

Enantioselective catalysis with 3d transition metal complexes: chiral pincers as stereodirecting ligands

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Meridionally coordinating chiral tridentate ligands, frequently referred to as “pincers”, provide the structural platform for the construction of efficient stereodirecting molecular environments. Whilst many of the known chiral systems of the “pincer” type perform relatively poorly in enantioselective catalysis due to certain lack of control of substrate orientation, their assembly from rigid heterocyclic units recently has given rise to several highly enantioselective catalysts which have been proven to be efficient in a variety of applications in organic synthesis.

Recently, we developed bis(oxazolynylmethylidene)isoindoline (“Boxmi”) ligands which have been used in a variety of enantioselective transformations including alkylations of β -ketoesters and their subsequent cyclization to spirolactones, as well as the trifluoromethylation, trifluoromethylthiolation and azidation of β -ketoesters as well as oxindoles. The proved equally efficient in the enantioselective Ni-catalyzed hydrodehalogenation of prochiral geminal dihalides and their iron^(II) complexes match the activity and selectivity of the most efficient noble metal catalysts for the hydrosilylation of ketones.

The focus of the lecture will be the elucidation of the catalytic reaction mechanisms and the identification and characterization of the (frequently) paramagnetic species involved.

Selected references

- B. K. Langlotz, H. Wadepohl, L. H. Gade, *Angew. Chem. Int. Ed.* **2008**, *47*, 4670.
- Q.-H. Deng, H. Wadepohl, Lutz H. Gade, *Chem. Eur. J.* **2011**, *17*, 14922.
- Q.-H. Deng, H. Wadepohl, L. H. Gade, *J. Am. Chem. Soc.* **2012**, *134*, 2946.
- Q.-H. Deng, H. Wadepohl, L. H. Gade, *J. Am. Chem. Soc.* **2012**, *134*, 10769.
- Q.-H. Deng, T. Bleith, H. Wadepohl, L. H. Gade, *J. Am. Chem. Soc.* **2013**, *135*, 5356.
- C. Rettenmeier, H. Wadepohl, L. H. Gade, *Chem. Eur. J.* **2014**, *20*, 9657.
- C. A. Rettenmeier, H. Wadepohl, L. H. Gade, *Angew. Chem. Int. Ed.* **2015**, *54*, 4880.
- T. Bleith, H. Wadepohl, L. H. Gade, *J. Am. Chem. Soc.* **2015**, *137*, 2456.
- C. A. Rettenmeier, H. Wadepohl, L. H. Gade, *Chem. Sci.* **2016**, *7*, 3533.
- T. Bleith, L. H. Gade, *J. Am. Chem. Soc.* **2016**, *138*, 4972.
- T. Bleith, Q.-H. Deng, H. Wadepohl, L. H. Gade, *Angew. Chem. Int. Ed.* **2016**, *55*, 7852.