

DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

FALL 2017 GRAD SEMINAR SERIES

OPEN TO THE PUBLIC

DATE: WEDNESDAY, OCTOBER 4, 2017

WHERE: CENTRAL KING BUILDING - 204

TIME: 2:30 PM

Refreshments at 2:30 pm – Seminar at 2:45 pm

GUEST SPEAKER

Piotr Piotrowiak, Ph.D.
Department of Chemistry
Rutgers University
Newark, NJ

TOPIC

**Ultrafast photo-induced electron transfer:
The importance of vibrationally hot intermediates**

ABSTRACT

Electron transfer (ET) is the simplest and most ubiquitous chemical reaction. It is essential in numerous natural processes which span the range from photosynthesis through respiration to corrosion. Similarly, many established and emerging technologies, from electroplating to solar production of fuels involve ET as the key step. The seminar will give an overview of our recent experimental work on photo-induced electron transfer in three classes of systems: (i) molecular electron donors anchored to the surface of TiO₂ nanoparticles; (ii) monodisperse polyoxotitanate clusters with electron donating ligands; (iii) electron donor attached to dendritic array of acceptors. In all three cases the experimental results point to the importance of the competition between the vibrational and thermal relaxation and the electron transfer event. As a result, the standard Marcus theory, which assumes full thermal equilibration of the reactants, cannot accurately predict the behavior of these systems. More sophisticated models and simulations which explicitly account for non-equilibrium population of the intermediate states and solvation dynamics are necessary in order to quantitatively interpret the results.

BIOGRAPHY



Piotr Piotrowiak was born and grew up in Poland. In 1982 he received an MS degree in Chemical Physics (liquid dynamics studied by ^{13}C -NMR) from the University of Wrocław, and in 1988 a PhD in Physical Chemistry (correlation between electron transfer & triplet energy transfer) from the University of Chicago. He proceeded to a postdoctoral position at Argonne National Laboratory where he studied the influence of electrolytes on electron transfer and the solvated electron. In 1991 he joined the University of New Orleans where he received tenure in 1996. The following year he has moved to Rutgers University-Newark. His current work and research interests revolve around experimental studies of electron and energy transfer processes in increasingly complex systems and at interfaces, primarily in the context of solar energy conversion. In 2011 he received the Donald H. Jacobs Chair in Applied Physics in recognition of the construction of a femtosecond Kerr-gated microscope.

Seminar Series Coordinators

Dr. Yong Yan - yong.yan@njit.edu

Dr. Yuan Zhangwei - yuanwei.zhang@njit.edu