Electronic Supplementary Information:

Glucose Oxidase Stabilized Fluorescent Gold Nanoparticles as an Ideal Sensor Matrix for Dual Mode Sensing of Glucose

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Determination of Quantum Yield (QY)

Upon treatment with acid, GOx stabilized Au NPs result in the formation of tiny particles that exhibits strong fluorescence behaviour. GOx – FL Au NPs on exposure to UV light (365 nm) emits a yellowish green fluorescence. Quantum Yield (QY) of such fluorescent material is measured using Rhodamine B in water as a standard solution. Quantum yield of GOx – FL Au NPs in water is calculated using the following equation:

$$\Phi = \Phi_{st} (I_x/I_{st}) (\eta^2/\eta^2_{st}) (A_{st}/A_x)$$

Where Φ is the quantum yield, Φ_{st} is the standard quantum yield, I_x is the measured integrated emission intensity, I_{st} measured emission intensity for standard solution, η is the refractive index (1.33 for water), and A_x is the optical density of the sample and A_{st} is optical density of the standard sample. Here standard sample, the reference fluorophore of Rhodamine B in water has a known QY of 0.31. In our case, QY of GOx – FL Au NPs is determined to be 5%.

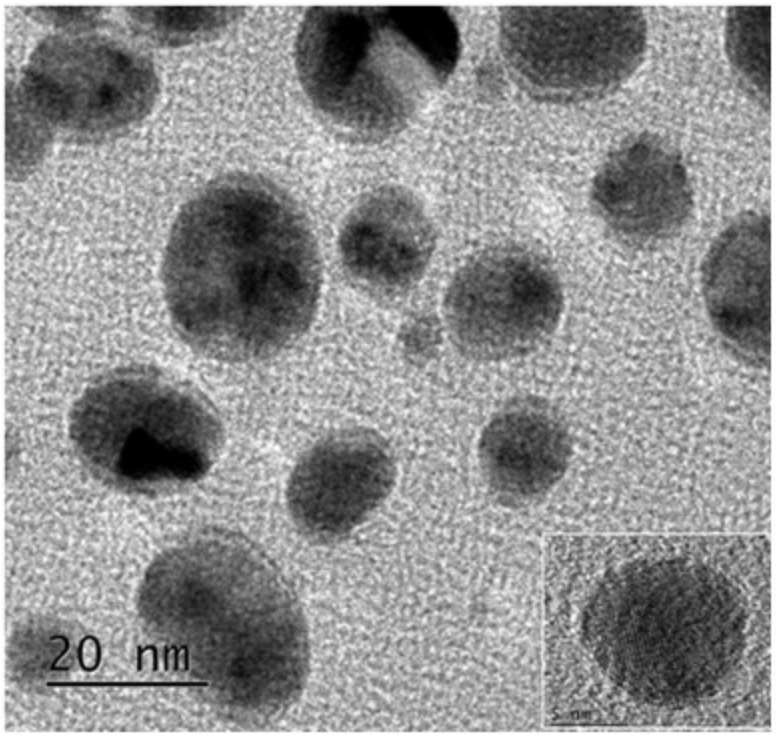

Figure S1. TEM image of GOx stabilized FL Au NPs and inset displays a lattice fringe pattern formation.

