2012-2013 POCC Lecture Series

March 28, 2013, 8:00 PM

Prof. Robert Flowers

Lehigh University

Follow the Thread: Unraveling the Mechanism of Single-Electron Reduction and Oxidation in Important Synthetic Reactions

Carolyn Hoff Lynch Lecture Hall
Chemistry Building, University of Pennsylvania

The Philadelphia Organic Chemists' Club

POCClub.org

To join us for dinner before the lecture please contact POCC's assistant secretary Simon Golec (SimonG1326@aol.com) at least one week ahead of time.

Bob Flowers was born in Easton, Pennsylvania in 1964. He received his B.S. in chemistry from East Stroudsburg University of Pennsylvania in 1986. After taking time off from school, he was admitted to Lehigh University and worked under the direction of John Larsen. After graduating in 1991, he moved to Duke University as a postdoctoral research associate with Professor Ned Arnett where he worked on several projects related to electron transfer. In 1994, Bob moved to his first independent position as an assistant Professor at the University of Toledo. In 2001, he moved to the Department of Chemistry & Biochemistry at Texas Tech University. In 2004, he moved to the Department of Chemistry at Lehigh University as Department chair and in 2008 he was appointed the Danser Distinguished Faculty Chair in Chemistry.

Bob's research group is interested in the mechanistic analysis and synthetic development of Sm(II) and Ce(IV) reagents, mechanistic study and development of catalytic single electron transfer reactions, and the development and applications of back scattering interferometry in non-aqueous media (with Darryl Bornhop, Vanderbilt University).

Abstract: The high degree of sophistication of modern redox-initiated organic reactions is based on the ability to efficiently manipulate and interconvert reactive intermediates such as anions, radicals, cations, and related radical ions through redox processes. Despite the utility of these reactions, chemists have a limited understanding of the important variables in complex reactions that proceed through single-electron reduction and oxidation. It is our supposition that advances in synthesis are best facilitated by identifying and discerning mechanistic factors critical for reaction success. The studies presented will focus on understanding, improving, and developing efficient methods based on important synthetic platforms that utilize single electron transfer as a critical step in bond-forming reactions. These include: 1) Sm(II)-based reductions, 2) Ti(III) catalyzed cyclizations, 3) oxidative enolate heterocoupling, 4) organo-SOMO activation, and 5) Ag/persulfate catalyzed coupling of arylboronic acids and heteroarenes.