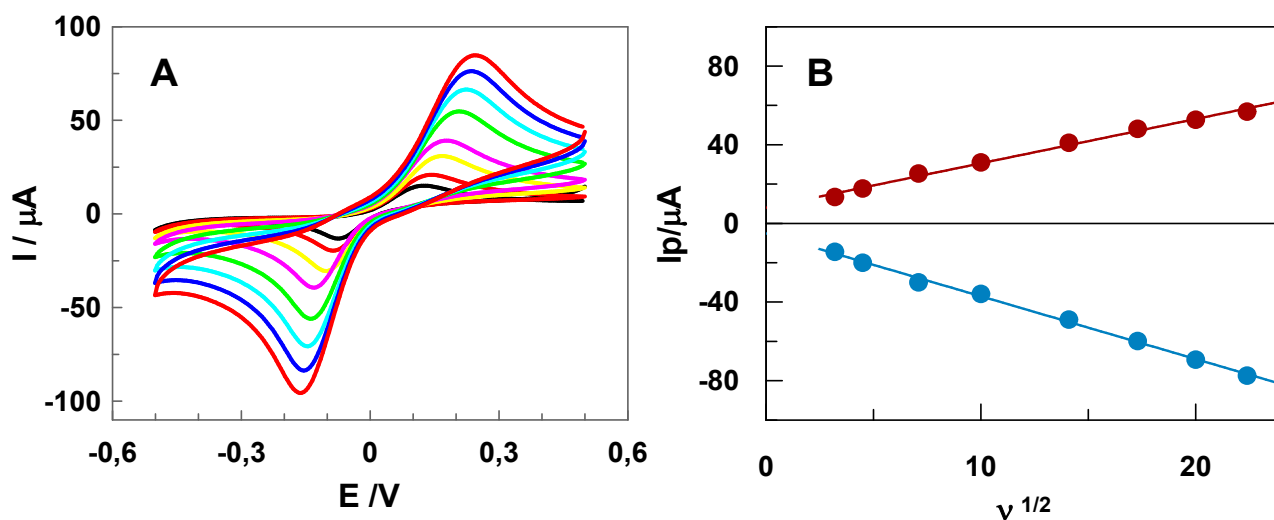


Fig. S2– (A) CVs of 1mM HQ in 0.1 M PBS pH 7, with a scan rates from 10 to 500 mV s^{-1} from inner to outer curve, at the untreated SPCE. (B) Linear relationship between the peak currents and square root scan rates. Anodic linear fit: $y = (2.25 \pm 0.07)x + (8.01 \pm 0.99)$, $R^2 = 0.997$; Cathodic linear fit: $y = (-3.19 \pm 0.07)x + (-5.11 \pm 0.95)$, $R^2 = 0.998$.

