

Main Group Catalysis

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Over the last few decades, main group compounds have received a great deal of attention due to their potential applications in bond activation and catalysis.^[1–8] Recent developments in this field have deepened our fundamental understanding of the main group elements and has expanded the potential applications of their compounds. Both experimental and theoretical studies have been devoted to understanding the effects that dictate the chemical reactivity of the central element including its electronic nature, ligand effects, and cooperativity. This allows for rational design of main group compounds with the intention to fine-tune their reactivity and related catalytic applications.

The vast majority of all catalytic processes are based on the use of transition metal complexes, however, this comes with potential disadvantages, such as limited availability (high cost), relatively high toxicity, and frequent metal incorporation in the end product. One area of modern main group chemistry attempts to address these problems and to pave the way for more sustainable catalytic processes. To this end a significant body of recent research in the field has focused on the development of new classes of more environmentally friendly, cheap, and abundant main group catalysts that can serve as transition metal mimics. While main group catalysis is still a comparatively new field, the ongoing research in this area is leading to the discovery of new catalysts and/or reactivity that is complementary to that of the transition metals.

The ability to utilize organic and inorganic small molecules and to convert them into value added products is of keen interest for sustainable chemical technologies. This can be achieved through their activation/functionalization and subsequent reactions with substrates. The use of stoichiometric reactions to examine the interaction and reactivity of main group compounds with different substrates, has enabled the isolation of unique main group (metal) complexes, which may in their own right display intriguing chemistry.

This Special Issue of *European Journal of Inorganic Chemistry* (EurJIC) and *ChemCatChem* entitled “main group catalysis” aims to showcase the rapidly growing field of main group element chemistry. The 30 contributions to this special issue are published by some of the international leading researchers in this field. These articles range from the synthesis and reactivity of novel main group complexes (group 1 to group 16 complexes) to their applications in catalysis. The collection of articles emphasizes the large diversity of topical aspects in the

area such as their variable biphilic (nucleophilic and electrophilic) nature and unusual element-ligand or element-substrate bonding.

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