Bottom-Up Synthesis of Nanographenes and Graphene Nanoribbons with Tailored Edges

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Modern Organic Chemistry offers many opportunities to fabricate tailor-made nanographenes, their linear extended derivatives such as graphene nanoribbons (GNRs) and also two dimensional conjugated organic frameworks (2D-COFs). The very traditional fields of synthetic aromatic and heteroaromatic chemistry found renewed interest in such extended derivatives due to their implementation into materials science and their application into organic electronics and spintronics.
We aim to tune the ground state of nanographenes to be open-shell thus containing unpaired electrons and use them as building concepts towards materials for future application in spintronic devices. Replacing single or multiple carbon atoms within the basal plane or at the edges of graphene molecules by heteroatoms such as nitrogen, boron or a combination of them, is an unique way to tune the optoelectronic properties without changing their structural skeleton.[1]-[3] Additionally, the stability for example of a zigzag edge can be strongly influenced.[4] In addition, we demonstrated charged nitrogen Nanographenes with helicity and uniqe cove-edges.[5]
Doped graphene molecules can provide new functions for electronics and energy-related fields.

References

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Figures

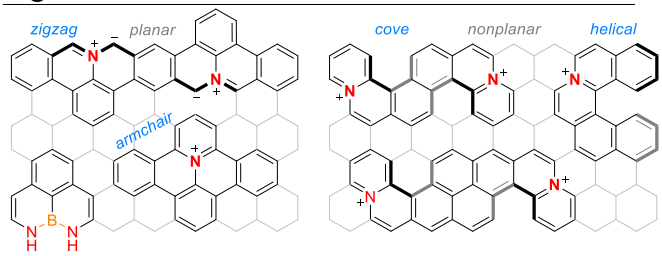

Figure 1: Schematic Representation of Nanographenes with tailored armchair-,zigzag- and cove-edges and nitrogen as well as nitrogen-boron-nitrogen doping.