

**ESI (Electronic Supplementary Information)**

**Green Synthesis of Highly Fluorescent  
Au(I)@Ag<sub>2</sub>/Ag<sub>3</sub>-Thiolate Core-Shell Particles for  
Selective Detection of Cysteine and Pb(II)**

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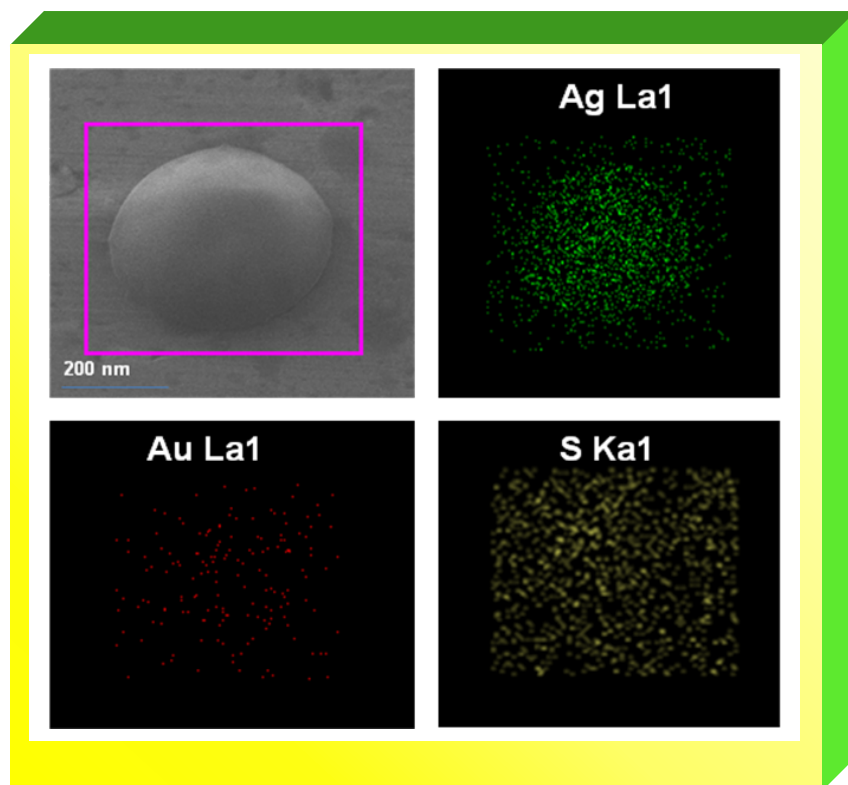


Figure S1: Elemental mapping of a single particle for the element silver, gold and sulfur in AuAgF solution.

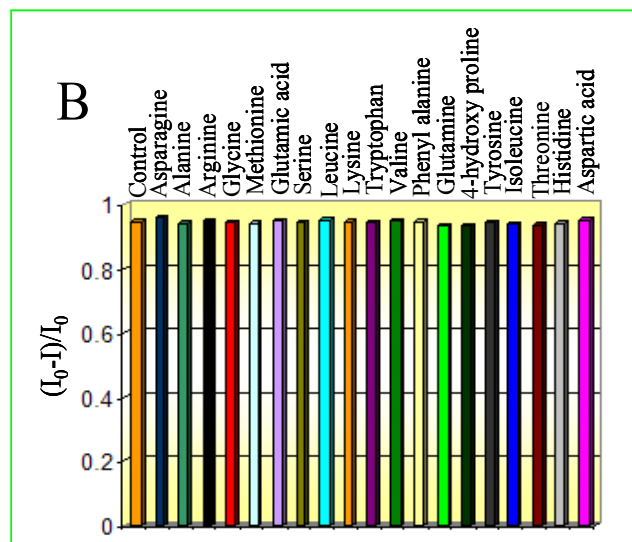
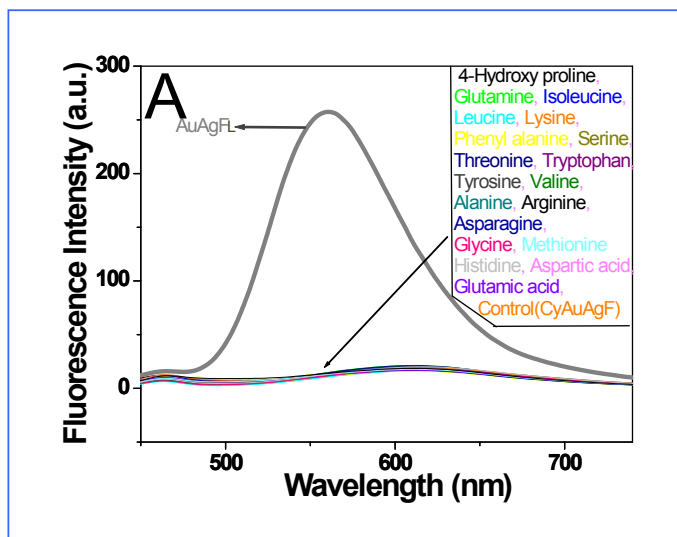


