Supporting Information

Precise Engineering of Nanocrystal Shells *via* Colloidal Atomic Layer Deposition

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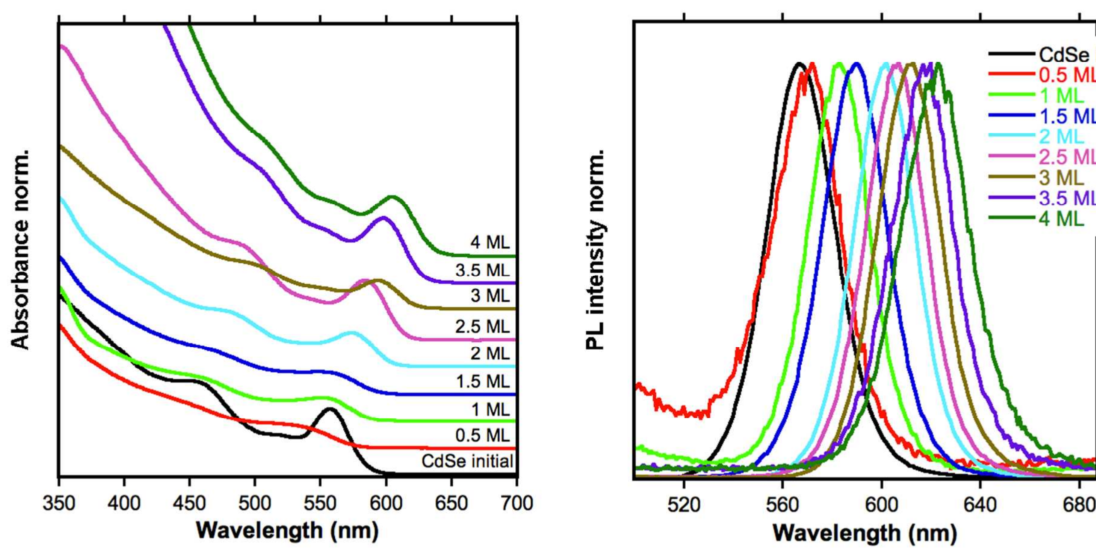

Figure SI1. Evolution of absorption (left) and PL (right) spectra of CdSe NCs upon growing four CdS MLs resulting in CdSe/CdS4 NC heterostructure.

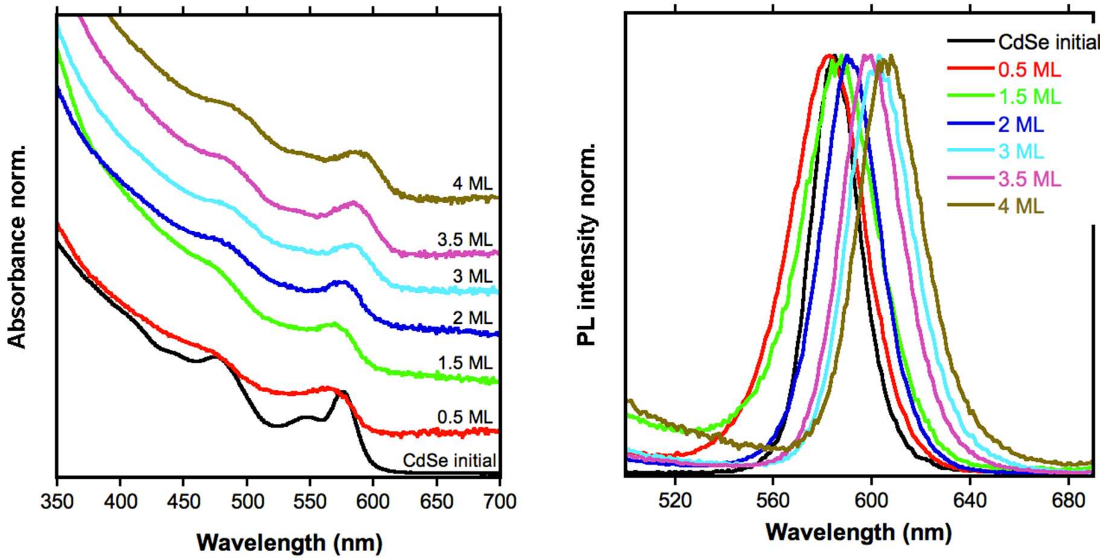

Figure SI2. Evolution of absorption (left) and PL (right) spectra of CdSe NCs upon growing four ZnS MLs resulting in CdSe/ZnS4 NC heterostructure.

