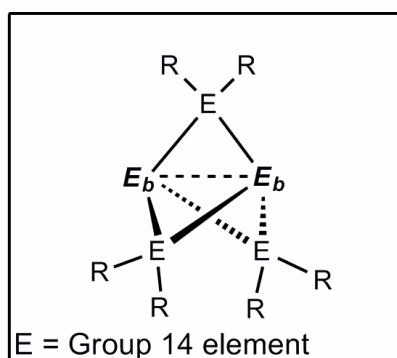


Exploring the Organometallic Chemistry of Metallapropellanes

Augenstein, T., Karlsruhe/D, Nied, D., Karlsruhe/D, Breher, F., Karlsruhe/D

Karlsruhe Institute of Technology (KIT), Institute of Inorganic Chemistry, Engesserstr. 15, D-76131 Karlsruhe, Germany.

Propellane molecules intrigue chemists for a number of reasons, not least because their carbon frameworks resemble the eponymous macroscopic propellers. The intrinsic [1.1.1] scaffold of propellanes belongs to the so-called “non-classical” structures, showing inverted tetrahedral bridgehead atoms (E_b). The bonding between the latter is far apart from being trivial. Even the well-established all-carbon [1.1.1]propellane has attracted renewed interest, from both experimentalists and theoreticians.



For the heavier congeners of carbon, however, the situation is seemingly more complicated.^[1] These heavy metalla[1.1.1]propellanes $[E_5R_6]$ ($E = \text{Si, Ge, Sn}$) have frequently been described as *biradicaloids* due to their considerably stretched bond between the bridgeheads E_b .^[1] Although numerous quantum chemical calculations^[2] have been performed on these species, synthetically accessible and structurally characterised compounds are very rare. Seminal work on the all-tin propellane $[\text{Sn}_5\text{Dep}_6]$ ($\text{Dep} = 2,6\text{-Et}_2\text{C}_6\text{H}_3$) was performed by Sita *et al.* in the early 1990s.^[3] Analogous compounds were reported later.^[4] Recently, the last missing members of Group 14, the first pentagerma- as well as the first pentasila[1.1.1]propellane $[E_5\text{Mes}_6]$ ($\text{Mes} = 2,4,6\text{-Me}_3\text{C}_6\text{H}_2$, $E = \text{Si, Ge}$) were investigated in combined experimental and quantum chemical studies.^[5] And indeed, these heavy propellanes and other derivatives were revealed to be intriguing species from both a bonding and reactivity perspective.^[6]

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