Figure S2: (A) Fluorescence spectral profile and (B) bar diagram displaying the effect of interfering amino acids on 2.5 mL CyAuAgFL solution. Condition : [Amino acid] =  $20 \times 10^{-4}$  M,  $\lambda_{ex} = 400$  nm.

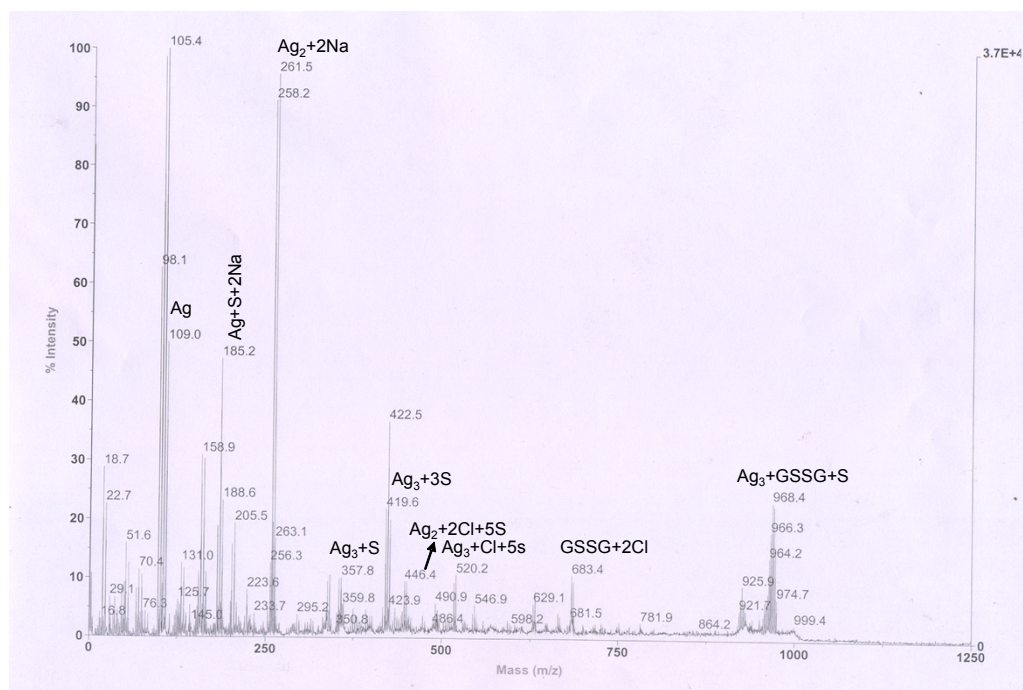


Figure S3(a): MALDI mass spectrum of the drop-casted AuAgFL solution.

