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Controlling Hierarchically Self-Assembly in Supramolecular Tailed-Dendron Systems NATHALIE MERLET-LACROIX, University of Fribourg, JINGUI RAO, AFANG ZHANG, DIETER SCHLÜTER, ETH-Zürich, Switzerland, JANNE RUOKOLAINEN, Helsinki University of Technology, Finland, RAFFAELE MEZZENGA, ETH-Zürich, Switzerland, PHYSICS DEPARTMENT, UNIVERSITY OF FRIBOURG TEAM, DEPARTMENT OF MATERIALS, ETH-ZÜRICH TEAM, HELSINKI UNIVERSITY OF TECHNOLOGY, FINLAND TEAM — We study the self-assembly of a dendritic macromolecular system formed by a second-generation dendron and a polymer chain emanating from its focal point. We use supramolecular ionic interactions to attach to the periphery of the dendrons sulphated alkyl tails. The resulting "triblock copolymers" have a molecular architecture similar to a four-arm pitchfork with varying arms and holder lengths. The bulk morphologies observed by SAXS and TEM show thermodynamically stable, hierarchical "inverted" hexagonal or lamellar structures. The structural models for the molecular packing emerging from experimental findings are benchmarked to available self-consistent field theories (SCFT) and experiments and theoretical predictions are found in perfect agreement. The present results show that supramolecular systems based on tailed dendrons and surfactants can be used to scale up of the structural organization from the liquid crystalline length scale to the block copolymer length scale, while preserving the inverted unconventional morphologies offering new possibilities in the design of nanostructured materials.

Nathalie Merlet-Lacroix
University of Fribourg

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