

Electronic Supplementary Information

Plasmon Coupling Enhanced Two-Photon Photoluminescence of Au@Ag Core-shell Nanoparticles and Applications in Nuclease Assay

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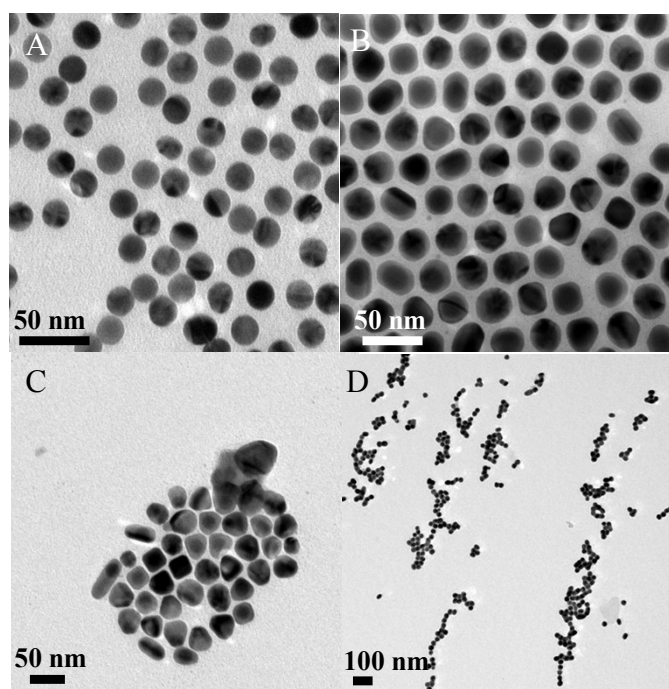


Figure S1. The TEM images of (A) Au NPs, (B) Au(19)@Ag(3.5) NPs, (C) Au(19)@Ag(5.5) NPs, (D) Assembly of Au(19)@Ag(3.5) NPs induced by cysteamine.

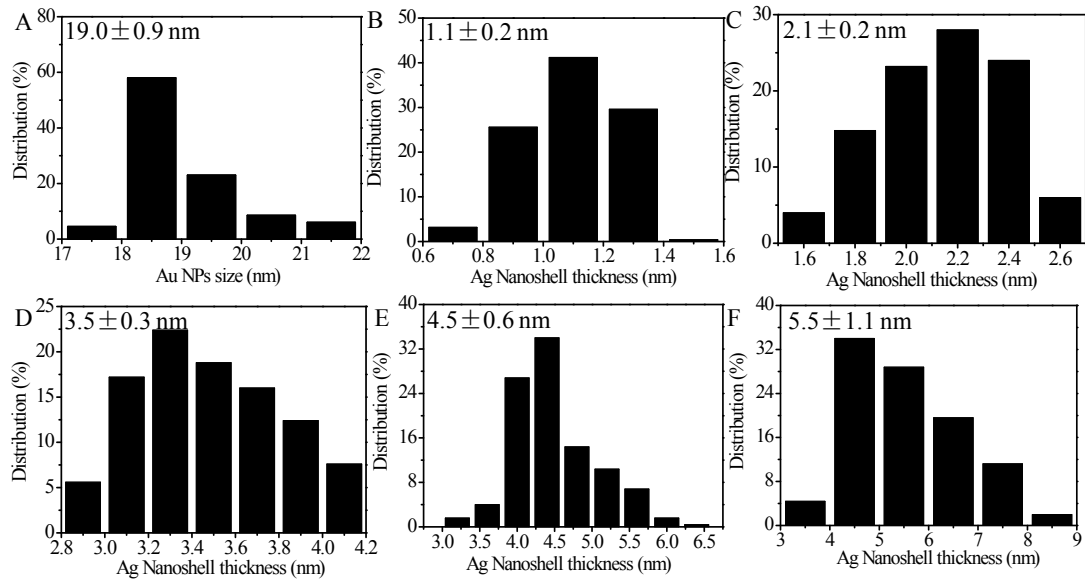


Figure S2. The histograms of sizes based on the size analysis of 250 nanoparticles from TEM images: (A) Au NPs and Au@Ag NPs with shell thickness of 1.1, 2.1, 3.5, 4.5 and 5.5 nm (B-F).