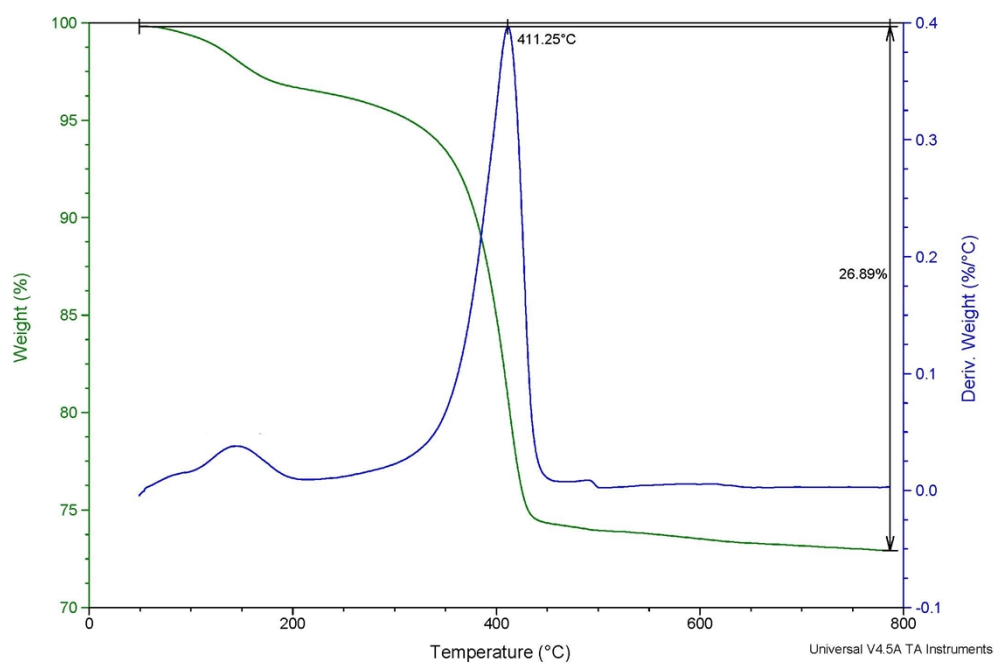


Fig. S3 – TGA curve of scraped polymeric layer with continuous N_2 flow..

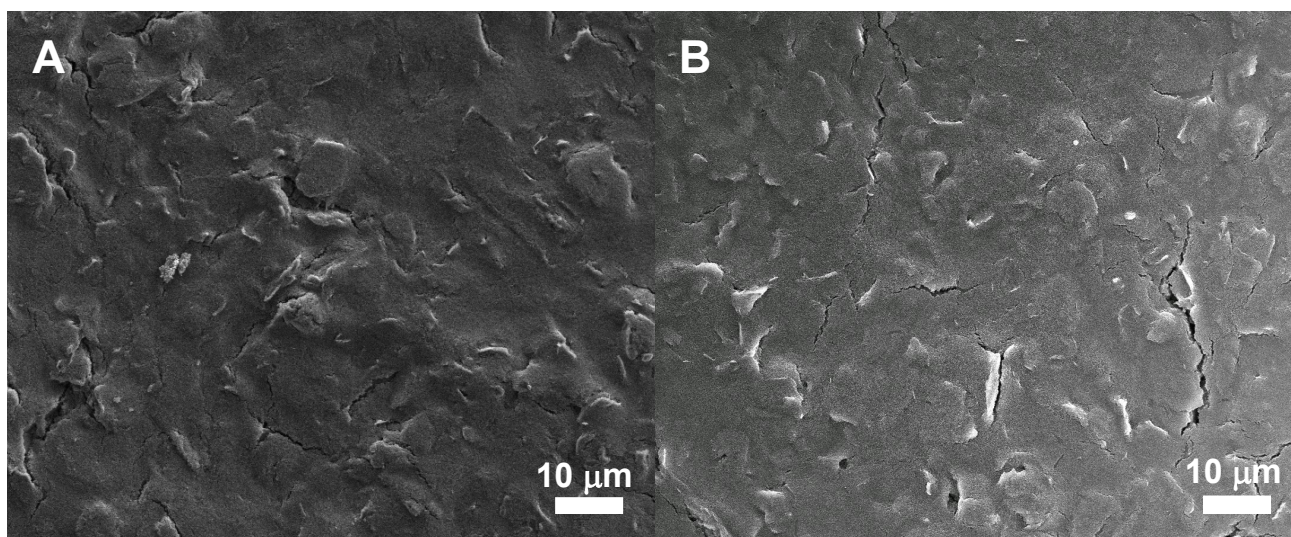


Fig. S4 – Representative SEM images of untreated commercial SPCE surface (A) and after 8 hours at 200 °C treated ht-SPCE surface (B).