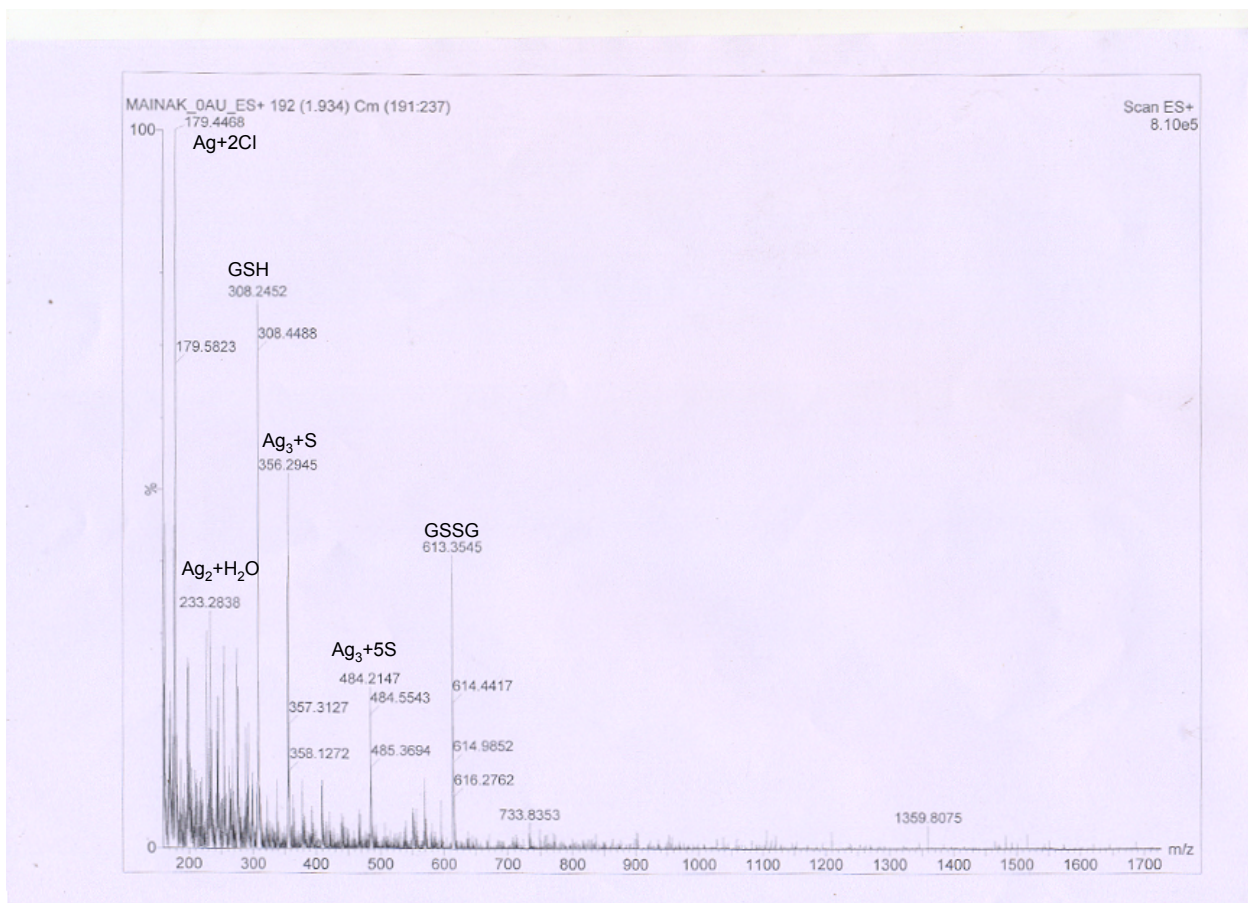


Figure S3(b): Liquid chromatography mass spectrum in ES+ mode of the AuAgFL solution.

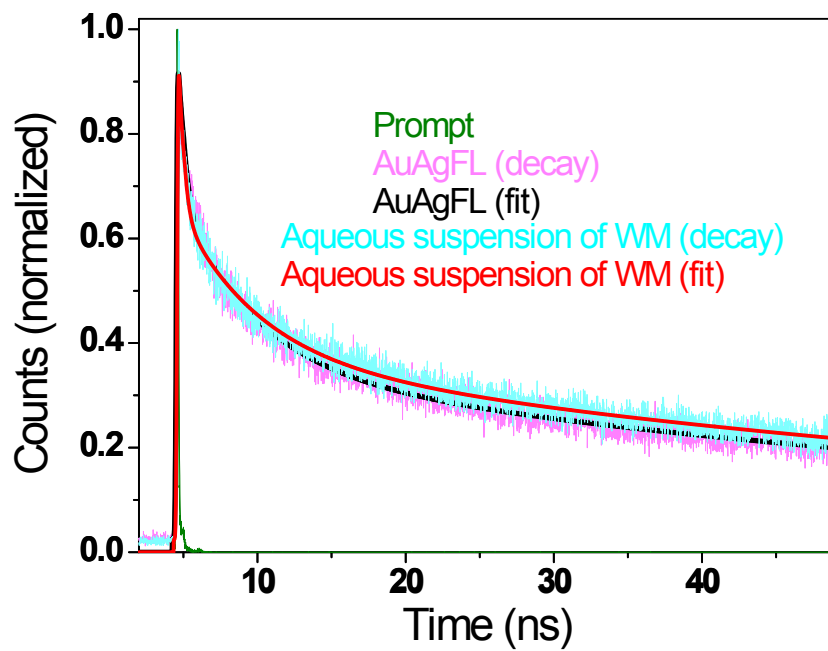


Figure S4: Fluorescence decay profile of AuAgFL and aqueous suspension of WM.