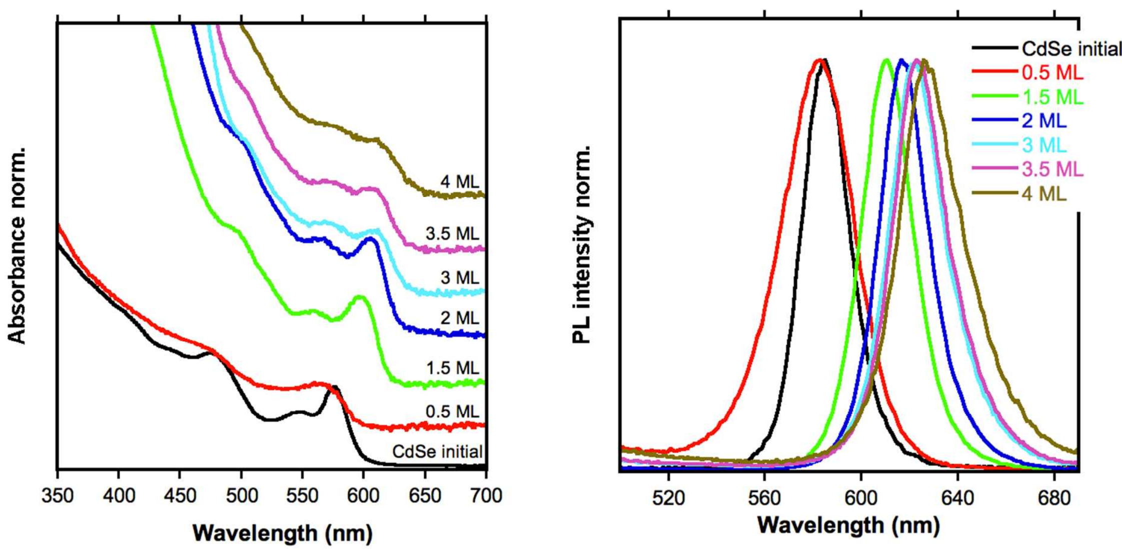

Figure SI3. Evolution of absorption (left) and PL (right) spectra of CdSe NCs upon growing two CdS MLs, one ZnS ML and one CdS ML resulting in CdSe/CdS2/ZnS/CdS NC heterostructure.

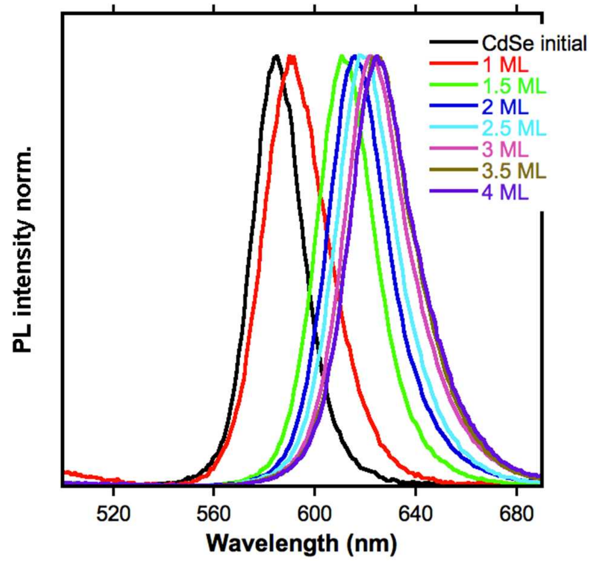

Figure SI4. Evolution of PL spectra of CdSe NCs upon growing three CdS MLs and one ZnS ML resulting in CdSe/CdS3/ZnS NC heterostructure.

