

Supplementary Material

Biosensors Platform Based on Chitosan/AuNPs/Phthalocyanine Composite Films for the Electrochemical Detection of Catechol. The Role of the Surface Structure

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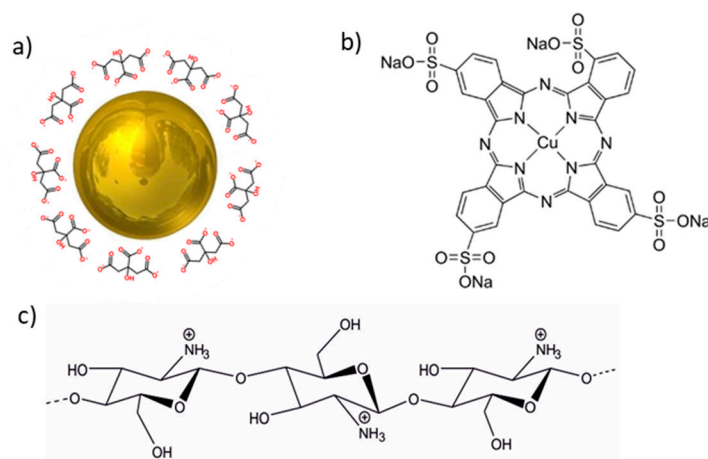


Figure S1. Materials used to form the sensing platforms: a) gold nanoparticles (AuNPs) capped with citrate; b) sulfonated copper phthalocyanine (CuPcS); and c) chitosan (CHI).

The AuNPs' size was recalculated following the Mie method, using the following equation:

$$d = \frac{\ln\left(\frac{\lambda_{spr} - \lambda_0}{L_1}\right)}{L_2}$$

where λ_{spr} is the surface plasmon resonance peak position, and $\lambda_0=512$ nm. $L_1=6.53$ nm and $L_2=0.0216$ nm⁻¹, are theoretical parameters when d is known to be $d>25$ nm. The λ_{spr} value of 533 nm was determined from the absorbance spectrum shown below. The estimated diameter of the obtained AuNPs is 54 nm.

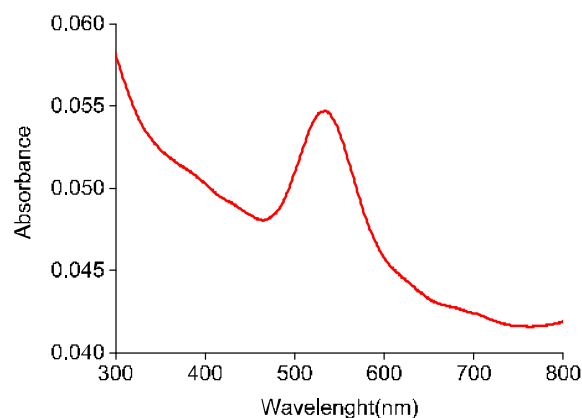


Figure S2. UV-Vis spectrum of AuNP solution.

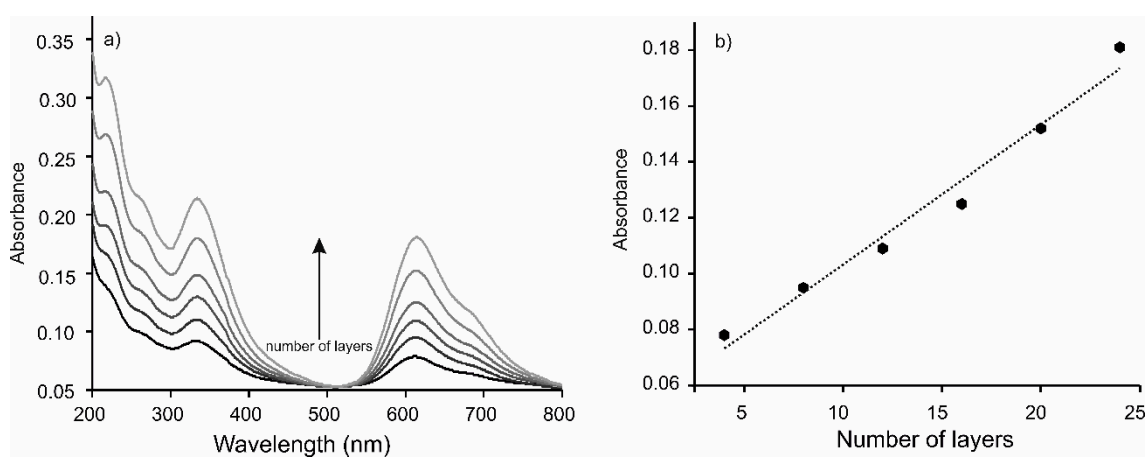


Figure S3. UV-Vis spectra of a) [(CHI)-(AuNPs)-(CHI)-(CuPcS)]₂ LbL films with increasing number of layers (n = 4,8,12,16,20); and b) correlation between the absorbance measured at 615 nm and the number of layers.

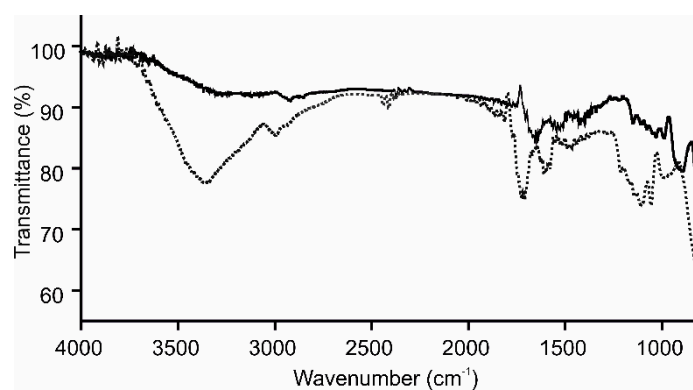


Figure S4. Comparison of the FTIR spectra of the LbL platform [(CHI)-(AuNPs)-(CHI)-(CuPcS)]₂ (solid line) and of the biosensor [(CHI)-(AuNPs)-(CHI)-(CuPcS)]₂-Lac (dotted line).

