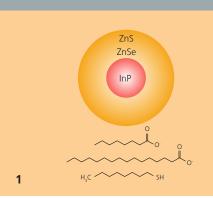
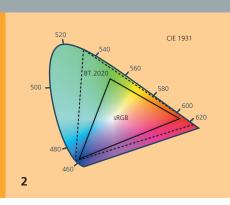


### FRAUNHOFER INSTITUTE FOR APPLIED POLYMER RESEARCH IAP







- 1 Schematic representation of InP-QD with ZnSIZnSe shell.
- 2 Color diagram.
- 3 Researcher demonstrating glowing QDs.

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# **QUANTUM MATERIALS** DESIGN, SYNTHESIS, APPLICATION

#### 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, CuInS<sub>2</sub>, 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

# Application

Use of quantum materials in different applications:

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