Condition: [Cys] =  $30 \times 10^{-6}$  M.

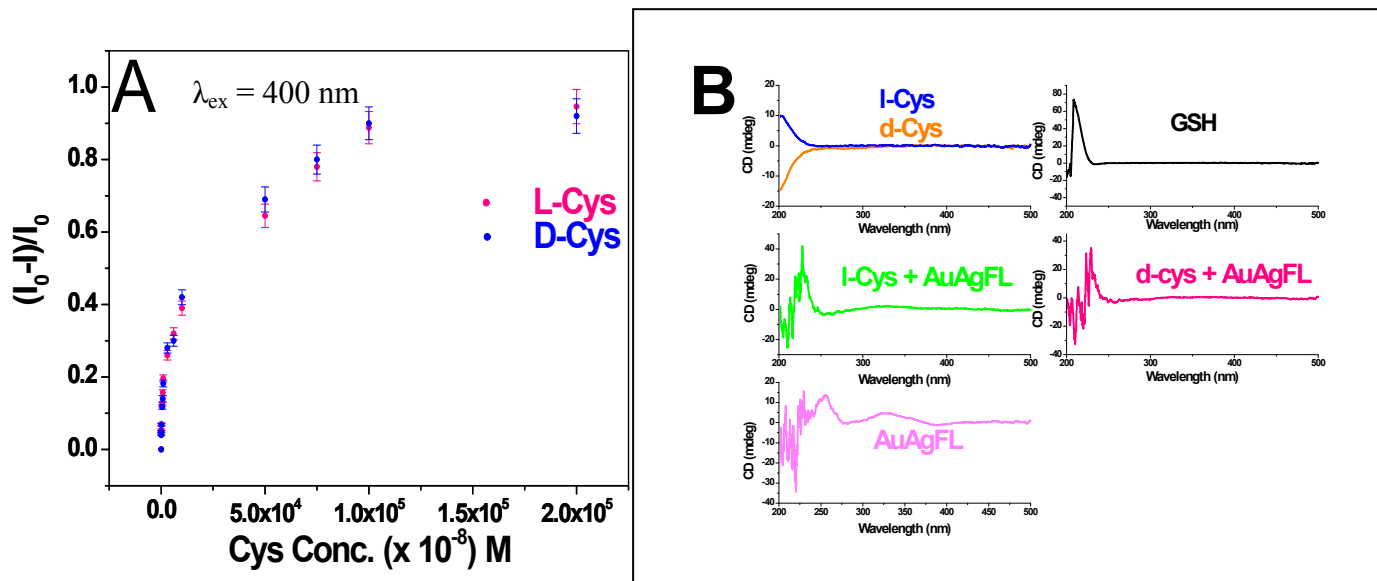


Figure S5: (A) Degree of fluorescence quenching of AuAgF solution with [*l*-Cys] and [*d*-Cys].

(B) CD spectra of *l*-Cys, *d*-Cys, GSH, AuAgFL, (*l*-Cys + AuAgFL), (*d*-Cys + AuAgFL).

Condition : AuAgF = 2.5 mL, [Cys/GSH] =  $20 \times 10^{-4}$  M.

