Uncommon C–C and C–Heteroatom Bond-Forming Reactions Enabled by a Versatile Diiron Bis-Cyclopentadienyl Core

Fabio Marchetti

Department of Chemistry and Industrial Chemistry, University of Pisa, Via Moruzzi 13, 56122 Pisa, Italy

fabio.marchetti@unipi.it

Dinuclear metal complexes offer unique reactivity patterns that are not accessible to related monometallic species, by leveraging cooperative effects between adjacent metal centers.[1]

Diiron complexes featuring a bridging vinyliminium ligand can be prepared on a multi-gram scale through a broad-scope synthesis starting from the inexpensive and commercially available $[Fe_2Cp_2(CO)_4]$ (Cp = η^5-C_5H_5).[2] These compounds constitute a versatile platform for chemical diversification, as the acidity of the vinyliminium moiety can be exploited to promote a wide range of functionalization reactions and multicomponent assembly strategies under mild conditions (Figure 1).[3] This approach enables the straightforward generation of a diverse array of uncommon yet robust organometallic architectures. The scope and synthetic potential of this chemistry will be discussed, including the first reproducible synthesis of a class of ferrabenzenes.[4]

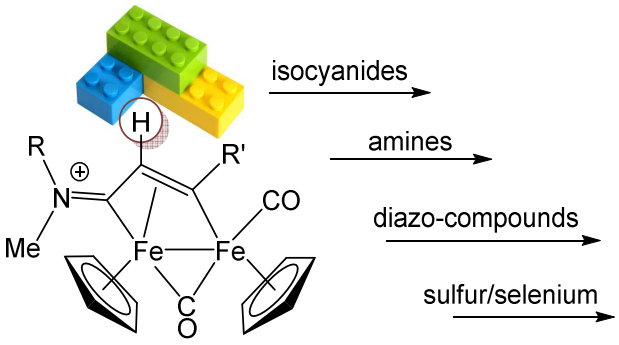

Figure 1. General structure of diiron vinyliminium complexes, which serve as starting materials for the synthesis of a wide variety of organometallic frameworks, including highly functionalized organic molecules. R = alky, aryl; R' = alkyl, aryl, H, carboxylate, $SiMe_3$, thiophenyl, pyridyl, ferrocenyl.

References

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