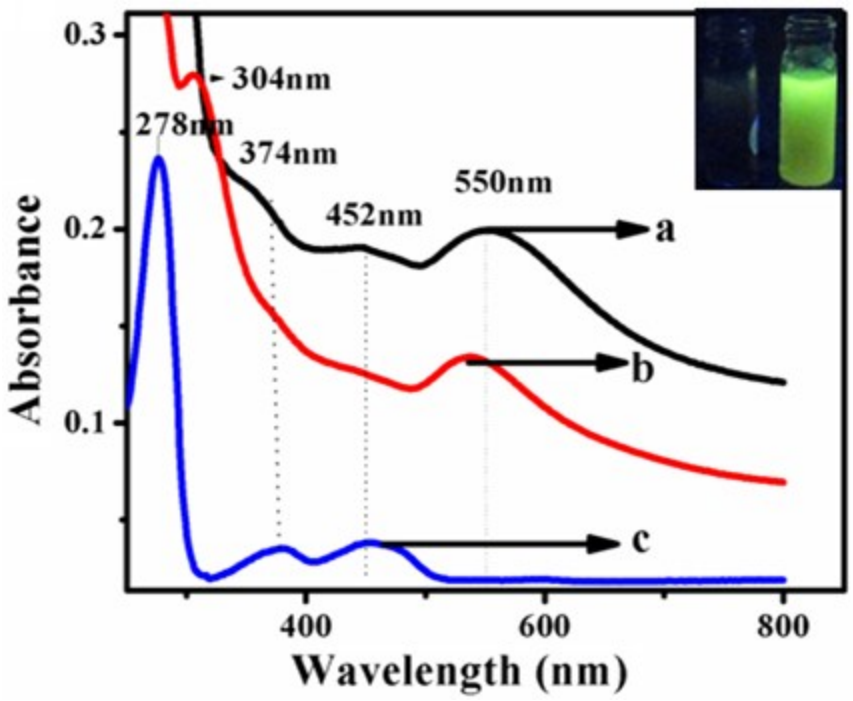

Figure S2. UV−Vis spectra of (a) as-prepared GOx – Au NPs (black line), (b) GOx – FL Au NPs (red line) and (c) the enzyme, GOx alone in PBS (pH = 7.0) buffer solution. Inset: Photograph of UV irradiated GOx – Au NPs solution before and after the acid treatment, exhibiting a bright yellowish green fluorescence in the case GOx – FL Au NPs.

