中国科学院物理研究所
INSTITUTE OF PHYSICS CHINESE ACADEMY OF SCIENCES

软物质物理实验室
学术报告

Influence of Acceptor Structure on Charge Separation Dynamics in Organic Photovoltaic Materials

Prof. John B. Asbury

Department of Chemistry
The Pennsylvania State University,
University Park, PA 16802

经历简介

Education

University of Tennessee, Knoxville Chemistry B.S. (1996); Emory University Chemistry Ph.D. (2001) (graduate advisor: Tianquan Lian)

Training

Stanford University Chemistry (2001 – 2005); (post-doctoral advisor: Michael D. Fayer)

Appointments

Assistant Professor of Chemistry, Department of Chemistry, The Pennsylvania State University, 2005 - present.

Honors and Awards

U.S. NSF CAREER Award (2009); 3M Non-Tenured Faculty Grant (2008, 2009); Eli Lilly Analytical Chemistry New Faculty Award (2007); Camille and Henry Dreyfus New Faculty Award (2005)

报告内容摘要

The dynamics of charge separation in photovoltaic polymer blends following photoinduced electron transfer from the conjugated polymer, regioregular-P3HT, to electron acceptors are observed with ultrafast vibrational spectroscopy. The investigators take advantage of a solvatochromic shift of the vibrational frequency of the carbonyl (C=O) stretch of the acceptors to directly measure the rate of charge transfer state dissociation to form charge separated states. Two acceptor classes are examined – functionalized fullerenes (PCBM) and perylene diimides (PDIs). Charge separation in rr-P3HT:PCBM blends occurs through activationless pathways whereas rr-P3HT:PDI blends exhibit activated charge separation. The variation in charge separation mechanism arises from differences in the degree of electron delocalization that the electron acceptors can support. The three-dimensional structure of fullerenes enables large electron delocalization giving rise to low barriers to charge separation. The pseudo-two-dimensional structure of PDIs causes localization of electrons in the acceptor phase and larger barriers to charge separation.

报告时间：2012年3月5日 下午14：00
报告地点：中科院物理所B-304
联 系 人：软物质物理实验室　翁羽翔研究员（010-82648118）