

OPEN-SHELL NANOGRAPHENOIDS

Marcin Stępień

Wydział Chemii, Uniwersytet Wrocławski, ul. F Joliot-Curie 14, 50-383 Wrocław, Poland
marcin.stepien@chem.uni.wroc.pl

The interest in open shell aromatic molecules is motivated by the fundamental aspects of their electronic structure, posing considerable challenges to synthetic, physical, and theoretical chemists, and by their unique properties, with emerging applications in materials science.^[1–3] Modern strategies of creating biradicaloid molecules typically combine quinoidal, aromatic, and antiaromatic substructures in ways that stabilize open-shell configurations and high-spin states. Our own research on two-dimensionally fused aromatics containing hetero- and carbocyclic ring systems^[4–8] has provided access to novel π -conjugated frameworks that can be tailored into radicals and oligoradicaloids. In this contribution we will discuss our recent synthetic advances and describe the spectroscopic and supramolecular features of these systems. In particular, we will discuss an air-stable tetraradicaloid macrocycle, which is simultaneously active as an anion receptor and a redox switch, and can function as a unique “diiodine splitter.”^[9] We will also present the first example of an azacoronene-derived radical and its giant σ -dimer.

REFERENCES

- [1] M. Abe, *Chem. Rev.* **2013**, *113*, 7011–7088.
- [2] Z. Zeng, X. Shi, C. Chi, J. T. L. Navarrete, J. Casado, J. Wu, *Chem. Soc. Rev.* **2015**, *44*, 6578–6596.
- [3] T. Kubo, *Chem. Rec.* **2015**, *15*, 218–232.
- [4] D. Myśliwiec, M. Stępień, *Angew. Chem. Int. Ed.* **2013**, *52*, 1713–1717.
- [5] E. Gońka, P. J. Chmielewski, T. Lis, M. Stępień, *J. Am. Chem. Soc.* **2014**, *136*, 16399–16410.
- [6] M. A. Majewski, T. Lis, J. Cybińska, M. Stępień, *Chem. Commun.* **2015**, *51*, 15094–15097.
- [7] M. A. Majewski, Y. Hong, T. Lis, J. Gregoliński, P. J. Chmielewski, J. Cybińska, D. Kim, M. Stępień, *Angew. Chem. Int. Ed.* **2016**, *55*, 14072–14076.
- [8] M. Żyła-Karwowska, H. Zhylitskaya, J. Cybińska, T. Lis, P. J. Chmielewski, M. Stępień, *Angew. Chem. Int. Ed.* **2016**, *55*, 14658–14662.
- [9] H. Gregolińska, M. Majewski, P. J. Chmielewski, J. Gregoliński, A. Chien, J. Zhou, Y.-L. Wu, Y. J. Bae, M. R. Wasielewski, P. M. Zimmerman, et al., *J. Am. Chem. Soc.* **2018**, *140*, 14474–14480.