

Department of Chemistry, IIT Madras
Ph.D. Colloquium Seminar

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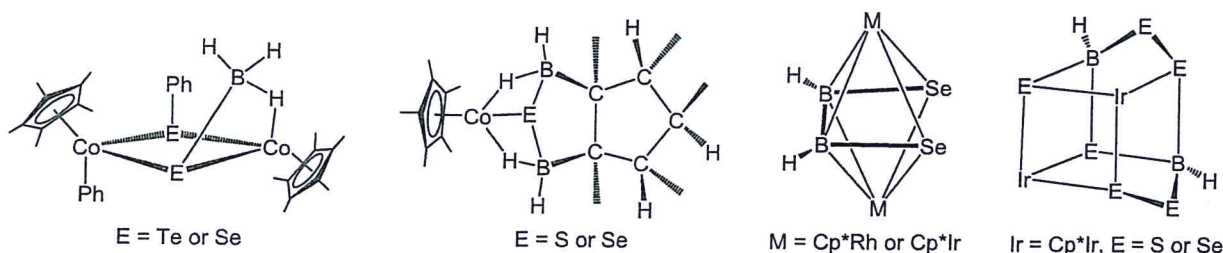
Venue: CB 310

Date: 24.09.2019

Time: 4.15 p.m.

Synthesis, structure and chemistry of metallaheteroboranes of groups 8 and 9 metals

The incorporation of the heteroatoms into borane or metallaborane cages is of interest due to their diverse bonding, geometry and functional properties that differ from their parent molecules. Chalcogen containing boranes or metallaheteroboranes constitute an important class in this field. A previous approach for the synthesis of metallaheteroboranes was to react preformed polyhedral heteroboranes with metal precursors. Later, this strategy was over-powered by a new synthetic route using preformed metallaboranes with various chalcogen sources. A recent advance in this chemistry appeared with the use of chalcogenated borohydride reagents $\text{Li}[\text{BH}_3\text{EPh}]$ and $\text{Li}[\text{BH}_2\text{E}_3]$ ($\text{E} = \text{S}, \text{Se}, \text{or Te}$) that form new metallaheteroboranes. These reagents were used earlier as mild reducing agents for the reduction of aldehydes, ketones and many other organic transformations. In that context, an efficient route to the bimetallic cobalt σ -borate complexes has been developed employing chalcogenated borohydrides $\text{Li}[\text{BH}_3\text{EPh}]$ ($\text{E} = \text{Se}, \text{or Te}$). Further, triple-decker sandwich complexes containing four membered open B_2Se_2 Ring have been synthesized by direct addition of chalcogen powder to preformed metallaborane intermediates of group 9 transition metals. Also, the reactivity of open ring complexes has been explored with metal carbonyl compounds. In addition, we have synthesized and structurally characterized bimetallic bis- and tris-homocubane analogues of Ir and Rh.



References:

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- [3] B. Joseph, S. K. Barik, R. Ramalakshmi, G. Kundu, T. Roisnel, V. Dorcet, S. Ghosh, *Eur. J. Inorg. Chem.*, **2018**, 2045.
- [4] B. Joseph, S. Gomosta, S. K. Barik, T. Roisnel, V. Dorcet, J.F. Halet, S. Ghosh, *J. Organomet. Chem.*, **2018**, *865*, 29.
- [5] B. Joseph, R. Prakash, K. Pathak, T. Roisnel, S. Kahlal, J-F. Halet, S. Ghosh, (*submitted for publication*).
- [6] B. Joseph, S. Gomosta, R. Prakash, T. Roisnel, A. K. Phukan, S. Ghosh, (*manuscript under preparation*).

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