Supporting information

Water soluble cadmium selenide quantum dots for ultrasensitive detection of organic, inorganic and elemental mercury in biological fluids and live cells

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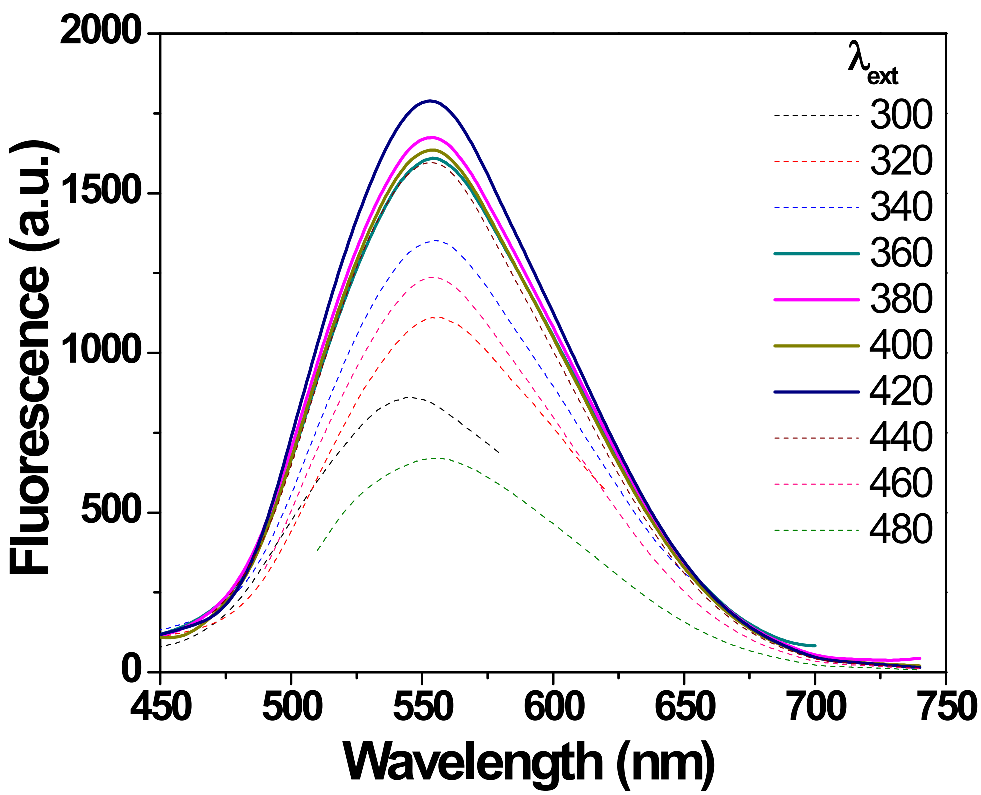

Figure S1: Fluorescence emission spectra of CdSe QDs at different excitation wavelength. It is noted that maximum emission was observed when the CdSe QDs excited between 360 nm to 420 nm.