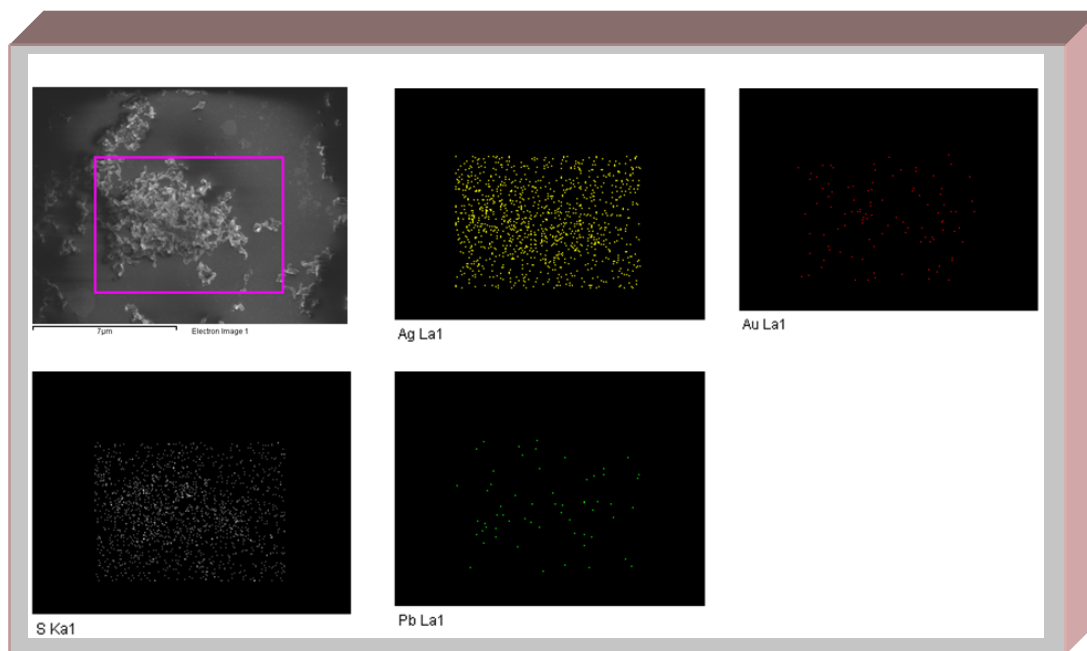


Figure S6: Elemental mapping for the element silver, sulfur, gold and lead from WM precipitate.



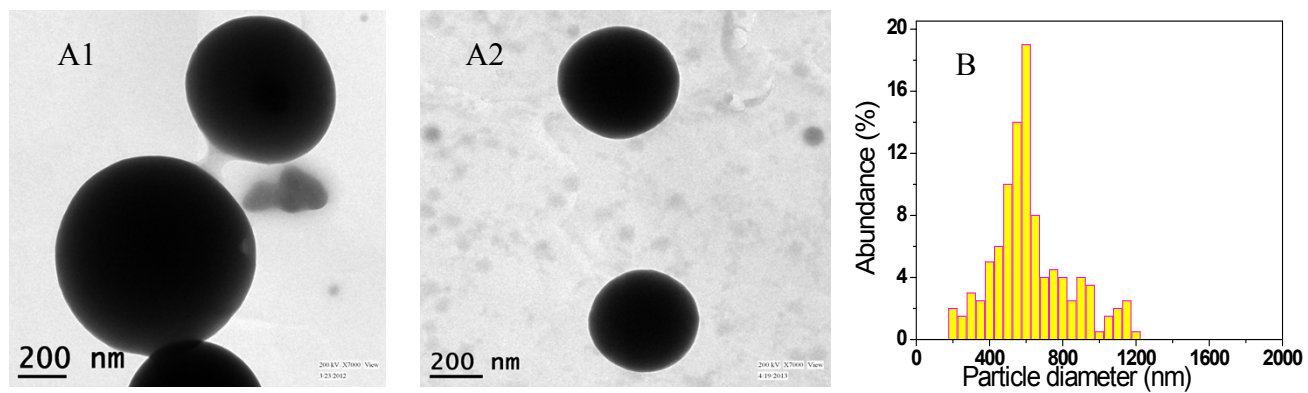


Figure S7: TEM image (A1, A2) from same copper grid and size distribution histogram (B) of AuAgFL.

