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Monday, October 1 ~ 2:00 pm 331 Klamath Hall

Tracking Charges in Sensitized Organic Thin Films without using Electrodes

Conjugated polymer and molecular thin films have demonstrated their potential in a number of opto- electronic applications that include: organic light-emitting diodes, thin film transistors, organic photovoltaic devices and optically-pumped organic lasers. In all cases, the conjugated structures are used to not only facilitate the transport of charges, but to help either the promotion of charge generation or the reverse, radiative recombination. But these materials have low dielectric constants leading to strong coulomb coupling between electrons and holes, and flexible structures that result in polaron stabilization effects. It is amazing that they work at all!

Flash photolysis time-resolved microwave conductivity (*fp*-TRMC) is a power spectroscopic tool that provides a method of tracking the formation and loss of unbound, mobile charges in these materials. While it is unable to track the actual transport over long distances, it is sensitive to very low concentrations and provides insights into the fundamental photophysics that are critical to device performance.

The presentation will focus on the developments of this spectroscopic tool at NREL and how we are using it to address some of the basic questions of charges in organics. Issues such as: how does the solid-state structure of the polymer influence things? How do we understand the photo generation of charges and what controls the recombination process? How different are singlets and triplets in these systems? A number of examples will be discussed in order to help explain and address these questions.

Refreshments served at 1:45 pm 331 Klamath Hall

Hosted by Mark Lonergan