

Supplementary Information

Improved Sensing from Methionine Capped CdTe and CdTe/ZnS Quantum Dots for the Detection of Trace Amount of Explosive Chemicals (DNT, NB and NT) in Liquid Medium

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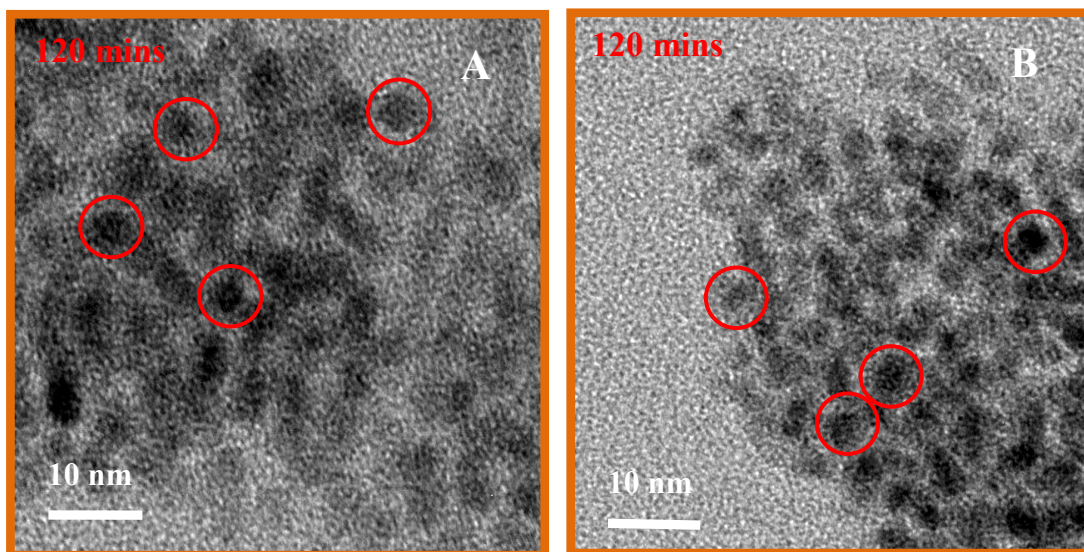


Figure S1. Shows the HRTEM image of (A)Methionine and (B) L-Cysteine capped CdTe QDs.

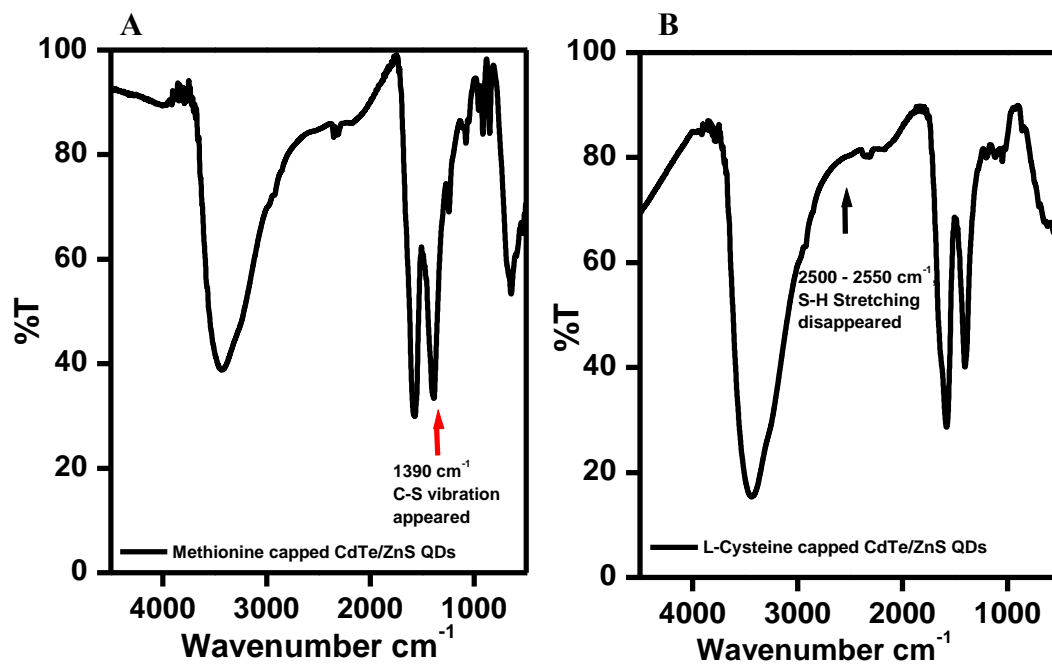


Figure S2. Shows the FTIR spectrum for core/shell QDs capped with (A) Methionine and (B) L – Cysteine.

