Supporting information

for

Fluorometric sensing of ultralow As(III) concentrations using Ag doped hollow CdS/ZnS bi-layer nanoparticles

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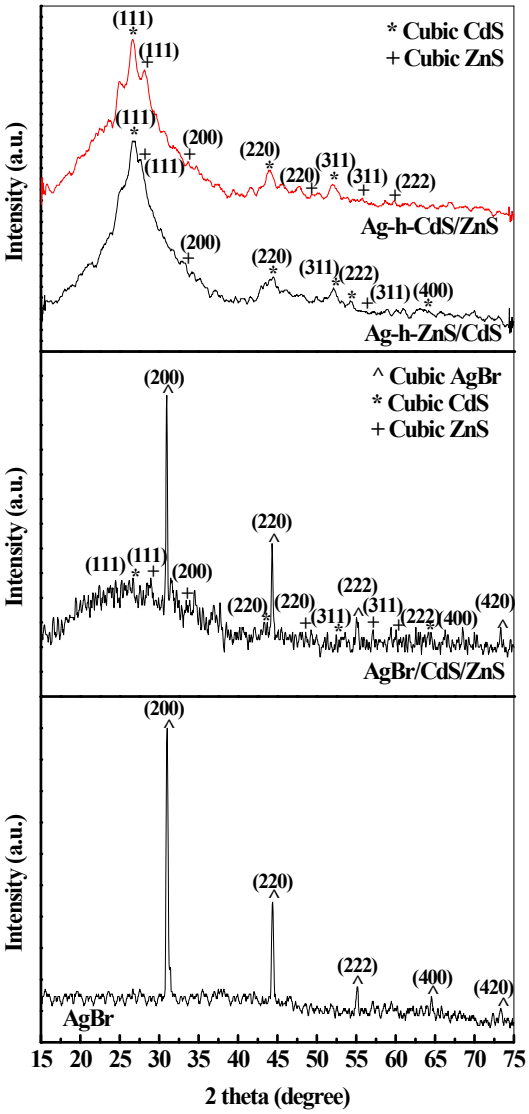

Figure S1. X-ray diffraction patterns of pure AgBr, AgBr/CdS/ZnS, Ag-h-CdS/ZnS and Ag-h-ZnS/CdS nanoparticles.

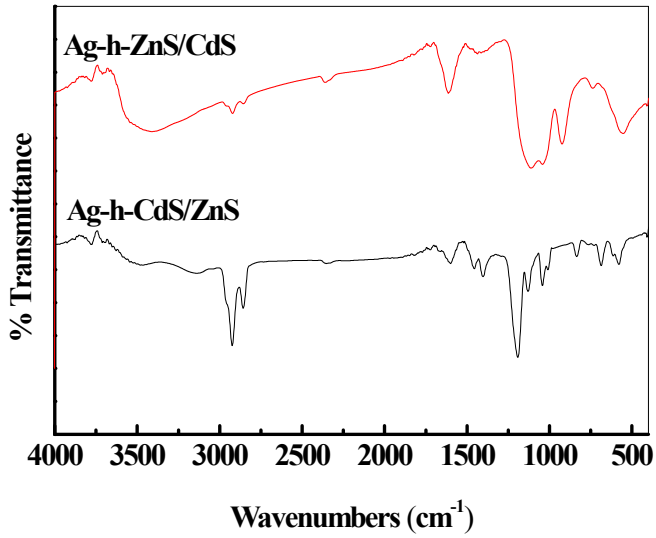

Figure S2. FT-IR spectra of Ag-h-CdS/ZnS and Ag-h-ZnS/CdS nanoparticles.

