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Thermally-induced Atomic Reconstruction of PbSe/CdSe Core/Shell Quantum Dots into PbSe/CdSe Bi-hemisphere Hetero-nanocrystals

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SUPPORTING INFORMATION

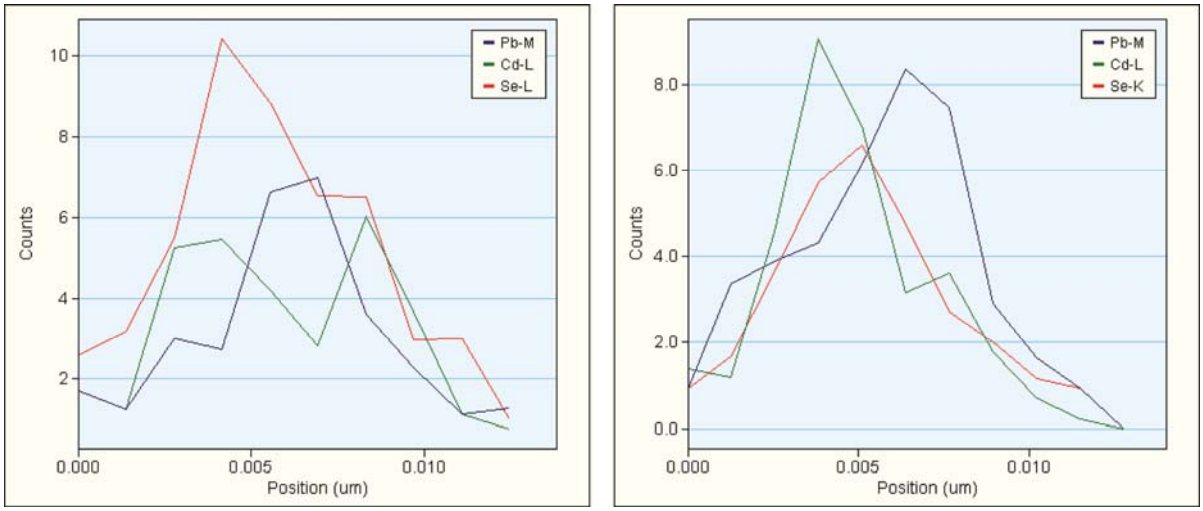

Figure S1. EDX analysis of two different PbSe/CdSe HNCs heated for 1.5 h at 160°C under vacuum (10^{-6} mbar) in a Schlenk line.

The EDX analysis presented in the right side of Fig. S1 shows that one side of the HNC is richer in Pb, while the opposite side is richer in Cd, clearly indicating the reconstruction of the original PbSe/CdSe core/shell QDs into bi-hemisphere HNCs. In contrast, the EDX analysis displayed in the left panel shows a higher Cd concentration at the edges of the HNC, while the center is richer in Pb. This is consistent with a reconstruction into a "peacock eye"-like HNC, which is oriented on the substrate in such a way that the PbSe part is facing up.

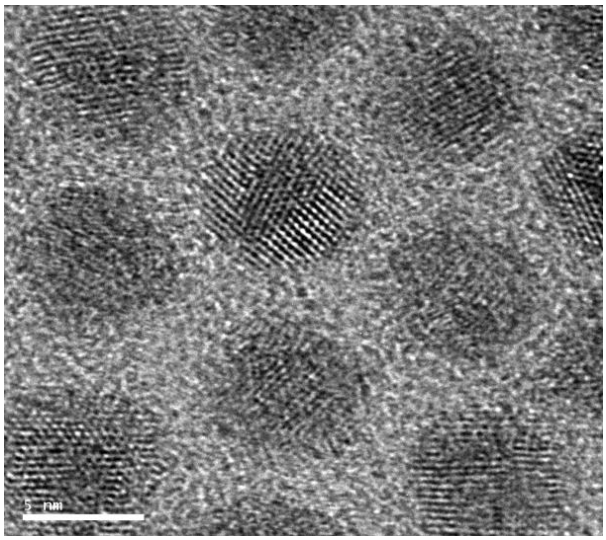

Figure S2. HR-TEM image of PbSe/CdSe HNCs after heating in diphenylether at 150 °C. The HNCs still possess a core/shell structure.

