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Nanomolar Level Electrochemical Detection of Glycine on a Miniaturized Modified Screen-Printed Carbon-based Electrode; A Comparison of Performance with Glassy Carbon Electrode System

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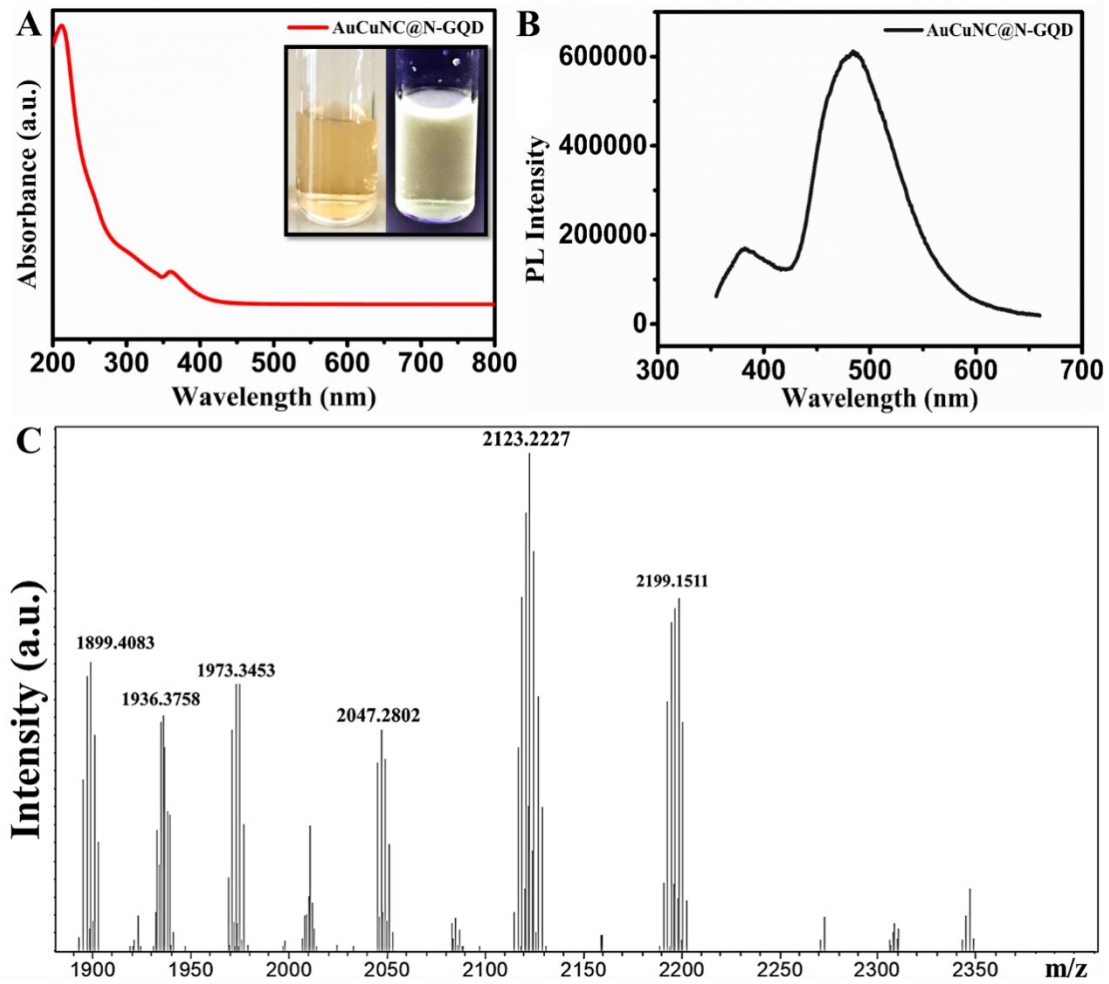

Figure S1. (A) The UV-Vis spectrum of AuCuNC@N-GQD; (Inset of (A) The digital images of the PL of the AuCuNC@N-GQD under normal and short-UV (365 nm); (B) The emission spectrum of AuCuNC@N-GQD; (C) MS-ESI-TOF mass spectra of AuCuNC@N-GQD.

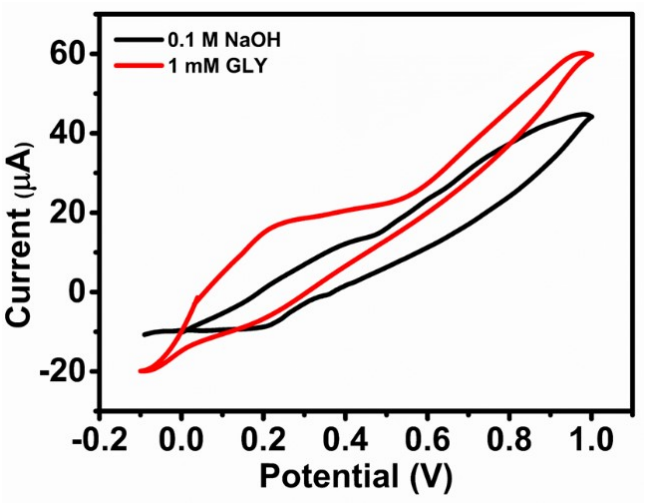

Figure S2. The CV graphs of 1 mM GLY in 0.1 M NaOH on AuCuNC@N-GQD/SPE

Sensitivity Calculation

The sensitivity of an electrode depends on the current response (I), concentration of the analyte (C) and also the area of the electrode (A) used. They are related as,

Calculation 1

$$\text{Sensitivity} = \frac{\text{Current response}}{\text{Concentration of analyte} * \text{Area of electrode}}$$

From the calibration curve,

I_1 = 2.4648 μA C_1 = 29.350 μM

I_2 = 7.3626 μA C_2 = 218.111 μM

ΔI = 4.8978 μA ΔC = 188.761 μM

Area of the electrode = 12.56×10^{-2} cm^2 (r=0.2 cm)

Sensitivity = $4.8978/(188.761*12.56\times10^{-2})$ μA μM^{-1} cm^{-2}

= 0.2065851 μA μM^{-1} cm^{-2}

Calculation 2

$$Sensitivity = \frac{Slope\ of\ the\ calibration\ curve}{Area\ of\ the\ electrode}$$

Slope of the calibration curve= 0.0259 μA/μM from LDR graph

Area of the electrode = 12.56×10^{-2} cm^2 (r=0.2 cm)

Sensitivity=$0.0259/(12.56\times10^{-2})$ $\mu A\ \mu M^{-1}\ cm^{-2}$

=0.2062102 $\mu A\ \mu M^{-1}\ cm^{-2}$

Form the calculation 1 and calculation 2 the sensitivities obtained remains same that indicate that both the equations are valid for sensitivity calculations.

LOD Calculation

$$\mathrm{LOD} = \frac{3\sigma}{\mathrm{m}}$$

σ- The standard deviation of the current responses of blank

m-Slope of Current vs Concentration graph