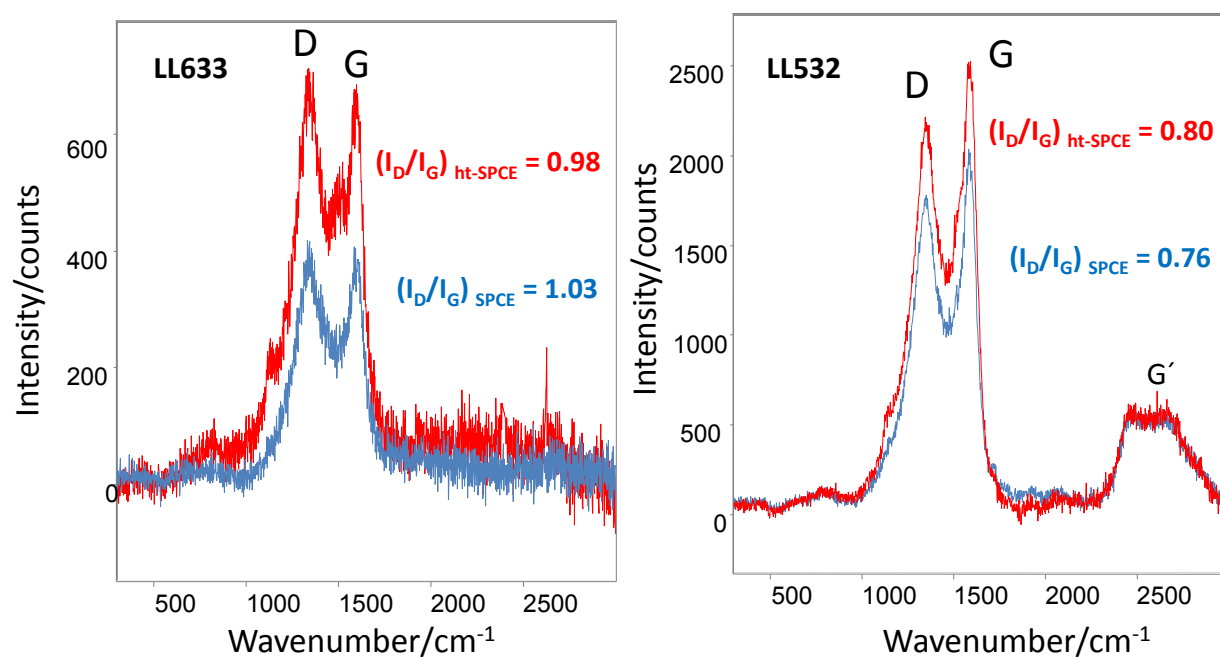


Fig. S5 - Raman spectra of untreated (blue lines) and heat-treated (red lines) SPCEs recorded using two laser excitation lines: 633 nm (left) and 532 nm (right). Inset: I_D/I_G ratio for untreated and treated SPCE at each laser line.

