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Supporting information for:

Synthesis of gold nanoparticles supported on functionalized nanosilica using deep eutectic solvent for electrochemical enzymatic glucose biosensor

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Table S1. Zeta-potential values.

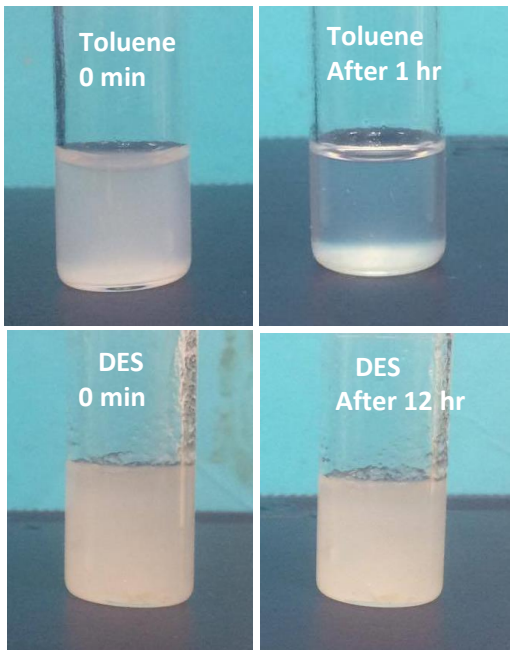


Figure S1.Comparison of the dispersibility of SiO_2 nanoparticles in DES and toluene.

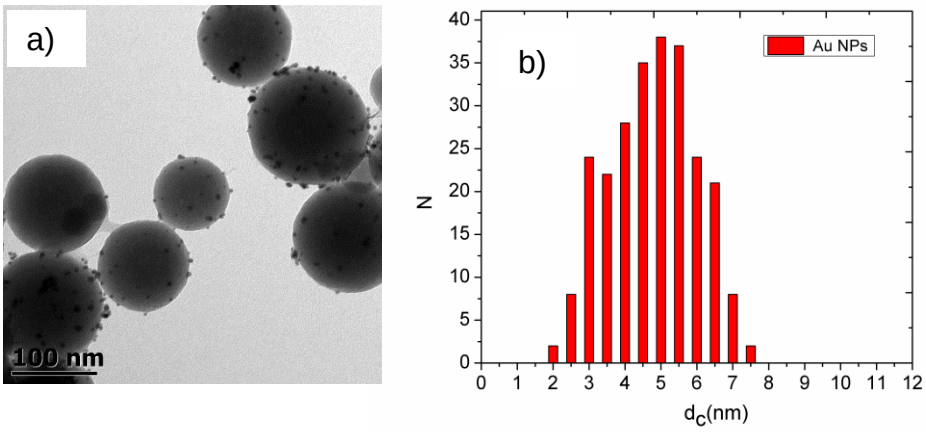
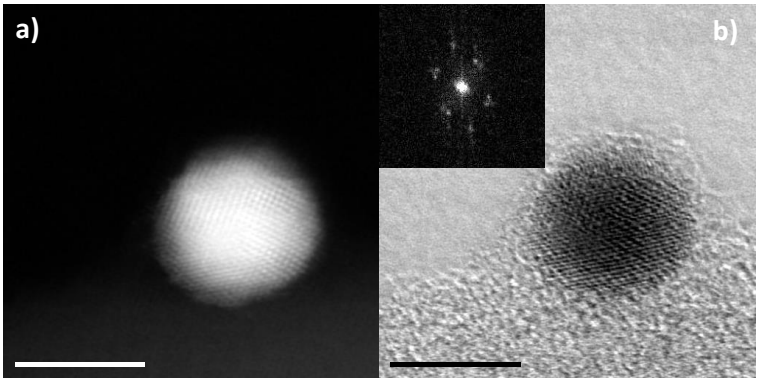
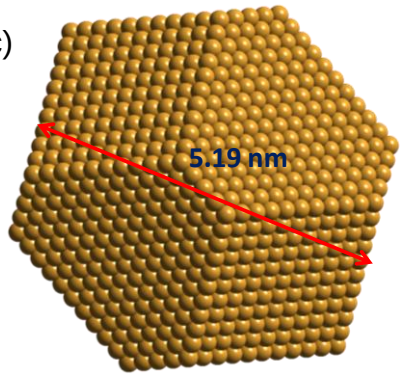


Figure S1. (a) TEM image and (b) corresponding size distribution of the Au NPs (on the SiO_2 spheres). The average core diameter was found to be 5.2 ± 0.7 nm.

