biosensors

MDPI

Supporting Information

Sensitive and Rapid Detection of Aspartic Acid with Co_3O_4-ZnO Nanorods Using Differential Pulse Voltammetry

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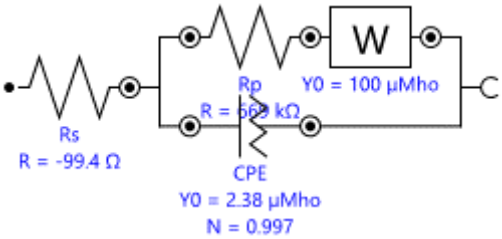
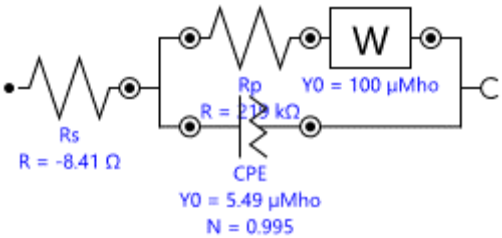
Electronic Supplemental Section

S1 (a)



Element	Parameter	Value
Rs	R	−99.356
Rct	R	6.6851×10^{5}
CPE	Y0	2.3807×10^{-6}
	N	0.99701
W1	Y0	0.0001

(b)



Element	Parameter	Value
Rs	R	−8.4112
Rp	R	2.1882×10^{5}
CPE	Y0	5.4865×10^{-6}
	N	0.99533
W1	Y0	0.0001

S2: Analytical Performance Parameters

Limit of Detection (LOD)

This was calculated using the equation;

$$LOD = \frac{3 \times SD}{\text{Slope of the calibration plot}}$$

where SD is the standard deviation of the blank response.
From our results, LOD = $3 \times 1.05 \times 10^{-6} / (0.0001) = 0.032\ \mu M$

Limit of Quantification (LOQ)

This was determined using the equation.

$$LOQ = \frac{10 \times SD}{\text{Slope of the calibration plot}}$$

$LOQ = 10 \times 1.05 \times 10^{-6} / (0.0001) = 0.11\ \mu M$

Sensitivity

This was calculated using the formula:

$$\textbf{Sensitivity} = \frac{\textbf{Slope of the calibration plot}}{\textbf{GCE surface area}}$$

Sensitivity = $0.0001\ \mu A \mu M^{-1} / 0.07\ cm^2 = 0.0014\ \mu A \mu M^{-1} cm^{-2}$

S3: Real Sample Analysis

Method used: Standard addition.

$$\text{Recovery (\%)} = \frac{Ci - Co}{Cs}$$

Where Ci is the total concentration of analyte, Co is concentration of analyte (before spike), Cs is the concentration of the spiked 2, 4-dnphz.