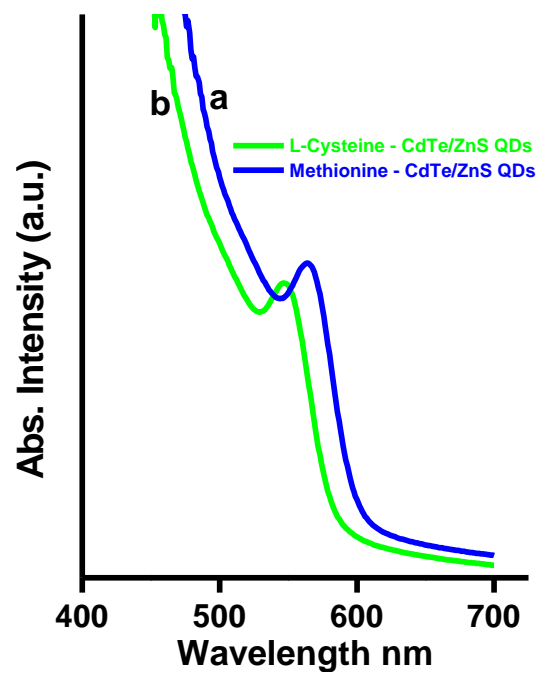


Figure S3. Shows the absorption spectrum for (a) Methionine capped; (b) L-cysteine capped CdTe/ZnS core/shell QDs.

