From Sand to Spectacular: Riding the Silicon Wave

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Over the past several decades, low-valent main group species have been at the center of some of the most exciting research in synthetic chemistry. These advances have increased our understanding of fundamental chemical phenomena, such as the nature of chemical bonding itself. As the field has become more established, and more is known about the nature of low-valent main group compounds, a shift in focus towards application has gradually emerged. Areas such as materials and catalysis, which are irreplaceable pillars of the chemical industry, have sought particular interest in sustainable and environmentally responsible alternatives to traditional processes. The use of reactive low-valent silicon compounds may offer a cost-efficient and non-toxic alternative to many current transition metal-based industrial processes. In fact, these compounds have been shown to act as transition metal mimics undergoing facile oxidative addition with a series of strong σ bonds. In this presentation, design, synthesis, structure and reactivity of selected silicon compounds will be delivered. In particular, unique small molecule activations, bottom-up synthesis of small silicon clusters, and homogenous catalysis will be presented.

References

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