

Physical Chemistry Seminar

Tuesday,
February 10, 2015

11:00 am

Room 1315
Chemistry Building

Probing and Pulling: From Polymer Solar Cells to Photoswitchable DNA Nanoparticles



Professor David Ginger

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Host: Professor Trisha Andrew

Conjugated polymer photovoltaics and DNA-linked nanoparticle clusters are technologies that offer unique opportunities in areas ranging from energy conversion to photonics, biodiagnostics, and sensing. However these emerging materials also present unique challenges in materials organization and characterization: How can one identify which domains in a nanostructured solar cell are most active? What role does heterogeneity at a buried interface play in carrier recombination? How can one reversibly actuate biological binding to a surface to improve sensor selectivity? This talk will present our experimental efforts to answer such questions with a focus on combinations of scanning probe microscopy and optical spectroscopy. I will discuss recent work that sheds new light on the role of buried interfaces on non-geminate carrier recombination losses in organic solar cells and I will discuss the development and application of unique scanning probe tools such as time-resolved electrostatic force microscopy (tr-EFM) that we are using to understand how nanoscale morphology influences both performance and lifetime in thin film PV. Finally, I will present our recent results using dynamic force spectroscopy (AFM pulling measurements) to help us understand the reversible optical actuation of photoswitchable DNA-linked materials that offer compelling advantages such as all-optical, isothermal, isotonic hybridization stringency conditions capable of detecting single-base mismatches in target nucleic acids.

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

Graduate Students may meet with the speaker at 1:00 p.m. in Room 8305F