

The close and loose relationship between Carbon and Phosphorus

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Polyphosphorus units are an important class of compound and isolobal to carbon-based relatives. Because of the lone pairs at the phosphorus atoms, the five-fold symmetric cyclo-P₅ ring of the pentaphosphaferrocenes [Cp^RFe(η⁵-P₅)] enables the use of these complexes in unique supramolecular aggregations with Lewis acidic transition metal moieties to form unprecedented giant spherical molecules (Figure 1, left).¹ Moreover, they represent sandwich complexes with a flexible redox² and substitution behavior³ (Figure 1, right-top and center), different from the one of the carbon-based analogue ferrocene. The talk will compare similarities and differences between P- and C-based compounds and show some advantages of the former ones. Furthermore, the use of alternative reagents⁴ to synthesize such powerful starting materials of polypnictogen complexes and other surprising compounds will be presented (Figure 1, right bottom).⁵

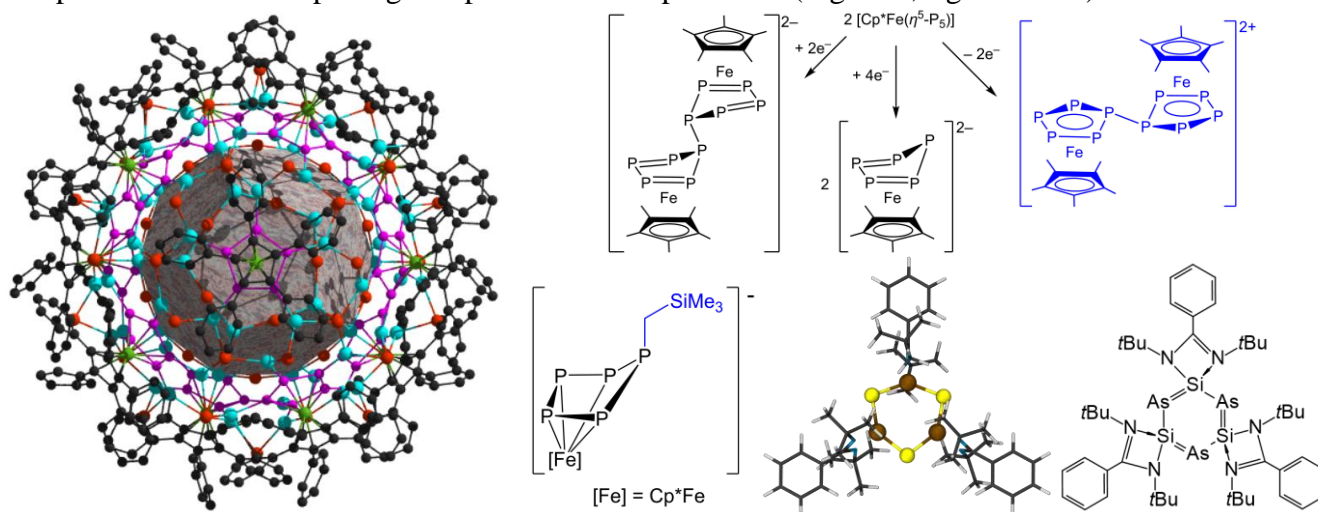


Figure 1. Versatile reactivity of [Cp^RFe(η⁵-P₅)]: left) giant supramolecular sphere; right top) redox reactions; center bottom) product of a nucleophilic attack; right bottom) arsa-sila-benzene

- (1) C. Heindl, E. V. Peresyphkina, A. V. Virovets, W. Kremer, M. Scheer, *J. Am. Chem. Soc.* **2015**, *137*, 10938.
- (2) M. V. Butovskiy, G. Balázs, M. Bodensteiner, E. V. Peresyphkina, A. V. Virovets, J. Sutter, M. Scheer, *Angew. Chem. Int. Ed.* **2013**, *52*, 2972.
- (3) E. Mädl, M. V. Butovskii, G. Balázs, E. V. Peresyphkina, A. V. Virovets, M. Seidl, M. Scheer, *Angew. Chem. Int. Ed.* **2014**, *53*, 7643.
- (4) A. E. Seitz, U. Vogel, M. Eckhardt, M. Eberl, G. Balázs, E. V. Peresyphkina, M. Bodensteiner, M. Zabel, M. Scheer, *Chem. Eur. J.* **2017**, *23*, 10319.
- (5) A. E. Seitz, M. Eckhardt, A. Erlebach, E. Peresyphkina, M. Sierka, M. Scheer, *J. Am. Chem. Soc.* **2016**, *138*, 10433.