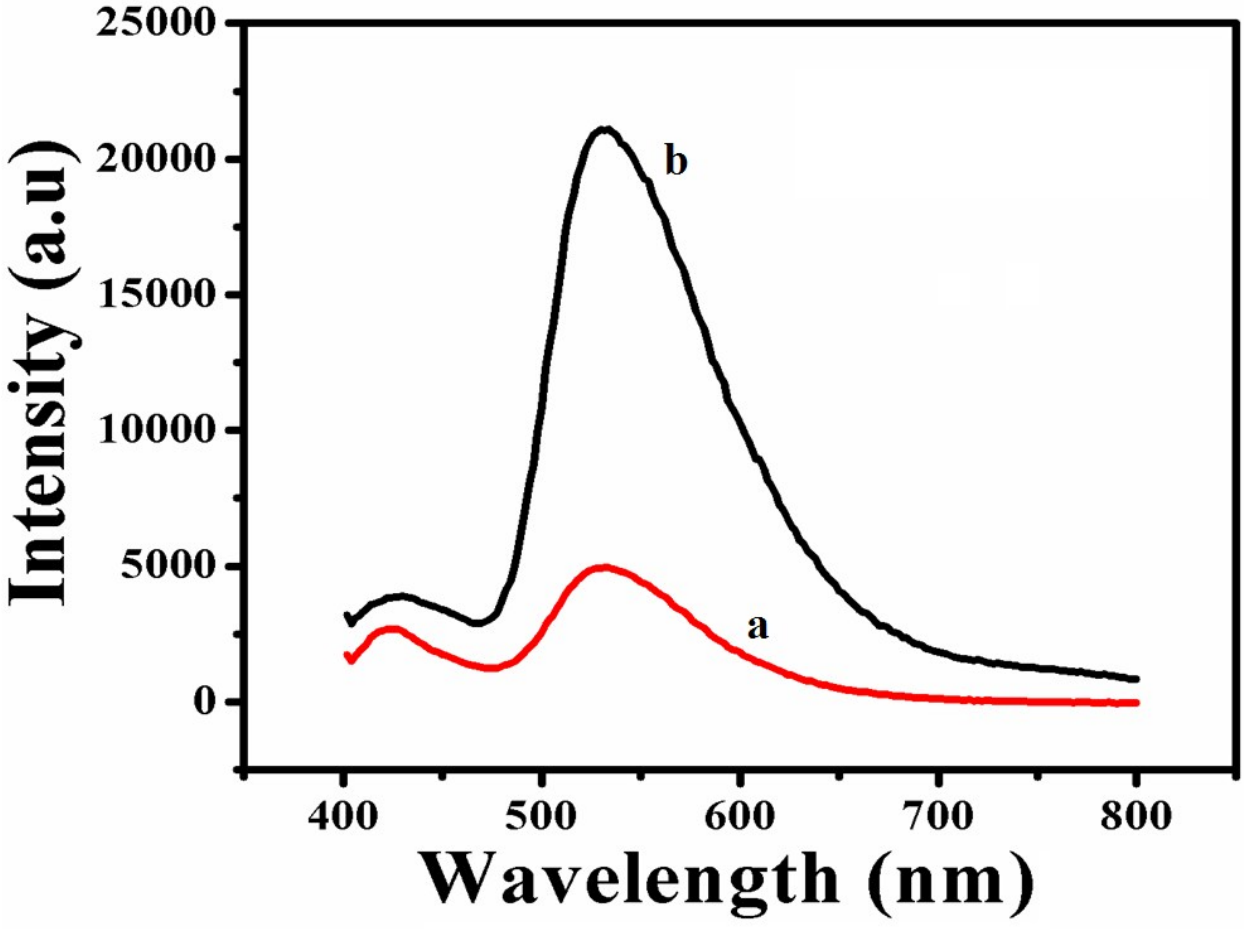

Figure S3. PL emission spectra recorded at an excitation wavelength of 360 nm for the enzyme, GOx alone (a) and GOx stabilized FL Au NPs (b).

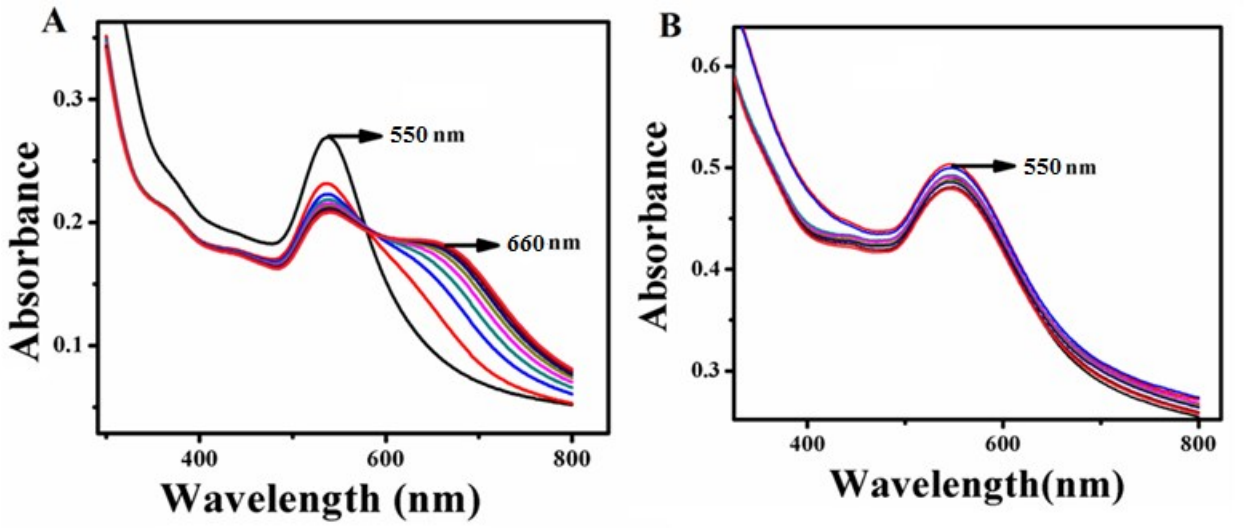

Figure S4. UV – Vis spectra of GOx stabilized FL Au NPs (A) and GOx – Au NPs (B) for the addition of various concentrations of cysteine.