S2. Characterization of Au NPs



c)



Number of atoms	8115
N of surface atoms	1706 (21.02%)
Size of the nanoparticle	5.19 nm

Figure S2. a, b) STEM image of the single Au NPs. Inset b: corresponding FFT pattern. C) Structure of the AuNPs by simulation and estimated number of atoms and number of atoms in the surface of single NPs as shown in the table.

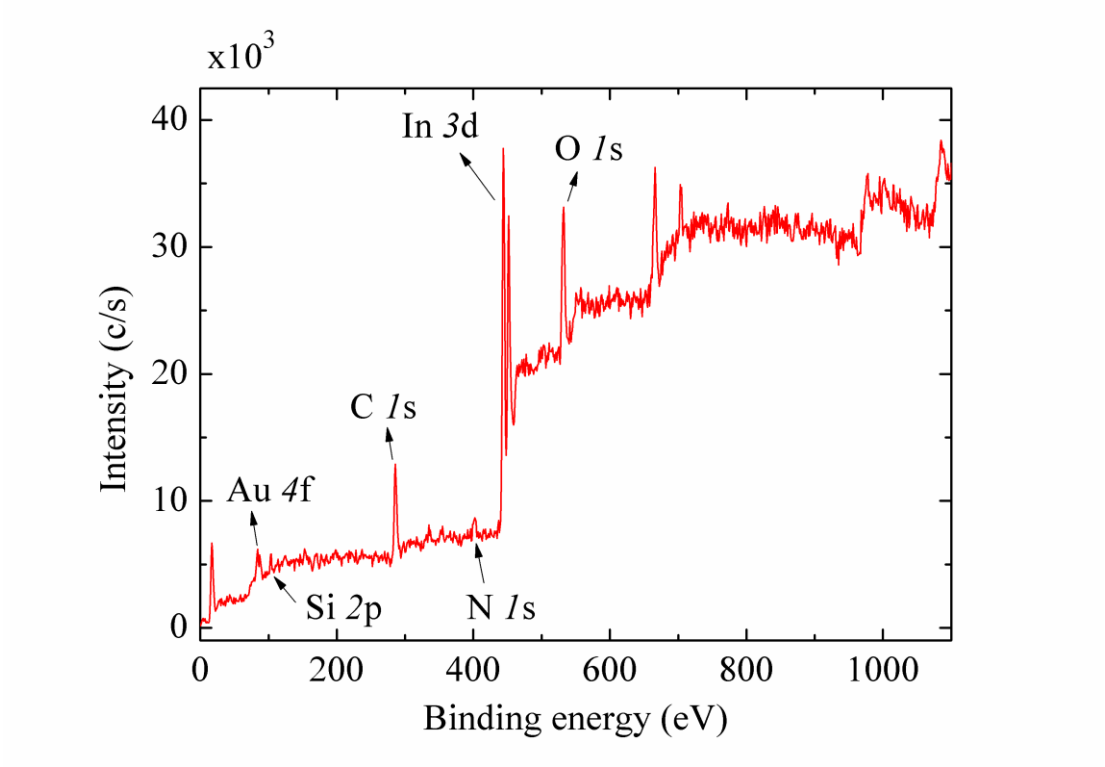


Figure S4. XPS survey spectra of the amine functionalized Au-SiO_2NP, sample was supported on the indium sheet for make XPs the measurement and *AAnalyzer* Software is used to fit the graphs.

Table S1. Zeta-potential values of SiO_2 and Au@SiO_2 NPs with varied surface functional steps. The values are average ± standard deviation (SD) in 4 measurements. All the measurements were carried out in DI water.

