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Supporting Information

Rapid Colorimetric Glucose Detection via Chain Reaction Amplification of Acrylic Functionalized Ag@SiO2 Nanoparticles

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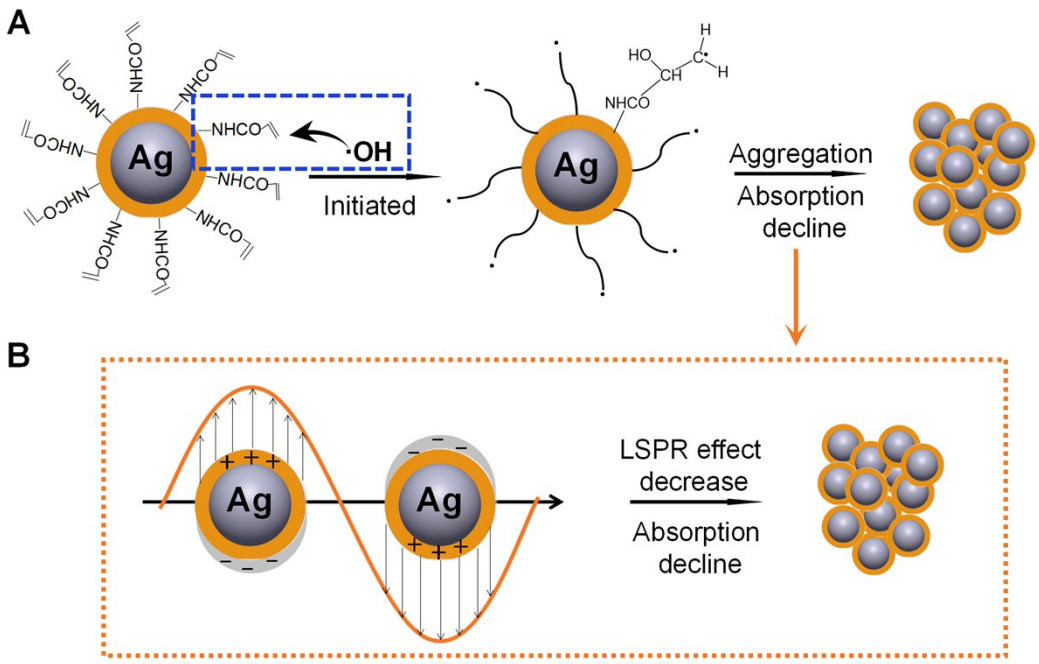

Fig. S1 Schematic illustration of colorimetric detection using polymerization-based signal amplification, which is (A). the chain reaction amplification mechanism combined with (B). the LSPR effect.

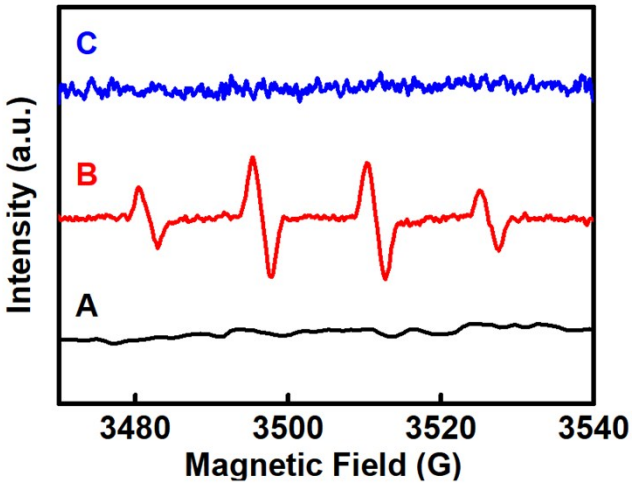

Fig. S2 The ESR spectra of ·OH radicals in different testing systems: A). Glucose/GOx/DMPO; B). Glucose/GOx/Fe^{II}/DMPO; C). Glucose/GOx/Fe^{II}/acrylic acid-functionalized Ag@SiO_2 NPs/DMPO. Testing conditions: 1.8 M glucose, 0.2 M GOx, 0.28 M $FeCl_2$, acrylic acid-functionalized Ag@SiO_2 NPs (100 μL), and DMPO (20 μL).

