Liquid State Ligand Exchange

Due to their high absorbance, low cost, and tunable bandgap, perovskites show great potential in addressing the growing demand for renewable energy. They are considered a promising candidate to replace silicon as the absorber material in photovoltaic technologies. By decreasing the crystal size within the film below 10 nm, the so-called quantum confinement regime is reached, and ligands need to be used to limit their size. As ligands are a tradeoff between stable size and charge carrier transport properties, they need to be exchanged for shorter ones. Generally, perovskite nanocrystals offer the great advantage of exceeding the theoretical maximum efficiency for a solar cell.

The advertised Master's thesis includes manufacturing and optimizing perovskite nanocrystal solar cells using a wide range of optical, electrical, and scattering characterization techniques. The main focus of the Master's thesis will be the ligand exchange in the liquid solution state before deposition via the scalable slot-die coating technique.