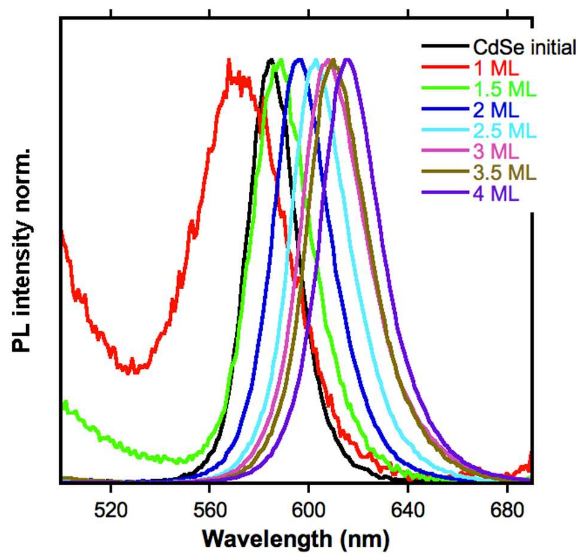

Figure SI5. Evolution of PL spectra of CdSe NCs upon growing one ZnS ML and three CdS MLs resulting in CdSe/ZnS/CdS3 NC heterostructure.

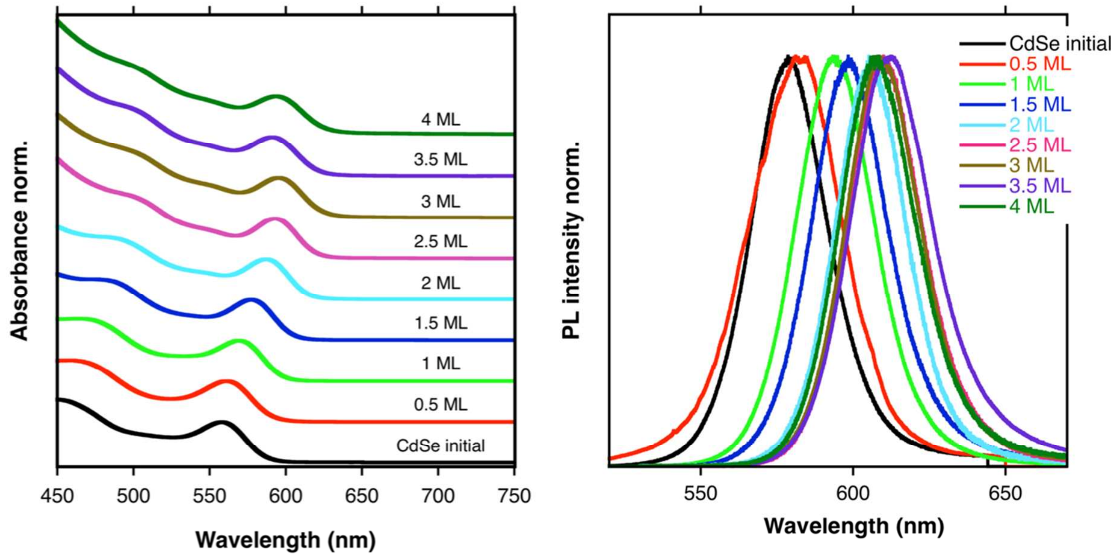

Figure SI6. Evolution of absorption and PL spectra of CdSe NCs upon growing two CdS MLs and two ZnS MLs resulting in CdSe/CdS2/ZnS2 NC heterostructure.

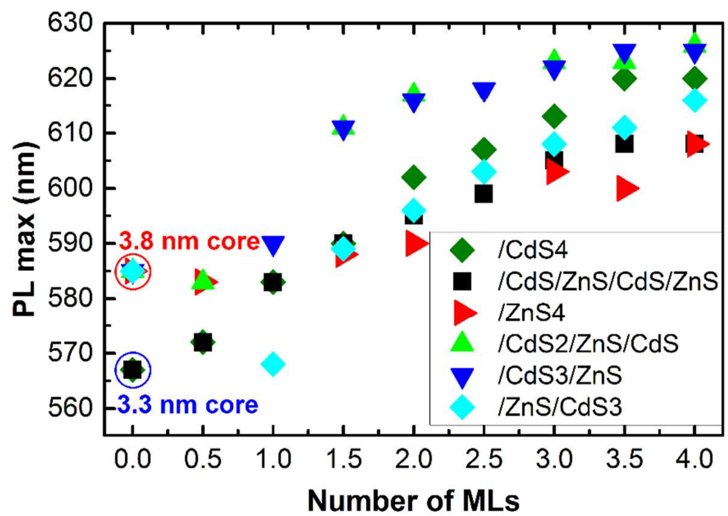

Figure SI7. Positions of the PL maxima depending on the shell configuration for two CdSe NC core sizes, 3.3 nm and 3.8 nm.

