

# Open-Shell Nanocarbons

## Organic Materials and Synthetic Tools

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In this project, we propose to make new classes of carbon-rich organic oligoradicals and oligoradicaloids (open-shell nanocarbons) and explore their physical properties and reactivity. We will design and synthesize new open-shell coronoids, indenoarenes, arenoquinodimethanes, and other systems, containing previously unexplored carbo- and heterocyclic motifs and diversely functionalized. These systems will be tailored to control their fundamental characteristics, such as ambient stability, electronic bandgaps, singlet–triplet equilibria, electrochemical activity, as well as their non-covalent and covalent self assembly. In the latter context, we will use the principles of dynamic covalent chemistry to develop complex molecules and materials with a high degree of intrinsic porosity and long-range order. Further applications of the new oligoradicaloids and their assembly products may include thermochromic and electrochromic materials, organic semiconductors, and non-linear optics materials.

### LEAD PAPERS

[1] M. A. Majewski, P. J. Chmielewski, A. Chien, Y. Hong, T. Lis, M. Witwicki, D. Kim, P. M. Zimmerman, M. Stępień, *Chem. Sci.* **2019**, *10*, 3413–3420.

[2] 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, M. Stępień, *J. Am. Chem. Soc.* **2018**, *140*, 14474–14480.

### ONE PHD STUDENT POSITION

Up to 48 months, scholarship 1 700 PLN/month (tax-exempt). Requirements:

1. Multistep organic synthesis, including microscale work, and inert-atmosphere procedures.
2. Design and planning of complex synthetic sequences
3. Experience with aromatic/functional dye chemistry
4. Experience with spectroscopic methods, in particular NMR spectroscopy
5. Fluency in English
6. Fulfilled admission criteria at the University of Wrocław Doctoral School (College of Chemistry)

Please apply online at <https://forms.gle/83yNYUuBYiPtc9QdA>

Deadline: 2022-10-11 23:59



NARODOWE CENTRUM NAUKI