

Silica/Titania Graphite Composite Modified with Chitosan and Tyrosinase Employed as a Sensitive Biosensor for Phenolic Compounds

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Table S1. Data taken from the thermogravimetric curves of the Si/Ti-G, CS-5, CS-10 and CS-15 materials

Material	Weight loss 0-150 °C / %	Weight loss 150-400 °C / %	Weight loss 400-650 °C / %
Si/Ti-G	0.19	1.38	1.42
CS-5	0.54	2.46	2.67
CS-10	0.75	4.50	3.87
CS-15	1.23	4.86	4.57

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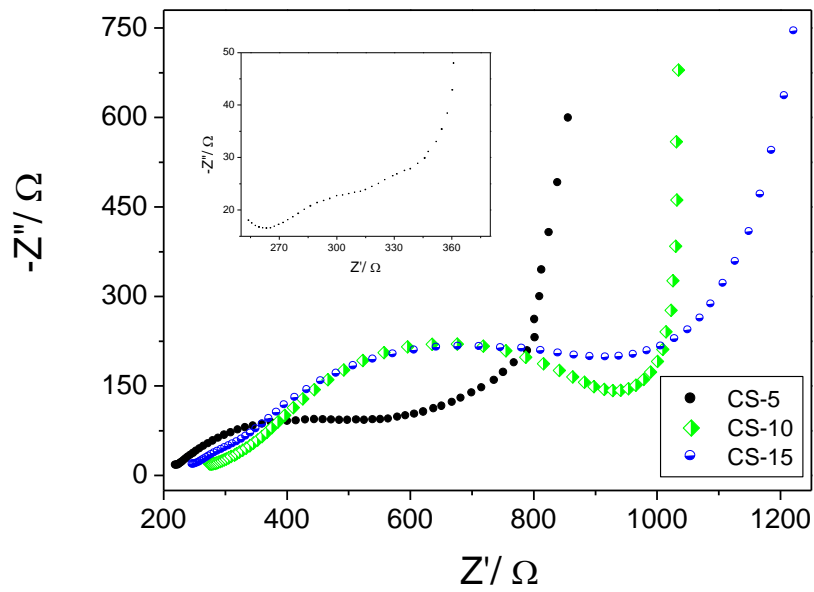


Figure S1. Nyquist diagram of the electrodes CS-5, CS-10 and CS-15 in the presence of a potassium ferricyanide and potassium ferrocyanide solution (1.0 mmol L^{-1}) and KCl (0.1 mol L^{-1}) in phosphate buffer at a pH of 7.0.

Equations S1 and S2 show the ratio between log of peak current (I_p) and log of scan rate (v) for catechol using electrode CS-5-Ty (Figure 6c).

$$\log I_{pa} = 1.45 (\pm 0.02) + 0.457 (\pm 0.01) \log v \text{ with } R^2 = 0.996 \quad (\text{S1})$$

$$\log I_{pc} = -0.278 (\pm 0.02) + 0.294 (\pm 0.01) \log v \text{ with } R^2 = 0.995 \quad (\text{S2})$$

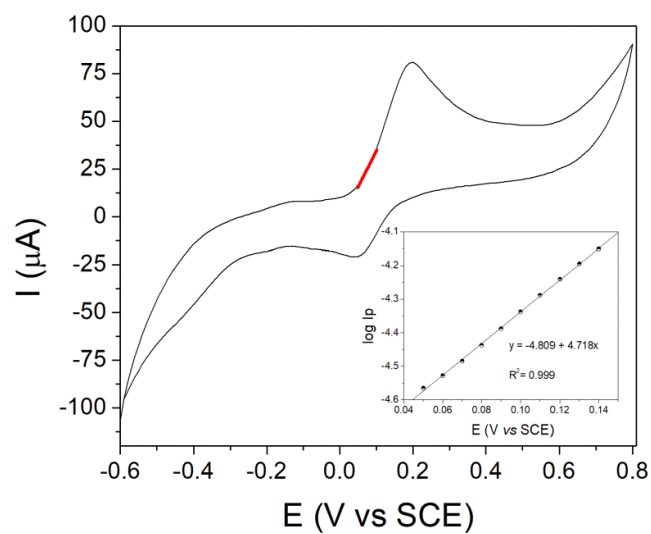


Figure S2. Cyclic voltammogram of the CS-5-Ty electrode in the presence of $385 \mu\text{mol L}^{-1}$ of catechol in phosphate buffer solution pH 7. Inset on Figure S2 Tafel plot obtained from CV.