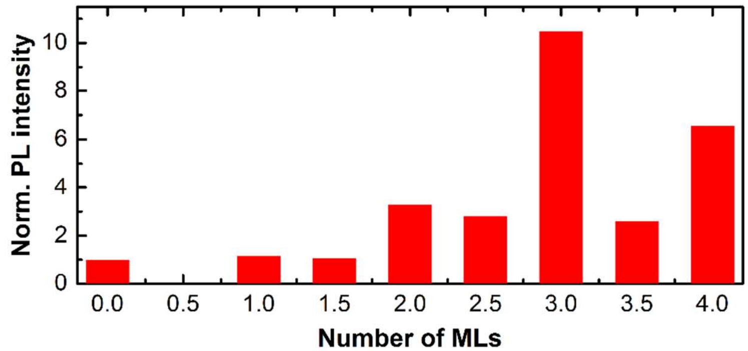

Figure SI8. PL evolution of the CdSe/ZnS/CdS3 NCs as a function of the shell thickness: initial PL intensity value remained almost unaltered after ZnS layer deposition and then increased six-fold of the starting value (the numbers are normalized areas under PL curves plotted on energy scale).

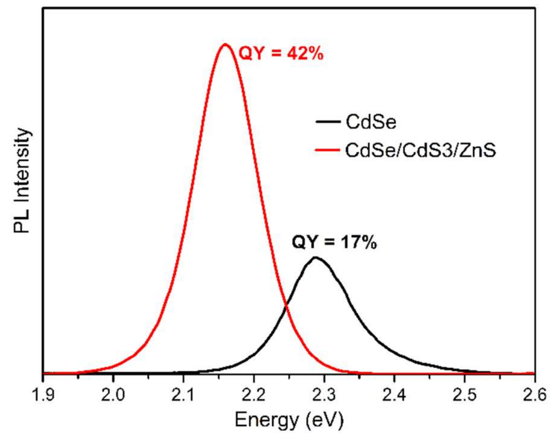

Figure SI9. PL spectra and PLQYs of initial CdSe core (3.8 nm) and CdSe/CdS3/ZnS core/shell NCs, measured after storing the samples under air and ambient light for several days.

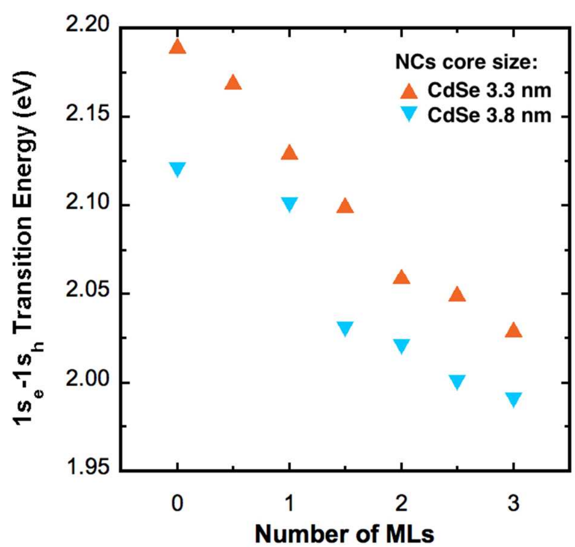

Figure SI10. Evolution of the $1S_e$-$1S_h$ transition energy with increasing CdS shell thickness for 3.3 nm and 3.8 nm core CdSe NCs. Growing a thicker shell reduces the transition energy. This behavior is more pronounced for the CdSe 3.3 nm core size, since the exciton confinement is more prominent compared to the 3.8 nm NC core.