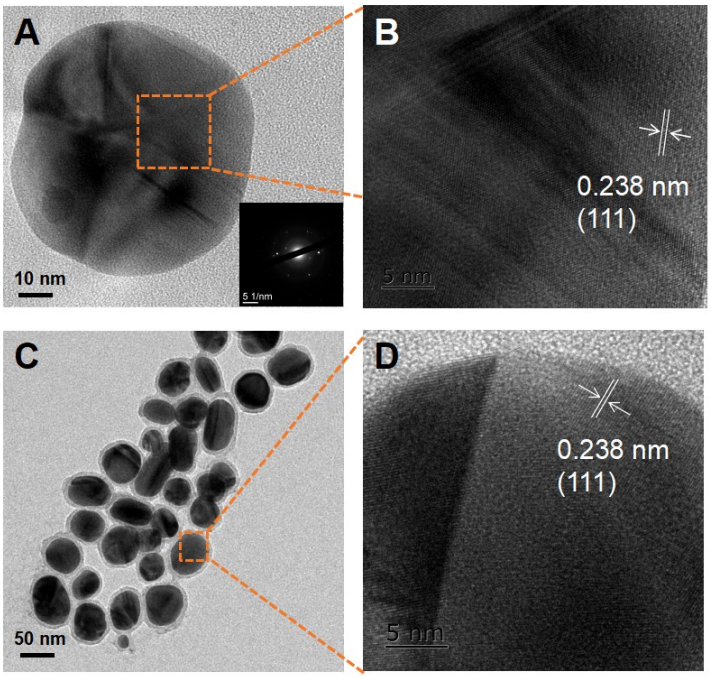

Fig. S3 The TEM image of (A) Ag NPs and (C) acrylic acid-functionalized Ag@SiO_2 NPs. The high resolution TEM image of (B) Ag NPs and (D) acrylic acid-functionalized Ag@SiO_2 NPs. It was clearly seen that AgNPs were highly crystalline with lattice fringes of 0.238 nm, which was attributed to the Ag (111).

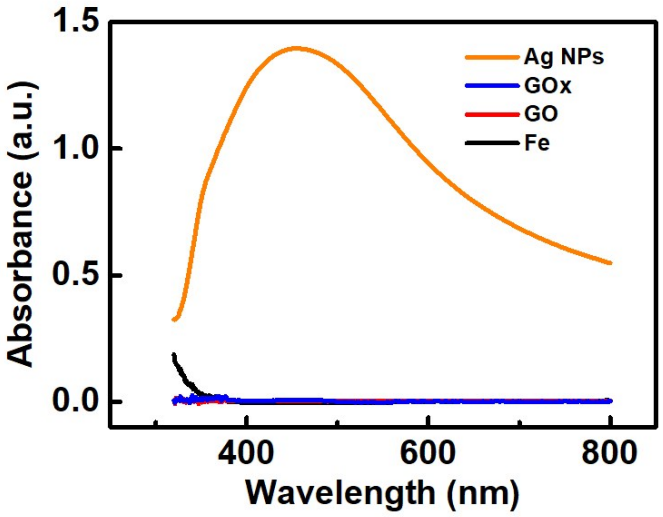

Fig. S4 UV-visible spectra of (black) Fe^{II} ions, (red) GO, (blue) GOx and (orange) acid-functionalized Ag@SiO_2 NPs.

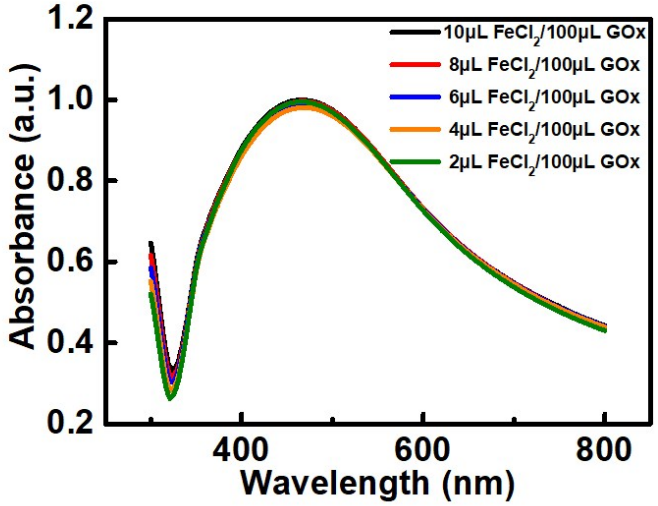

Fig. S5 Time-resolved UV-visible spectra of sensor system without glucose under identical conditions.