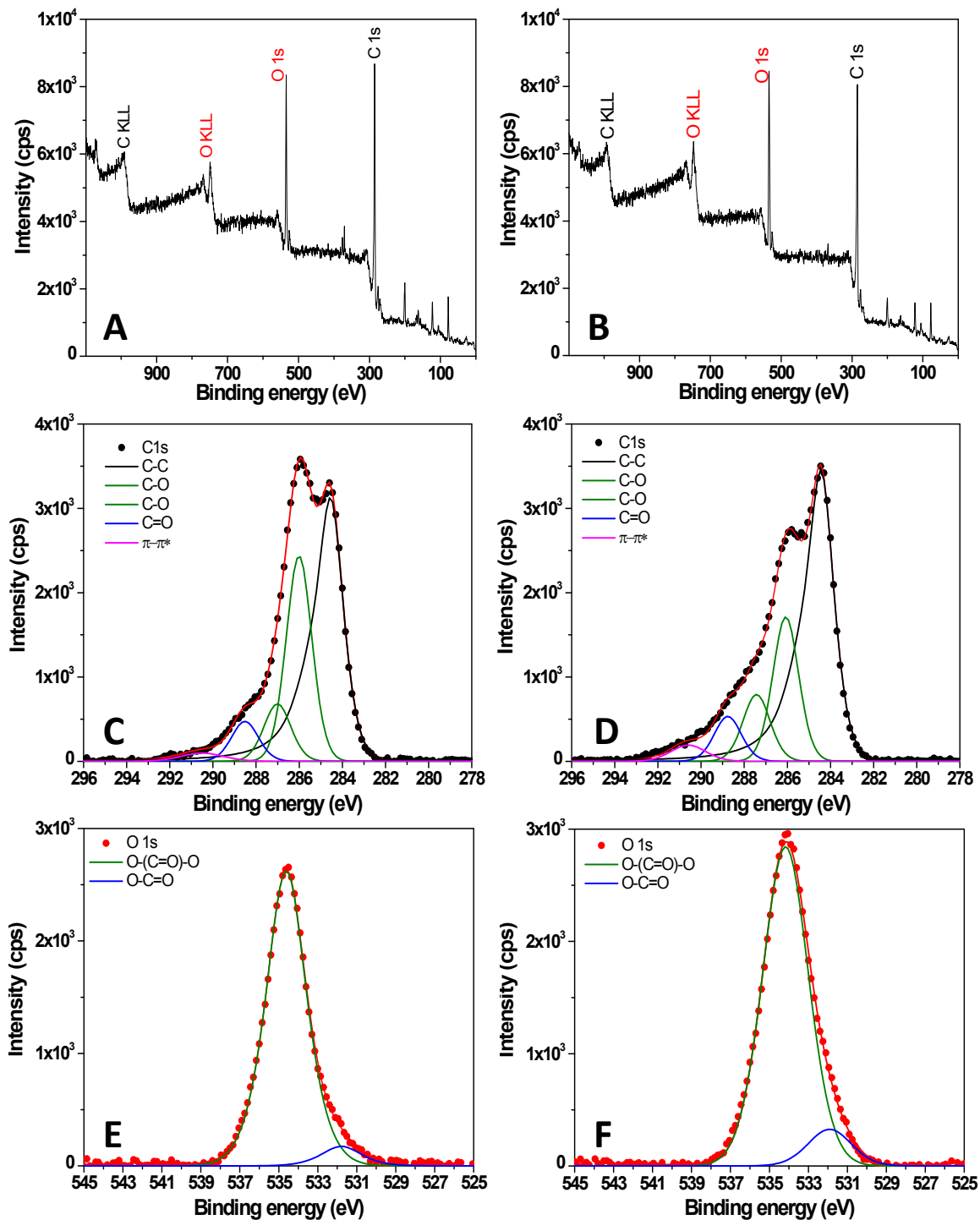


Fig. S6 — Survey XPS spectra of SPCE (A) and ht-SPCE (B) XPS spectra of the C1s (C-D) and O1s (E-F) for SPCE (C and E) and ht-SPCE (D and F). The blue, black, magenta and green lines represent the deconvolution of the different contributions in the spectra as indicated.