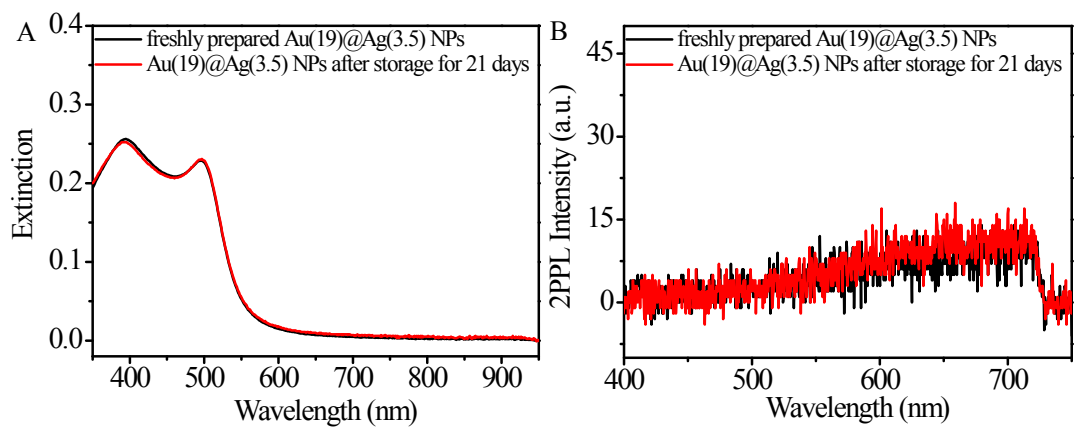


Figure S3. (A) Extinction and (B) 2PPL spectra of freshly prepared Au(19)@Ag(3.5) NPs and after storage for 21 days.

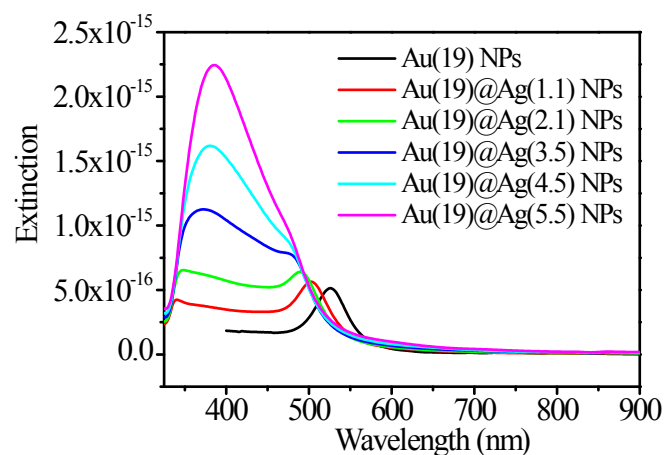


Figure S4. Simulated extinction spectra of 19 nm Au NP and Au@Ag NPs with Ag shell thickness of 1.1, 2.1, 4.5, and 5.5 nm.

