

Article

Glassy Carbon Electrode Modified with C/Au Nanostructured Materials for Simultaneous Determination of Hydroquinone and Catechol in Water Matrices

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Supplementary Material

Table S1. Current and potential values for the oxidation and reduction of HQ using the different systems of CNT. (Scan rate: 50 mV).

System	Oxidation		Reduction		ΔE_p (V)
	E_p (V)	I_p (μ A)	E_p (V)	I_p (μ A)	
GCE	0.471	2.306 ± 0.04	0.139	-1.120 ± 0.03	0.332
GCE/CNT	0.328	23.26 ± 2.06	0.294	-19.99 ± 2.15	0.034
GCE/CNT-COOH	0.348	24.18 ± 2.36	0.286	-28.08 ± 2.41	0.062
GCE/CNT-NH ₂	0.336	29.57 ± 2.44	0.281	-30.33 ± 2.35	0.055

Table S2. HQ oxidation peak potentials and currents obtained using the different AuNS and CNT systems.

System	E_p (V)	I_p (μ A)	System	E_p (V)	I_p (μ A)
GCE/CNT-COOH	0.345	20.62 ± 2.41	GCE/CNT-NH ₂	0.333	40.75 ± 2.47
GCE/AuNS	0.473	2.77 ± 0.03	GCE/AuNS	0.474	2.22 ± 0.04
GCE/CNT-COOH-AuNS	0.347	24.77 ± 4.11	GCE/CNT-NH ₂ -AuNS	0.343	45.47 ± 3.06

Table S3. Current values obtained for independently modified electrodes ($n = 10$) for the oxidation of 50.0 μ M hydroquinone by differential pulse voltammetry.

Electrode	I (μ A)	CV%
GCE	1.31 ± 0.04	3.12
GCE/CNT-NH ₂	27.0 ± 2.43	9.03
GCE/CNT-NH ₂ -AuNS	22.6 ± 3.06	13.51

Table S4. Analytical figures of merit of the PLS models constructed for the simultaneous determination of HQ and CT.

Analyte modeled	HQ	CT
Data Transformation	Baseline correction + Log10	
Data Preprocessing	Mean Center	
Latent variables (k)	2	3
% Explained variance	87.4	93.9
$n_{\text{calibration}}$	21	21
Range (μ M)	1.2–125.9	6.7–176.9
SEC	19.7	21.6
SEV	21.74	23.51
r_{val}	0.869	0.884
r_{cal}	0.910	0.921
$n_{\text{validation}}$	8	8
SEP	9.9	8.4
$r_{\text{prediction}}$	0.758	0.950

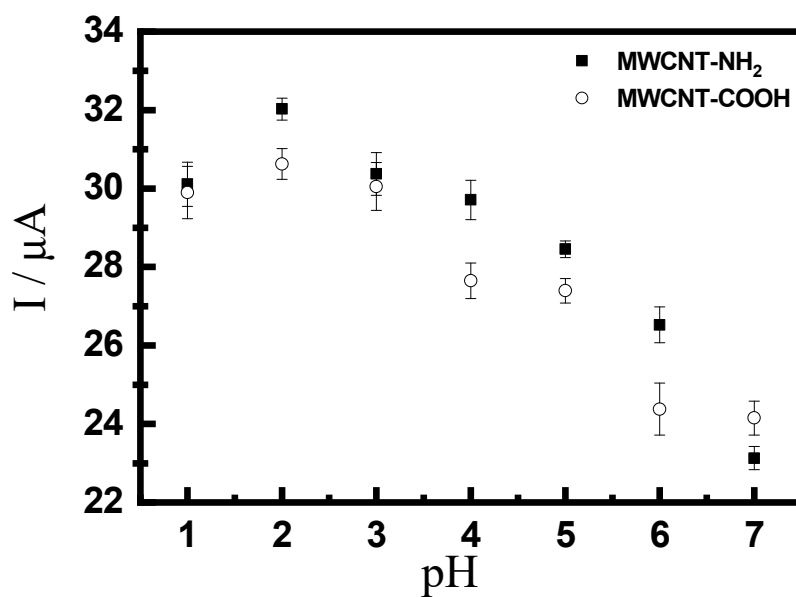


Figure S1. Effect of pH on oxidation current intensity of 0.1 mM HQ for GCE/MWCNT-NH₂ and GCE/MWCNT-COOH systems. Working conditions of Cyclic Voltammetry: Scan Speed 50 mV/s, Electrolyte: Buffer Britton-Robinson 0.1 M.

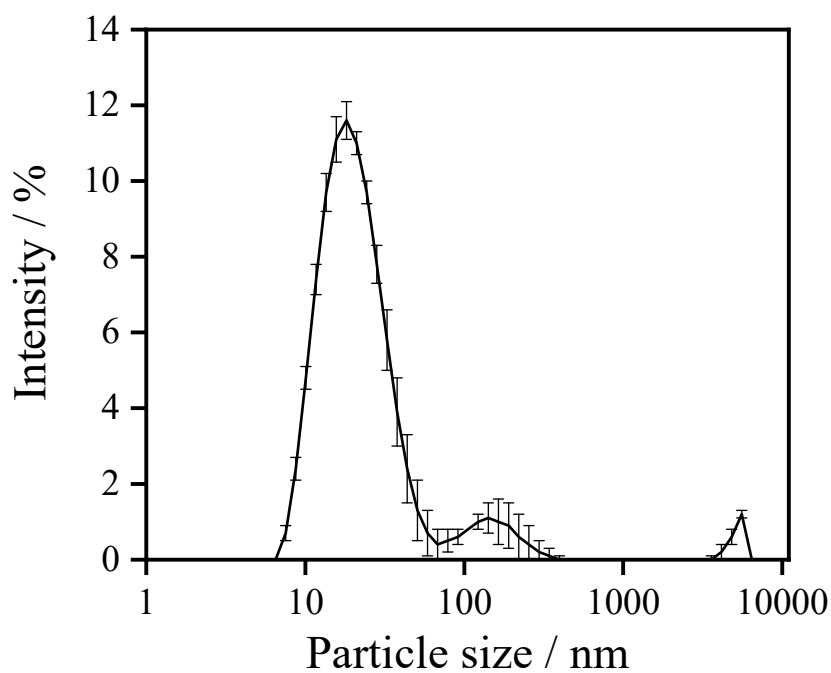


Figure S2. Size distribution of AuNS obtained using DLS.