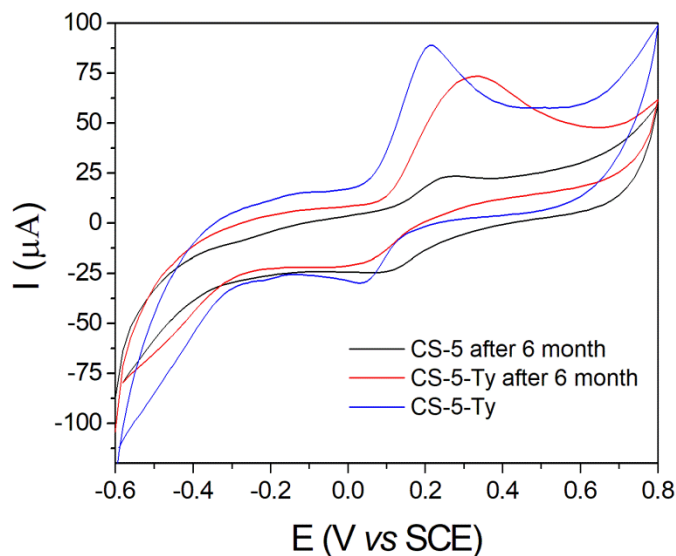


Figure S3. Cyclic voltammogram of the CS-5 and CS-5-Ty electrodes in the presence of $385 \mu\text{mol L}^{-1}$ of catechol in phosphate buffer solution pH 7.

Equations S3, S4 and S5 show the linear ratio of chronoamperograms (Figure 8b) for each analyte at different concentrations, after six months of storage, for catechol is the equation S3, for dopamine is equation S4 and pyrogallol is equation S5.

$$I(\mu\text{A}) = 0.64 (\pm 0.14) + 20.37 (\pm 0.44) [\text{catechol}] (\text{mmol L}^{-1}) R^2 = 0.997 \quad (\text{S3})$$

$$I(\mu\text{A}) = 0.54 (\pm 0.09) + 14.62 (\pm 0.21) [\text{dopamine}] (\text{mmol L}^{-1}) R^2 = 0.998 \quad (\text{S4})$$

$$I(\mu\text{A}) = 0.06 (\pm 0.03) + 14.86 (\pm 0.08) [\text{pyrogallol}] (\text{mmol L}^{-1}) R^2 = 0.999 \quad (\text{S5})$$

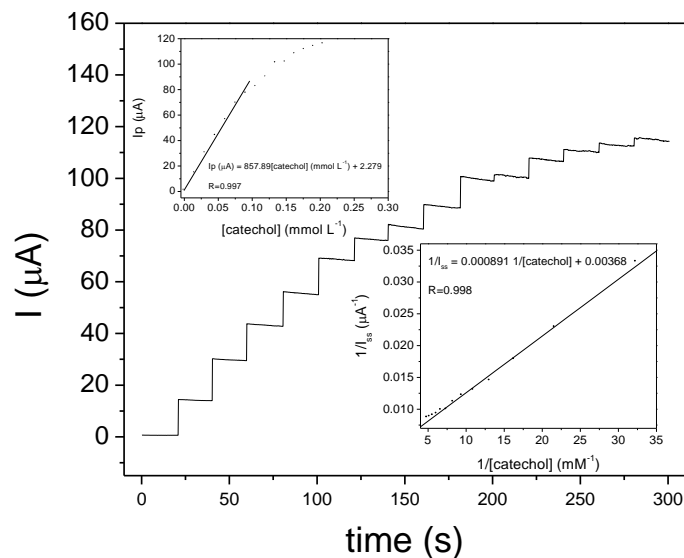


Figure S4. Chronoamperometric response (I vs. t) for the electrode CS-5-Ty for successive additions of catechol in the concentration range of 0.0 to 0.3 mmol L^{-1} . Inset Figure S4 above the chronoamperometric curve. Linear relation between current intensity and concentration of catechol. Inset Figure S4 below Lineweaver-Burk plot for amperometric response of CS-5-Ty biosensor towards catechol addition.