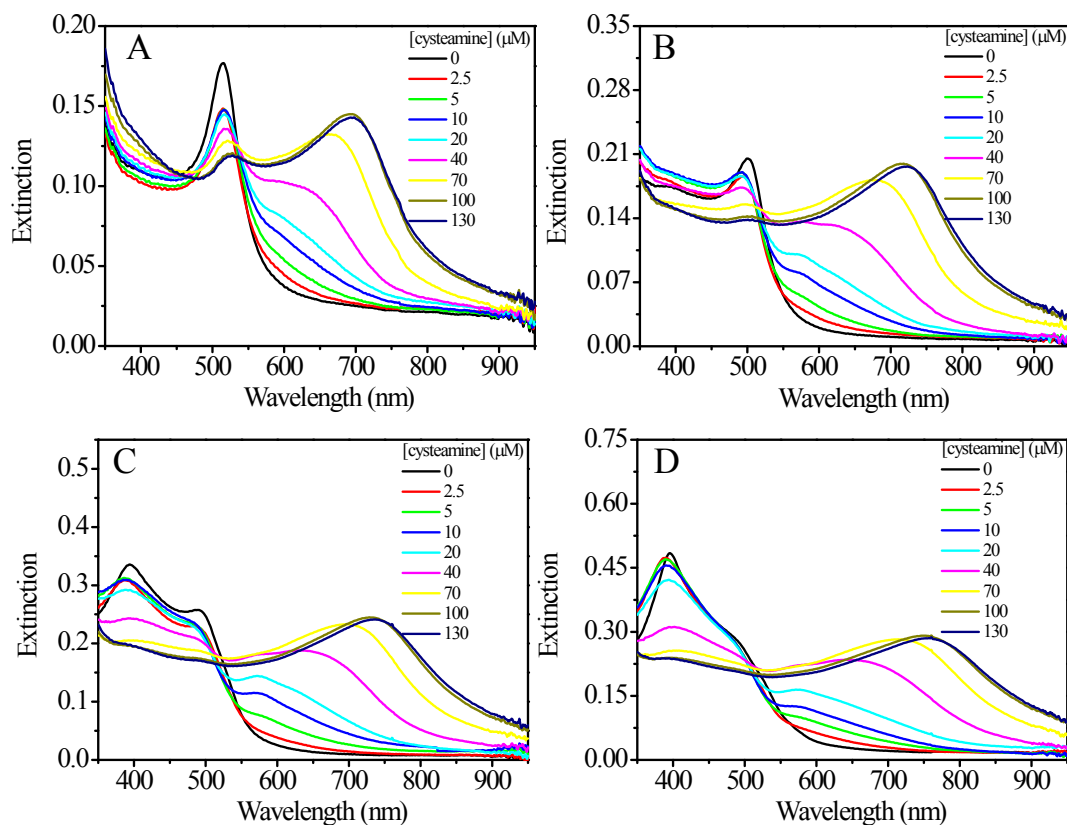


Figure S5. (A-D) Extinction spectra of Au@Ag NPs with Ag shell thickness of 1.1, 2.1, 4.5, and 5.5 nm before and after addition of cysteamine with different concentrations.

