



1 Schematic representation of InP-QD with ZnS/ZnSe shell.

2 Color diagram.

3 Researcher demonstrating glowing QDs.

QUANTUM MATERIALS

DESIGN, SYNTHESIS, APPLICATION

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Quantum Materials Design

Design of quantum materials (e.g. quantum dots, perovskites) with respect to the targeted application including the following aspects:

- material composition
- (multi) shell design
- ligand shell
- emission wavelength

Materials for quantum dot core design, e.g.:

- InP, ZnSe, CdSe, CuInS₂, PbSe

Materials for lead based perovskites, e.g.:

- standard perovskite (MAPI)
- triple cation perovskites (e.g. Cs, Formamidinium, Methylammonium)
- quadruple cation (e.g. Rb, Cs, Formamidinium, Methylammonium)
- wide selection of corresponding precursors

Shell design:

- single and multi shell
- thin shells and giant shells

Ligand shell:

- ligand exchange during or after synthesis
- polarity tuning
- development of new ligand shell structures and setups

Synthesis

Expertise for various synthesis methods:

- heating up, hot injection, hybrid approaches
- solvent/melt based synthesis
- reaction tracking
- upscaling up to gram batches
- good reproducibility
- experience with flow reactor synthesis

Application

Use of quantum materials in different applications:

- display and lighting (QDEF/QLED)
- photovoltaics
- inkjet printing
- security features
- sensing