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Main group chemistry: from molecules to materials

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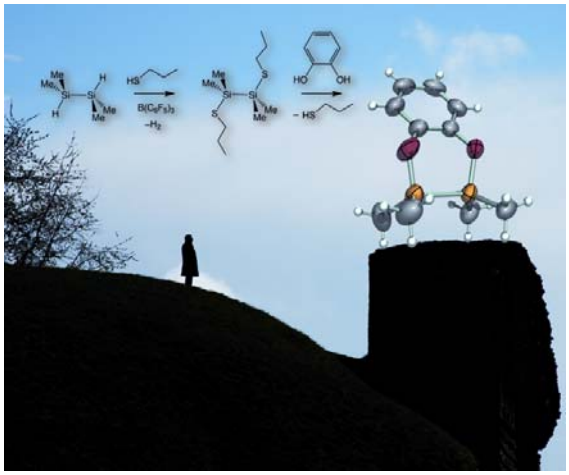

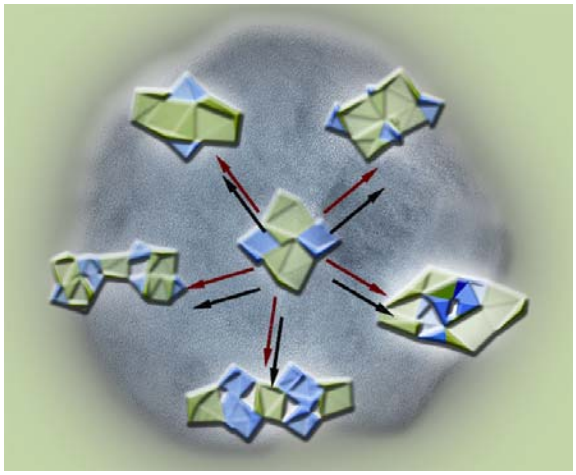

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Main group chemistry: from molecules to materials

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Simon Aldridge

Welcome to this special themed issue of *Dalton Transactions* entitled *Main group chemistry: from molecules to materials.* This volume is designed to showcase the scope of modern main group chemistry, from fundamental studies of small molecules on the one hand, through to applications of functional materials on the other.

From very early days synthetic main group chemistry developed a strong record of challenging accepted theories of valence, chemical bonding and compound stability. Indeed strategies based, for example on high levels of steric shielding, which have recently been exploited to elegant effect in transition metal systems previously 'cut their teeth' in studies of low-valent Group 13 and 14 compounds. Current experience demonstrates, that, given the right support, this area of endeavour continues to go from strength to strength. Recent highlights including Mg–Mg bonds in Mg(I) systems and isolated boryl anions, will surely grace the undergraduate textbooks of tomorrow and help to disprove the notion that 'there is little new out there to be discovered.'

However, as the title of this issue suggests, there is far more to modern main group chemistry than simply fundamental 'blue skies' research. Thus an understanding of the synthetic, structural and reaction chemistry of main group systems underpins efforts to address some of the key chemical challenges of the 21st century. These include (but are certainly not limited to) energy and the 'hydrogen economy', sensors, functional polymers, weakly coordinating anions, semiconductors and novel ligand systems. Perhaps some of the most challenging areas of current research concern the *interface* between molecular species and bulk materials. Here, in particular, the application of chemical ingenuity and imagination in experimental design has brought about significant advances, for example in the understanding of how small molecules interact with nano-scale metal particles. Such work provides a powerful illustration of how an understanding of the underlying chemical science is key to providing efficient routes to the technological advances which society craves.

The current issue represents a snapshot of current efforts across the broad spectrum of main group chemistry, encompassing novel ligand systems, hydride-containing materials, supramolecular self-assembly, sol–gel synthesis and polymerization chemistry. Moreover, it gives an idea of the origins of the recent upsurge of interest (some might say 'renaissance') in main group chemistry, from both fundamental and applied perspectives.