University of Minnesota
Driven to Discover℠

Department of Chemistry

Seminar

9:45 a.m. Thursday, December 6, 2012 • 331 Smith Hall

Postdoctoral Researcher

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Development of Dye-Sensitized Solar Cell Organic Dyes and the Oxidative Heck Reaction

Abstract

Part 1. Organic sensitizers are a key component of dye-sensitized solar cells (DSCs), which dramatically influence the device power conversion efficiency.Understanding the structure-performance relationship for these dyes is crucial for rationally designing future high efficiency DSC devices. Additionally, the successful introduction of π-conjugated functionality novel to DSC organic sensitizers diversifies the structural building blocks available and offers the opportunity for more efficient dyes. The first portion of this talk will focus on DSC organic sensitizer designs incorporating the squaraine chromophore and a previously unexplored heterocycle with regard to organic materials, ullazine. Synthetic strategies to access the 16 π-electron heterocycle will be discussed as well as the unique properties and performance of sensitizers incorporating ullazine for DSCs.

Part 2. Transition metal catalyzed reactions have revolutionized synthetic approaches in organic chemistry. The Heck reaction is unique among the originally discovered palladium catalyzed coupling reactions whereas a C-H bond is functionalized in place of a prior activated coupling partner. Recently, the oxidative Heck, Pd(II)-based manifold has enjoyed increasing attention in part due to commentary reactivity to the traditional Pd(0)-based reductive reaction. The second portion of this talk will focus on the development of the oxidative Heck reaction with an emphasis on the potential for streamlining natural product and pharmaceutically active molecule synthesis.

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