University of Minnesota
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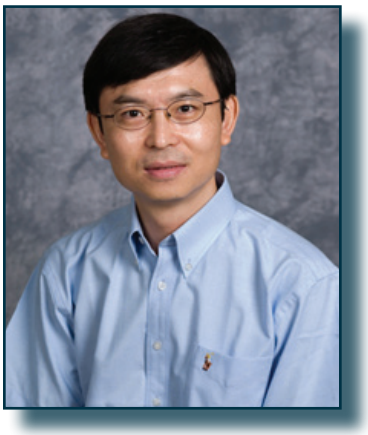
Department of Chemistry

Seminar

9:45 a.m. Thursday, September 20, 2012 • 331 Smith Hall



Professor

X. Peter Zhang

Department of Chemistry
University of South Florida

Stereoselective C–H Amination with Azides via Co(II)-Based Metalloradical Catalysis

Research interests are in the areas of organic and organometallic chemistry. The research program involves the design and synthesis of new organic and organometallic compounds, and the exploration of their applications in the areas of catalysis, materials, and medicine. Current research projects center on the construction of functionalized porphyrins, in particular chiral porphyrins.

Website: http://chemistry.usf.edu/faculty/zhang/

Abstract

Amination based on metal-catalyzed nitrene C–H insertion represents a powerful approach for the direct transformation of ubiquitous C–H bonds into valuable amine functionalities while offering potential control of various types of selectivities. Departing from the widely-used Rh(II)2 and other closed-shell catalysts, we have been focused our efforts in developing open-shell cobalt(II) porphyrin complexes ([Co(Por)]) as metalloradical catalysts for C–H amination. The [Co(Por)]-based metalloradical amination is unusual as it can effectively activate different azides as the nitrene sources under neutral and nonoxidative conditions, with the generation of nitrogen gas as the only by-product. Because it obviates the need for terminal oxidants and other additives, the [Co(Por)]/azide catalytic system has a high degree of functional group tolerance in addition to its operational simplicity. As demonstrated with several intramolecular processes, the Co(II)-catalyzed reactions possess uncommon capability for efficient amination of strong primary C–H bonds and exhibit remarkable chemoselectivity toward allylic C–H amination over competitive C=C aziridination. These and other unique reactivities and selectivities are attributed to the underlying radical mechanism of Co(II)-based metalloradical catalysis.

Host: Professor Christopher Douglas
Refreshments will be served prior to the seminar.