

Recent Advances in Carbene Chemistry: Concepts and Applications

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This lecture intends to showcase some unconventional ways of harnessing the reactivity of alkynes via highly selective metal-catalyzed transformations. After a short review of our work in the area of triple bond metathesis, some unorthodox addition reactions to internal alkynes will be discussed in detail.

The use of carbophilic Lewis acids based on gold, platinum or rhodium provides many opportunities for the selective functionalization of triple bonds. Although it is well accepted that the reactions usually proceed via metal carbene intermediates, the actual nature of such species was subject to speculation. Only recently has our group managed to isolate reactive carbenes of gold and rhodium. The structural features of these species and the preparative implications will be discussed in some detail.

Moreover, unprecedented ruthenium-catalyzed *trans*-hydrogenation, *trans*-hydroboration and *trans*-hydrostannation reactions will be presented. These unconventional transformations are also thought to proceed via metal-carbene intermediates, some of which have also been isolated and fully characterized. Selected applications to target-oriented synthesis are meant to showcase the current state of development.