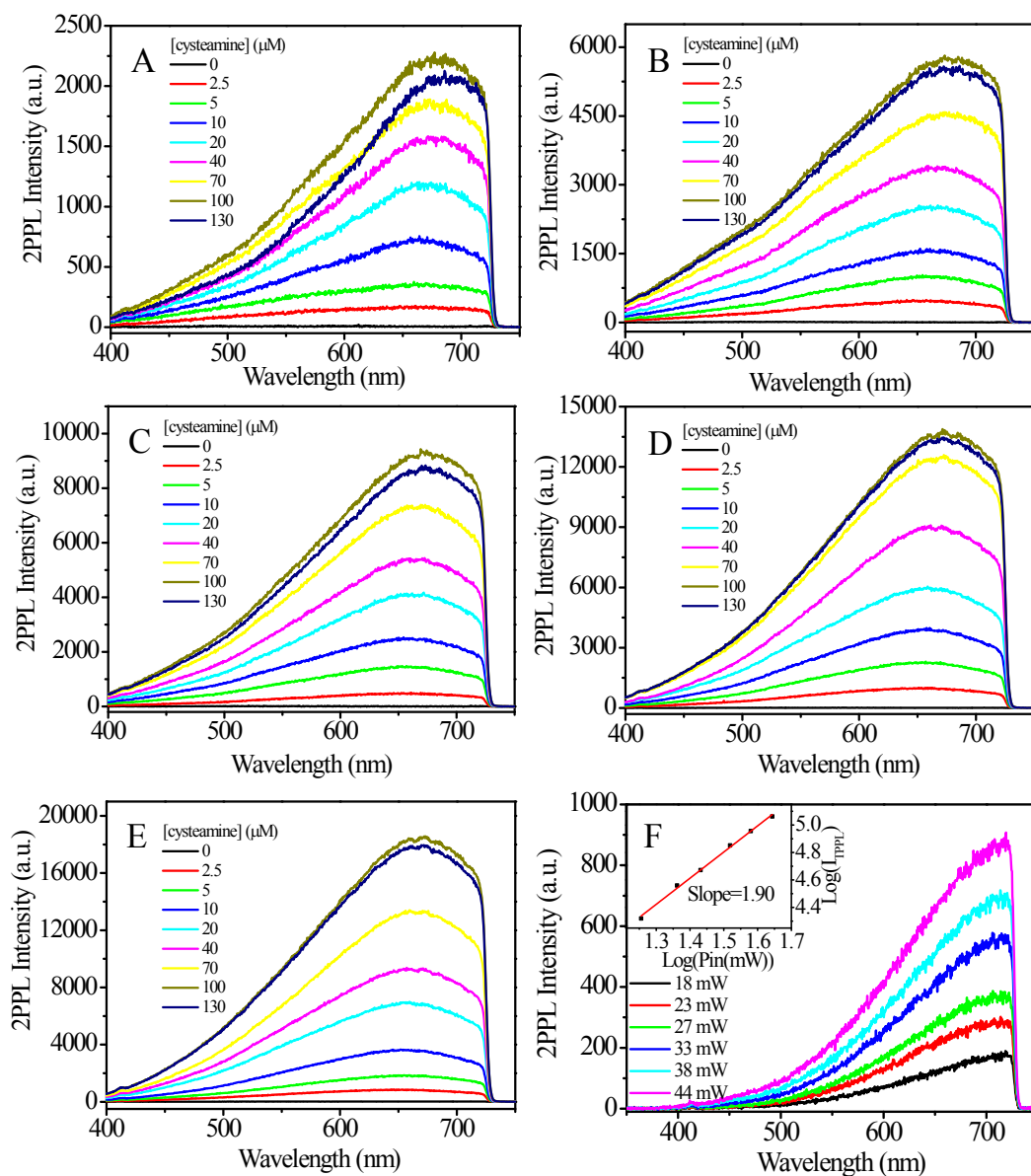


Figure S6. 2PPL spectra of (A) Au NPs and (B-E) Au@Ag NPs with Ag shell thickness of 1.1, 2.1, 4.5, and 5.5 nm before and after addition of cysteamine with different concentrations. (F) Excitation power dependence of the 2PPL for the sample of coupled Au(19)@Ag(3.5) NPs induced by 10 μM cysteamine in solution.

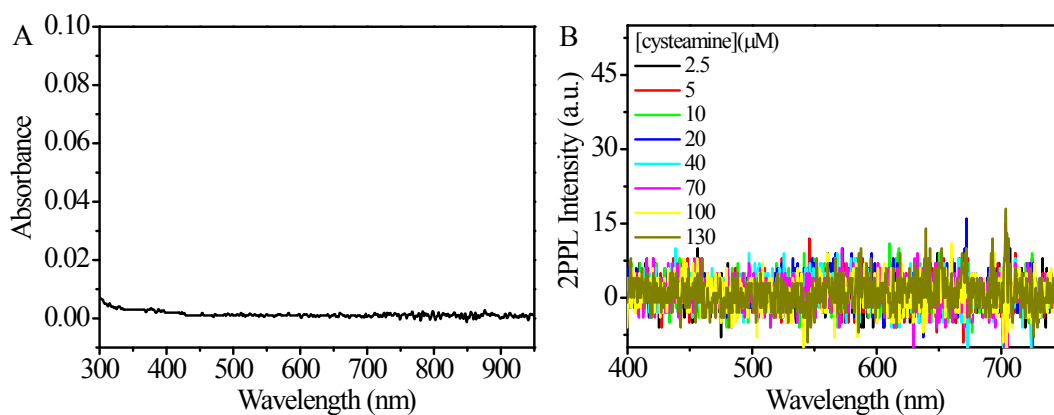


Figure S7. UV-Vis and 2PPL spectra of cysteamine molecules with different concentrations.

