

Chemistry Colloquium

Guest Speaker:

Professor François Gabbai

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Department of Chemistry



Wednesday, May 17th, 12:00pm

Lander Auditorium, Hutchison Hall 140

University of Rochester

Department of Chemistry

“Exploiting the non-innocence of antimony ligands: From organometallic catalysis to the photo-reductive elimination of halogens”

Abstract:

Although often regarded as heavy phosphine analogues, stibines behave as non-innocent ligands and display an unusual reactivity even when ligated to transition metals (M). This reactivity comes to light in their ability to undergo oxidation reactions without dissociation of the coordinated transition metal. This oxidation induces the formation of a M→Sb interaction resulting in a drastic Lewis acidity increase at the transition metal center [1-4]. Using a family of gold stibine derivatives, we will demonstrate that such coordinated-stibine oxidation reactions can be used to afford potent hydroamination catalysts [5,6]. Stibines are also non-innocent from a coordination point of view and can readily bind hard anions such as fluoride, without dissociation from the transition metal center. This anion binding events convert the antimony atom into a more strongly donating ligand, leading to an increase of electron density at the metal center [7]. In this presentation, we will explain that this process can be exploited in reverse as a means to increase the electrophilic character of the transition metal center. This approach will be illustrated by the chemistry of a series of antimony platinum complexes and their activation into electrophilic hydroarylation and enyne cyclisation catalysts via antimony-centered anion abstraction reactions. In the second part of this presentation, we will show that oxidation of some of these MSb complexes can be reverted upon irradiation with UV light [8] as in the case of a new Pd(II)/Sb(V) complex which undergoes elimination of a chlorine equivalent from the Sb(V) center [9].

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