Novel Concepts in Polymer Bulk Heterojunction Devices

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Abstract:
Polymer bulk-heterojunction (BHJ) solar cells are the present generation of organic photovoltaic (OPV) devices. Although they show excellent performance and potential for lowering production costs, they are limited by the high fraction of optically insensitive materials present. In this work, we discuss the effect of introducing a small amount of graphene into the active layer of BHJ devices. The graphene is shown to influence both exciton dissociation and charge transport in the donor: acceptor blend. Greatly improved OPV performance was achieved due to addition of graphene. Device physics and morphological changes in the polymeric active layer were investigated using different techniques. Further efforts to improve device performance and necessary studies will also be discussed.

Bio:
Fei Yu is a PhD candidate in materials science, University of Cincinnati. In 2008, he received his Bachelor degree in Chemical Engineering from Southeast University, Nanjing, China. In 2009, he received Master of Engineering degree in Material Engineering from University of Cincinnati. After that Mr. Yu joined Dr. Vikram Kuppa’s research group and has been working on organic photovoltaic device and studying the behavior of polymer/graphene blend system in OPV application.