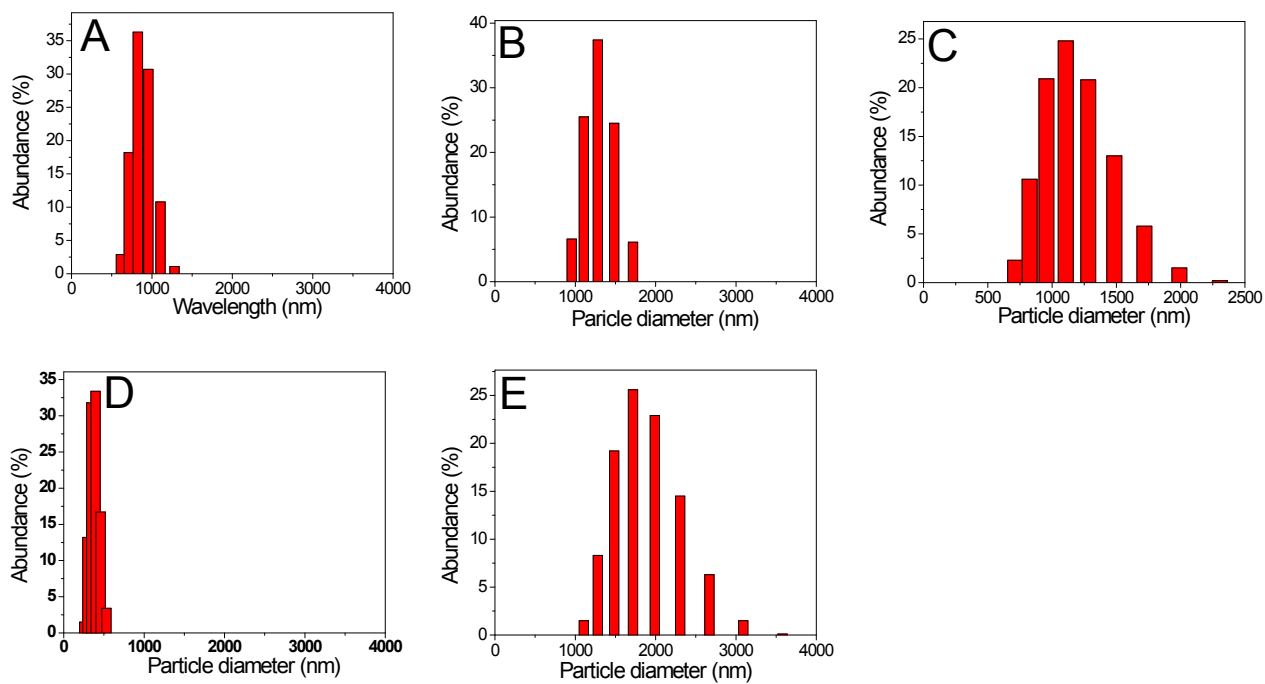


Figure S8: The particle size distribution of (A) AuAgFL, (B) AuAgFL after heating at 70°C, (C) CyAuAgFL, (D) aqueous suspension of WM and (E) aqueous suspension of WM + Na<sub>2</sub>-EDTA measured by a DLS particle size analyzer.

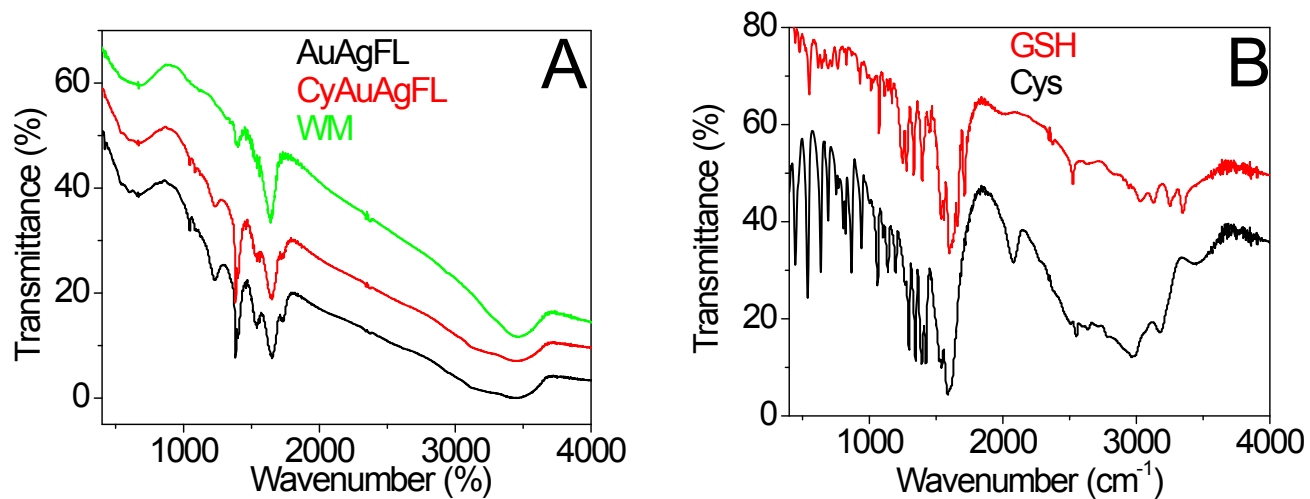


Figure S9: FTIR spectra of AuAgFL, CyAuAgFL, WM, pure GSH and pure Cys.