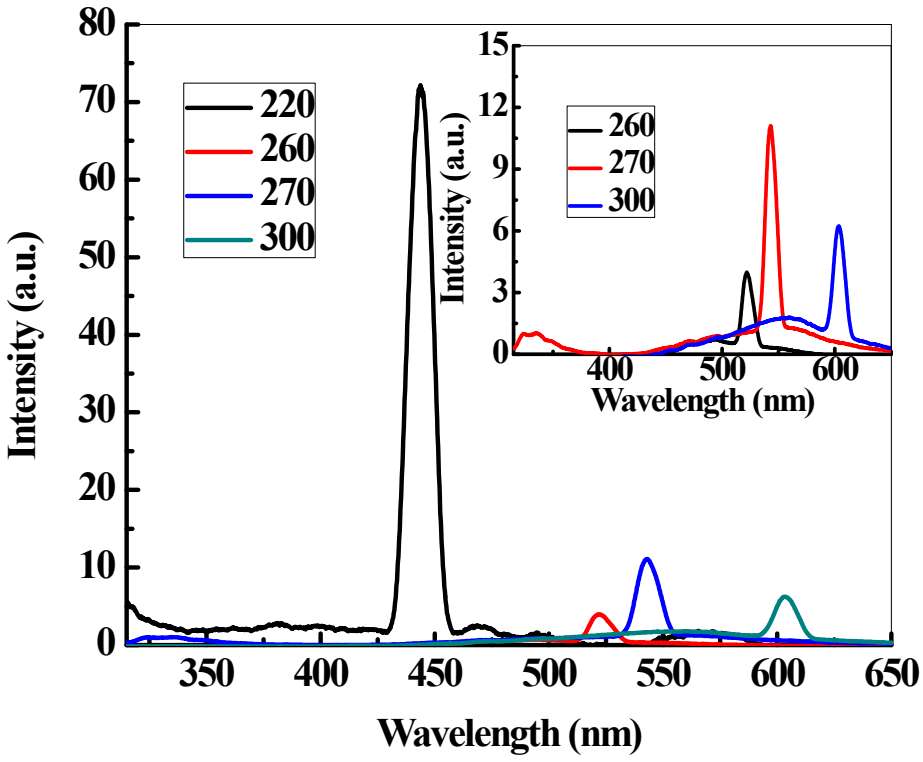

Figure S3. Fluorescence emission spectra of Ag-h-CdS/ZnS nanoparticles after excitation at 220, 260, 270, and 300 nm wavelengths.

Quantum yield calculation

Quantum yield was calculated using the equation (1), where phenol was taken as the reference. The refractive index and quantum yield of phenol were taken 1.5425 and 0.14 , respectively.

$$Q.Y_S = Q.Y_R\left(\frac{Grad_S}{Grad_R}\right)\times\left(\frac{\eta_S}{\eta_R}\right)^2 \quad \text{----------(1)}$$

Where, $Q.Y_S$ – Quantum yield of the sample

$Q.Y_R$ – Quantum yield of the reference (Phenol)

$Grad_S$ – Slope of the Integrate intensity vs. absorbance line for sample

$Grad_R$ – Slope of the Integrate intensity vs. absorbance line for reference (Phenol)

η_S – Refractive index of the sample

η_R – Refractive index of the reference (Phenol)

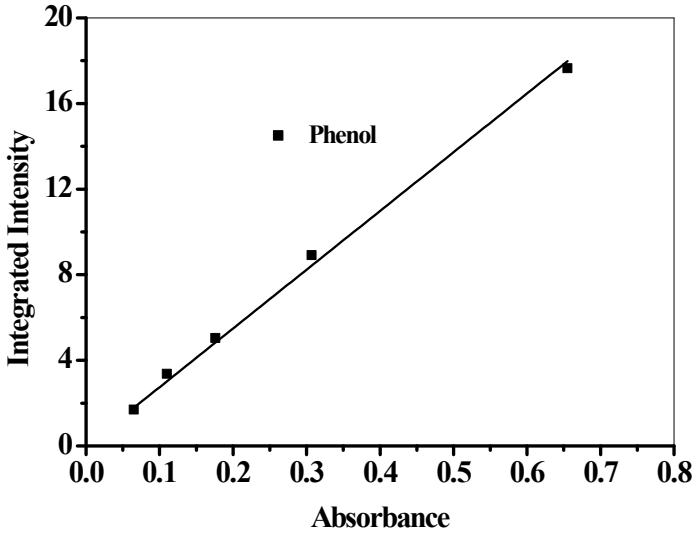

Figure S4. The plot of absorbance vs. integrated intensity of phenol as the reference solution.