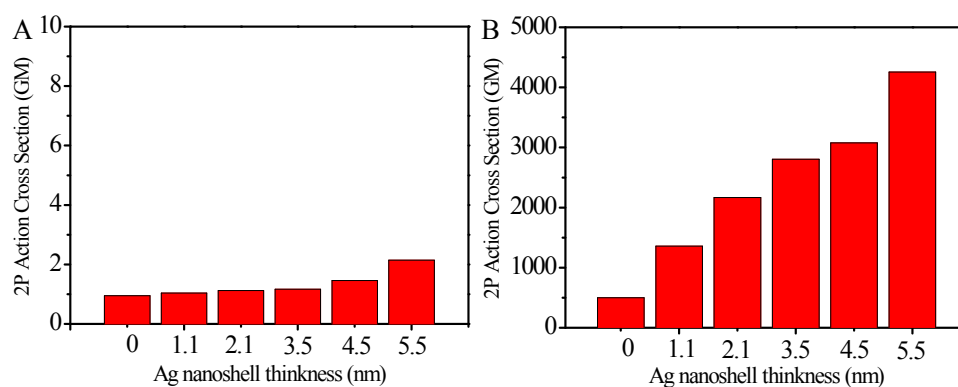


Figure S8. Two-photon action cross section of (A) isolated and (B) aggregated NPs coated with different thickness of Ag nanoshells.

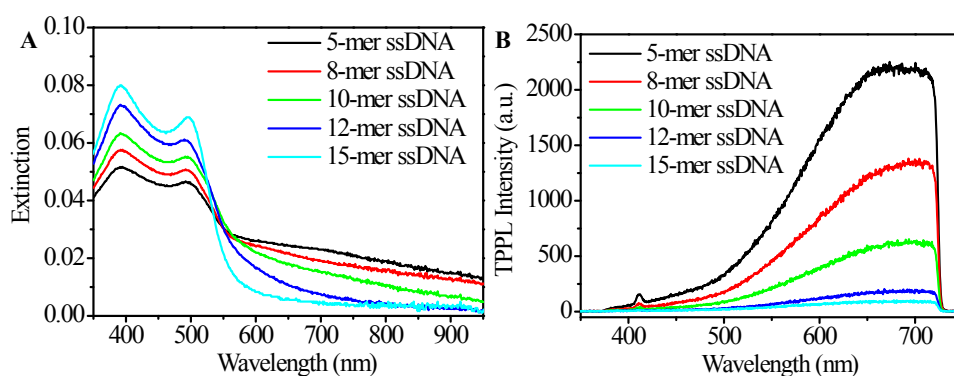


Figure S9. (A) Extinction and (B) 2PPL spectra of Au(19)@Ag(3.5) NPs after addition of different lengths of ssDNA in the presence of NaCl. The ssDNA sequences are 5'-TTAGC-3'(5-mer), 5'-ACCTTATC-3'(8-mer); 5'-GGTGCTAACT-3'(10-mer), 5'-ATCTTAACTGTG-3'(12-mer), and 5'-CCAACCACACCAACC-

3'(15-mer).

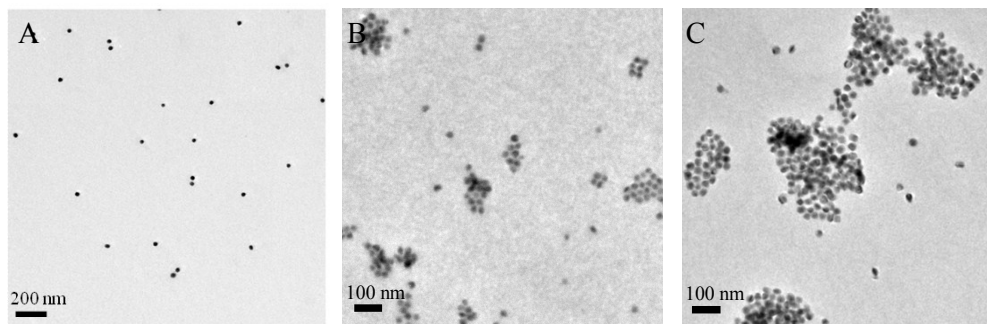


Figure S10. TEM images of Au(19)@Ag(3.5) NPs with the addition of different concentration of S1 nuclease (A) 0, (B) 55×10^{-6} U/ μ L, (C) 165×10^{-6} U/ μ L.