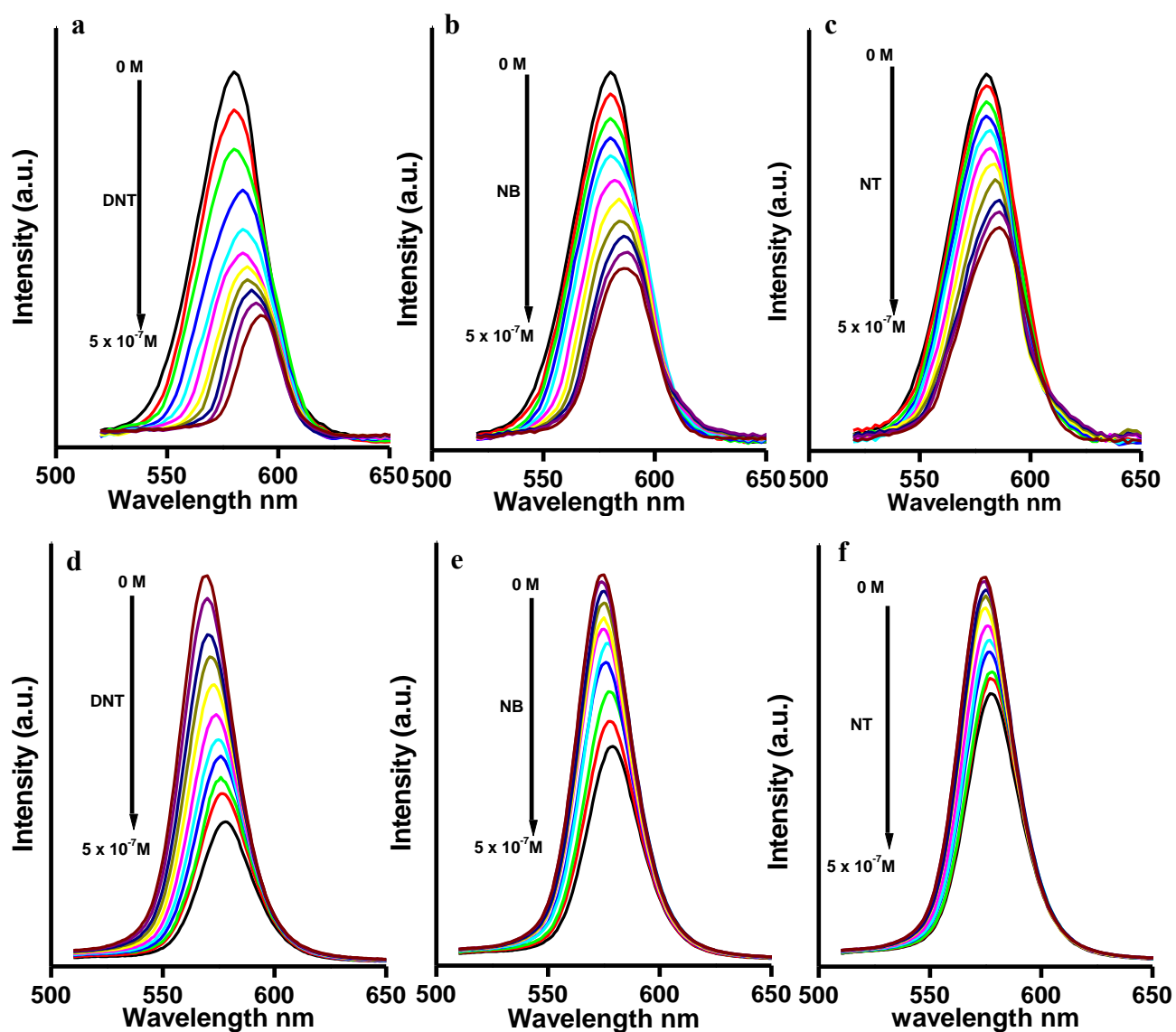


Figure S4. Fluorescence quenching spectrum of (a-c) Methionine capped core/shell QDs and (d-f) L-Cysteine capped core/shell QDs in DNT, NB and NT explosives respectively. The analytes concentration varies from top to bottom are 0, 0.5×10^{-7} , 1×10^{-7} , 1.5×10^{-7} , 2×10^{-7} , 2.5×10^{-7} , 3×10^{-7} , 3.5×10^{-7} , 4×10^{-7} , 4.5×10^{-7} and 5×10^{-7} mol/L respectively.

Table T1. Average Lifetime values for Methionine and L-Cysteine capped CdTe and CdTe/ZnS core/shell QDs with different concentrations of DNT, NB and NT analytes.

		Core/shell average lifetime x 10⁻⁹ S	
<i>Explosive</i>	<i>Concentration of explosive</i>	<i>Methionine capped CdTe/ZnS QDs</i>	<i>L-Cysteine capped CdTe/ZnS QDs</i>
DNT	0 M	23.99	22.83
	2 M	16.77	17.21
	4 M	9.08	12.18
NB	2 M	17.20	19.36
	4 M	12.13	15.23
NT	2 M	17.93	20.67
	4 M	16.14	16.42
		Bare average lifetime x 10⁻⁹ S	
		<i>Methionine capped CdTe QDs</i>	<i>L-Cysteine capped CdTe QDs</i>
DNT	0 M	7.33	7.19
	10 M	5.50	6.70
	20 M	5.02	6.18
NB	10 M	5.93	6.88
	20 M	5.71	6.62
NT	10 M	6.50	7.17
	20 M	5.84	6.82

Table T2. Charge transfer rate for Methionine and L-Cysteine capped CdTe and CdTe/ZnS core/shell QDs with different concentrations of DNT, NB and NT analytes.

<i>Explosive</i>	<i>Concentration of explosive</i>	Core/shell Charge Transfer Rate x 10⁷ S⁻¹	
		<i>Methionine capped CdTe/ZnS QDs</i>	<i>L-Cysteine capped CdTe/ZnS QDs</i>
DNT	2 M	1.79	1.42
	4 M	6.83	3.82
NB	2 M	1.64	0.78
	4 M	4.07	2.18
NT	2 M	1.40	0.45
	4 M	2.02	1.70
		bare Charge Transfer Rate x 10⁷ S⁻¹	
		<i>Methionine capped CdTe QDs</i>	<i>L-Cysteine capped CdTe QDs</i>
DNT	10 M	4.54	1.00
	20 M	6.26	2.26
NB	10 M	3.22	0.60
	20 M	3.85	1.17
NT	10 M	1.74	0.02
	20 M	3.47	0.74