Department of Chemistry
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Research Proposal Seminar

Transition Metal Complexes of Bidentate Ligands Containing Normal and Abnormal Carbene Donors: Synthesis and Catalytic Application

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Guide: Dr. Arnab Rit 4: 00 PM (CB 310)

N-heterocyclic Carbenes (NHCs) have emerged as an important class of ancillary ligands for transition metals in past few decades. The strong σ-donor ability and the possibility of facile stereoelectronic modifications made them popular in the area of organometallic chemistry.[1] Recently, analogues class of NHCs known as abnormal N-heterocyclic carbenes (aNHCs) have gained the attention of organometallic chemists because of their stronger σ-donor nature.[2] As established from previous studies, transition metal complexes of NHC-based chelating ligands are advantageous over those of monodentate carbene ligands in terms of stability and catalytic behavior.[3] Incorporation of the NHCs (normal as well as abnormal NHCs) into chelating ligands opened a new direction in the development of robust ligand systems, among them, pincer type ligands hold an important position as they are capable of introducing chirality in their complexes as well. Such complex systems are found to be robust and preclude the decomposition of intermediates form during any catalytic process. Second and third row transition metal complexes with pincer carbene ligands have been extensively explored in homogenous catalysis mainly in the areas of olefin metathesis, hydrogenation, cross-coupling reactions etc. and have benefited tremendously from the enhanced electronic properties of the NHCs.[4] In this seminar, I will discuss the importance of carbene incorporated pincer ligands over classical phosphorus and nitrogen donor based analogues and their applications in the field of homogeneous catalysis. Further, the synthesis of new NHC based pincer ligands and their metal complexes will be discussed in detail with some preliminary results.

References

(1) Hopkinson, M. N.; Richter, C.; Schedler, M.; Glorius, F. *Nature* **2014**, *510*, 485.
(2) Schuster, O.; Yang, L.; Raubenheimer, H. G.; Albrecht, M. *Chem. Rev.* **2009**, *109*, 3445.
(3) Díez-González, S.; Marion, N.; Nolan, S. P. *Chem. Rev*. **2009**, *109*, 3612.
(4) Pugh, D.; Danopoulos, A. A. *Coord. Chem. Rev*. **2007**, *251*, 610.

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