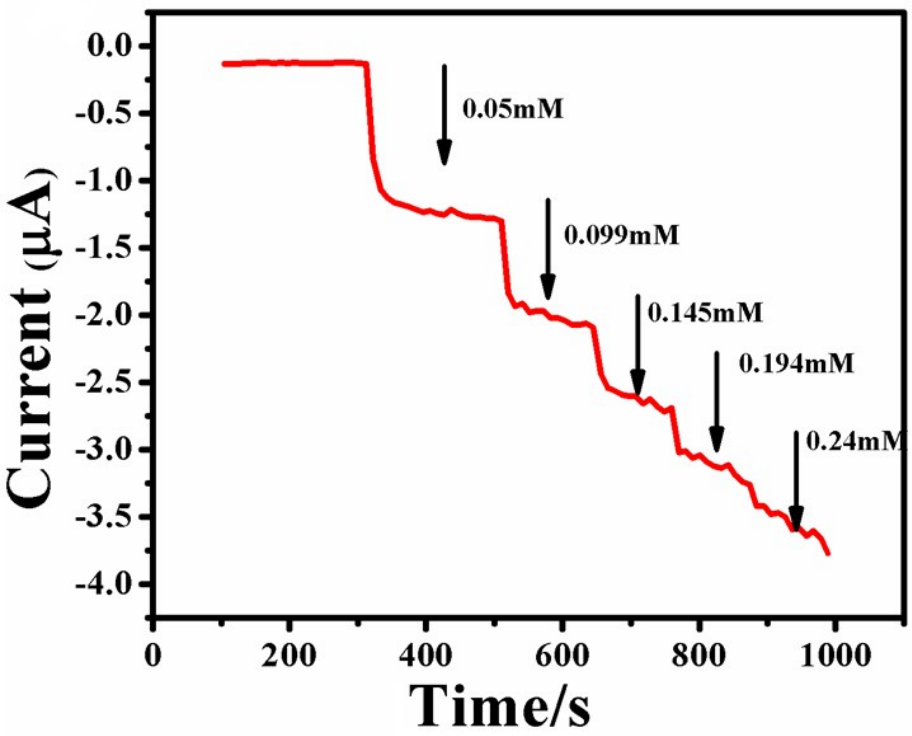

Figure S5. Chronoamperometric (i vs. t plot) response corresponding to various concentrations of glucose addition onto GOx – Au NPs modified GC electrode in PBS (pH = 7.0) buffer solution under N_2 atmosphere.

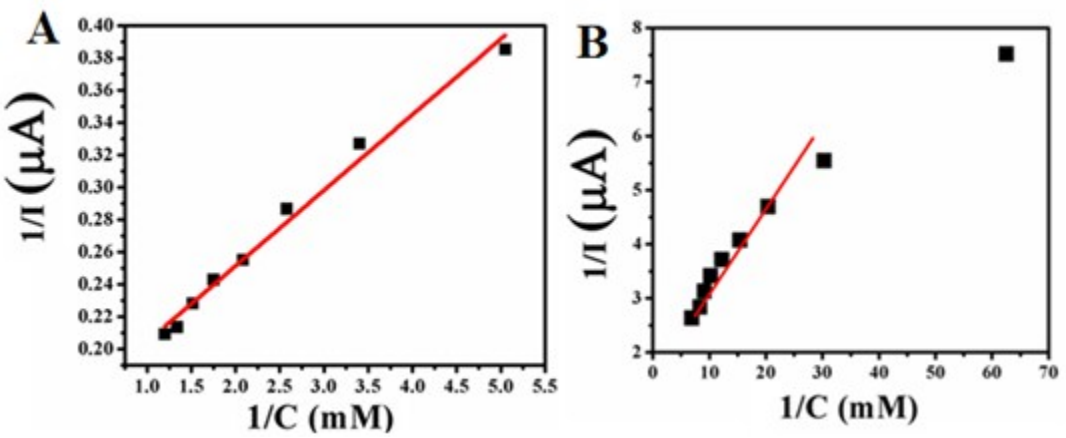

Figure S6. Lineweaver – Burk plot of GOx – Au NPs (A) and GOx – FL Au NPs (B) modified GC electrode for glucose addition. Data points were obtained from Fig. 6B and Fig. 7B respectively.