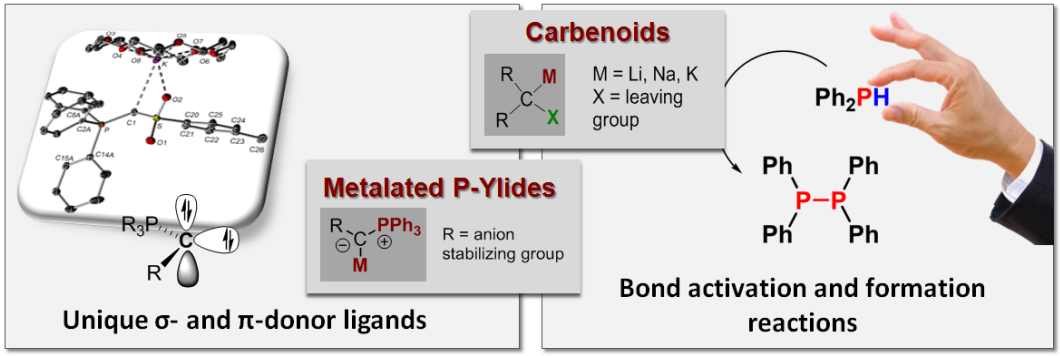
Tailoring the reactivity and properties of carbenoids and metalated ylides

Viktoria H. Gessner

Institut für Anorganische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany.

E-mail: vgessner@uni-wuerzburg.de

The last decades have revealed a revolution in the chemistry of main group element and metal compounds. The stabilization of reactive species has allowed their use in unusual transformations, particularly in bond activation reactions and catalytic transformations. Prominent examples are carbenes or other low-valent main group element systems.[1] Research in our group focuses on the application of carbon bases in such transformations and their use as unique donor ligands. While carbon bases such as Grignard or organolithium reagents are nowadays routinely used, the majority of applications is still limited to metalation reactions. The development of new applications is often hampered by the high reactivity of these compounds. In order to overcome these limitations und to control the reactivity, we aim at the tuning of the electronic properties of carbon bases, above all of phosphorus substituted ylides and carbenoids.[2] Recent developments allowed their use as ligands for the coordination of transition metal and main group element compounds and their direct application in bond activation reactions. For example, we have demonstrated that alkali metal carbenoids, which are usually thermally labile species, can be stabilized and applied in unexpected transformations, such as the activation of B–H bonds or the dehydrocoupling of phosphines.[3] Furthermore, metalated P-ylides act as effective σ- and π-donor ligands which for example allows the isolation of unique main group element compounds.[5] Here, we present our recent findings in the chemistry of phosphorus-stabilized ylides and carbenoids with focus on reactivities towards main group element compounds.



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