

Opto-electronic investigations of light management in hybrid solar cells

The close combination of organic and inorganic semiconductors in a hybrid solar cell promises several advantages for carrier extraction and at the same time also offers great changes for efficient light absorption. The present topic will take a closer look at light management in hybrid solar cells and will have a particular focus on opto-electronic simulations in 1 – 3D using e.g. the finite element method. Various geometries of inorganic nanorods covered by organic material will be calculated and also the impact of plasmonic and photonic nanoparticles, additionally integrated into the structure, will be investigated. The calculations will be set up based on experimental input data and optimizations shall be confirmed in subsequent experiments. The fabrication of ZnO nanorods, of adequate optically active nanoparticles and their stable and efficient combination will constitute the experimental counterpart to the theoretical simulations. Further insight into light interaction with the nanostructures is expected from PL and micro-PL measurements.