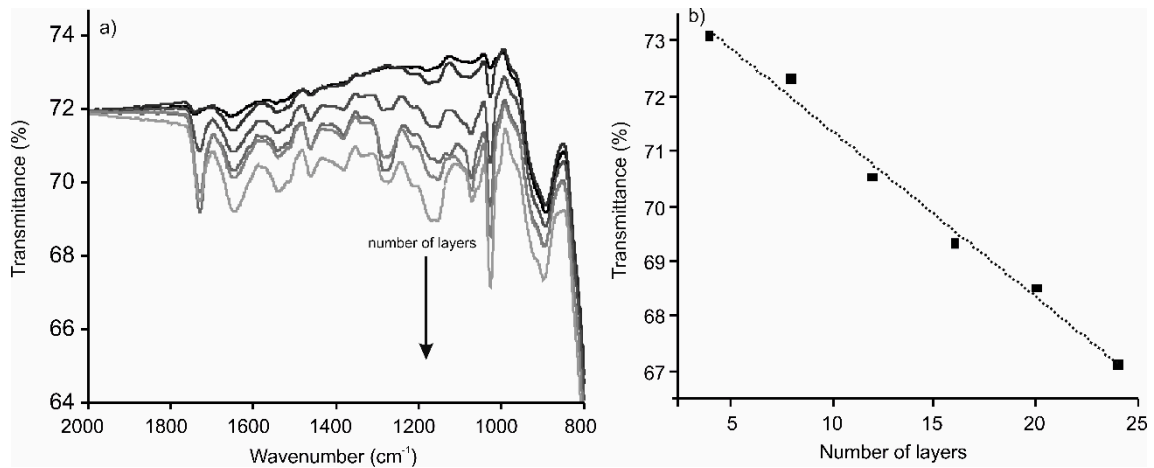


Figure S5. a) FTIR spectra of the platform [(CHI)-(AuNPs)-(CHI)-(CuPcS)]₂ with increasing number of layers (n = 4,8,12,16,20,24) and b) correlation between the transmittance measured at 1033 cm⁻¹ and the number of layers.

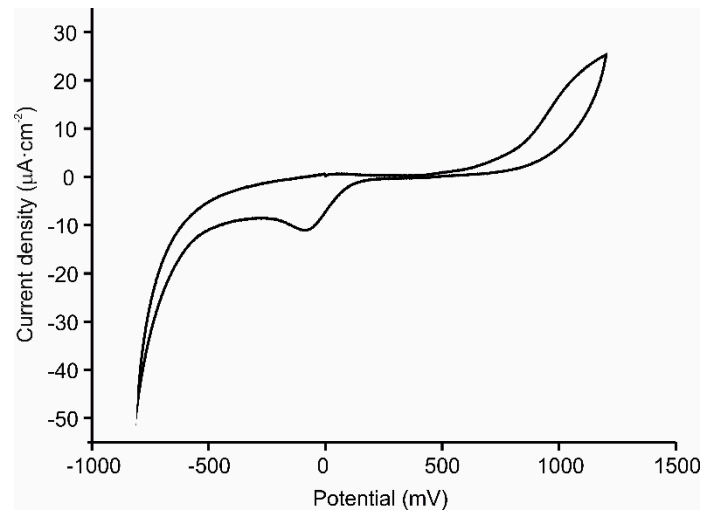


Figure S6. CV curves registered in catechol 10⁻⁴ mol·L⁻¹ in 0.01 M phosphate buffer pH 7 at a bare ITO electrode.

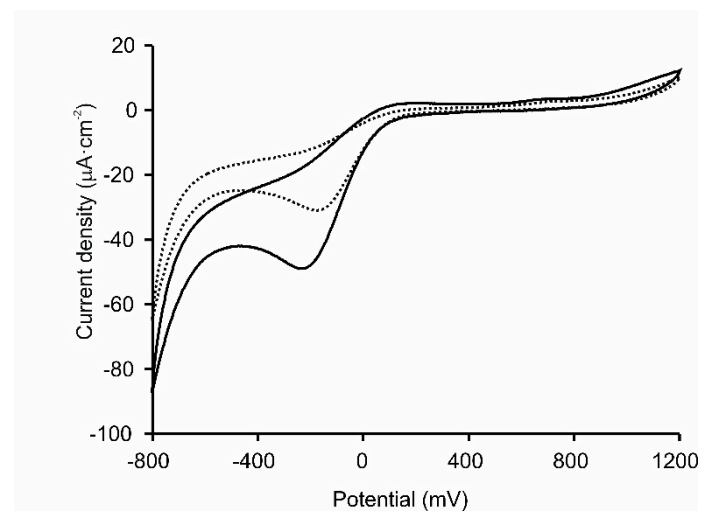


Figure S7. CV registered in catechol 10⁻⁴ mol·L⁻¹ in 0.01 M phosphate buffer pH 7 at [(CHI)-(AuNPs)-(CHI)-(CuPcS)]₂-Lac electrode, where the enzyme was cross-linked by immersion in glutaraldehyde liquid (dotted line) and exposure to glutaraldehyde vapors (solid line).



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