Summery

Development of solution processable bulk heterojunction (BHJ) devices based on lowmolecular- weight organic compounds is an emerging research field with high potential for cost-effective generation of electricity from solar light. Until to date, only few compounds could be identified as suitable electron donor components for such devices. Thus, exploration of new efficient molecular semiconductors for this purpose is a challenging, but potentially rewarding, task. Our recent observation that dipolar merocyanine dyes, which are widely applied as nonlinear optical and photorefractive materials, also exhibit photovoltaic activities motivated us to explore the potential of this traditional class of colorants for solution processable bulk heterojunction (BHJ) solar cells. Thus, the major objective of our initial proposal within the DFG priority program “SPP 1355: Elementary Processes of Organic Photovoltaics” has been the investigation of photovoltaic efficiencies of blends of bismerocyanine dyes, which can form supramolecular polymers, with fullerene derivative PCBM ([6,6]-phenyl-C61-butyric acid methyl ester). As the bismerocyanine dyes that we have studied so far, show rather low power conversion efficiencies due to their poor selfaggregation propensity and unfavourable solubilities, in the forthcoming project period we will focus on bismerocyanine dyes with enhanced solubility and self-assembly propensity to adequately address the concept of supramolecular polymerization. Furthermore, we will extend our concept to trismerocyanines, which will lead to branched 3D-structures and networks.