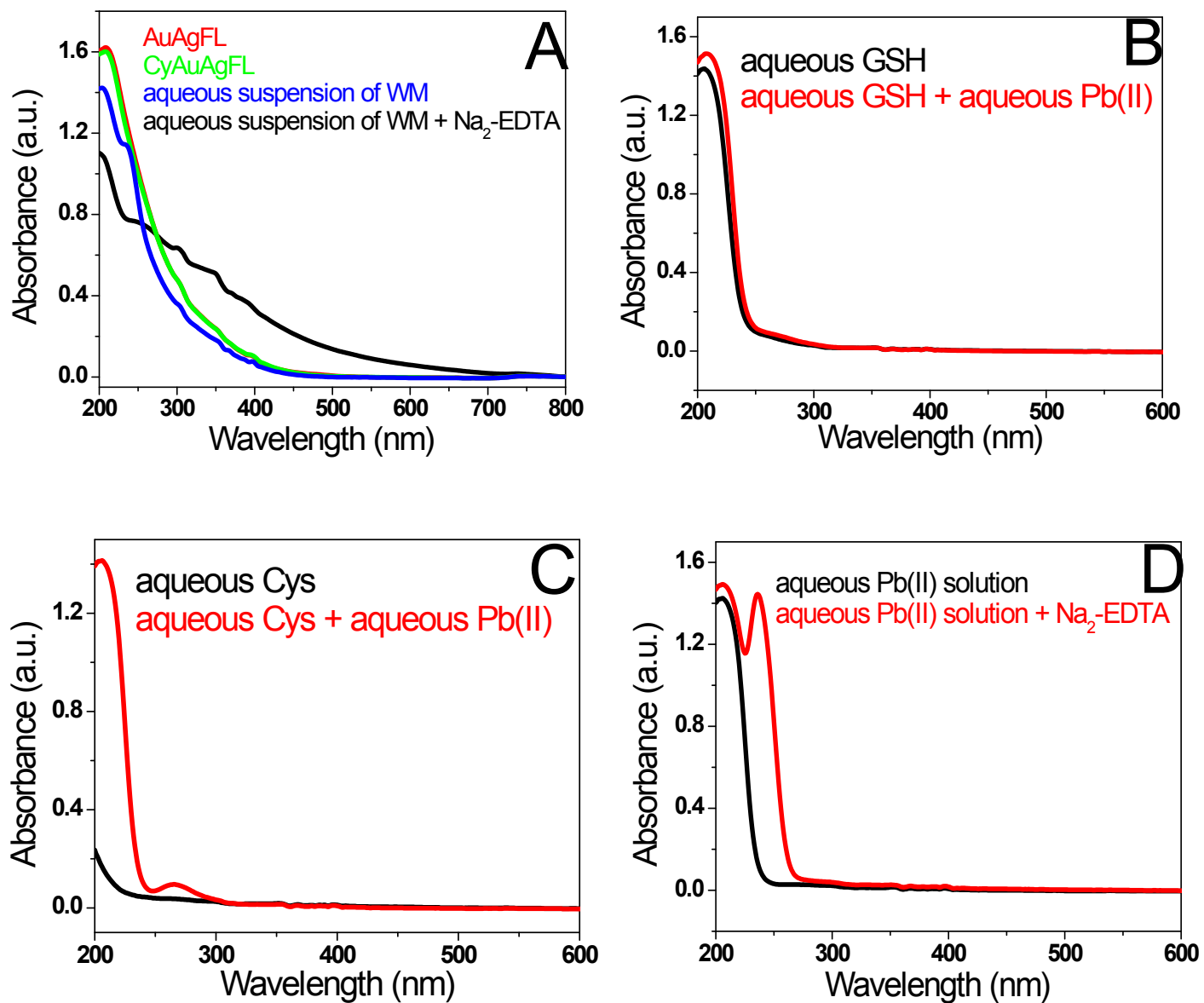


Figure S10: Absorption spectral profile of (A) AuAgFL, CyAuAgFL, aqueous suspension of WM, aqueous suspension of WM + Na<sub>2</sub>-EDTA, (B) aqueous GSH, aqueous GSH + aqueous solution of PbNO<sub>3</sub>, (C) aqueous Cys, aqueous Cys + aqueous solution of PbNO<sub>3</sub>, (D) aqueous