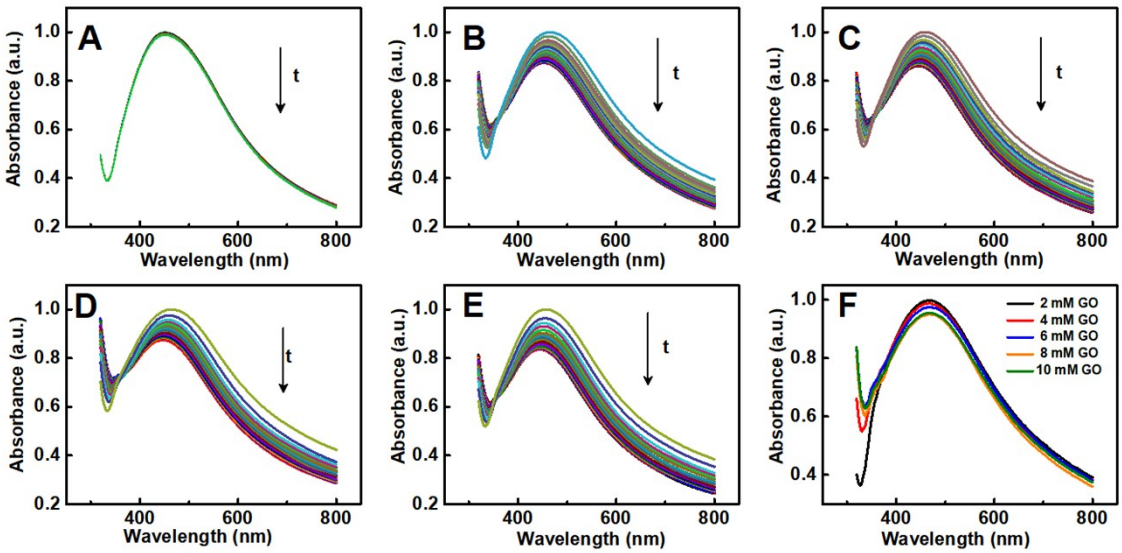

Fig. S6 Time-resolved UV-visible spectra of sensor system with 2 μL(A), 4 μL(B), 6 μL(C), 8 μL(D), 10 μL(E) $FeCl_2$ salt under identical conditions. The test interval time was 3 minutes. (F) UV-visible spectra of sensor system with 20 μL $FeCl_2$ salt for 100 μL glucose in range of 2 to 10 mM under identical conditions.

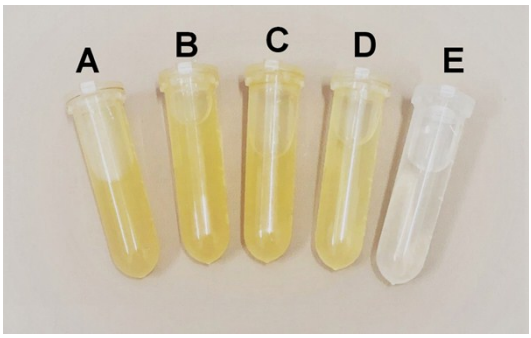

Fig. S7 The photographs of the color variation in the plasmonic sensing solution with different glucose concentrations: 1 (A), 2 (B), 6 (C), 10 (D), 16 mM (E).

