Engineering Energy Transport in Organic Photovoltaic Cells

Organic semiconductors are attractive for application in photovoltaic cells due to their highly tunable optical properties and compatibility with high-throughput processing techniques. Indeed, recent demonstrations of power conversion efficiencies exceeding 10% highlight the potential associated with organic photovoltaic cells (OPVs). In these materials, optical excitation leads to the formation of tightly bound electron-hole pairs known as excitons, which must be dissociated in order to realize a photocurrent. In the simplest OPVs, dissociation occurs at a heterojunction between electron donating and accepting materials, requiring the exciton to diffuse from the point of photogeneration in order to be harvested. Often, the unfavorable trade-off between the exciton diffusion length (L_D~10 nm) and optical absorption length (L_A~100 nm) limits active layer thickness and overall performance. This limitation is typically addressed through the use of bulk heterojunctions where the donor and acceptor materials are blended to increase the interface area for dissociation. While able to successfully circumvent the need for exciton diffusion, these structures do not address the fundamental origin of the short exciton diffusion length. Our goal is to . . . attend the lecture to find out more!

MATERIALS SEMINAR

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Monday, October 14, 2013
3:30 pm in 1315 Chemistry

Coffee & cookies 3:15 pm atrium