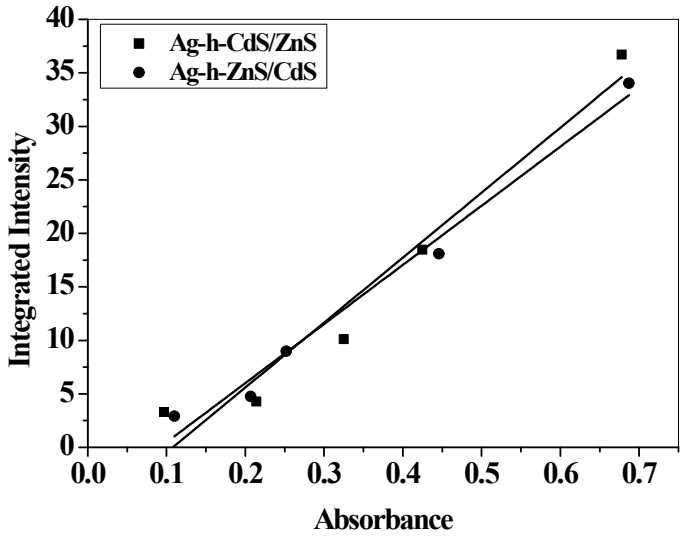

Figure S5. The plot of absorbance vs. integrated intensity of Ag-h-CdS/ZnS, Ag-h-ZnS/CdS nanoparticles.

Table S1. The fitting equation and R^2 value of integrated intensity (from fluorescence spectra) vs. absorbance (from UV spectra) line and the QY of phenol, Ag-h-CdS/ZnS and Ag-h-ZnS/CdS nanoparticles.

Material	Fitting equation	R^2 value	Quantum yield (QY)
Phenol (reference)	y=26.72x+0.3154	0.9973	0.14
Ag-h-CdS/ZnS	y=60.6x-6.5	0.93	0.8814
Ag-h-ZnS/CdS	y=55.24x-5.046	0.98	0.8034

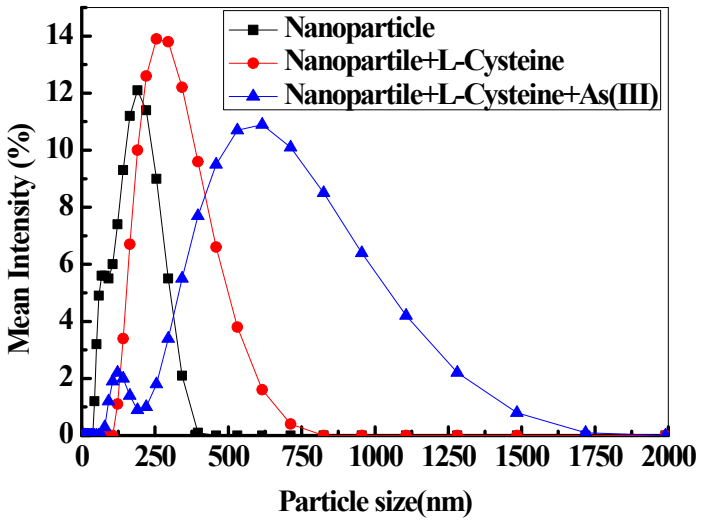

Figure S6. Particle size distribution of Ag-h-CdS/ZnS nanoparticles in pure form, L-cysteine capping, and L-cysteine capping in presence of As(III) measured by dynamic light scattering (DLS).

