

Electronic Supporting Information

Facile Detection of Glucose in Human Serum Employing Silver-ion-guided Surface-enhanced Raman Spectroscopy Signal Amplification

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1. Preparation and Modification of AgNPs

AgNPs were synthesized using Lee's method. AgNO_3 (0.018 g) was dissolved in 100 mL of water, and the solution was boiled under a vigorous stirring condition. A sodium citrate solution (1 w%, 2.0 mL) was added to the aforementioned solution. The mixed solution was then kept boiling for ca. 1 h. Next, the solution was allowed to cool to room temperature with continuous stirring. As characterized by TEM images, the average size of the Ag NPs was 50-60 nm. The UV-vis absorption spectra show that the maximum absorption wavelength of these Ag NPs was 422 nm and a red shift of 5 nm was observed after linking with cysteamine, demonstrating that the AgNPs were successfully modified with the cysteamine.

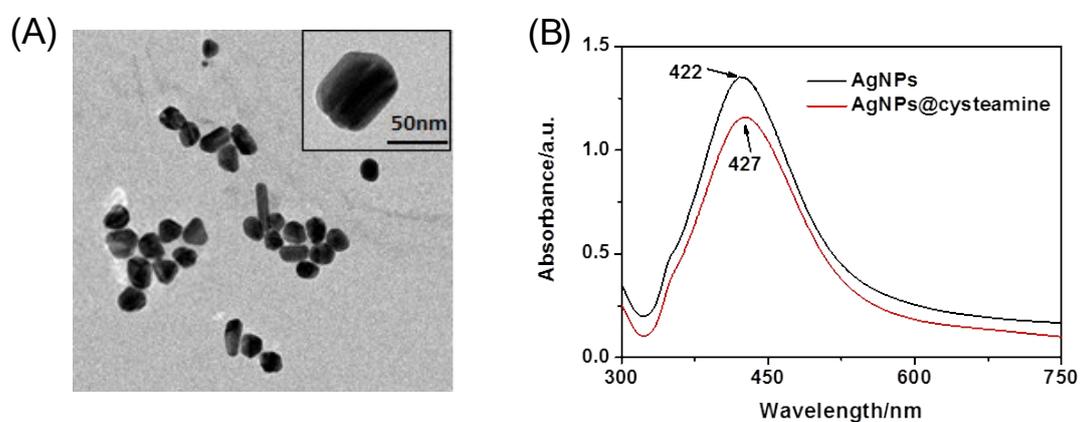


Figure S-1. (A) TEM image of the AgNPs. (B) UV-vis spectra of Ag NPs (black) and cysteamine-functionalized AgNPs (red).

2. SERS measurements

SERS spectra from the sensor of AgNPs assembling on the surface of an Au wafer@4-ATP with and without the addition of $1 \mu\text{M}$ Ag^+ were recorded; the results are shown in Figure S-2.

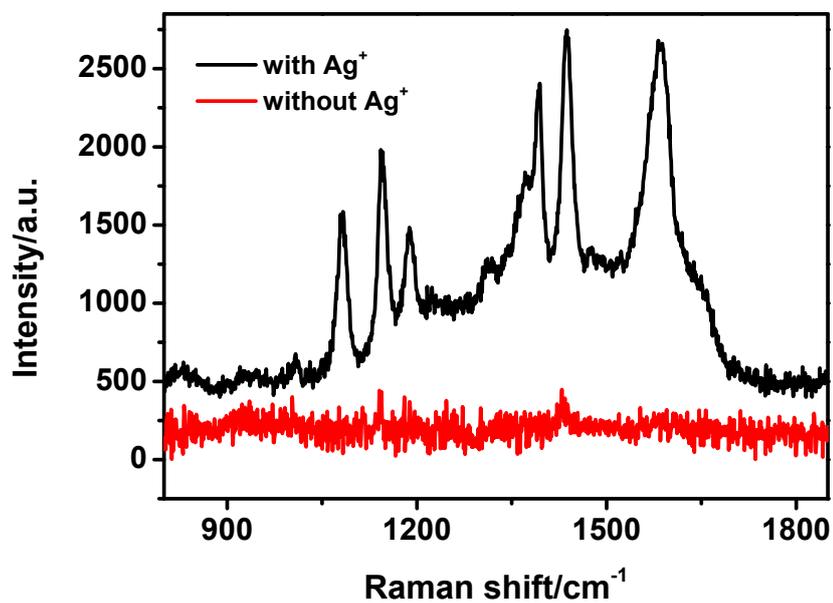


Figure S-2. SERS spectra of 4-ATP from the sensor with and without the addition of $1 \mu\text{M}$ Ag^+ ions

