chemosensors

Article

Efficient Oxidase Biosensors Based on Bioelectrocatalytic Surfaces of Electrodeposited Ferrocenyl Polycyclosiloxanes—Pt Na-noparticles

Alvaro Boluda [1], Carmen M. Casado [2], Beatriz Alonso [2] and M. Pilar García Armada [1,*]

[1] Department of Industrial Chemical Engineering, Escuela Técnica Superior de Ingenieros Industriales, Universidad Politécnica de Madrid, José Gutierrez Abascal, 2, 28006 Madrid, Spain; Aboludacalvo@gmail.com,
[2] Department of Inorganic Chemistry, Universidad Autónoma de Madrid, Cantoblanco, 28049 Madrid, Spain; carmenm.casado@uam.es (C.M.C.); beatriz.alonso@uam.es (B.A.)
* Correspondence: pilar.garcia.armada@upm.es

Levich Plots of Modified Electrodes:

Citation: Boluda, A.; Casado, C.M.; Alonso, B.; Garcia Armada, M.P. Efficient Oxidase Biosensors Based on Bioelectrocatalytic Surfaces of Electrodeposited Ferrocenyl Polycyclosiloxanes—Pt Nanoparticles. *Chemosensors* **2021**, *9*, 81. https://doi.org/10.3390/chemosensors9040081

Academic Editor: Eugenia Fagadar-Cosma

Received: 9 March 2021
Accepted: 10 April 2021
Published: 16 April 2021

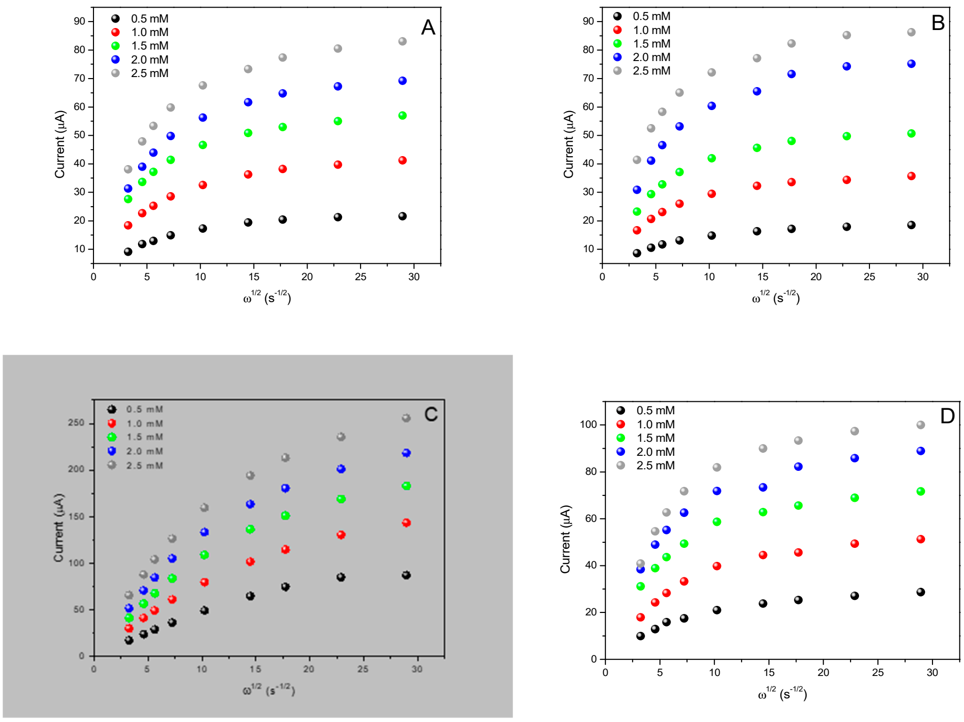


Figure S1. Levich plots for catalytic oxidation of hydrogen peroxide in deaerated phosphate buffer (pH = 7.0)/$NaClO_4$ (0.1 M) solution with (**A**) a FPP ($\Gamma = 4.24 \times 10^{-10}$ molFc/cm^2), (**B**) a MFPP ($\Gamma = 1.17 \times 10^{-10}$ molFc/cm^2), (**C**) a PtNPs/FPP (3.19×10^{-10} molFc/cm^2), and (**D**) a PtNPs/FPP (3.08×10^{-10} molFc/cm^2) modified electrodes. The working potential was 0.5 V vs. SCE.

