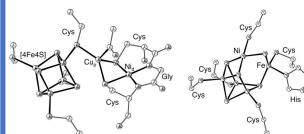


Bioinspired Ligand of Soft and Hard Donors: Double Insertion of CS₂ into Ru-H Bonds in a New Ruthenium-Hydride-Borohydride Complex

Archana Yadav and Raja Angamuthu*
Department of Chemistry, Indian Institute of Technology Kanpur



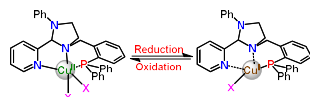
Introduction



Acetyl-coenzyme A synthase (ACS)
Carbon monoxide dehydrogenase (CODH)

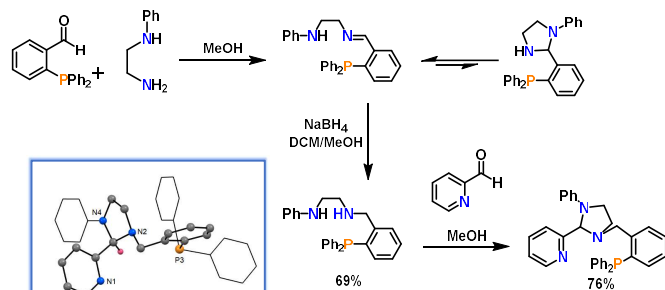
Goals:

- Modified koneramines as bioinspired ligands with hard and soft donors together (PNN or NNP)
- Flexible coordination modes upon varying the oxidation states
- Expeditious synthesis of ligands and complexes
- Chiral ligands and complexes



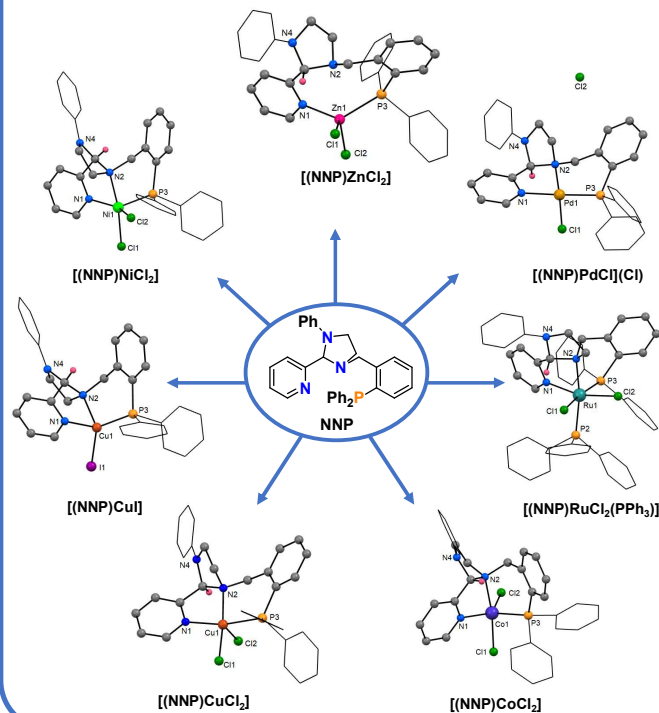
P, soft base/donor; N, hard base/donor
Cu(II), hard acid; Cu(I) soft acid

NNP Ligand

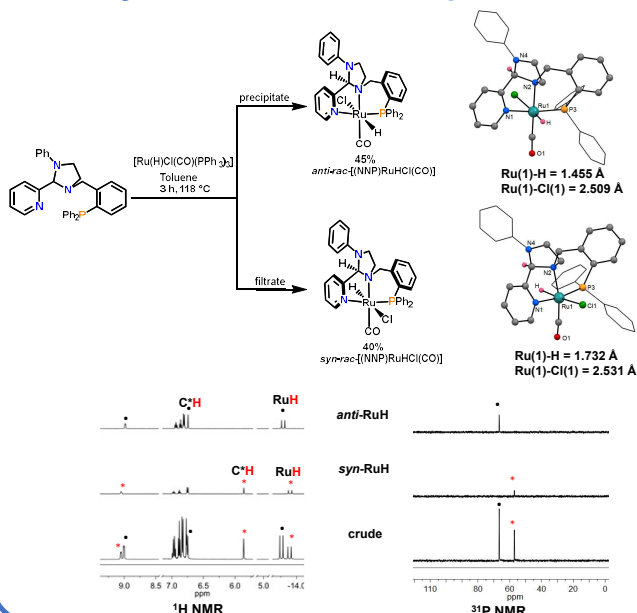


NNP

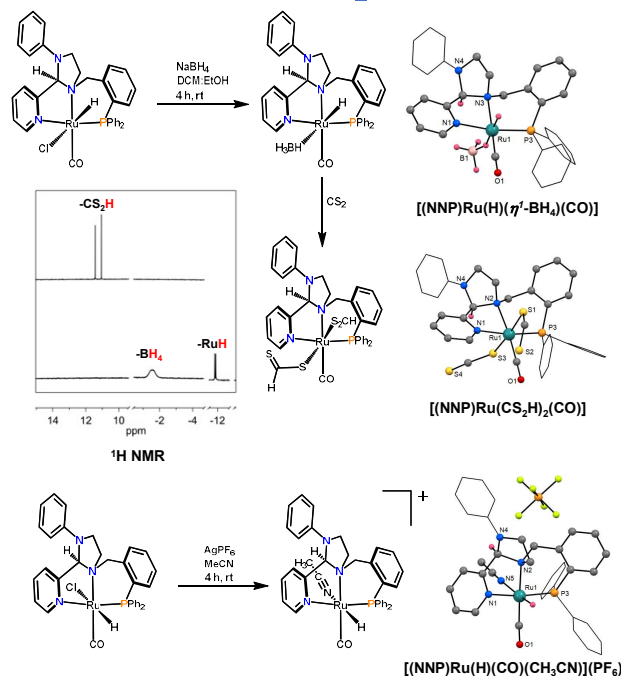
Metal Complexes of NNP



Syntheses of RuH Complex



Reactivity of Ru-H-BH₄ complex with CS₂



Summary

- Modified koneramine ligand (NNP) and its metal complexes have been synthesized and characterized by ¹H, ¹³C, ESI-MS and SC-XRD techniques; facile synthesis of a tridentate chelate with hard and soft basic donor sites
- NNP offers variety of coordination modes with Cu(I), Zn(II), Ni(II), Pd(II) and Ru(II) owing to the flexibility of the ligand and the presence of hard and soft donors
- Double insertion of CS₂ into Ru-hydride-borohydride complex yielding bis-dithioformate [(NNP)Ru(CO)(η⁷-CS₂H₂)] complex.