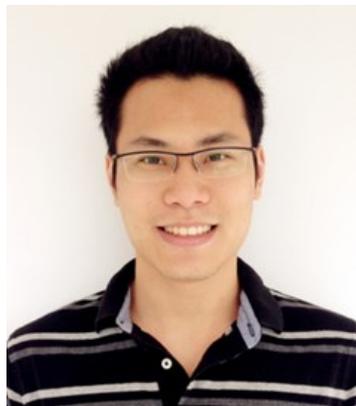




GRADUATE RESEARCH SEMINAR SERIES

Nanostructured Electrode Materials for Supercapacitors



Zenan Yu (12 – 12:30PM) - Dr. Jayan Thomas's Group

Abstract: Supercapacitors have drawn considerable attention in recent years due to their high specific power, long cycle life, and ability to bridge the power/energy gap between conventional capacitors and batteries/fuel cells. Nanostructured electrode materials have demonstrated superior electrochemical properties in producing high-performance supercapacitors. In this talk, nanostructured electrode materials recently developed in our lab will be covered.

Friday
November 21st,
2014

12:00 — 1:00PM

NSTC
Conference Room

Modeling Symmetry Breaking and Solvatochromic Effects on Electronic Spectra

Héctor J. Rivera Jacquez (12:30-1PM) - Dr. Artem E. Masunov's Group

Abstract: Polymethines are organic dyes with an odd number of CH groups in conjugated chain. Their applications include tunable lasing, multi-photon imaging, optical switching, biomolecular labeling, and hybrid photovoltaics. All of them rely on the strong absorption of these dyes in the visible to near-infrared range. Understanding of polymethine dyes electronic spectra is crucial for successful design of the new molecules with optimized properties. The unusual bandshape on the electronic absorption spectra of some polymethine dyes was a mystery for many years. Here we discuss its qualitative origin and quantitative semiempirical model, capable to describe this shape. This model is built on three essential states, described in the basis of the resonance structures. It accounts for the coupling of electronic and vibrational degrees of freedom. It also includes the thermal fluctuations of the reaction field in the polar solvent. The overall optical spectra are obtained as an average, weighted by the Boltzmann distribution (inhomogeneous broadening) over chromophore states with variable amount of symmetry breaking. Both one-photon and electronically forbidden (but vibronically allowed) two-photon transitions are described by this model.



Pizza and drinks will be provided