solution of PbNO<sub>3</sub> + Na<sub>2</sub>-EDTA.

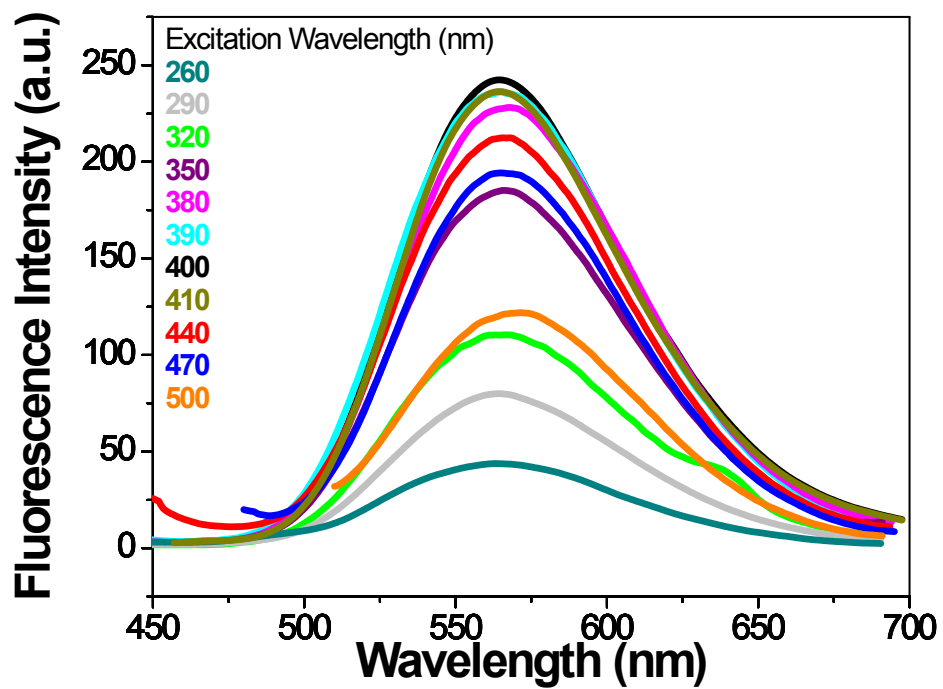


Figure S11: Fluorescence spectral profile of AuAgFL at different excitation wavelength.

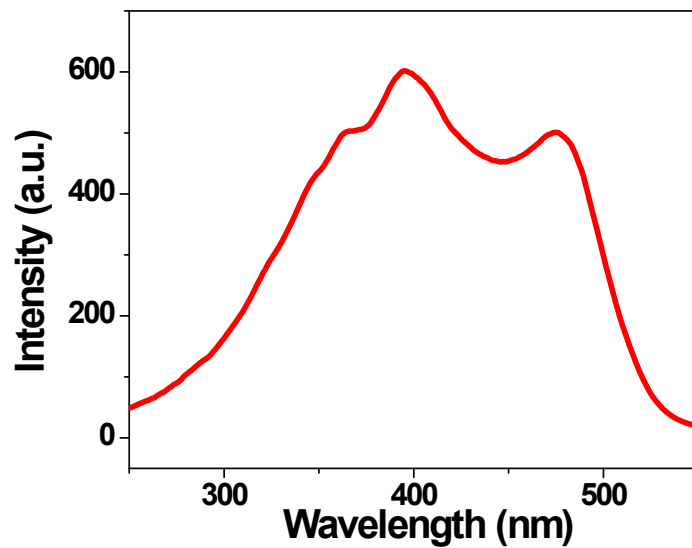


Figure S12: Excitation spectral profile of AuAgFL at the emission wavelength of 564 nm.