Supporting Information

Auger and Carrier Trapping Dynamics in Core/Shell Quantum Dots Having Sharp and Alloyed Interfaces.

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Spectra of 4.0 nm CdSe cores, 5 monolayer ZnSe shells.

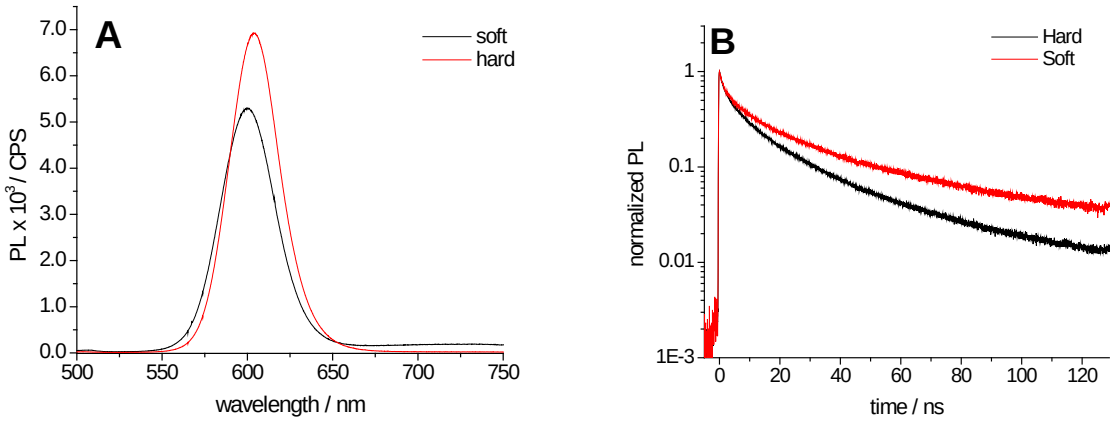

Figure S1: A) PL spectra of alloyed 'soft' interface particles compared with 'hard' interface un-annealed particles. The quantum yield is ~30% for the former and 40% for the latter. B) Normalized PL decay kinetics at the PL maximum, collected by TCSPC for CdSe/ZnSe particles in chloroform with a hard and soft interface, as indicated. The observed lifetime of the core-shell particles increases upon annealing.

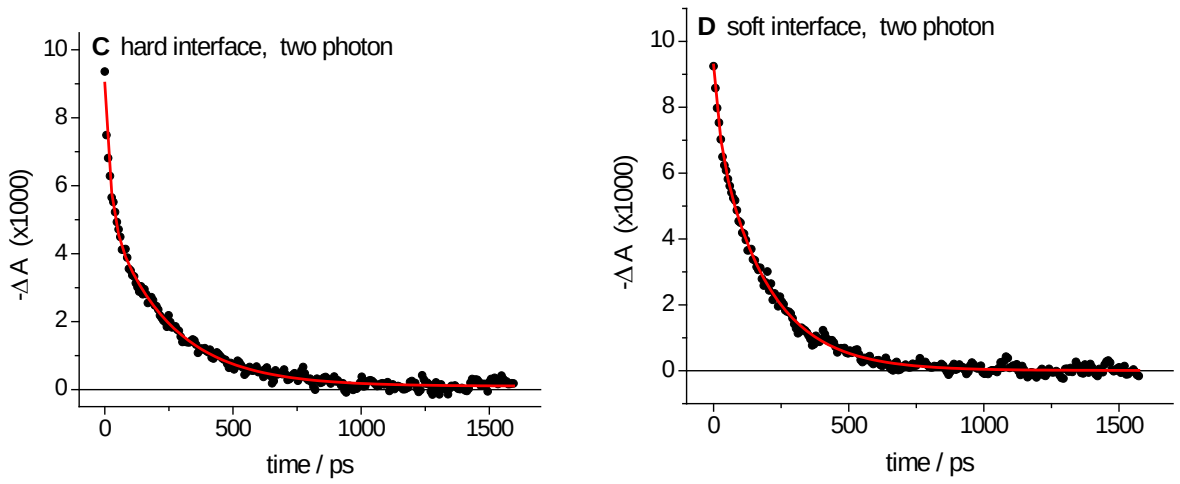

Figure S2: Full data range for high minus scaled low power kinetics for the soft and hard interface particles, corresponding to figures 4C and 4D in the text. The hard interface results are fit to a biexponential decay having 19 ps (41%) and 240 ps (59%) components and the soft interface results are fit to a biexponential decay having 21 ps (17%) and 190 ps (83%) components (red curves).

