Reactivity Enhancement of a Diphosphene by Reversible *N*-Heterocyclic Carbene Coordination: Influence of *N*-Substituents

Reversible binding / coordination is well known in certain transition metal complexes, such as for example the Wilkinson's catalyst, making them very useful in catalytic processes.[1] In recent years the possibility of reversible binding / coordination in main group chemistry has been studied[2], a feature that allows such compounds to mimic as transition metal complexes.[3] Developments of this type will allow chemists to make sustainable catalysts, using compounds of *p*-block elements, instead of transition metal complexes, for different organic transformations.[4]

In this talk I will discuss the reversible coordination of *N*-heterocyclic carbene (NHC), **I** with diphosphene, **II** under the formation of Lewis acid-base complex of diphosphene and NHC, **III**. The NHC-coordination enhanced the reactivity of the diphosphene towards hydrolysis and hydrogenation reactions. To know the influence of NHC on the reactivity of diphosphene - we have considered i) the use of catalytic amount of NHC and ii) the use of different NHCs in terms of electronic and steric variation. The breaking of P-P bond in diphosphene will also be addressed under the formation of donor-stabilized phosphinidene, **IV**. In this talk I will also discuss low-valent germanium compounds which are isoelectronic with base coordinated and base free phosphinidenes.

References:
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[4] N. L. Dunn, M. Ha, A. T. Radosevich, *J. Am. Chem. Soc.* **2012**, *134*, 11330–11333.