Zigzag-Edged Nanographenes: Bottom-up Synthesis of peri-Tetracene and Circumanthracene

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Zigzag-edged nanographenes such as peri-acenes and circumacenes are attractive for potential applications in organic electronics by virtue of their intrinsic spin properties [1,2]. Among peri-acenes, the closed-shell analogues such as perylene and bisanthenes had been synthesized decades ago, however, the higher analogue, i.e., peri-tetracene (4-PA) was hitherto unknown. 4-PA is predicted to exhibit an open-shell singlet ground state and hence it would be challenging to achieve via solution based synthesis strategy. We have circumpassed this barrier and accomplished 4-PA for the first time where we sterically protected the active zigzag edges to impart stability [3,4]. Later we have demonstrated the capability of 4-PA towards Diels-Alder reactions and successfully synthesized various circumanthracene derivatives, which are attractive due to their narrow energy gaps.

References


Figures

Figure 1: Zigzag-edged peri-acenes.