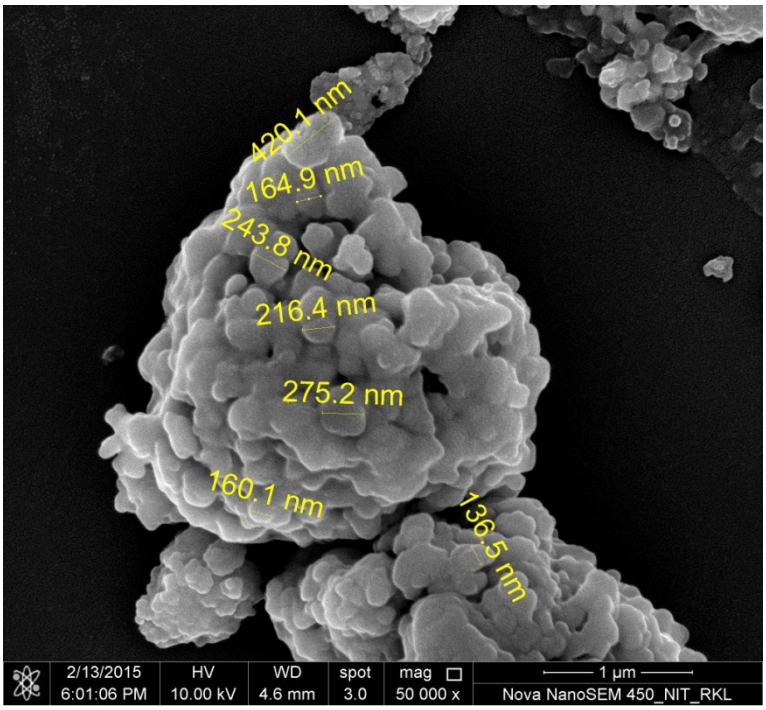

Figure S7. Field emission scanning electron microscopic (FE-SEM) image of L-cysteine capped Ag-h-CdS/ZnS nanoparticles after As(III) addition.