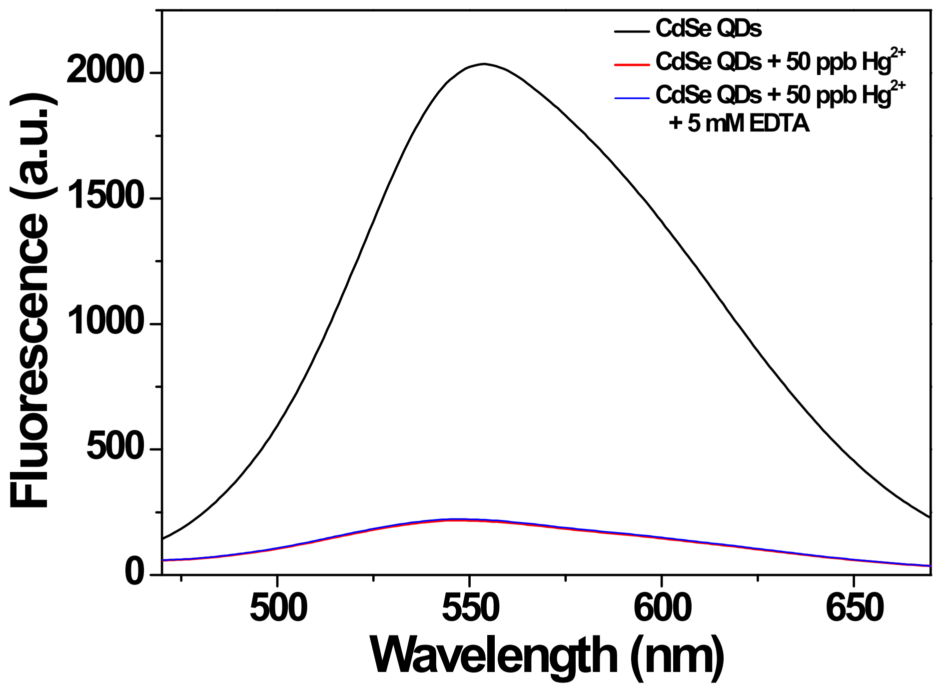

Figure S2: Fluorescence emission spectra of CdSe QDs in the presence of Hg^{2+} and Hg^{2+} + EDTA. Though EDTA is known to form complex with many metals ion, here, it is unable to extract Hg from the Hg-CdSe QDs complex. Which supports that Cd-Hg metallophilic interaction is involved in quenching the fluorescence of CdSe QDs.