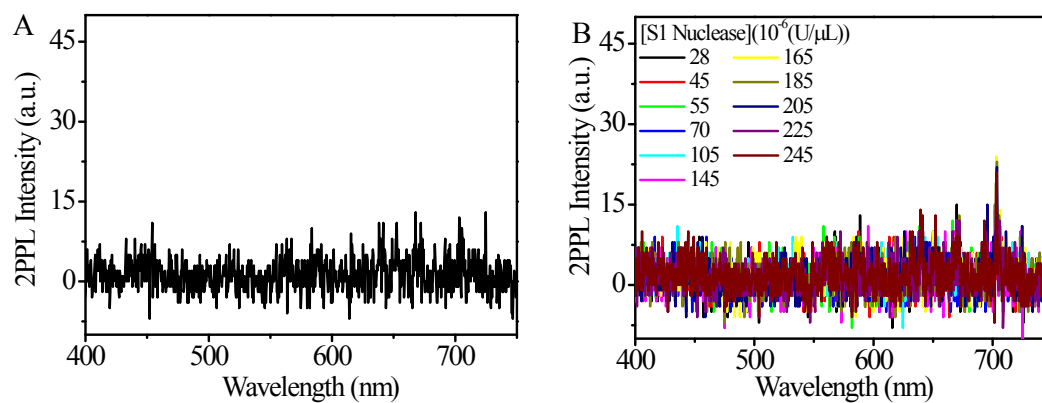


Figure S11. 2PPL spectra of (A) ssDNA (1×10^{-6} M) and (B) S1 Nuclease with different concentrations.

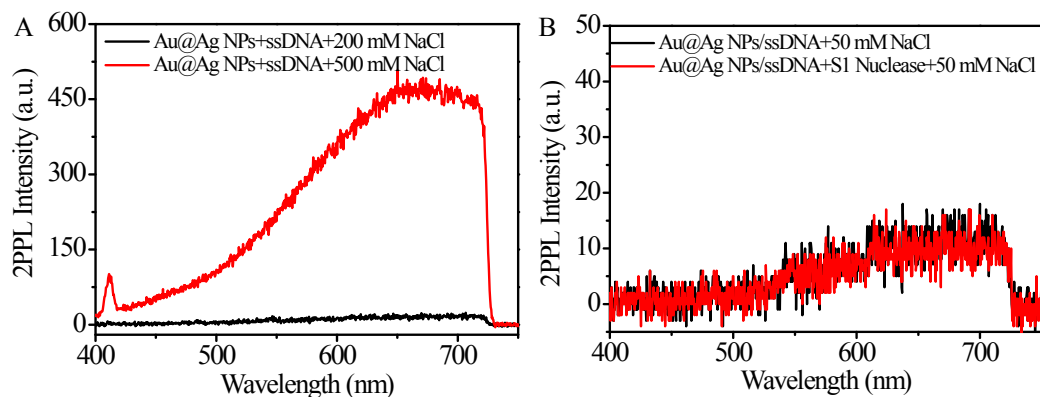


Figure S12. (A) [NaCl] effect on the 2PPL of the detection scheme; (B) 2PPL signals of Au(19)@Ag (3.5)NPs in the absence and presence of S1 nuclease (105×10^{-6} U/ μ L) after incubation with 50 mM NaCl.

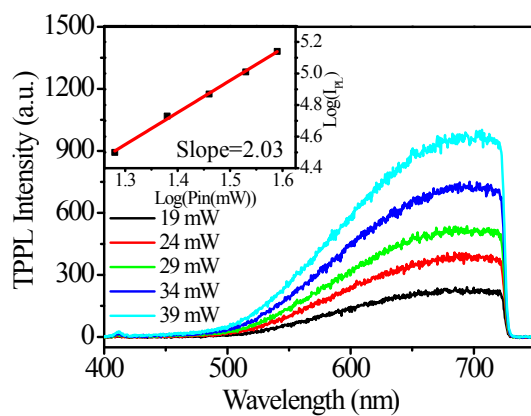


Figure S13. Excitation power dependence of the 2PPL for the sample of coupled Au(19)@Ag(3.5) NPs induced by 165×10^{-6} U/ μ L S1 nuclease in solution.