

Synthesis of Elongated CdSe/CdS Core/Shell Nanoparticles Realized on Top of Cubic Crystal Structured Cores

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Shown here is a new and easy method to grow elongated and further more in thickness controllable CdSe/CdS core/shell nanoparticles. The particles hold a very high extinction coefficient in comparison to common core/shell structures. This made them perfect emitter materials (e.g. for display applications).

The wurtzite shell is grown on top of a cubic crystal structured core. So an elongated growth is realized without the commonly used wurtzite structured core.[1] The presented synthesis is realized using a combination of coordinating surfactants and non coordinating solvents as well as a two step heating method.

Further studies determined the Cd to S ratio to be a main factor for the aspect ratio of the resulting particles. By now the aspect ratio can be tuned from spherical to 1:20 diameter to length, directly during the synthesis and not in post synthesis step.[2]

More over these results can be way guiding for the synthesis of elongated, cadmium free systems, because most promising materials e.g. InP or ZnSe do not exist in a the hexagonal core structure.

References: [1] L. Carbone et al., Nano Letters 7.10 (2007), S. 2942_2950

[2] M.G. Bawendi et al., ACS Nano 10, 3, (2016), S. 3295-3301

Figures:

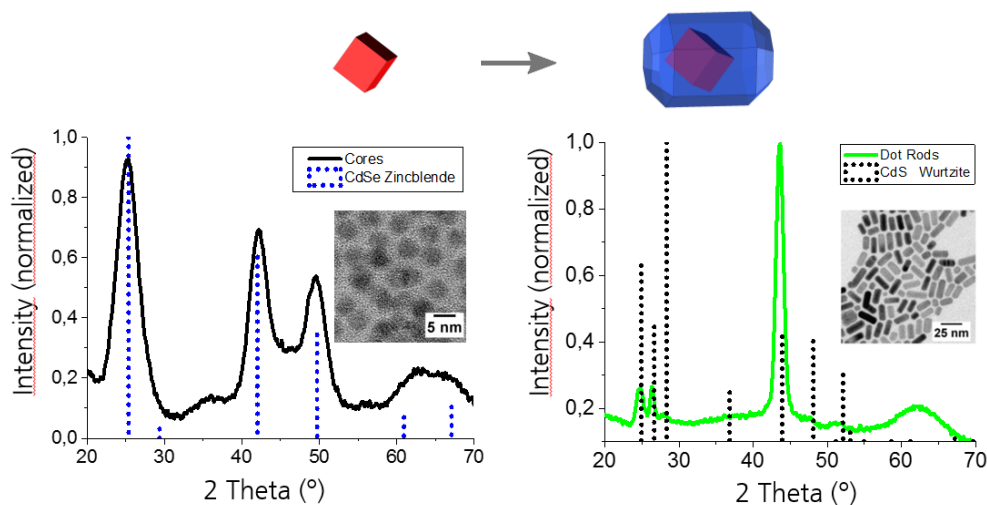


Figure 1: XRD of cubic CdSe cores (left) and resulting hexagonal CdS shell on these cores (right.)