Proceedings of the 2nd World Congress on Momentum, Heat and Mass Transfer (MHMT'17)
Barcelona, Spain – April 6 – 8, 2017
ISSN: 2371-5316
DOI: 10.11159/icmtod17.1

Organic Transformations Catalysed by Low-Coordinate m-Terphenyl Complexes

Deborah L. Kays
School of Chemistry, University of Nottingham
University Park, Nottingham, NG7 2RD, United Kingdom
Deborah.kays@nottingham.ac.uk

The use of sterically demanding m-terphenyl ligands allows the isolation of highly unsaturated transition metal complexes which show unusual bonding modes and reactivity [1,2,3,4]. In addition to stoichiometric reactivity towards small molecules, these complexes are efficient precatalysts for the cyclotrimerisation of isocyanates (Figure 1); they exhibit high selectivity and allow the formation of mixed species through cross-coupling reactions [5]. Significantly, we have also demonstrated the catalysis of hydrophosphination reactions that produce mono- (**M**) or diinsertion (**D**) phosphinocarboxamide products selectively (Figure 1) [2]. Diinsertion products **D**, asymmetric phosphorus analogues of biuret, are a new family of derivatised phosphinodicarboxamides.

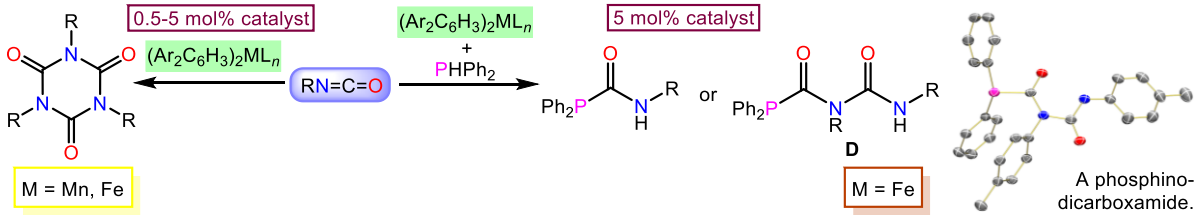

Fig. 1: Isocyanate reactions catalysed with m-terphenyl complexes; Ar = Mes (2,4,6-$Me_3C_6H_2$), n=0; Tmp (2,4,5-$Me_3C_6H_2$), L = THF, n=1.

References

[1] D. L. Kays, A. R. Cowley, "Monomeric, two-coordinate Mn, Fe and Co(II) complexes featuring 2,6-(2,4,6-trimethylphenyl)phenyl ligands," *Chem. Commun.*, pp. 1053-1055, 2007.
[2] D. L. Kays, "Recent developments in transition metal diaryl chemistry," *Dalton Trans.*, vol. 40, pp. 769-778, 2011.
[3] B. M. Gridley, G. J. Moxey, W. Lewis, A. J. Blake, D. L. Kays, "Conformational Isomerism in Monomeric, Low-Coordinate Group 12 Complexes Stabilized by a Naphthyl-Substituted m-Terphenyl Ligand," *Chem. Eur. J.*, vol. 19, pp. 11446–11453, 2013.
[4] B. M. Gridley, A. J. Blake, A. L. Davis, W. Lewis G. J. Moxey, D. L. Kays, "Low-coordinate cobalt(II) terphenyl complexes: precursors to sterically encumbered ketones," *Chem. Commun.*, vol. 48, 8910-8912, 2012.
[5] H. R. Sharpe, A. M. Geer, H. E. L. Williams, W. Lewis, A. J. Blake, D. L. Kays, "Cyclotrimerisation of isocyanates catalysed by low-coordinate Mn(II) and Fe(II) m-terphenyl complexes," *Chem. Commun.*, vol. 53, pp. 937-940, 2017.
[6] H. R. Sharpe, A. M. Geer, W. Lewis, A. J. Blake, D. L. Kays, "Iron(II)-catalyzed hydrophosphination of isocyanates," *Angew. Chem. Int. Ed.*, manuscript accepted.