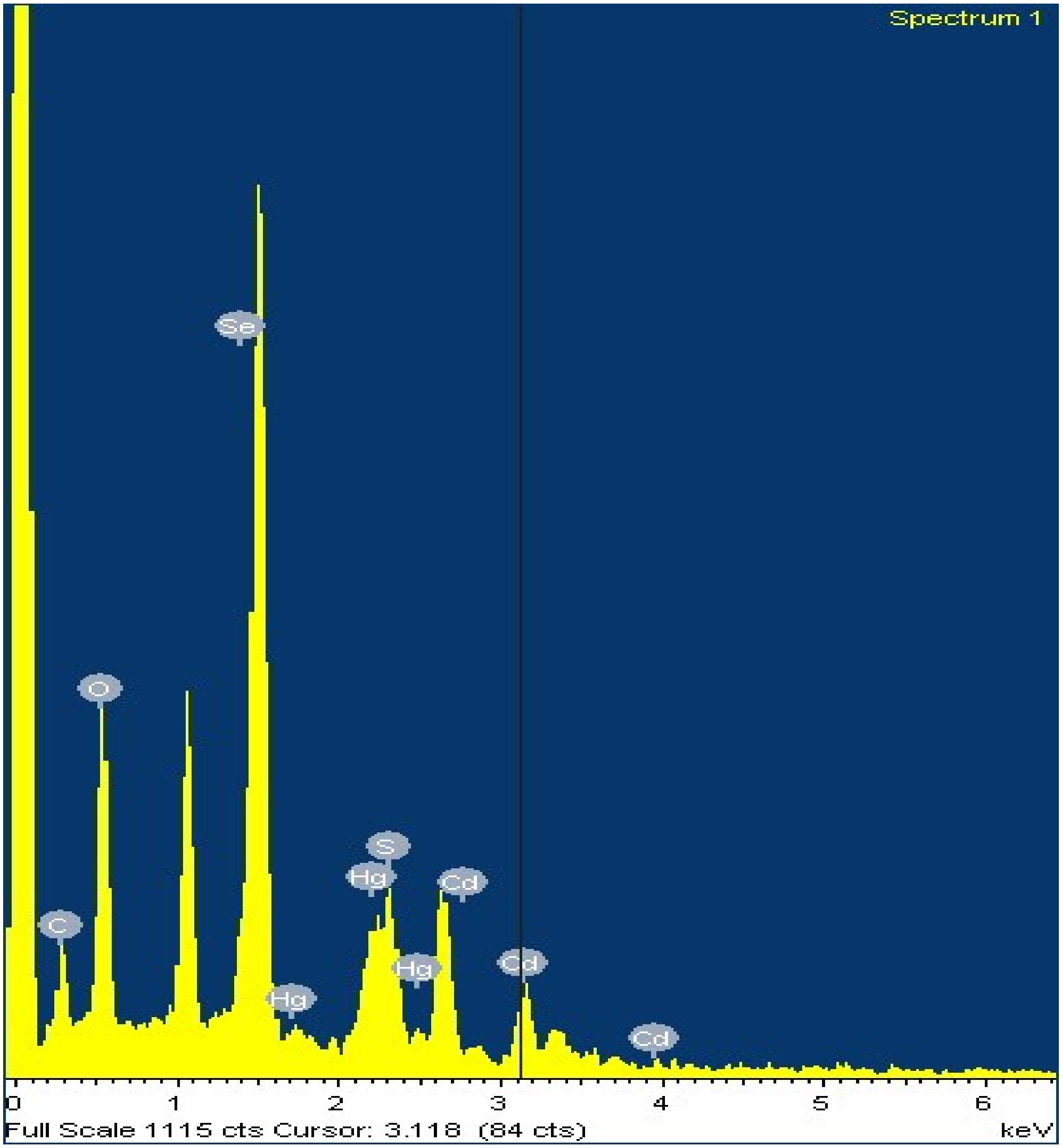

Figure S3: EDAX analysis shows the presence of Cd, Se and Hg in the Hg-CdSe QDs aggregates.