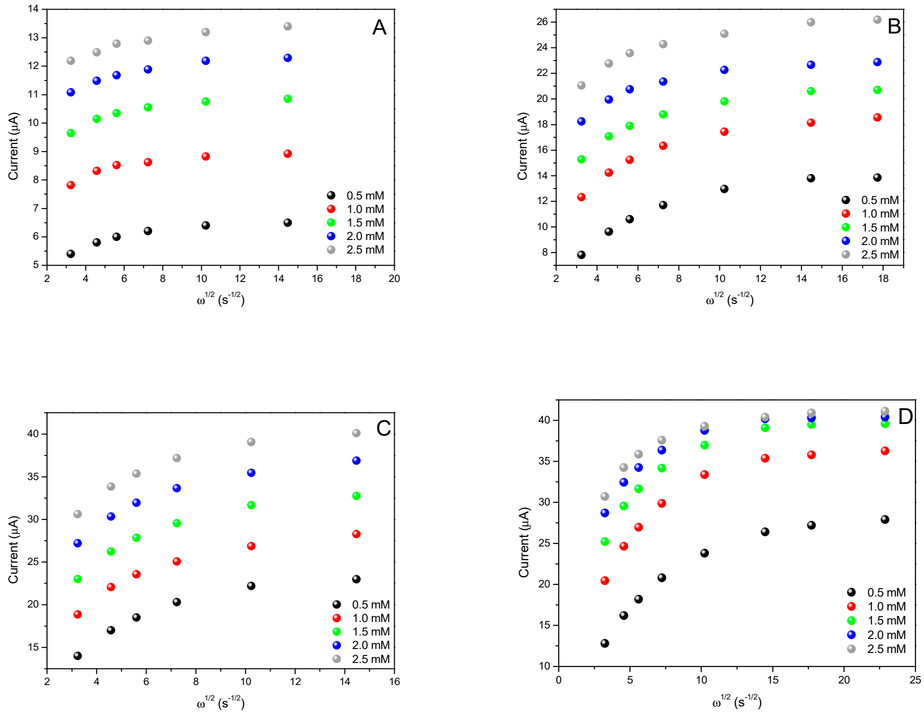


Figure S2. Levich plots for catalytic reduction of hydrogen peroxide in deaerated phosphate buffer (pH = 7.0)/$NaClO_4$ (0.1 M) solution with (**A**) a FPP ($\Gamma = 4.24 \times 10^{-10}$ molFc/cm^2), (**B**) a MFPP ($\Gamma = 4.14 \times 10^{-10}$ molFc/cm^2), (**C**) a PtNPs/FPP (3.29×10^{-10} molFc/cm^2), and (**D**) a PtNPs/MFPP (3.19×10^{-10} molFc/cm^2) modified electrodes. The working potential was −0.1 V vs. SCE.

