Fun with Funny Organophosphorus Compounds

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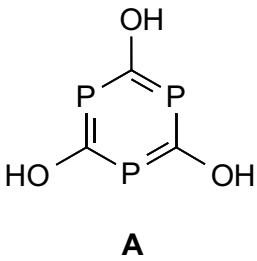
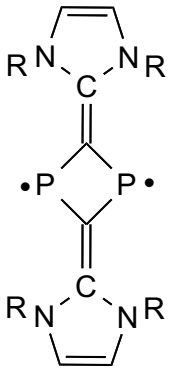
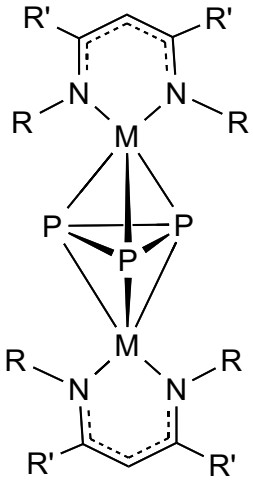
The elements C,H,N,O form the basis for organic molecules and their combination has led to a countless array of molecules. The substitution of nitrogen by phosphorus opens the door into the world of organophosphorus compounds. This "simple" mutual substitution of two "homologous" elements may generate molecules which may look similar but have very different properties. Having developed a simple synthetic method for the preparation of Na(OCP) – the analogue of the very well established sodium isocyanate – we started to explore its properties as building block for organophosphorus compounds and discovered that Na(OCP) has very little in common with its nitrogen analogue, Na(OCN), indeed. Apart from cycloadditions leading to new phosphorus heterocycles such as **A** or **B**, Na(OCP) also serves as "P" transfer reagent and allows, for example, the synthesis of molecular metal phosphides **C** which are difficult to obtain otherwise. This chemistry has inspired the synthesis of molecules which are of fundamental but also of practical interest.



A



B



C

[1] F. F. Puschmann, D. Stein, D. Heift, C. Hendriksen, Z. A. Gal, H.-F. Grützmacher, H. Grützmacher, *Angew. Chem., Int. Ed.* **2011**, *50*, 8420-8423.

[2] R. Suter, Y. Mei, M. Baker, Z. Benkő, Z. Li, H. Grützmacher *Angew. Chem. Int. Ed.* **2016**, DOI: 10.1002/anie.201610156; see also S. K. Ritter, *C&EN* **2017**, *95*, 6.

[3] In collaboration with Matthias Driess, TU Berlin.