

The cyclopropyl ligand: a prism for the activation of strong and inert bonds

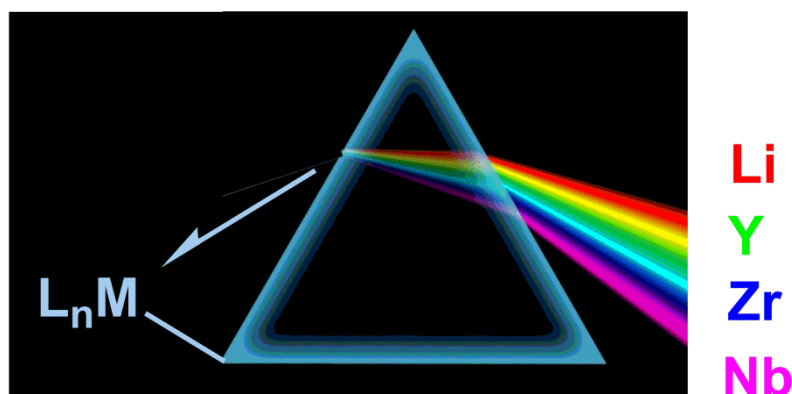
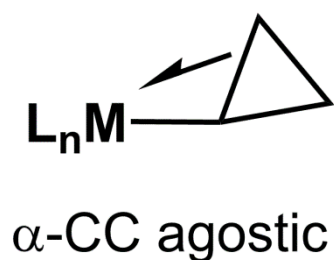
Michel Etienne^{a,b}

^a CNRS, LCC (Laboratoire de Chimie de Coordination), 205 route de Narbonne,
31077 Toulouse Cedex 4, France

^b Université de Toulouse, UPS, INPT, LCC, 31077 Toulouse Cedex 4, France

michel.etienne@lcc-toulouse.fr

Cyclopropane and its derivatives exhibit remarkable properties due to, in part, poor orbital overlap in the ring plane. Cyclopropyl complexes of electropositive metals [$L_nM(c-C_3H_5)$] ($M =$ group 1-5 metal) show unique structural and chemical properties that will be highlighted through three main complementary aspects: (1) because of strong electronic deficiencies, the complexes [$L_nM(c-C_3H_5)$] often present α -CC agostic distortions¹ the nature of which will be discussed, (2) the complexes [$Tp^{Me_2}NbR(c-C_3H_5)(MeCCMe)$] activate strong and inert hydrocarbon CH bonds, most prominently that of methane itself,² (3) dicyclopropyl zirconocene [$Cp_2Zr(c-C_3H_5)_2$] activates a CF bond in fluoropyridines and allows regioselective stoichiometric CC bond formation.³ Both types of reactions rely on the ability to stabilize reactive η^2 -cyclopropene intermediates [$L_nM(\eta^2-c-C_3H_4)$] which cleave CH or CF bonds in a unique manner. Structural and mechanistic details will be provided.



References

- 1- M. Etienne, A. S. Weller. *Chem. Soc. Rev.* **2014**, *43*, 242 - 259.
- 2- (a) P. Oulié, C. Dinoi, C. Li, A. Sournia-Saquet, K. Jacob, L. Vendier, M. Etienne. *Organometallics* **2017**, *36*, 53 - 63. (b) C. Li, C. Dinoi, Y. Coppel, M. Etienne. *J. Am. Chem. Soc.* **2015**, *137*, 12450 - 12453.
- 3- Unpublished results.