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Hierarchical Organization of Bio-Mimetic Supramolecular Polymers

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ABSTRACT: Morphological evolution during the hierarchical assembly process of chiral supramolecular polymers has always been a fascinating subject among supramolecular self-assembled structures.[1] A wide variety of chiral building blocks, like peptide amphiphiles, amphiphilic lipids, and proteins, are known to form self-twisting architecture. However, understanding the connection between molecular chemistry and morphological selection remains a challenge and thus an exciting topic of research. In the present talk, we are trying to find a correlation between molecular geometry and its supramolecular outcome, resulting in distinctive properties. We found that depending the conformational flexibility of the polycyclic aromatic hydrocarbon functionalized-dipeptide conjugate leads to the hierarchical organization of flat nanoribbons into microcrystals via a non-classical crystallization mechanism. However, a similar system with geometrical constraints forms nanotubes from the metastable helical nanoribbons through a series of intermediates. This morphological selection resulted in inversed switching of supramolecular chirality and circularly polarized luminescence. The details of these interesting hieratically organized bio-mimetic supramolecular polymer systems will be presented.

KEY WORDS:supramolecular polymer, bio-mimetism.

References

1. Hall, D. M., Bruss, I. R., Barone, J. R., Grason, G. M. Morphology selection via geometric frustration in chiral filament bundles. *Nat. Mater.,* **2016**, *15*, 727–732.
2. Hifsudheen, M.; Mishra, R. K.; Vedhanarayanan, B.; Praveen, V. K.; Ajayaghosh, A. The Helix to Super-Helix Transition in the Self-Assembly of π-Systems: Superseding of Molecular Chirality at Hierarchical Level. *Angew. Chem. Int. Ed.* **2017**, 56, 12634–12638.