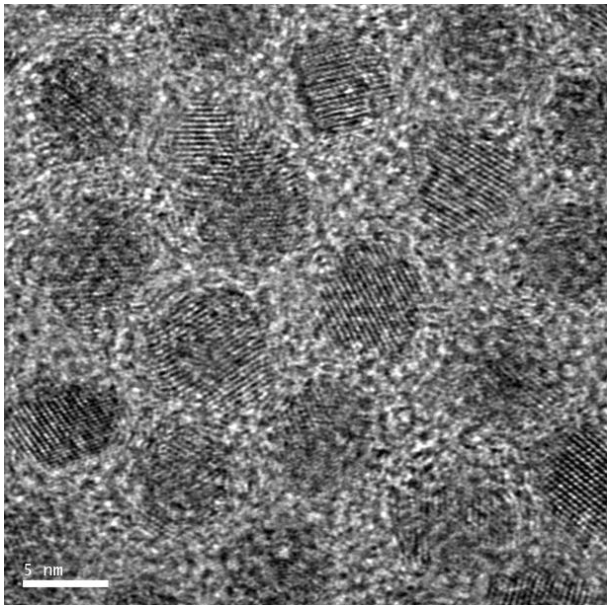

Figure S3. HR-TEM image of PbSe/CdSe HNCs after heating in diphenylether at 200 °C. Core/shell structures are difficult to identify, but nevertheless bi-hemisphere HNCs are also not present.

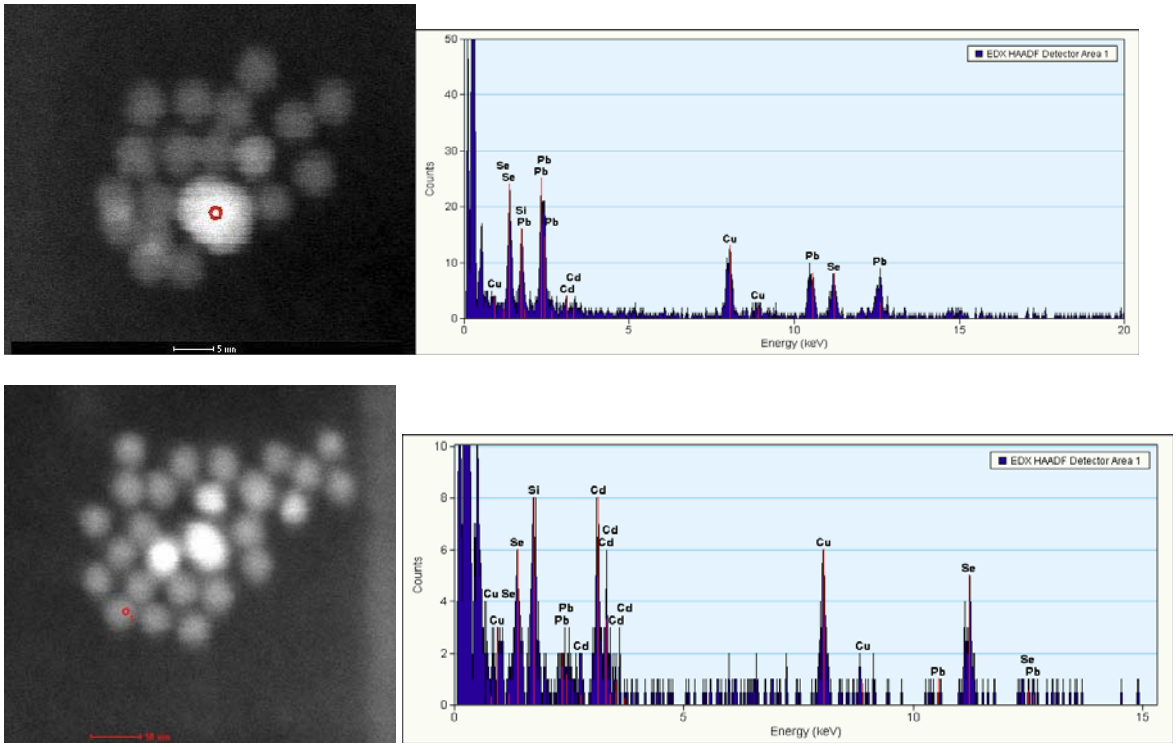

Figure S4. STEM images (right) and EDX analysis (left) of PbSe/CdSe HNCs heated in diphenylether at 220 °C. The red spots indicate the area on which the EDX analyses were done.

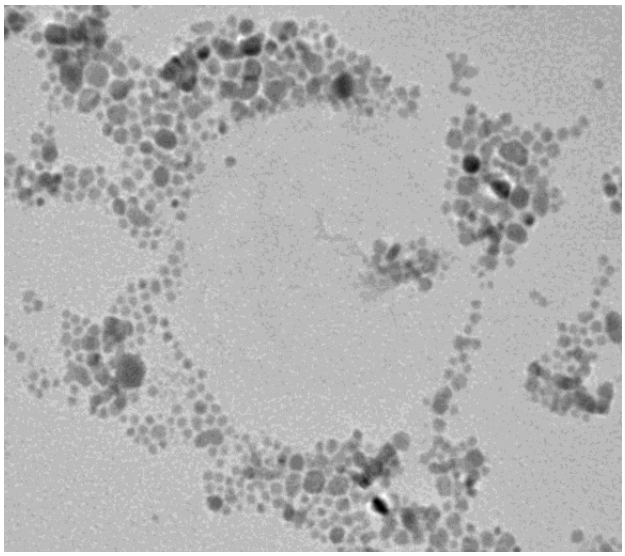

Figure S5. TEM image of PbSe/CdSe HNCs after heating in diphenylether at 240 °C.

