

“Bio-Inspired Iron-Catalyzed Hydrocarbon Oxidations”**Dr. Lawrence Que, Jr.**

**Regents Professor
3M/Alumni Distinguished Professor
Distinguished Teaching Professor of Chemistry
Center for Metals in Biocatalysis
Bioinorganic and Bioorganic Chemistry**

UNIVERSITY OF MINNESOTA

Thursday



November 12

3:40 p.m.

Buehler 415

(light refreshments served at 3:30 p.m.)

Webcast

Introduction & Research: Dr. Que

The seminar host, Dr. Shane Foister, would like to present the next speaker in our Chemistry Department's seminar series: Dr. Lawrence Que, Jr. the Distinguished Professor of Chemistry at the University of Minnesota, Twin Cities.

Highlights of Que's research accomplishments in the biomimetic area include the complete characterization of the first complexes containing the bis(μ -oxo)diiron "diamond" core, which has led to their postulated involvement in the mechanisms of dioxygen activation and substrate oxidation in important enzymes such as methane monooxygenase and ribonucleotide reductase. His group's synthesis and characterization of these systems represent a landmark in modern inorganic chemistry research and have captured the imagination of the international scientific community.

Abstract of Presentation

Inspired by the versatile oxidation chemistry catalyzed by nonheme iron enzymes, we have been investigating the iron-catalyzed oxidations of hydrocarbons. Highly stereoselective conversions of olefins to epoxides and/or cis-diols have been observed with the use of Fe(N4)(OTf)₂ complexes where N4 is a tetradentate ligand with four nitrogen donor sites such as TPA (TPA = tris(2-pyridylmethyl)amine) and BPMEN (BPMEN = N,N'-bis(2-pyridylmethyl)-N,N'-dimethyl-1,2-diaminoethane). Insights into the catalytic mechanism have been obtained from a combination of product distribution studies, ¹⁸O labeling experiments, spectroscopic characterization of intermediates trapped at low temperature, and DFT calculations. These results implicate an FeV=O oxidant. In a related study, hydrocarbon oxidation is observed for a biomimetic iron complex that reacts with O₂. The shape selectivity observed for this reaction is quite unusual, suggesting that substrate recognition can be elicited even in a relatively simple model complex.

Biosketch

Professor Que obtained his Ph.D. from the University of Minnesota under the direction of Professor Louis Pignolet and conducted postdoctoral research with Professor Richard Holm at M.I.T. and subsequently with Professor Eckard Münck at the University of Minnesota. Professor Que began his academic career at Cornell University and is now the 3M/Alumni Distinguished Professor of Chemistry at the University of Minnesota. Professor Que has published more than 400 peer-reviewed articles and is currently the Chief Editor of the Journal of Biological Inorganic Chemistry. Professor Que received the Alfred Bader Award in Bioorganic or Bioinorganic Chemistry in 2008 and is a Fellow in the Royal Society of Chemistry.

Website: <http://bioinorg.chem.umn.edu/quespace/>