Project 3.8 Probing the structure-property relationships in single-crystalline lead halide perovskites for photodetector applications

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Background:

Photodetectors based on semiconductors, which convert light into electric signals are widely used in optical communication and chemical/biological detection. The prerequisite for the fabrication of efficient photodetector is that the semiconductor material should possess a high absorption extinction coefficient to ensure sufficient light being absorbed by an active layer, the large charge carrier mobility for generating high photocurrent and low density of defects for diminishing the dark current density. In recent years, hybrid organic–inorganic lead halide perovskites have emerged as a new generation of promising materials for high-performance photodetectors.

Aim:

The overall goal of this project is to probe the relationship between the structure and composition of the perovskite active layer and its charge transport properties to understand the physical processes that determine the photoresponse of perovskite single crystals (SCs) based photodetector under working conditions. These studies will provide a better understanding of how the changes in structural composition, conduction mechanism and dimensionality will affect the figure-of-merit parameters of resulting photodetectors.

Requirements:

- a university degree in chemistry or materials science, experience in laboratory,
- work in field of inorganic and coordination chemistry, knowledge in spectroscopic,
- methods, independence to design and execute experiments/characterizations,
- and analytical mindset for interpreting measured data.