



NEW HORIZONS OF GOLD CATALYSIS

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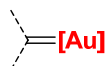
Abstract Speech

The innovative area of homogeneous gold catalysis¹ so far has mainly focused on alkylgold,² vinylgold³ and gold carbenoid⁴ intermediates.



Alkylgold
Species

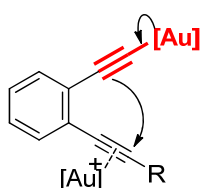
Vinylgold
Species



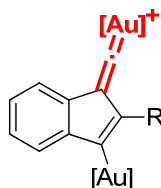
Gold
Carbenoid

A new class of gold-catalyzed reactions, proceeding via gold(I) vinylidene complexes, will be presented.⁶

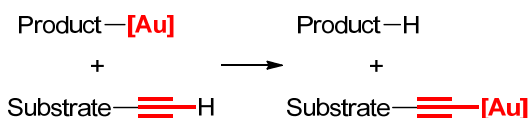
A full-scope study of these new catalytic cycles, involving the principle of "dual activation" of the substrate by two gold centers, gold vinylidene intermediates and an efficient "catalyst transfer" will be presented. In addition to experimental insights this includes studies of the new steps by computational chemistry.



Dual
Activation



Gold
Vinylidene



Catalyst
Transfer

Furthermore, new intermolecular reactions and extensions of these principles will be reported. This includes C-H activation at room temperature. Even sp³-C-H-bonds can be activated in a positional selective manner.

Improved catalysts for these reactions base on an innovative new one-step synthesis of NHC-gold(I) complexes.⁷

Vinyl iodides are accessible this way, too.⁸ This shows the orthogonality of gold catalysis and palladium catalysis in organic synthesis.⁹ It is possible to conduct a gold-catalyzed reaction at a halogenated substrate without addressing the halide at all, and then a subsequent palladium-catalyzed reaction with the organic halide can be done.

Some of the reactions allow the isolation of gem-diaurated species, interesting organometallic intermediates. These could be characterized by a number of X-ray single crystal structure analyses.

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