

## Summery

We propose a programme of systematic studies of mechanisms of charge generation and recombination in blended organic semiconductors with electron donating and electron accepting properties, respectively, aimed at clarifying the presence and the role of charge separated states intermediate between bound excitons and free charge carriers. It is assumed that such states are preferably stabilized at the interface of the materials blended. The decay of such geminate polaron pairs depends on the microscopic structure (morphology) of the bulk-heterojunction, but also on the relative spin orientation of charges within the pair. To probe such pair states, the magneto-optical spectroscopic technique based on the combination of electron-spin resonance and optical techniques, the photoluminescence and the photoinduced absorption spectroscopy, will be applied. Thus, a link between optical properties, e.g., the energetic position of the emission/absorption bands, and the spin state of recombining states will be established. The blend morphology will be controlled by the blend composition, film thickness, and annealing conditions. The morphology will be characterized with scanning force microscopy (SFM), Nanotomography based on SFM, and scanning electron microscopy. By analyzing the data obtained with different techniques, a detailed understanding of the correlation between electronic properties and morphology of photoactive blends is expected. The study of recombination kinetics of photoinduced charges is of outmost importance for organic photovoltaics as well as for organic optoelectronics in general.