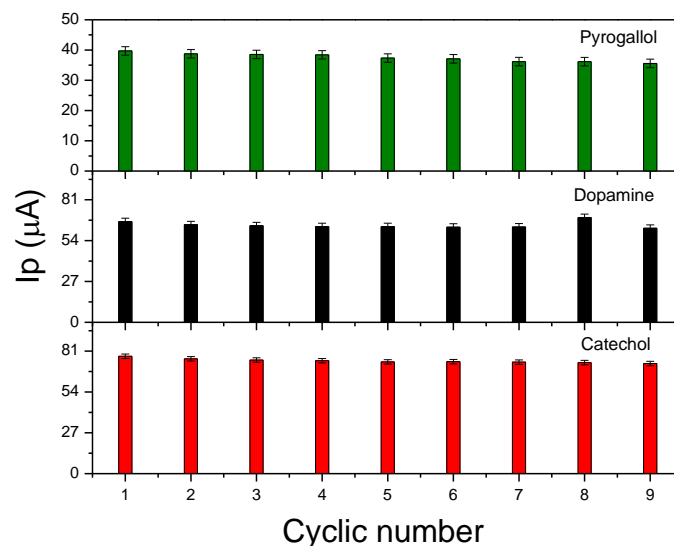


Figure S5. Anodic peak current for nine cycles using one same electrode for each analyte, for the electrode CS-5-Ty for pyrogallol, dopamine and catechol with analyte concentration of 0.9 mmol L^{-1} , using cyclic voltammetry, scan rate of 20 mV s^{-1} .

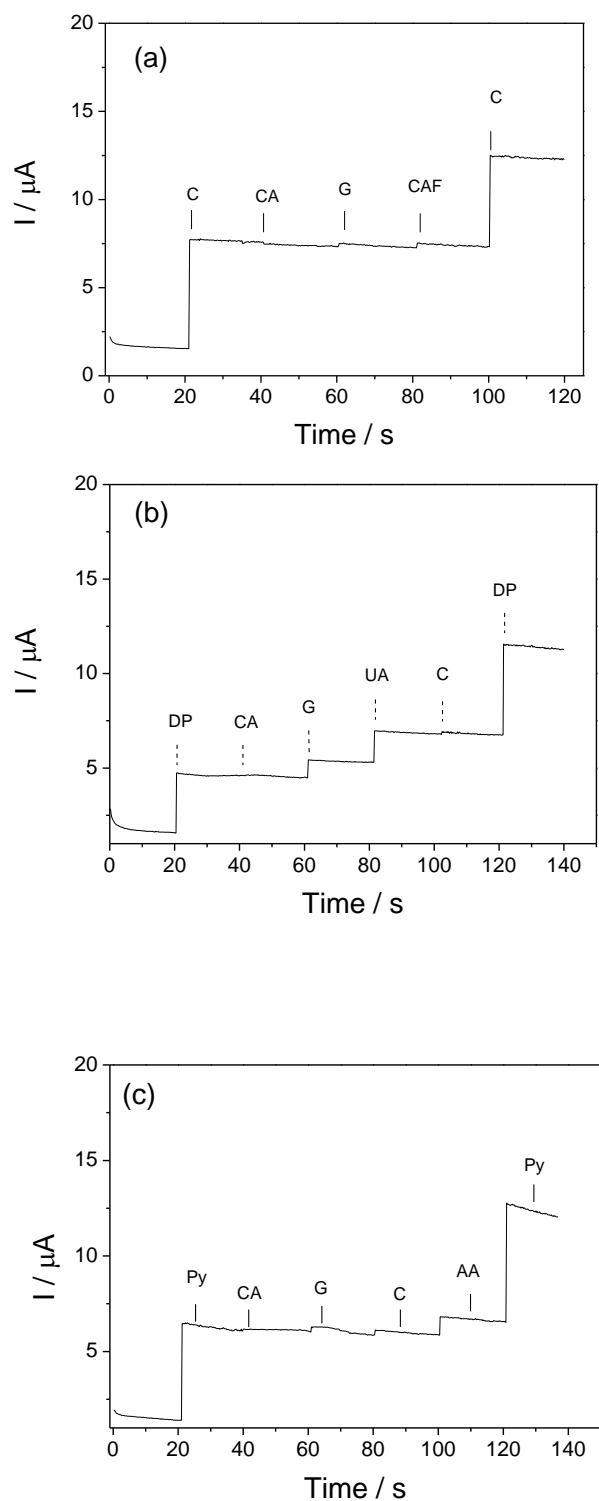


Figure S6. Amperometric response for the electrode CS-5-Ty in the presence of interferents for the three analytes, starting from 0.20 mmol L^{-1} of each analyte. The interferents were added in a 1:0.5 ratio of analyte:interferent. (a) Catechol (C), interferents citric acid (CA), glucose (G) and caffeine (CAF), (b) dopamine (D), interferents, CA, G, uric acid (UA) and CAF and (c) pyrogallol (Py) interferents, CA, G, CAF and ascorbic acid (AA).