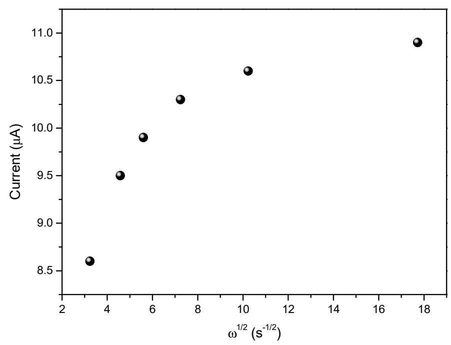
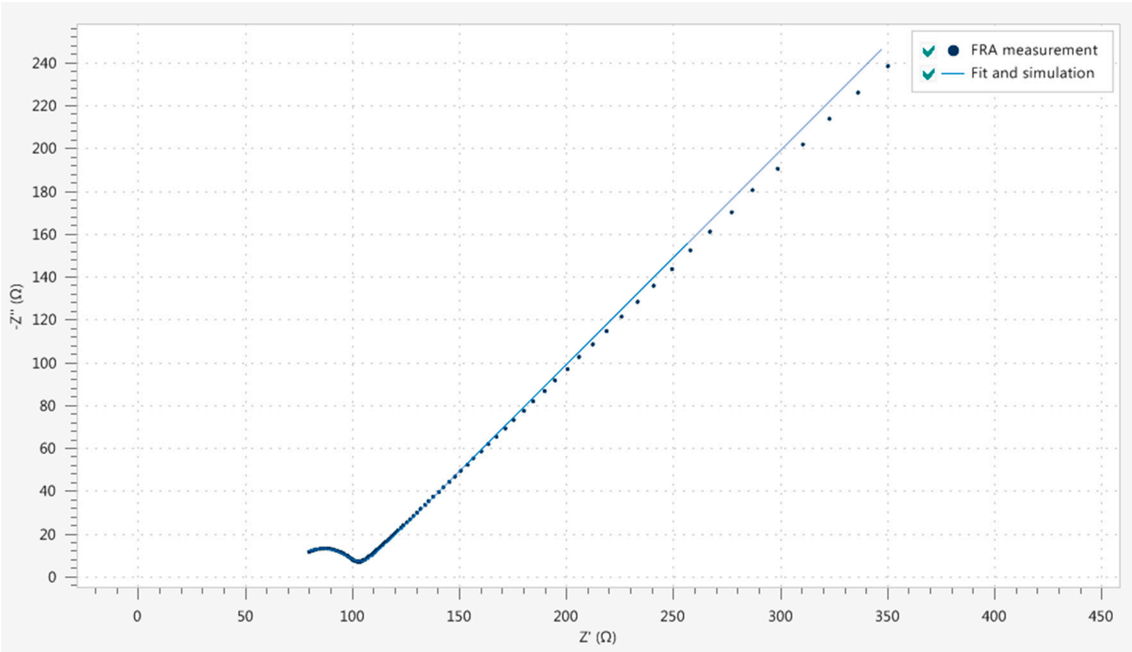
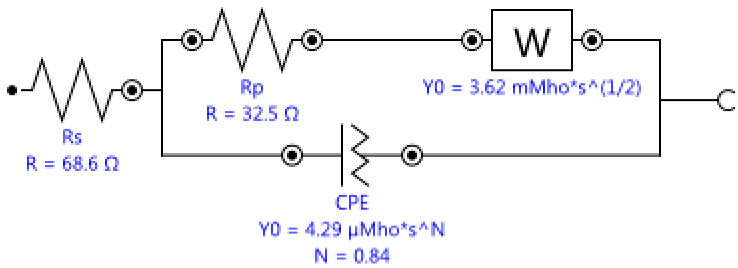


