第693回　化学・物質工学セミナー開催のお知らせ

この化学・物質工学セミナーは、平成30年度第2回5年一貫制博士課程グリーンシステム創成科学専攻の国際セミナーと共催します。万障お繰り合わせの上、ご参加下さい。

日時：平成30年 5月 21日（月）16:10～17:40

場所：総合教育研究棟　多目的ホール

講演題目：Relationships between structure and charge transfer kinetics at organic monolayer/oxide interfaces probed using waveguide spectroelectrochemistry – toward understanding and enhancing the efficiency of organic electronic devices

講演者：S. Scott Saavedra 博士（University of Arizona・第2回国際的な活躍が期待できる研究者の育成事業講演会　招待講演者）

講演概要

Charge transfer efficiency at organic/electrode interfaces in organic photovoltaic (OPV) devices and organic light emitting diodes (OLEDs) can be an important parameter in overall device performance. Rates of charge transfer across these interfaces are determined by a number of factors, such as offsets in frontier orbital energies, wave function overlap, reorganization energies, and charge mobilities, which in turn depend on structural parameters, e.g. packing and orientation, of the interfacial molecular layers. Modification of the electrode/donor interface with a redox-active, organic surface modifier may enhance charge injection across the interface by providing a facile electron transfer pathway between the contact and the adjacent organic layer, and by controlling chemical and physical interfacial compatibility and the effective work function of the contact. We are developing and implementing spectroelectrochemical approaches to study relationships between molecular structure and electron transfer kinetics in monolayers of redox-active chromophores tethered to transparent conducting oxide electrodes, where the monolayer is a model for the interfacial layer in an OPV or OLED.

This talk will highlight studies of phthalocyanines and perylenes tethered to indium-tin oxide (ITO) using a novel form of electroreflectance spectroscopy, potential-modulated, attenuated total reflection spectroscopy (PM-ATR). In PM-ATR, the intensity of visible light propagating in a planar waveguide electrode coated with ITO is monitored while an ac potential modulation is simultaneously applied to the ITO layer. The evanescent field at the surface of the waveguide interacts with an overlying thin film of redox-active chromophores. Changes in the absorbance of the film as a function of the light polarization, modulation frequency, and amplitude provide information about electron transfer rates and molecular structure.

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