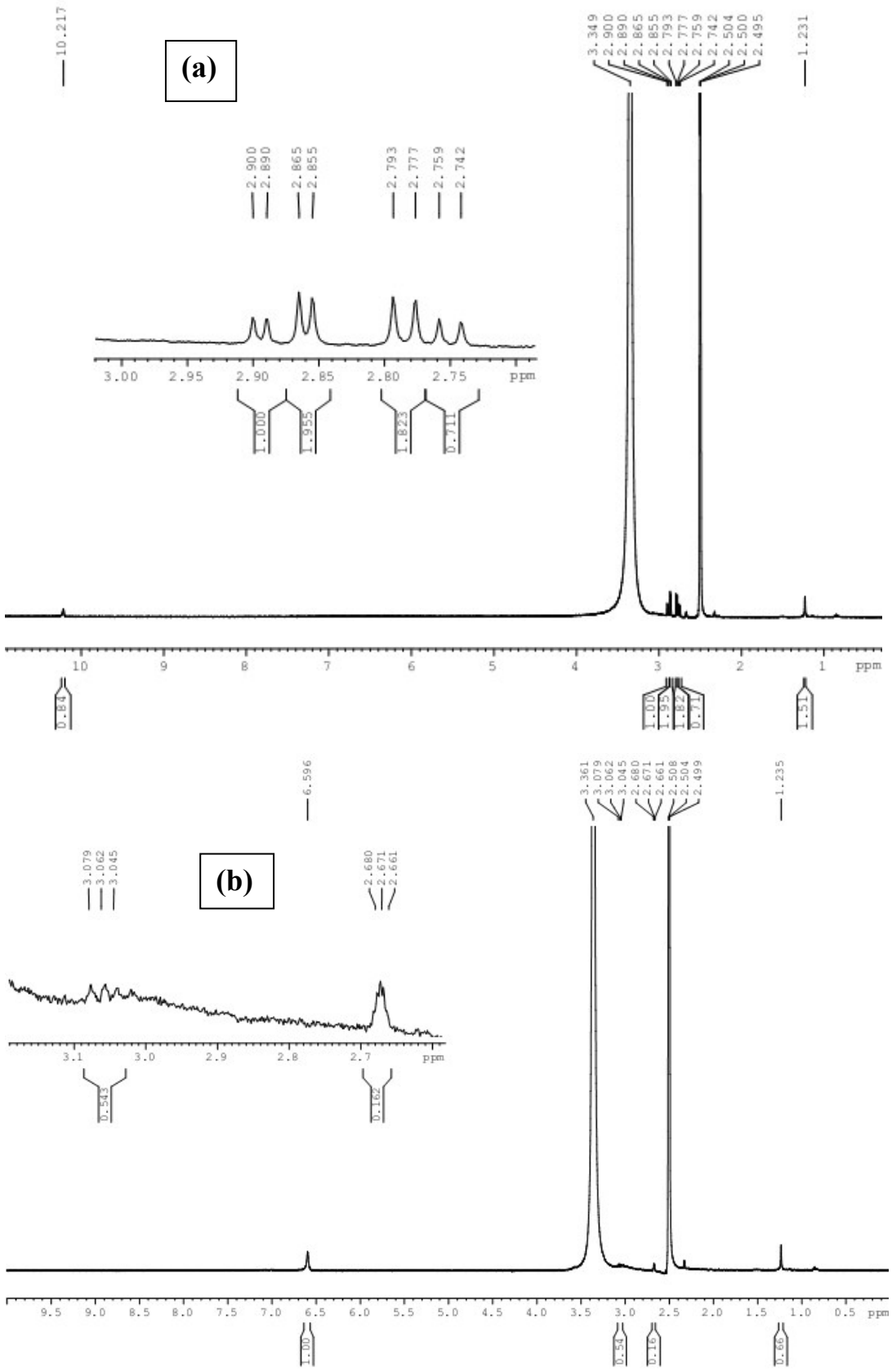

Figure S8. [1]H NMR spectra of (a) pure L-cysteine, (b) L-cysteine with As(III)

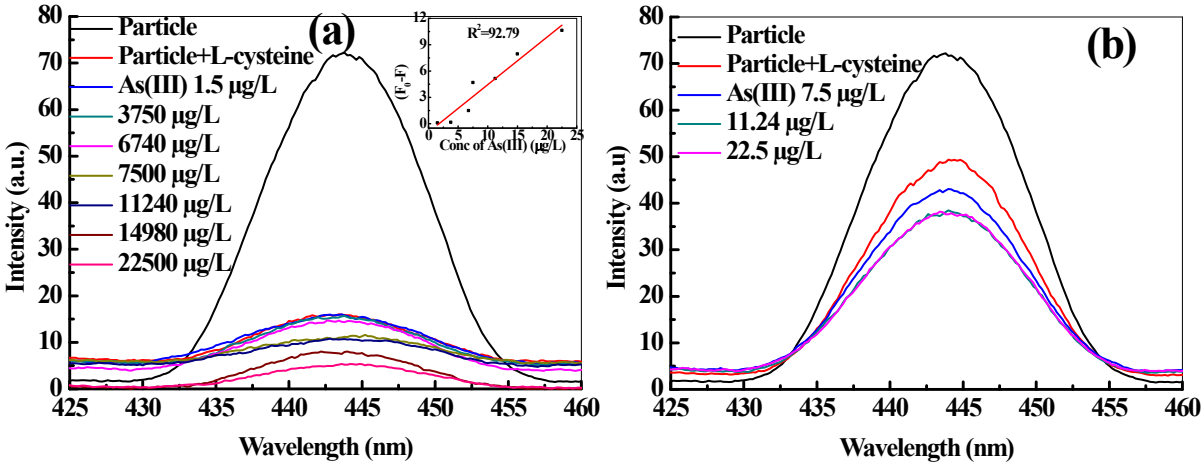

Figure S9. Fluorescence quenching of Ag-h-CdS/ZnS nanoparticles after capping with L-cysteine and the addition of As(III) ions in (a) acidic media (As(III) ions concentration 1.5 – 22.5 µg/L), (b) basic media (As(III) ions concentration 7.5 – 22.5 µg/L). Inset is the linear plot of quenched fluorescence intensity of the L-cysteine capped Ag-h-CdS/ZnS nanoparticles with the concentration of As(III) species in acidic media.