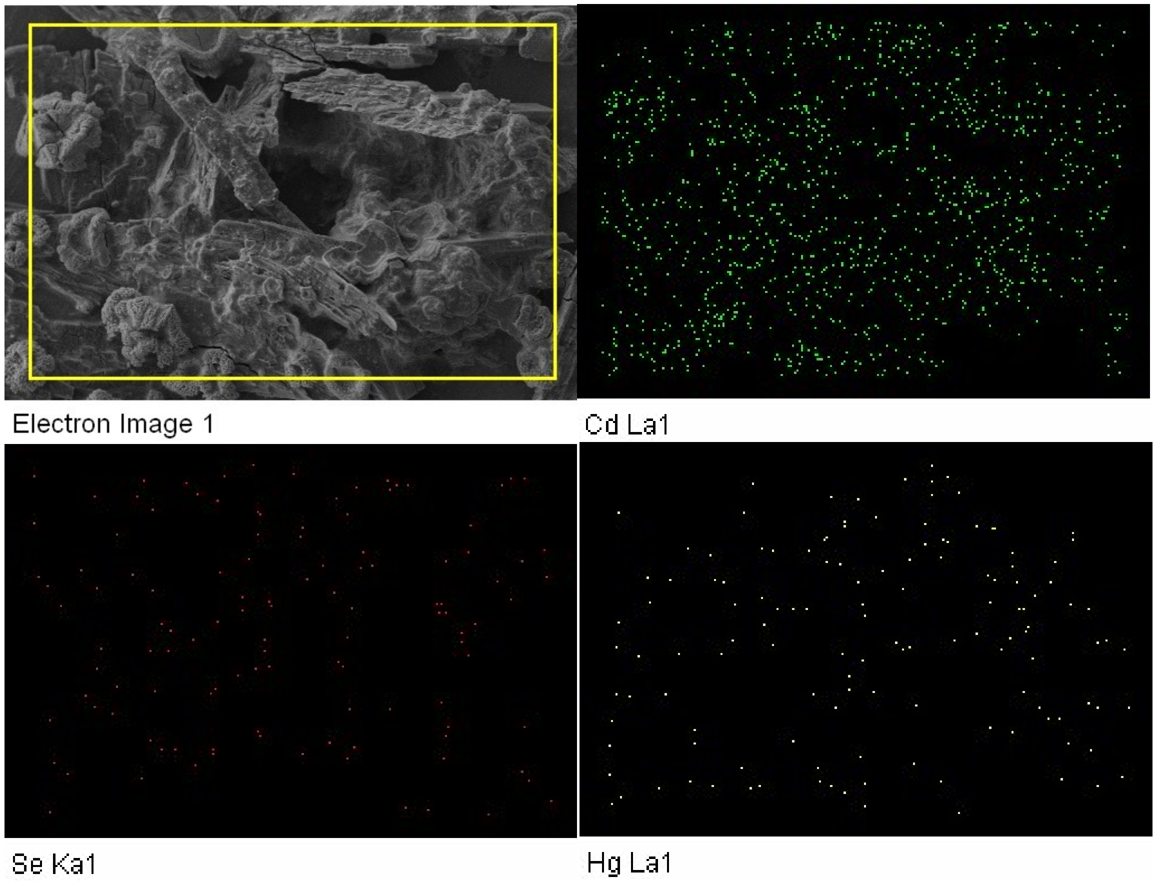

Figure S4: Elemental mapping showing the presence of Cd, Se, and Hg in the aggregates.