Spectra of 2.4 nm CdSe cores, 4 monolayer ZnSe shells.

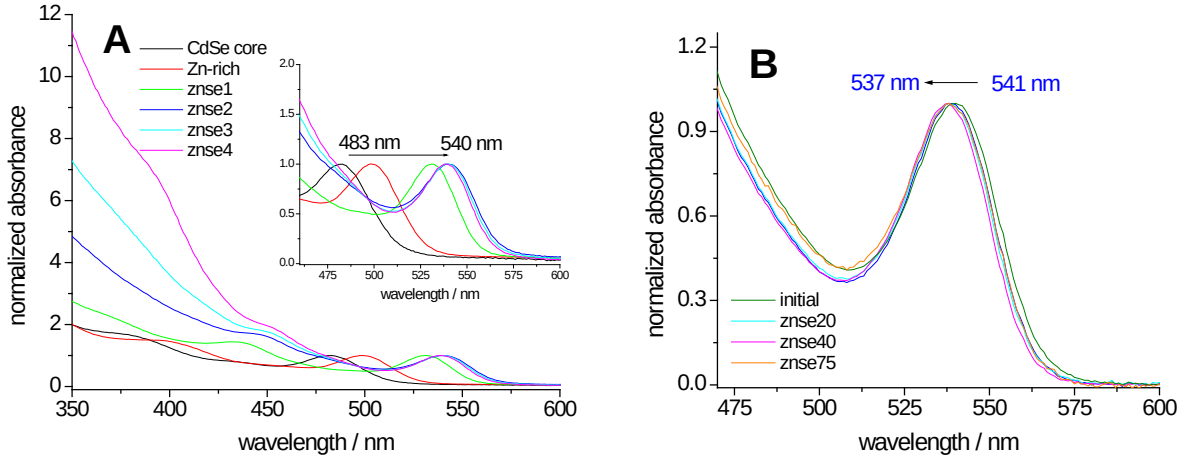

Figure S3: A) Absorbance spectra of 2.4 nm CdSe cores during the growth of the 4 monolayer shell. The insert shows the lowest exciton region. B) Absorption spectra of core/shell QDs during in-situ annealing at 260 °C. The lowest energy exciton shifts to the blue as annealing proceeds.

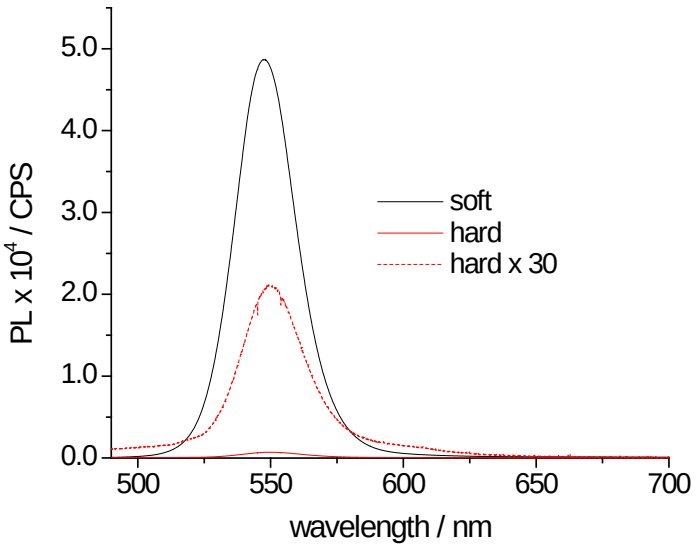

Figure S4: PL spectra of alloyed 'soft' interface particles compared with 'hard' un-annealed particles. The quantum yield is about a factor of 60 greater for the soft interface particles.

