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Shape Manipulation of II-VI Semiconductor Nanocrystals and Heterostructures by Controlled Reactant Injection. AARON SAUNDERS, FELICE SHIEH, BRIAN KORGEL, The University of Texas at Austin — We have developed a general solution-phase method for inducing CdS, CdSe, and CdTe nanorod growth. The shape can be tuned from spheres to rods with aspect ratios up to 20 simply by sequentially injecting precursor solutions to promote epitaxial elongation of the wurtzite crystal structure in the [001] direction (i.e., along the c-axis). Under the appropriate conditions, homogeneous particle nucleation can be avoided upon subsequent precursor injections and the fast growth kinetics in the [001] direction extends the nanorods without increasing the diameter. We have employed this sequential injection approach to form both Type I (Nested) and Type II (Offset) heterostructures of CdS/CdSe/CdS and CdTe/CdSe/CdTe nanorods. Consistent with the Type I band offset, addition of CdS extensions to the ends of the CdSe nanorods significantly enhances the photoluminescence (PL); whereas, the extension of CdTe off the ends of the CdSe rods quenches the PL emission as electrons and holes separate at the CdSe/CdTe interface in the rod.

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