

Project Summary 4

Charge separation at nanostructured molecular donoracceptor interfaces

Organic donor and acceptor molecules represent an important class of materials for solar energy conversion. The focus of this project is to combine the expertise of four experimental groups to address the correlation between film and interface morphology and the photoelectrical properties of excitonic solar cells. The goal of this multi-lateral approach is to develop a detailed understanding of the correlation between structural and electronic properties, microscopic transport phenomena and macroscopic parameters determining solar cell performance for different prototypes of donor and acceptor materials. In the first two funding periods we have studied a variety of D/A combinations, both in planar heterojunctions as well as in bulk heterojunctions, in order to identify different growth behaviour and to estimate their potential in OPV cells. In this final phase of the project we will now focus our efforts on selected, particularly promising D/A pairs, e.g. those containing diindenoperylene as acceptor moiety, and develop a general understanding of molecular solar cells by bringing together all the information obtained by our synergetic approach. This also includes interfaces between organic layers and metal electrodes as well as environmental effects and materials purity.