University of Minnesota
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Department of Chemistry

Seminar

9:45 a.m. Tuesday, October 1, 2013 • 331 Smith Hall

Assistant Professor

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Synthesis and Crystal Engineering of Small Molecules for Organic Electronics: Catalytic Reactions Based on the Insertion of Transition Metals Adjacent to Carbonyls

Research focuses on the development of new synthetic methods and on finding solutions to a variety of synthesis problems, including changing the way scientists approach the construction of organic molecules.
Website: http://www.chem.umn.edu/groups/douglas/

Abstract

Our group has developed synthetic methods to help address questions on the relationship of molecular structure to physical properties in small molecule organic electronic materials like rubrene (5,6,11,12-tetraphenyltetracene). Our findings on controlling rubrene derivatives' conformations of the flexible tetracene backbone in the solid state have allowed us to make systematic modifications to the packing in single crystals. In collaborative work at Minnesota, we have begun to develop structure-function relationships for the performance of rubrenes in a variety of devices.

Developing catalysis based on the activation of traditionally challenging bonds has emerged as an active area of research in organometallic and organic chemistry. New bond activation chemistry could change the way synthetic chemists approach the construction of complex molecules by allowing non-traditional retrosynthetic disconnections to be made. This presentation will focus on recent developments at Minnesota in the activation and functionalization of unstrained bonds adjacent to carbonyls and related functional group. Catalytic reactions are designed with an eye towards complexity-building reactions, as opposed to fragmentations. For example, the activation of the C-C bond of ketones, the C-O bond esters, and C-CN bond of imidoyl cyanides with late-metals enables carboacylation, oxyacylation, and cyanoacylation reactions of alkenes, respectively. Our contributions to these processes will be presented.

Refreshments will be served prior to the seminar.