

Photochemical Bottom-up Synthesis of Nanographenes and Graphene Nanoribbons

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Nanographenes (NGs) and graphene nanoribbons (GNRs) are very promising materials for electronic applications such as field-effect transistors, solar cells and biosensors. However, NGs and GNRs produced by physical methods suffer from poor solubility in common solvents, which make difficult their deposition on large substrates as required for the production of the next generation of electronic devices. Moreover, physical methods do not allow control over size, shape and functionalization of GNRs, leading to undefined electronic and physical properties. Methods to prepare such materials using the solution-phase bottom-up approach have been proposed. Yet, no synthetic method provides clean aromatization step and the resulting materials can possess significant amount of structural defects. In this presentation, we will show a new bottom-up synthetic strategy for the preparation of soluble, well-defined NGs and GNRs with controllable width and physical properties.[1] Our strategy is based on the straightforward preparation of different chlorine-containing oligo- and polyphenylene precursors, followed by an intramolecular cyclodehydrochlorination (CDHC) reaction to form the graphenic structure. The synthesis and characterization of several NGs and GNRs will be presented.

[1] Daigle, M.; Picard-Lafond, A.; Soligo, E.; Morin, J.-F. *Angew. Chem. Int. Ed.* **2016**, *55*, 2042.