

Low Coordinate Phosphorus Compounds for 40 Years

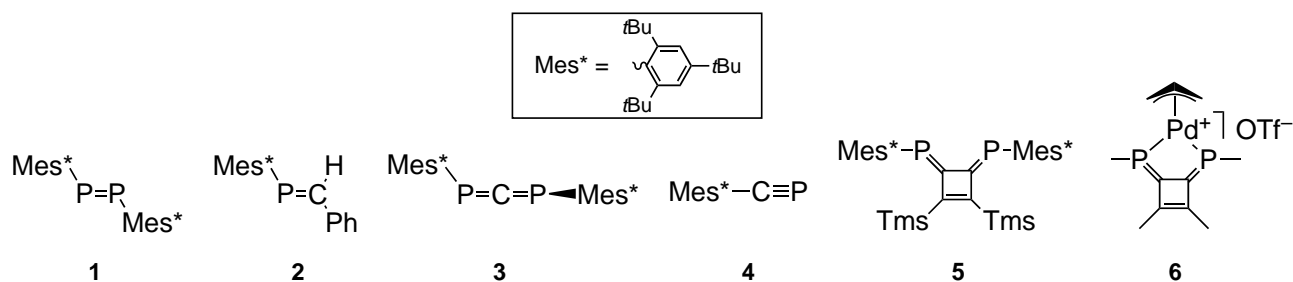
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Utilizing 2,4,6-tri-*t*-butylphenyl as a sterically demanding group (abbreviated as Mes*), a stable diphosphene (**1**) was isolated in 1981 for the first time and the physical and chemical property investigation was disclosed together with the X-ray structure determination [1]. Since then, in addition to **1**, various kinds of sterically protected stable low-coordinate phosphorus compounds such as 1-phosphaethene (**2**) [2], 1,3-diphosphaallene (**3**) [3], 1-phosphaalkyne (**4**) [4], and 3,4-diphosphinidenecyclobutene (**5**) [5] have been successfully prepared and characterized. The structures of these compounds are simple but unusual and uncommon based on the traditional knowledge of organic, inorganic, and/or physical chemistry [6]. (π -Allyl)palladium(II) complexes ligated with **5** or its derivatives **6** are useful in catalytic organic reactions such as the Ullmann reaction and the Tsuji-Trost reaction [7]; from a chiral *s*-alcohol, the corresponding chiral amine is obtained with retention of chirality suggesting a double inversion process.



References

- [1] M. Yoshifuji, I. Shima, N. Inamoto, K. Hirotsu, T. Higuchi, *J. Am. Chem. Soc.*, **1981**, *103*, 4587-4589; **1982**, *104*, 6167; M. Yoshifuji, *Eur. J. Inorg. Chem.*, **2016**, 607-615.
- [2] M. Yoshifuji, K. Toyota, N. Inamoto, *Tetrahedron Lett.*, **1985**, *26*, 1727-1730.
- [3] M. Yoshifuji, K. Toyota, N. Inamoto, *J. Chem. Soc., Chem. Commun.*, **1984**, 689-690.
- [4] M. Yoshifuji, T. Niitsu, N. Inamoto, *Chem. Lett.*, **1988**, 1733-1734.
- [5] M. Yoshifuji, K. Toyota, M. Murayama, H. Yoshimura, A. Okamoto, K. Hirotsu, S. Nagase, *Chem. Lett.*, **1990**, 2195-2198.
- [6] M. Yoshifuji, *Pure Appl. Chem.*, **2017**, *89*, 281-286.
- [7] F. Ozawa, M. Yoshifuji, *Dalton Trans.*, **2006**, 4987-4995.