Organometallic and Coordination Chemistry: synthesis, structures and reactivity - Philip Mountford

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Our main research interests are in the synthesis, structures, bonding and reactivity (both fundamental and catalytic) of new organometallic and coordination compounds. Specifically we are interested in (i) Synthesis, bonding and reactivity of new early transition metal imido complexes \((L^M=NR)\) in a wide range of supporting ligand environments. The main emphasis is on fundamental reactivity, including studies of novel bond-forming reactions not previously observed. We continue to make substantial advances in this area as indicated in the selected publications. (ii) New alkene polymerisation catalysts based on triazacyclononanes and related ligands. We are using these ligands as alternatives to the cyclopentadienyl (and related) ligand environment, and in particular are exploring their new coordination, organometallic and catalytic chemistry with the lanthanide and Groups 3 and 13 metals. With this same class of compounds we have recently communicated new results with perfluorinated aromatic ligands in supramolecular chemistry, and also the first structurally characterised, naked sp\(^3\)-hybridised carbanion. (iii) Organometallic, catalytic and coordination chemistry of diamido-diamine and bis(alkoxide)-diamine ligands with transition-, main group- and lanthanide-metals. In this program we are using new diamide-diamine and bis(alkoxide)-diamine ligands as flexible and tunable supporting environments in stoichiometric and catalytic processes.

All of this work is highly dependent on access to the world-class Cambridge Structural Database and QUEST software, which we access via the CDS. Without this kind of comprehensive facility it would be near-impossible to understand the structural and other novelties and/or precedents associated with our own work. It is only in the context of previous structural data that we can calibrate and contextualise our own contributions. Examples of some recent papers (2001-2) that acknowledge the importance of the CSD and supporting facilities available via the include:


