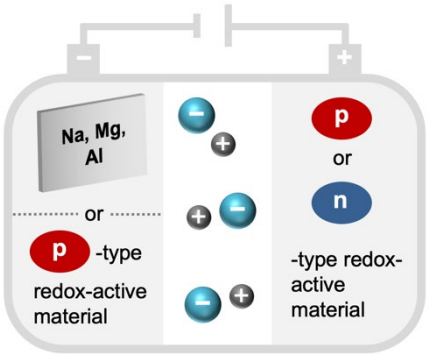
Organic Materials: From Batteries to Conjugated Nanohoops

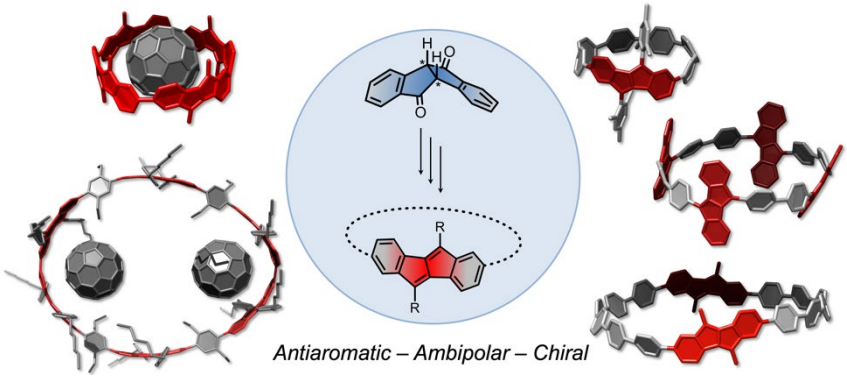
Birgit Esser

Ulm University, Institute of Organic Chemistry II and Advanced Materials,
Albert-Einstein-Allee 11, 89081 Ulm, Germany
birgit.esser@uni-ulm.de; www.esserlab.com

In face of the climate change there is a strong and growing demand for the storage of renewable energies. Organic electrode materials have attracted great interest for next-generation batteries, as they can be prepared from renewable, sustainable or less-limited resources, they are easy to recycle as well as potentially safer and cheaper to produce. Both p- and n-type organic materials with reversible redox processes can be used, often based on π-systems, furnishing different types of cell configurations.[1] In the first part of this talk design principles and examples of organic battery electrode materials and their application in all-organic and multivalent metal full cells will be discussed.



In conjugated nanohoops the effect of radial conjugation and bending on the π-systems can be investigated, they can possess unexpected optoelectronic properties, and their radially oriented π-system makes them attractive for host-guest chemistry. With the right choice of a π-subsystem, bending it out of planarity can induce chirality in the hoop. Dibenzopentalene is a small-bandgap, ambipolar organic semiconductor, which also makes it attractive for organic field-effect transistors. In the second part of this talk, synthetic strategies to (enantiopure) dibenzopentalene-based nanohoops will be presented as well as their optoelectronic, host-guest and chiroptical properties discussed.[2]



References:

[1] (a) B. Esser, F. Dolhem, M. Becuwe, P. Poizot, A. Vlad, D. Brandell, *J. Power Sources* **2021**, *482*, 228814; (b) B. Esser, *Org. Mater.* **2019**, *01*, 063–070.
[2] B. Esser, J. S Wössner, M. Hermann, *Synlett* **2022**, *33*, 737–753.