Sample	**Zeta-Potential (mV)**
SiO_2NPs	-38.62±1.089
SiO_2NPs-NH_2	24.972±0.47
SiO_2NPs-Au	1.3764±0.82
Au-SiO_2NPs/NH_2	1.432±0.24
Au-SiO_2NPs/NH_2/ GA linker	1.894±0.23
Au-SiO_2NPs/GOx (enzyme)	-4.41±0.41

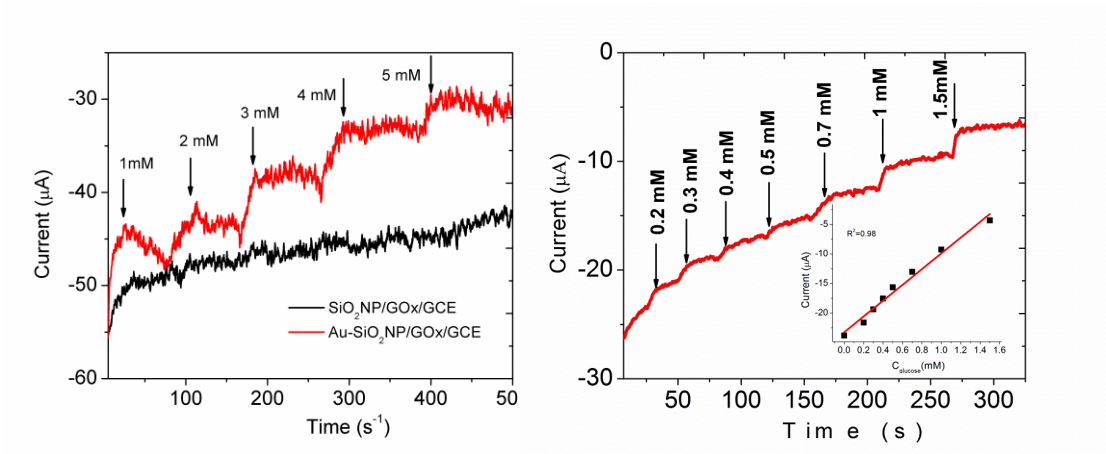


Figure S5. (a) Amperometric response of the Au-SiO_2NP/GOx/GC electrode (red), by successive addition of 1 mM glucose, and SiO_2NP/GOx/GC electrode (black), respectively. (b) Amperometric response to the Au-SiO_2NP/GOx/GC electrode with the addition of low glucose concentration (0.2- 1.5 mM). Inset showing the calibration plot between 0.2 to 1.5 mM ranges.

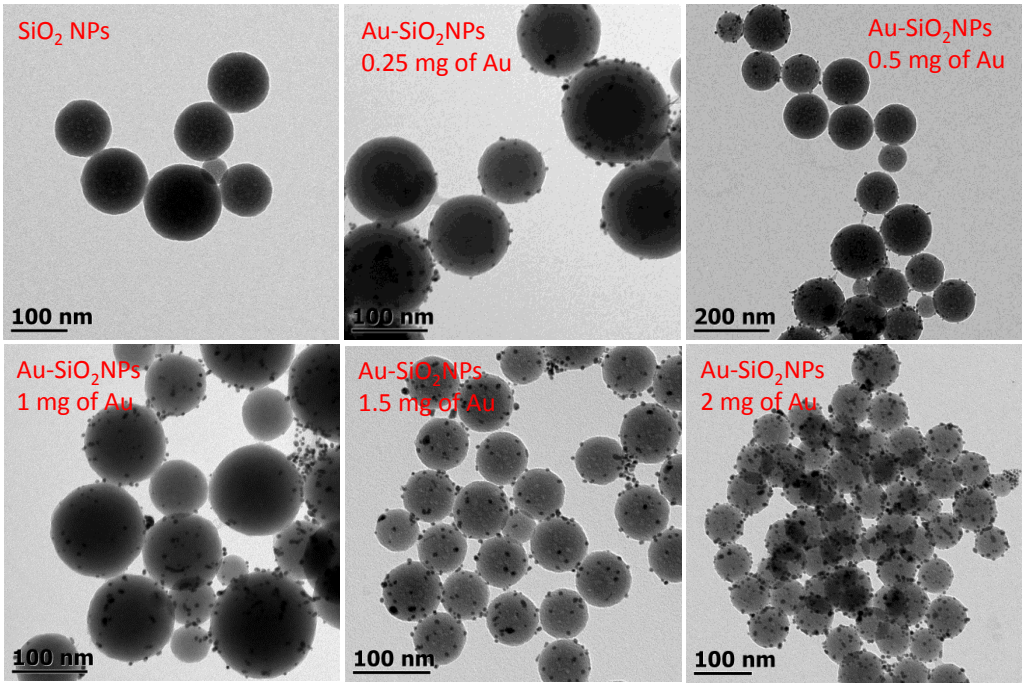


Figure S6. TEM images of bare SiO_2, Au-SiO_2 nanoparticles with increasing AuNPs loading (0.25, 0.5, 1, 1.5, and 2 mg/ 5ml of DES)

