PURDUE UNIVERSITY Discovery Park

Birck Nanotechnology Center
Discovery Park Engagement
Energy Center

SOLAR SEMINAR SERIES

SPRING 2013 PHOTOVOLTAIC SEMINAR SERIES

BRYAN W. BOUDOURIS

Birck Rm. 2001
January 24, Thurs., 3:30 p.m.

Bryan W. Boudouris, Assistant Professor of Chemical Engineering, Purdue University holds a B. S. of chemical engineering from the University of Illinois at Urbana-Champaign and a Ph. D. of chemical engineering from the University of Minnesota. In September of 2009, he moved to the University of California, Berkeley as a postdoctoral fellow. In August of 2011, he started his own laboratory at Purdue University. During its first 18 months of existence, the laboratory has been recognized as a future leader in the design and implementation of functional polymers , as acknowledged by the AFOSR Young Investigator Program award, the DARPA Young Faculty Award, and Purdue University's Showalter Research Trust Award.

Design of Optoelectronically-active Polymers for Organic Photovoltaic Applications

Organic photovoltaic (OPV) devices are of great interest due to their promise of providing flexible, lightweight, and inexpensive alternatives to their currently-used inorganic counterparts. However, large-scale implementation of these modules has been hampered due to their relatively low power conversion efficiencies even in the highest-performing devices (PCE ~10%). Because the charge generation, separation, and collection processes in plastic solar cells occur on the nanoscale, the microstructure of the OPV active layer and the organic-metal interfaces are of great import. Here, we synthesize, characterize the nanoscale morphology of, and implement novel macromolecules into OPV devices.

Specifically, we demonstrate the ability to form well-ordered nanoscale domains through the use of diblock copolymers containing a semicrystalline moiety. Additionally, we present a new series of charge-conducting, transparent macromolecules that can be grafted directly from the surface of a transparent electrode; this leads to improved charge extraction at the anodic contact. As such, we are able to address both the active and charge extraction layers of OPV devices utilizing two emerging classes of functional polymers. And our abilities to design and pattern optoelectronically-active polymers into thin film morphologies with nanoscopic precision over large areas offers clear pathways for the advanced design of plastic solar cells.

Refreshments & Networking Opportunities

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Seminar Series Dates: Jan. 24; Feb. 7, 21; March 7, 21; April 4, 18

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