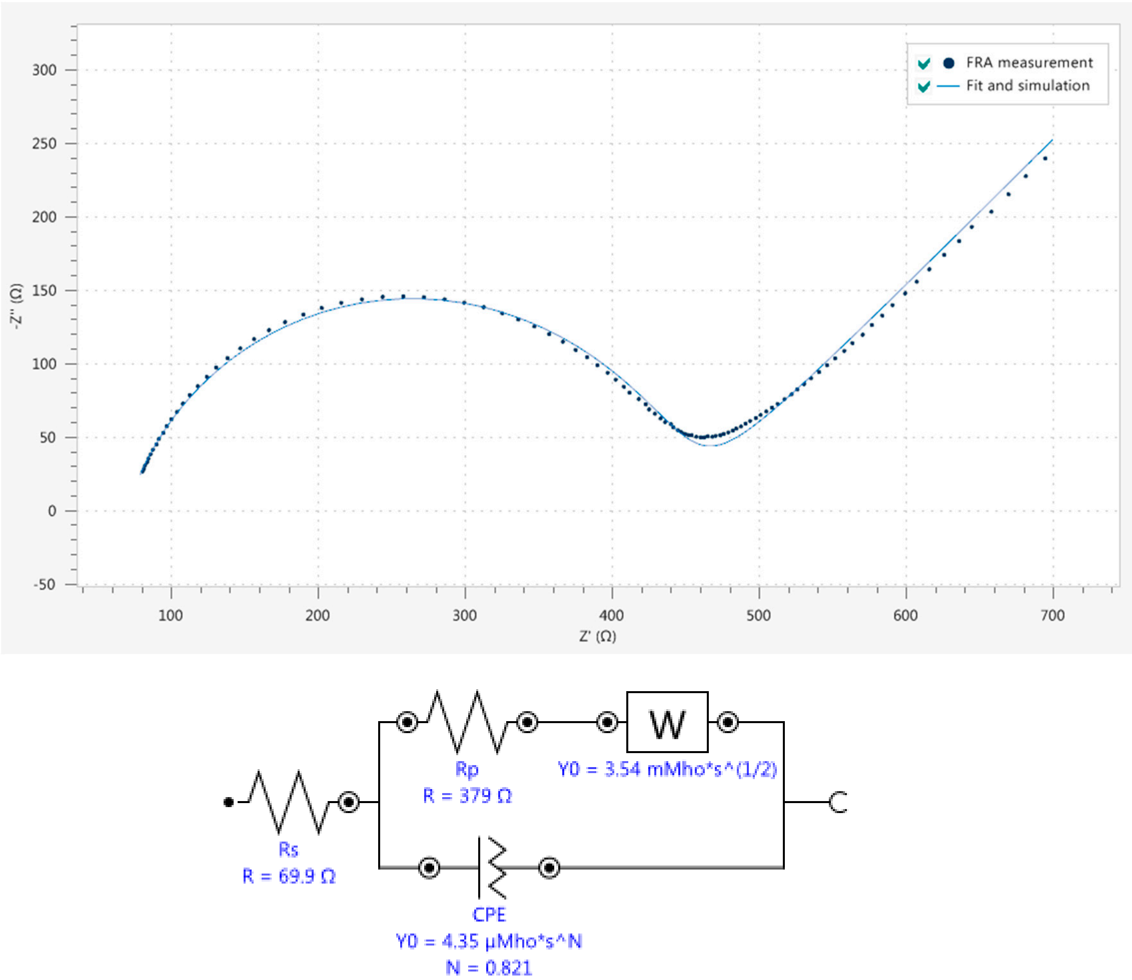
Figure S3. Levich plot for catalytic reduction of oxygen in oxygen saturated (24° C) phosphate buffer (pH = 7.0)/$NaClO_4$ (0.1 M) solution at a PtNPs/FPP ($\Gamma = 4.85 \times 10^{-10}$ molFc/cm^2) modified electrode. The working potential was -0.1 V vs. SCE.





