

Summary

This proposal suggests an interdisciplinary approach, combining the synthesis, photophysics, materials research, and process engineering expertises from the different network partners with the objective of both improved and more versatile solar cells and a better understanding of fundamental processes in organic photovoltaics. Our work will mainly address the following issues:

- For shifting the absorption spectrum and for improving the transport properties a new class of oligomers and polymers will be synthesized and evaluated in addition to the use of commercially available compounds that will also be used in the project.
- The morphology during film drying will be investigated for a better understanding of film formation and in order to determine the relevant thermodynamic parameters. The final morphology depends not only on material and blend ratio, but also on the deposition technique and drying time. The systematic investigation of the drying behavior will be correlated with the resulting macroscopic optoelectronic properties and a detailed structural investigation using X-ray diffraction (XRD), Atomic Force Microscopy (AFM) and Kelvin Probe Force Microscopy (KPFM).
- Transparent electrode systems are of pivotal importance for many applications (such as, e.g., the integration into buildings) as well as for the realization of efficient tandem and multijunction cells. We will use inorganic (transparent conductive oxides (TCO) and metallic) as well as vacuum deposited doped organic layers on top of the polymeric active layer. The critical parameters such as transmittance, series resistance and open-circuit voltage will be studied systematically for these compound layers. Additionally the influence of interfaces and interlayers will be investigated.