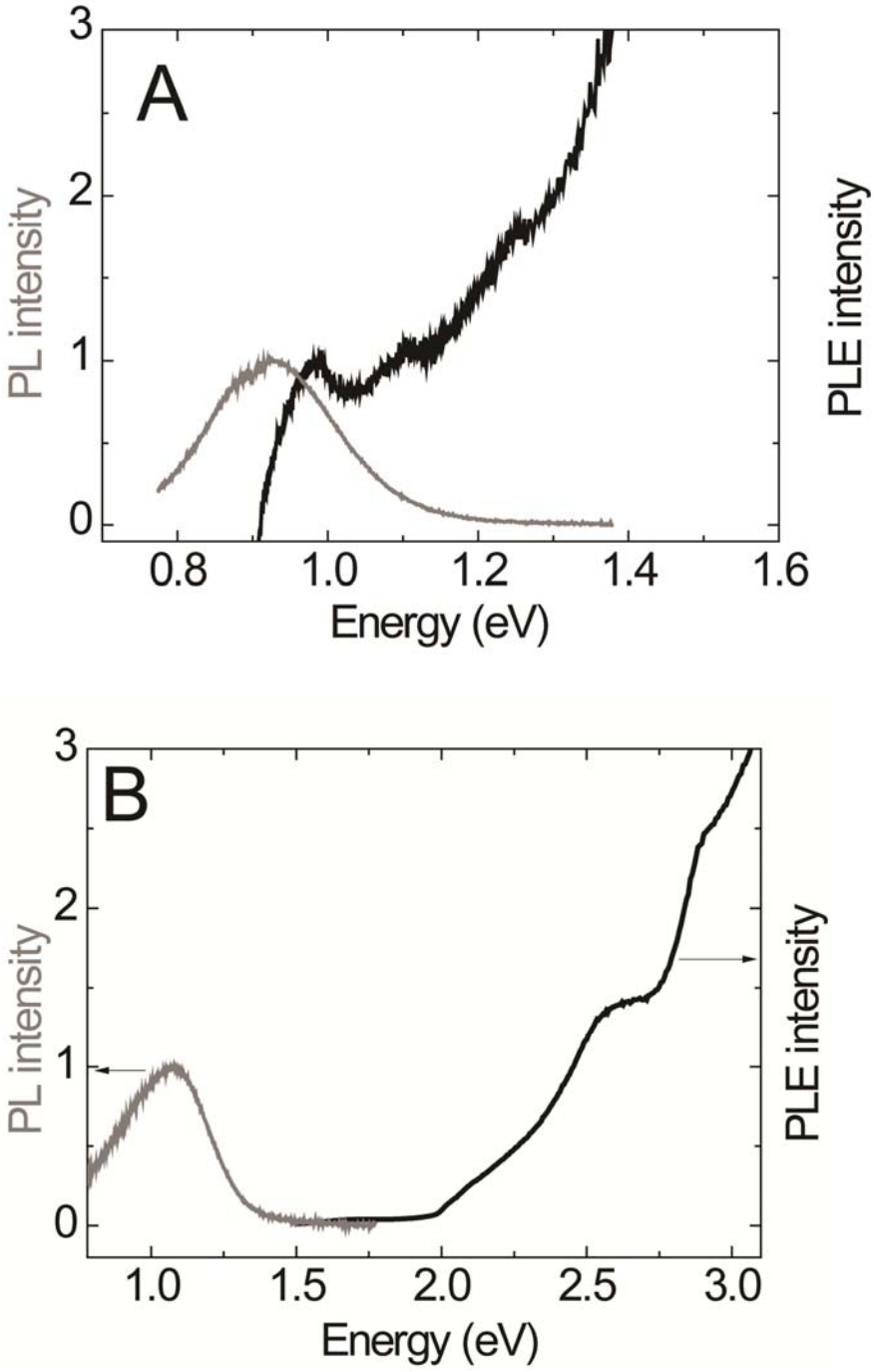

Figure S6. Photoluminescence (PL, grey line) and PL Excitation (PLE, black line) spectra of: (A) PbSe/CdSe core/shell QDs with a total diameter of 5.6 nm and 3.6 nm diameter core; and (B) PbSe/CdSe "peacock eye"-like bi-hemisphere HNCs obtained by thermal annealing of the sample shown in (A) at 160 °C under vacuum (10^{-6} mbar) in a rotary evaporator (see Figure 8 in the main text for illustrative HR-TEM images).