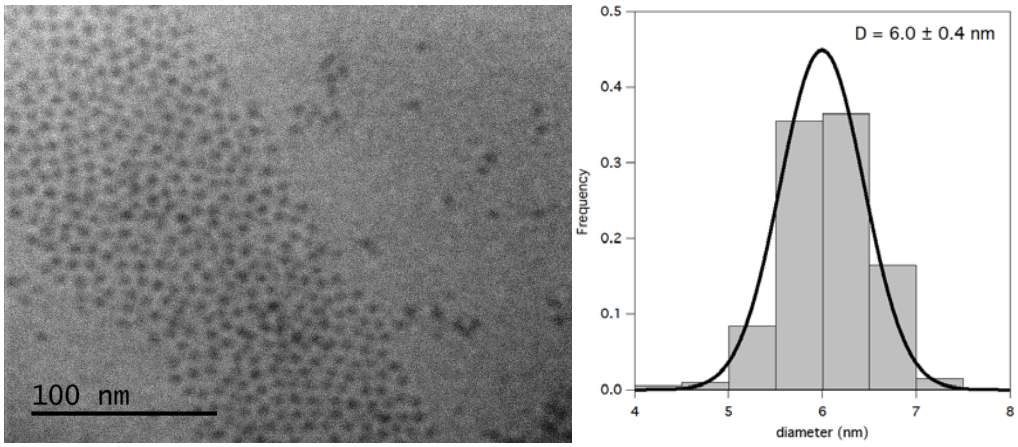

Figure S5: Representative TEM micrograph of CdSe/ZnSe core/shell particles (4.0 nm cores, 4 ML shells) prior to annealing (hard interface).

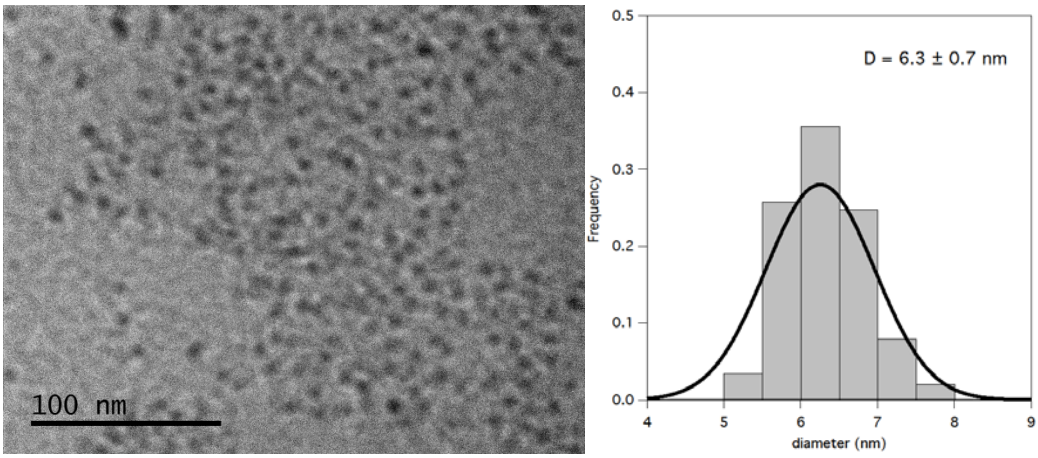

Figure S6: Same as figure S5, except following 70 minutes of annealing (soft interface).

Spectra of 3.1 nm CdSe cores, 4 monolayer ZnSe shells.

