

Department of Chemistry and Biochemistry
Seminar, Friday, 9/23/2016
2:00-2:50pm, Langseth 102
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**“Catalysis mediated by the Noble Metals Iridium and Gold: From
Sb H Insertion to Amine Oxidation”**

Abstract

Iridium porphyrinb catalyzed Sb H insertion reactions. Carbons group transfer reactions are important routes to industrially and biologically relevant organic molecules. The use of diazo compounds as carbene precursors in carbene transfer reactions such as cyclopropanation and Xs H insertion (X = S, N, O, C) represents an atoms economical route to organic compounds, since the environmentally benign N₂ gas is the only bys product. Numerous reports of transition metals catalyzed insertion of diazo carbenes into the Ss H bond of thiols abound in the literature. However, a detailed mechanistic study of such reactions has not been reported. This is probably because sulfurs containing substrates are generally regarded as catalyst poisons. In the first part of this presentation, I will show the effectiveness of an iridium porphyrin complex at catalyzing the insertion of carbene moieties obtained from different diazoesters into the Ss H bond of thiols. Results of our mechanistic investigations will be presented as well.

Nanogolddb catalyzed oxidation of cyclic amines into lactams. The oxidation of amines is a convenient method of synthesizing important nitrogens containing organic fragments, such as imines, amidines, lactams, and amine Ns oxides. Lactams represent a class of vastly utilized chemical feedstock. However, small and larges scale preparations of lactams typically involve multiple reaction steps, long reactions times, and waste generation. In the second part of my presentation, I will show that lactams are generated in an efficient ones pot oxidation of cyclic secondary and tertiary amines in the presence of metal oxides supported gold nanoparticles as catalysts. Furthermore, we have established amidine intermediacy during the catalytic conversion of the secondary amine substrates into the corresponding lactams.