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**Fullerene-based shape amphiphiles towards hierarchical supramolecular assemblies** CHIH-HAO HSU, The University of Akron, CHIEN-LUNG WANG, National Chiao Tung University, HAO-JAN SUN, The University of Akron, YINGFENG TU, Soochow University, STEPHEN CHENG, The University of Akron — Self-assembly is an elegant strategy which is used to create assemblies with tunable properties in nature as well as the artificial supramolecular systems. The self-assembly of [60]fullerene (C60) has drawn an tremendous amount of interest due to the exceptional optical and optoelectronic properties of C60. By constructing hierarchical supramolecular structures of C60 derivatives, the molecular functionality of C60 can be accumulated, amplified, and then transferred to bulk material properties. This research focuses on manipulating the balance of non-covalent interactions among C60 derivatives into molecular alignments in the supramolecular structure. The aliphatic tails and spacers in the C60 derivatives will improve the solubility and provide sufficient mobility for the effective packing of C60s. The differences in shape and intermolecular interaction between C60s and alkyl chains allow these molecules to arrange themselves in microphase-separated mesostructures. The hierarchical structure built up by C60 derivatives can be obtained via the highly-ordered packing of C60 in mesostructures. By adding an additional bisamide group to the molecular structure, the balance of the intermolecular interactions and the spatial packing can be tuned to exhibit supramolecular polymorphism.

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