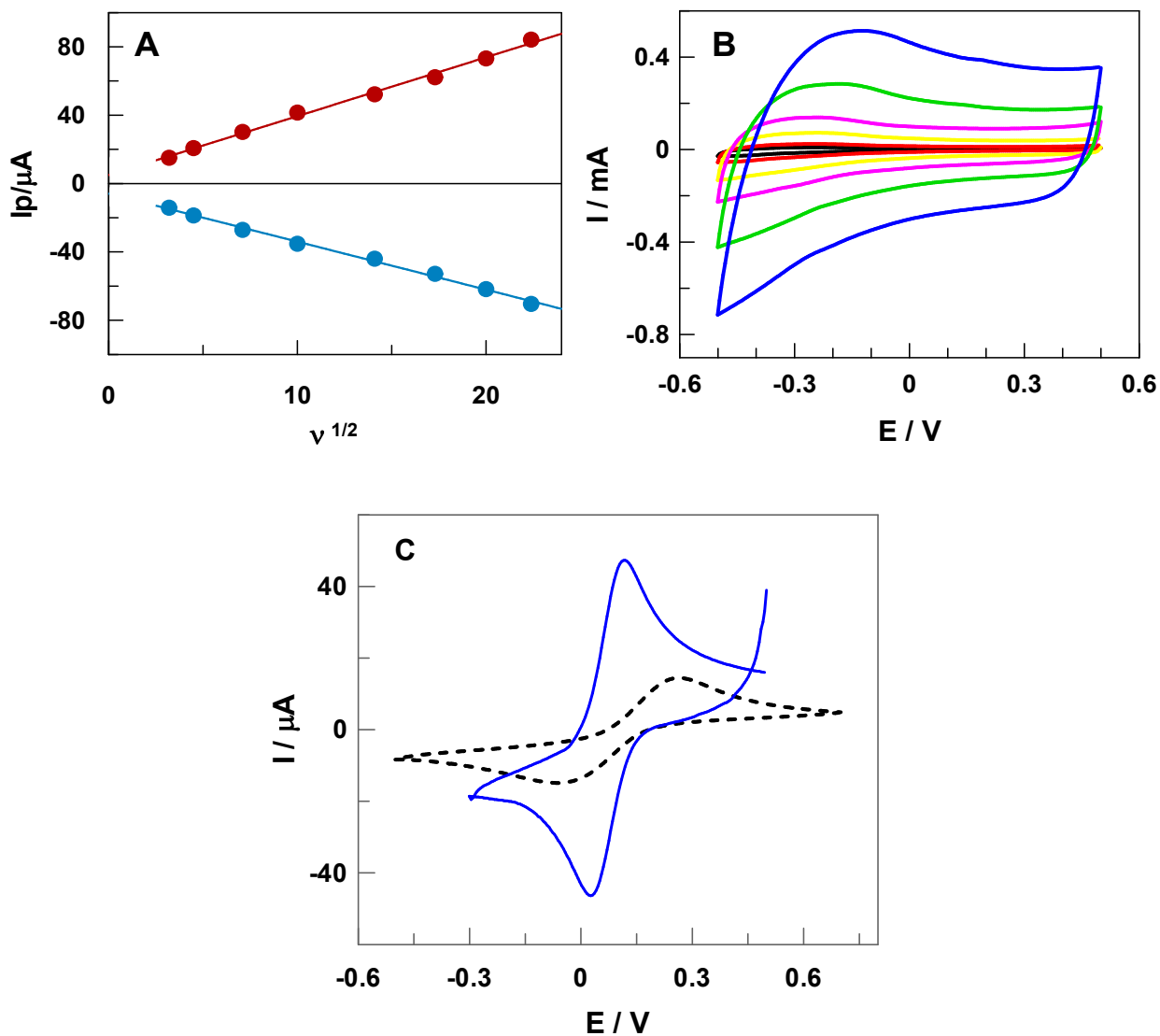


Fig. S7 – (A) Linear dependence of peaks currents on the square root scan rate for the ht-SPCE (200 °C; 8 hours) of 1.0 mM ferricyanide in 0.1 M KCl. Anodic linear fit: $y = (3.44 \pm 0.09)x + (4.97 \pm 1.27)$, $R^2 = 0.998$; Cathodic linear fit: $y = (-2.81 \pm 0.07)x + (-5.92 \pm 1.02)$, $R^2 = 0.998$. (B) CVs of the ht-SPCE (200 °C; 8 hours) in supporting media, 0.1 M PBS pH 7.4, at different scan rates from 10 mV s^{-1} to 400 mV s^{-1} . (C) CVs of 1.0 mM ferricyanide in 0.1 M KCl at untreated SPCE (dashed black line) and ht-SPCE, with blank correction (blue line), recorded at 100 mV s^{-1} .

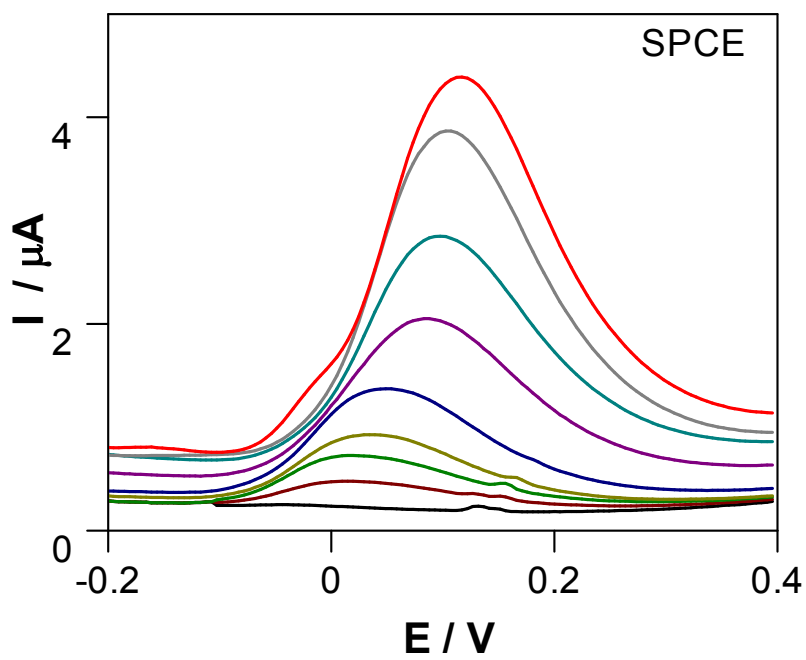


Fig. S8 – DPVs of DA in increasing concentrations, from 0 to 500 μM , at the untreated SPCE, in 0.1 M PBS pH 7.4 at 5 mV s^{-1} scan rate.