

## Summary

The central goal of the project is an improved understanding of electronic properties of active organic layers (blends) in organic solar cells including their interfaces (electrode/organics and organics/organics). We focus on new organic materials to be used as active layers of “bulk heterojunction”-type solar cells and their interfaces, both tuned systematically. Specially designed thiophene-based organic semiconductors are synthesized for organic/fullerene-based donor/acceptor couples with the aim to tune electronic properties such as the gap of the molecules and the charge injection barriers at the interfaces. Oligomers are synthesized as model systems for the study of the electronic interface properties. Thin films and interfaces are compared to those of corresponding polymer and polymer blends, systematically. Correlations between organic materials properties, thin film deposition parameters, interface properties and the resulting electronic structure are studied, including selective modifications of interfaces to electrodes by e.g. electron sensitive layers. Light-induced effects on the electronic structure shall give further insight on photophysical properties, approaching working conditions of OSC. Our studies will be carried out using complementary spectroscopic techniques that shall yield wide and detailed experimental information on these physical properties.