"EXCITON DYNAMICS IN ORGANIC SOLAR CELLS"

PHYSICAL SEMINAR

Monday,
November 30th, 2015
4:00 p.m.

Hutchison Hall 473
University of Rochester
Department of Chemistry

Guest Speaker:
Professor David Blank
University of Minnesota
Department of Chemistry

Abstract: Making solar cells out of materials such as polymers (plastic) or thin films of relatively small organic molecules offers potential advantages associated with production, such as cheap and energy efficient processing, and advantageous mechanical properties, such as flexibility and impact resistance. However, the efficiency of these cells has yet to compete with older technologies such as silicon. There are some important differences in the way these two types of cells operate. Due to the small dielectric constant in organic materials such as polymers, absorption of light is first converted to a bound electron hole pair (called an exciton) that must be transported to an interface where separation of charge takes place. The exciton transport step is often referred to as the exciton bottleneck due to the limit it can place on efficiency. The seminar will offer an introduction to these solar cells and then focus on what happens when light is absorbed. We will examine initial creation of the exciton and consider the subsequent localization, cooling, and transport that governs the race between charge separation and conversion to heat. Examples will include the dynamics of excitons on conjugated polymer chains and in organic thin films of chromophores such as phthalocyanines.

Host: Professor James Farrar, email: farrar@chem.rochester.edu