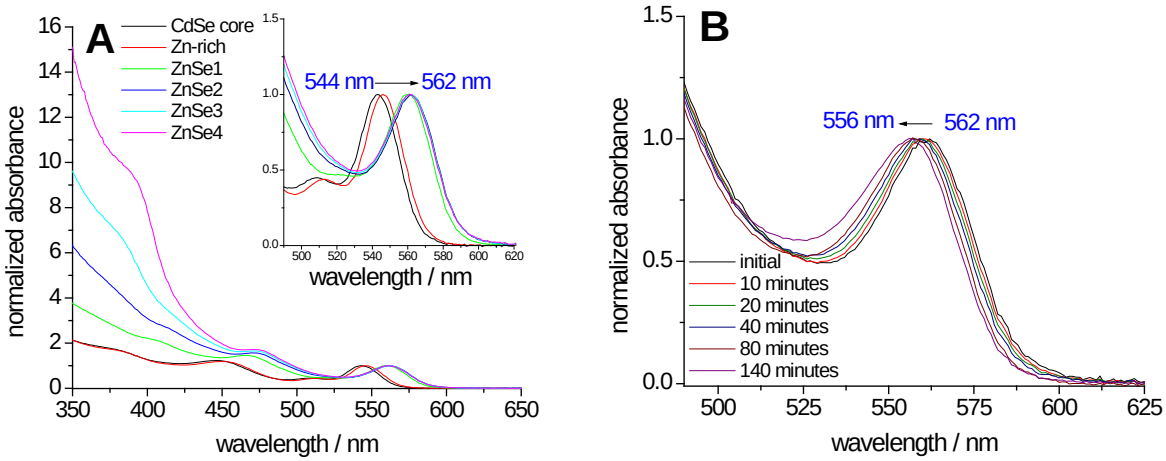

Figure S7: A) Absorbance spectra of 3.1 nm CdSe cores during the growth of the 4 monolayer shell. The insert shows the lowest exciton region. B) Absorption spectra of core/shell QDs during in-situ annealing at 260 °C. The lowest energy exciton shifts to the blue as annealing proceeds.

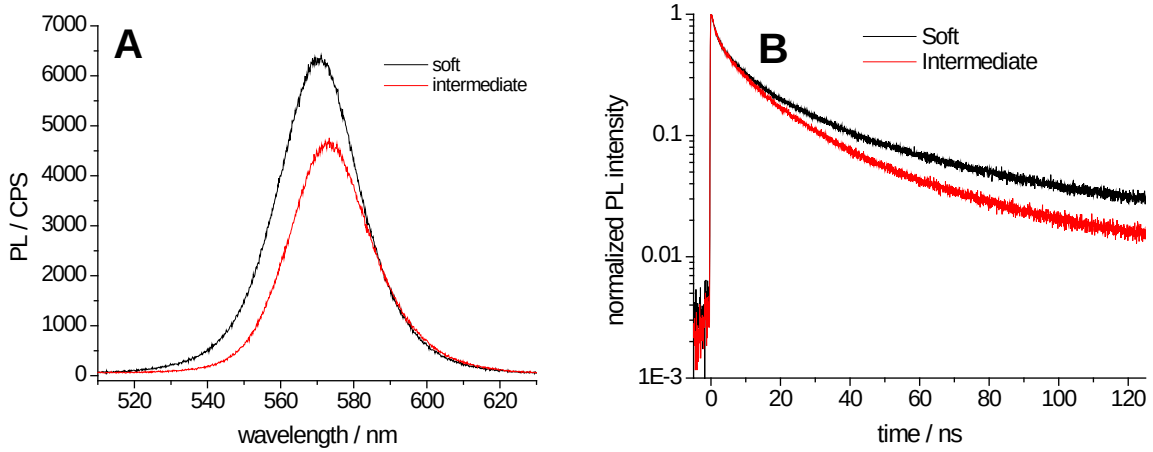

Figure S8: A) PL spectra for the intermediate sample (10 minutes annealing) and the soft interface particles (140 minutes annealing). The QYs are 17 % and 26 % for the former and the latter. B) Normalized PL decay kinetics at the PL maximum, collected by TCSPC for CdSe/ZnSe particles in chloroform with a intermediate and soft interface, respectively. The hard interface (no annealing) particles had a QY of less than 1%.