Engineering of Nanographenes with Doping and Pores

Kun Xu
TU Dresden, Dresden, Germany
kun.xu@tu-dresden.de

Nanographenes are important organic materials due to their great potential in electronics, optoelectronics and spintronics. The top-down synthesis of nanographenes via exfoliation presents well-known disadvantages such as non-regular edge structures or uncontrollable sizes. In contrast, the bottom-up organic synthesis approach has emerged in the last decades as a powerful tool to design structurally well-defined nanographenes.

Here two different bottom-up approaches have been developed to engineer the structure and energy gap of nanographenes. In the first example, cationic nitrogen and helicity were introduced into nanographenes via solution synthesis. The obtained molecules exhibit unique nonplanar configurations with axial chirality, lower lying HOMOs/LUMOs and energy gaps, as well as quasi reversible electrochemical reduction. In the second case, through a combined solution and on-surface synthesis approach, non-planar nanopores were introduced into nanographene. The porous nanographene exhibits an increased energy gap and nonplanar configuration.

References

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