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Curved Nanographenes and Graphene Nanoribbons: Bottom-up Synthesis and Characterizations

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Curved π-conjugated polycyclic hydrocarbons (or nanographenes) has become an important research targets owing to their fascinating intermolecular packing and extraordinary chiraloptical properties resulting from their contorted conformation. In general, two distinct approaches have been established for the synthesis of curved nanographenes: one is the incorporation of steric strain in their periphery, the other is to introduce the non-hexagonal rings (i.e. pentagon, heptagon, octagon) in their skeleton which induce the nonplanar nature. The resultant curvature in a π-conjugated system often yields an unusual electronic structure and unprecedented physical properties. Here, I will talk the reasonable synthesis of several curved nanographenes and graphene nanoribbons with different topologies, such as saddle-shaped and wavy-shaped open-shell radicaloids,[1] azulene-embedded helical nanographenes,[2] and curved graphene nanoribbons with multiple edge structures.[3] Apart from the synthetic strategies, the structure-property relations of these π-systems as well as their optical, electronic and magnetic properties will be also presented. Our work provides a new insight into the synthesis of functional curved aromatics as well as their potential applications in nanoelectronics and spintronic devices.

References

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[2] *Angew. Chem. Int. Ed.*, 14 (2020), 5637.
[3] *J. Am. Chem. Soc.*, 43 (2020) 18293.

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