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Development of Novel N-Phosphanyl-N-Heterocyclic and Acyclic diaminocarbenes: Synthesis, Properties and Catalysis

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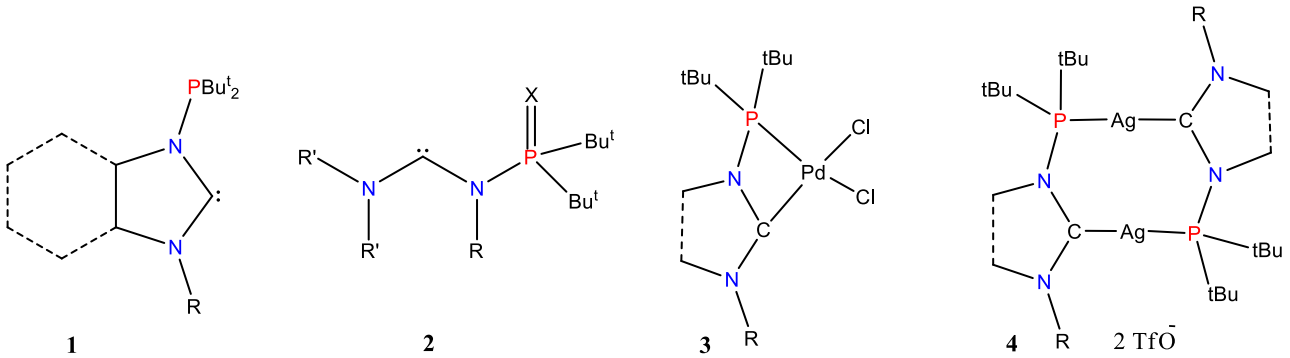
Over the last two decades, N-heterocyclic carbenes (NHCs) have been the focus of many investigations. Their properties such as their σ-donor ability, oxidative and thermal stabilities can be varied in a broad range, which makes them suitable for many catalytic processes. Another type of carbenes, the acyclic diaminocarbenes (ADCs), provide even greater opportunity to fine-tune their catalytic activities. In cooperation with Prof. A. Biffis novel heteroditopic ligands have been prepared that feature N-heterocyclic carbenes (NHCs) or acyclic diaminocarbenes as one of the coordinating moieties, as well as another coordinating phosphorus group directly connected to the NHC through the N atom, and their coordination chemistry has been studied (Scheme 1).



Scheme 1. Diaminocarbenes and their complexes.

Various synthetic approaches to *N*-phosphanyl-*N*-heterocyclic carbenes **1** and *N*-phosphanyl acyclic diaminocarbenes **2** have been developed**.** Various organic transformations have been studied [1,2]. Both heterocyclic and acyclic diaminocarbenes **1**,**2** form chelating complexes **3**. *N*-Phosphanyl-N-heterocyclic carbenes **1** form bridged silver complexes **4** that can be used as transmetallating agents for the transfer of the NHCP ligand towards gold(I) centres to afford either dicationic dinuclear species or neutral ones. Catalytical activity of Pd complexes (heterocyclic and acyclic) was studied in Suzuki, Sonogashira cross-coupling reactions and hydroamination.

References

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