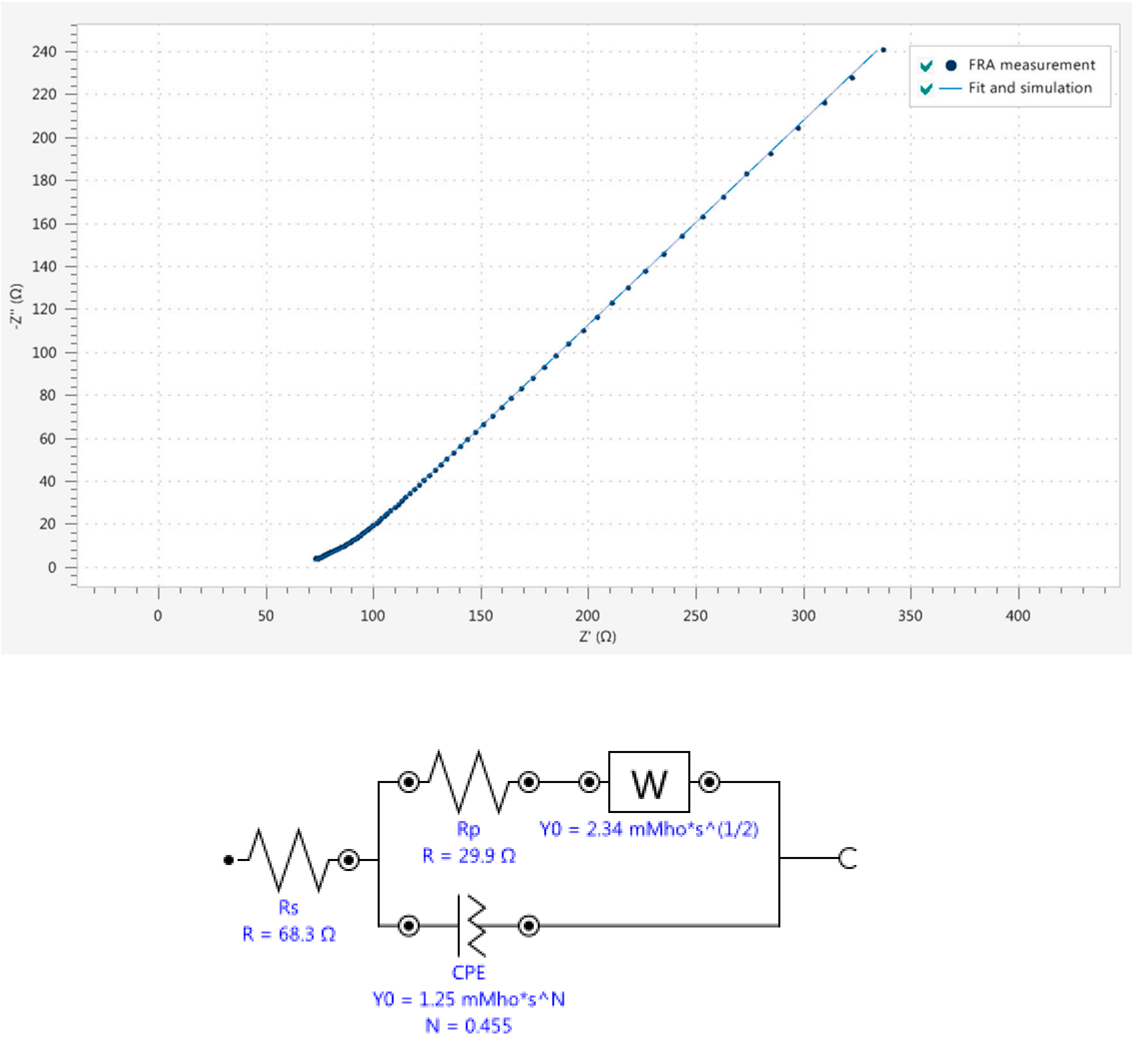
Element	Parameter	Value	Estimated Error (%)
Rs	R	68.607	1.337
Rp	R	32.484	3.056
CPE	Y0	4.2894×10^{-6}	12.561
	N	0.83957	2.029
W1	Y0	0.0036228	0.202
	χ^2	0.0044754	

Figure S4. Nyquist plot, fit and simulation, equivalent circuit and impedance data of a Pt bare electrode.



Element	Parameter	Value	Estimated Error (%)
Rs	R	69.881	0.676
Rp	R	378.69	0.330
CPE	Y0	4.3524×10^{-6}	2.568
	N	0.82075	0.381
W1	Y0	0.0035372	0.846
	χ^2	0.0141	

Figure S5. Nyquist plot, fit and simulation, equivalent circuit and impedance data of a FPP modified electrode.



Element	Parameter	Value	Estimated Error (%)
Rs	R	68.342	0.374
Rp	R	29.934	2.345
CPE	Y0	0.0012465	3.023
	N	0.45452	0.797
W1	Y0	0.0023357	1.586
	χ^2	0.0027942	

Figure S6. Nyquist plot, fit and simulation, equivalent circuit and impedance data of a PtNPs/FPP modified electrode.