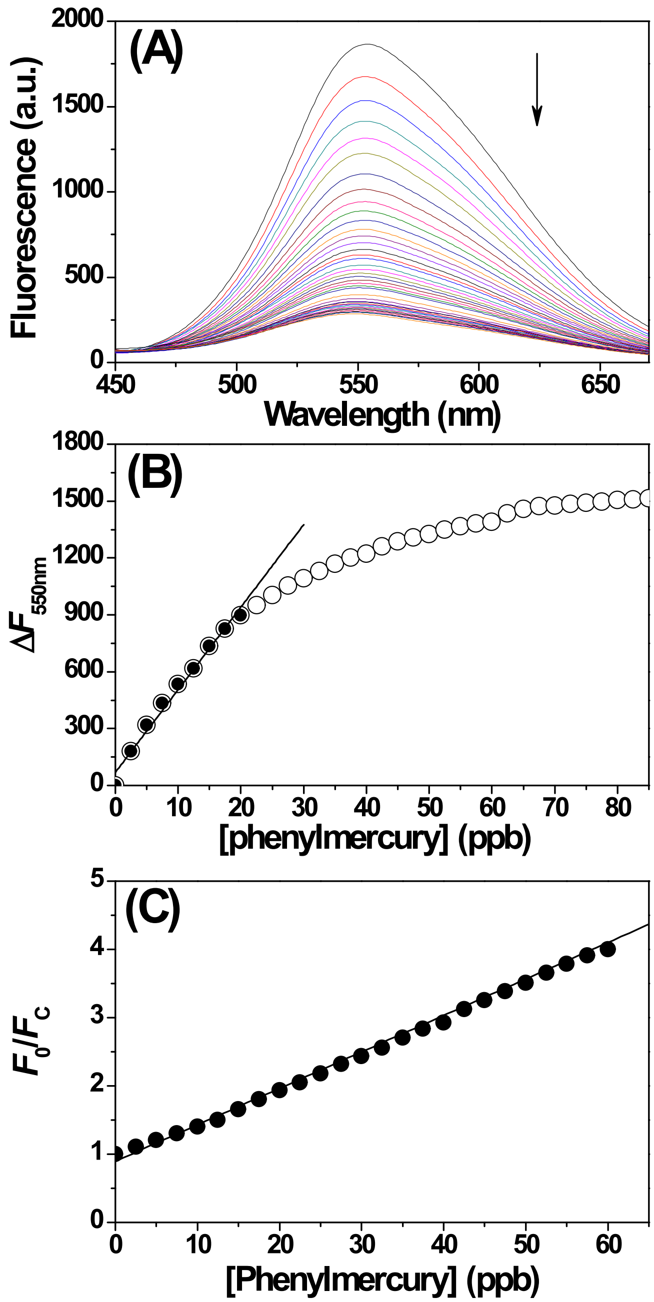

Figure S5: (A) Fluorescence response of CdSe QDs upon addition of Phenylmercury chloride. The arrow indicates the decrease in the fluorescence maxi-mum with increasing concentration of Phenylmercury chloride. (B) Plot of change in fluorescence intensity at 550 nm versus Phenylmercury chloride. Linearity was observed in the concentration range of Phenylmercury chloride from 0 -20 ppb. (C) Stern-Volmer plot display linearity between 0 - 60 ppb, suggesting the formation CdSe QDs- Phenylmercury chloride complex.

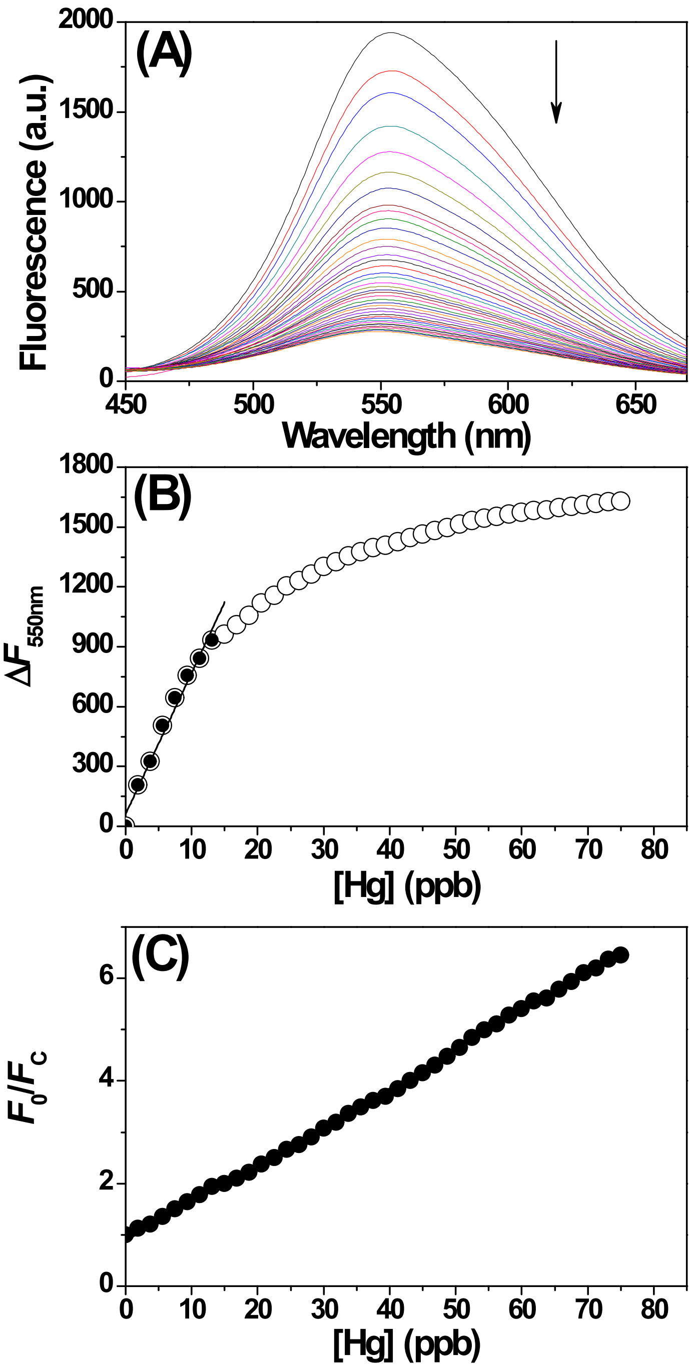

Figure S6: (A) Fluorescence response of CdSe QDs upon addition of elemental mercury. The arrow indicates the decrease in the fluorescence maximum with increasing concentration of elemental mercury. (B) Plot of change in fluorescence intensity at 550 nm versus elemental mercury. Linearity was observed in the concentration range of elemental mercury from 0 -13 ppb. (C) Stern-Volmer plot display linearity between 0 - 75 ppb, suggesting the formation CdSe QDs- elemental mercury complex.