Spectra analysis and vibrational band assignments

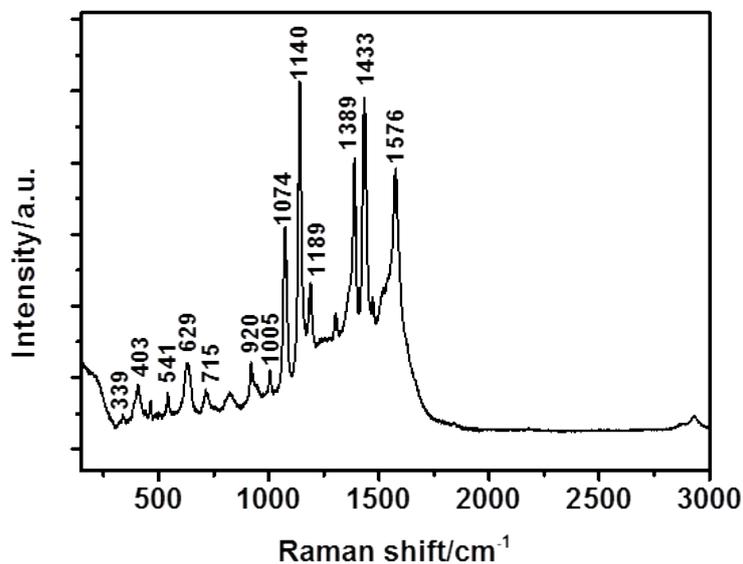


Figure S-3. SERS spectra from the constructed sensor with 1 mM Ag⁺ ions.

Table S-1. Vibrational frequencies and assignments

Assignment	Raman shifts (cm ⁻¹)
γ (N-Ag-N)	339
β (CC)	629
β (CC)+ γ (C-S)	715
α (CC)+ γ (CC)	1005
β (C-H)	1074
Ring breathing/ C-H	1140
β (C-H)	1189
γ (CC)	1389
β (C-H)	1433
γ (CC)	1576

α deformation, γ stretching, β bending

SERS measurements of 4-ATP at different Ag^+ ion concentrations was carried out, as shown in Figure S-4.

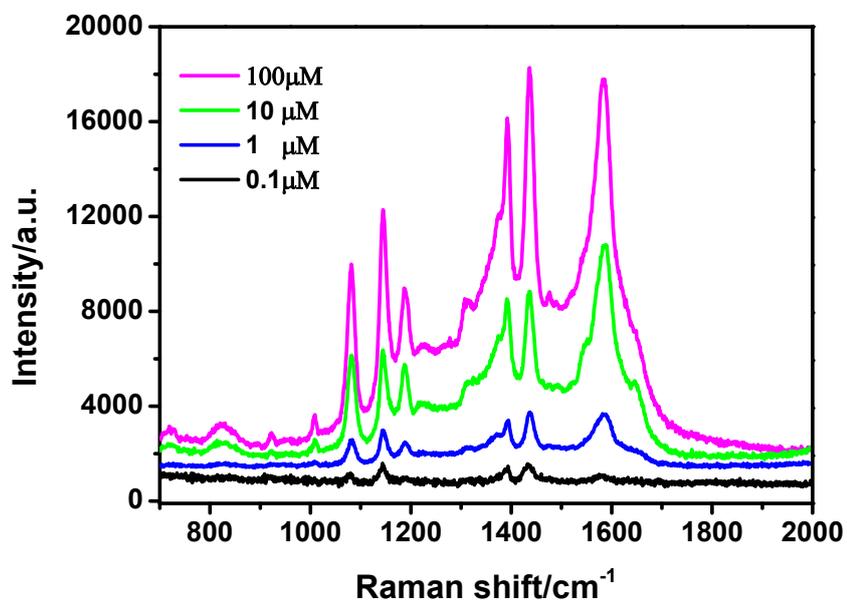


Figure S-4. SERS spectra from the sensor with the addition of different concentrations of Ag^+ ions