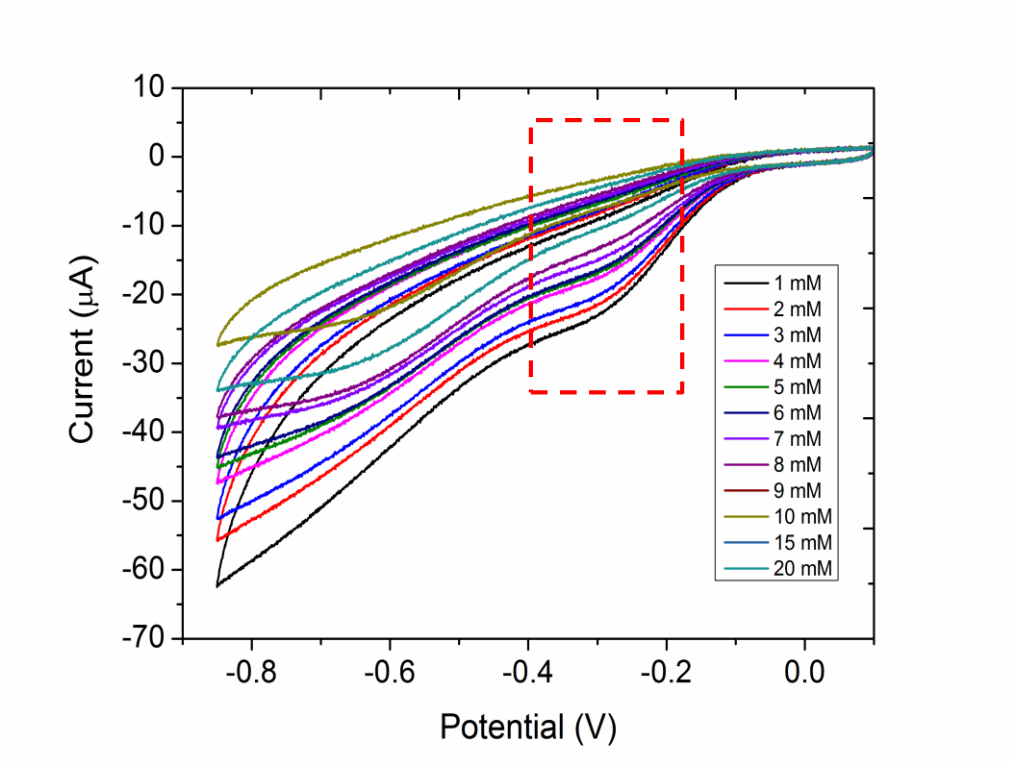


Figure S7. CVs of Au-SiO_2/GOx/GCE modified electrode fabricated using higher GOx immobilization of 25mg/ml with various glucose concentrations in 0.1 M of PBS under O_2-saturated condition. Scan rate 50 mVs^{-1}.

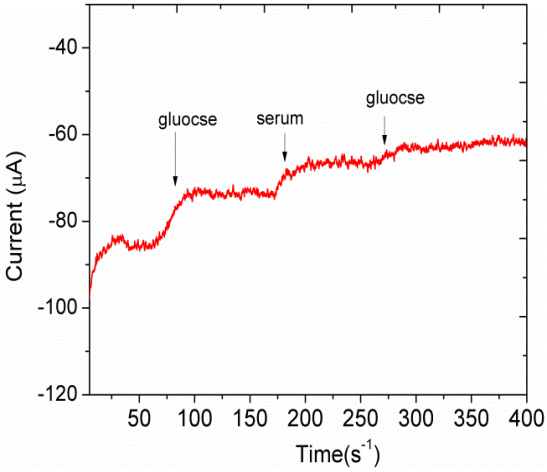


Figure S8. Amperometric response of an Au-SiO_2 NPs/GOx/GCE electrode to glucose and human serum samples at fixed potential of 0.5 V.