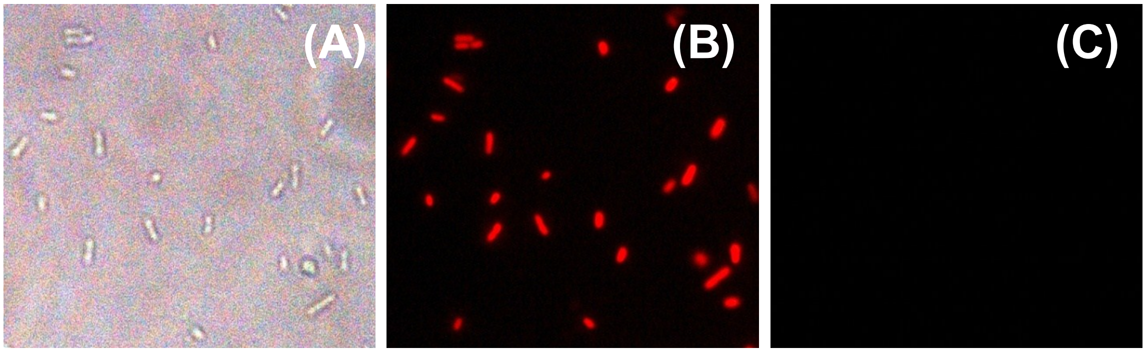

Figure S7: Bioimaging. (A) Bright and (B) fluorescence field image of *E.coli* stained with CdSe QDs. (C) fluorescence field image of *E.coli* stained with CdSe QDs and exposed to 25 ppb Hg^{2+} ions. The quenching of CdSe QDs fluorescence suggests the sensing of accumulated Hg^{2+} inside the cells.

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TEST REPORT

TEST REPORT NO: TNTH/M-0066/2018-19	DATE: 07.04.2018

SAMPLE SUBMITTED BY CUSTOMER

SAMPLE DESCRIPTION	Sample - 1
ANALYSIS STARTED ON	04.04.2018
ANALYSIS COMPLETED ON	07.04.2018

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Atomic Level of HG by ASS	-	PPM	1.135

Note : BQL : Below Quantification Limit, LOQ: Limit Of Quantification

***** END OF REPORT *****

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Figure S8: ASS report of mercury present in aqueous mercury chloride solution

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TEST REPORT

TEST REPORT NO: TNTH/M-0067/2018-19	DATE: 07.04.2018

SAMPLE SUBMITTED BY CUSTOMER

SAMPLE DESCRIPTION	Sample - 2
ANALYSIS STARTED ON	04.04.2018
ANALYSIS COMPLETED ON	07.04.2018

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Atomic Level of HG by ASS	-	PPM	3.286

Note : BQL : Below Quantification Limit, LOQ: Limit Of Quantification

***** END OF REPORT *****

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Figure S9: ASS report of elemental mercury

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TEST REPORT

TEST REPORT NO: TNTH/M-0068/2018-19	DATE: 07.04.2018

SAMPLE SUBMITTED BY CUSTOMER

SAMPLE DESCRIPTION Sample - 3

ANALYSIS STARTED ON 04.04.2018

ANALYSIS COMPLETED ON 07.04.2018

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Atomic Level of HG by ASS	-	PPM	5.956

Note : BQL : Below Quantification Limit, LOQ: Limit Of Quantification

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Figure S10: ASS report of mercury present in aqueous phenylmercury chloride solution