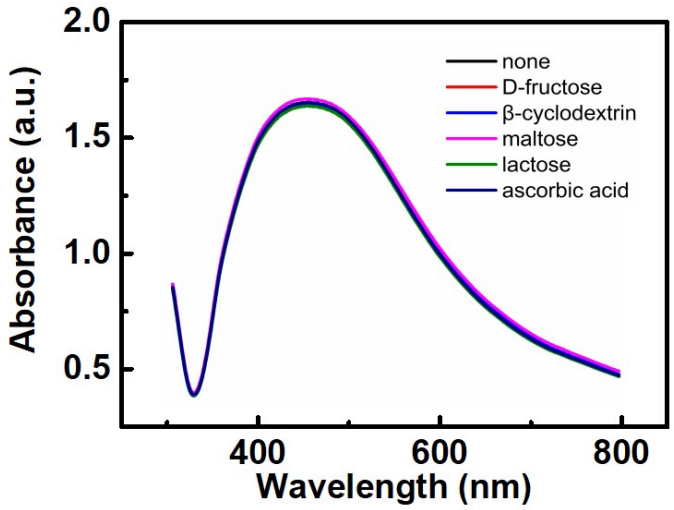

Fig. S8 UV-visible spectra of sensor system with Ag@SiO_2 only, ascorbic acid, D-fructose, β-cyclodextrin, lactose and maltose instead of glucose, under identical conditions.

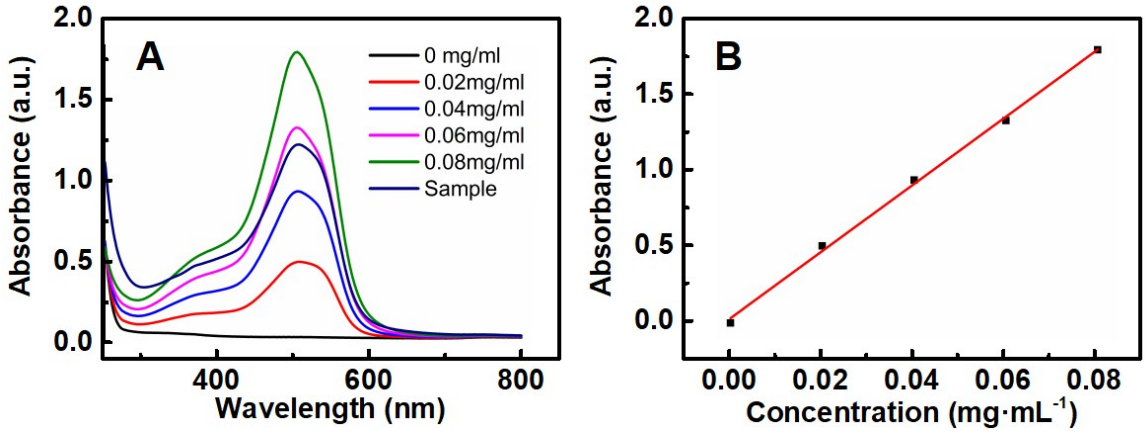

Fig. S9 (A) Representative UV-visible spectra obtained from a commercial glucose assay kit with different glucose concentrations. (B) Absorbance band maximum versus glucose concentration with a coefficient of 0.998.

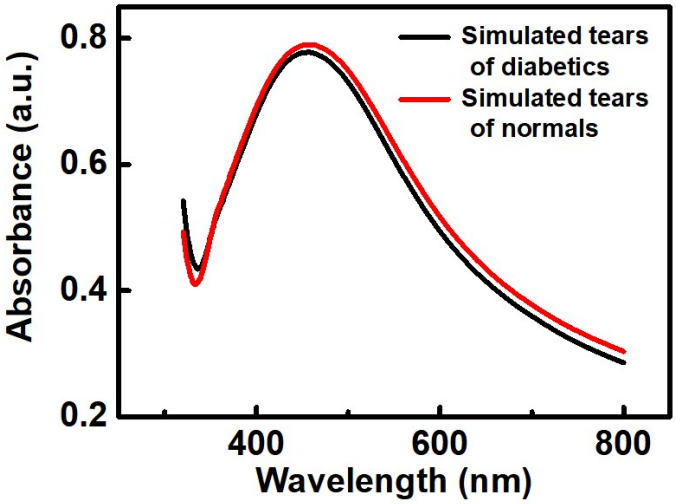

Fig. S10 UV-visible spectra of simulated tears of normals (red) and diabetics (black).

Table S1. Determination of simulated tear's glucose concentration.

Samples	Glucose concentration in the simulated tears of normals	Glucose concentration in the simulated tears of diabetics
Concentration according to Ref.S1	0.51 mM	0.92 mM
Concentration determined by the Plamonic biosensor	0.5±0.1 mM	1.0±0.1 mM

Reference

S1 D. K. Sen and G. S. Sarin, *British Journal of Ophthalmology*, 1980, **64**, 693-695.