Novel phosphaphenalene derivatives: en route towards a new generation of multifunctional organophosphorus materials

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Main group-based heterocycles enable materials properties that cannot be accessed from any all-carbon architecture. Particularly, phosphorus heterocycles stand out because of their special geometry and electronic characteristics.[1] The unique non-hybridization of phosphorus centers originates a myriad of fascinating properties; i.e. strong photoluminescence, electron-accepting capacity,[1] and a large variety of coordination reactions,[2] just to name a few. Deepening into the phosphorus heterocycles chemistry requires, nevertheless, the development of further synthetic protocols. The latter has recently attracted a great deal of research efforts;[1] the future of phosphorus-based heterocycles will be certainly governed by the availability of straightforward procedures to access groundbreaking architectures.

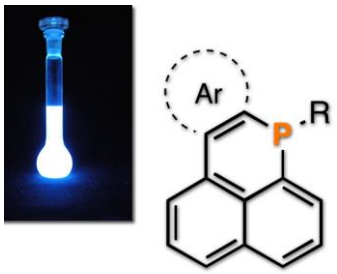

Fig. 1. Phosphaphenalene

In this communication, I will present a new non-catalyzed synthetic protocol to obtain novel, fused phosphorus heterocycles; i.e. phosphaphenalenes (Fig. 1).[3] Moreover, I will report a detailed investigation on their photo-electrochemical properties.[4] In particular, I will shed light into the multifunctionality of these novel phosphorus heterocycles; i.e. their capacity to generate light-induced electric current and to provide electroluminescence. In brief, I will describe relevant aspects for the design of a new generation of improved organophosphorus materials.

Literature:

[1] T. Baumgartner, *Acc. Chem. Res.*, **2014**, *47*, 1613. [2] L. Kollár, Keglevich, G. *Chem. Rev*. **2010**, *110*, 4257. [3] a) C. Romero-Nieto, A. López-Andarias, C. Egler-Lucas, F. Gebert, J.-P. Neus, O. Pilgram, *Angew. Chem. Int. Ed*. **2015**, *54*, 15872; b) O. Larrañaga, C. Romero-Nieto, A. De Cózar, *Chem. Eur. J.* **2017**, DOI: 10.1002/chem.201703495. [4] P. Hindenberg, A. López-Andarias, F. Rominger, A. De Cózar, C. Romero-Nieto, *Chem. Eur. J.* **2017**, *23*, 13919.