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Self-Assembly of Supramolecular Composites under Cylindrical Confinement PETER BAI, KARI THORKELSSON, Univ of California - Berkeley, PETER ERCIUS, Lawrence Berkeley National Laboratory, TING XU, Univ of California - Berkeley — Block copolymer (BCP) or BCP-based supramolecules are useful platforms to direct nanoparticle (NP) assemblies. However, the variety of NP assemblies is rather limited in comparison to those shown by DNA-guided approach. By subjecting supramolecular nanocomposites to 2-D cylindrical confinement afforded by anodic aluminum oxide membranes, a range of new NP assemblies such as stacked rings, and single and double helices can be readily obtained, as confirmed by TEM and TEM tomography. At low NP loadings (3 v%), the nanostructure conforms to the supramolecule morphology. However, at higher NP loadings (6-9 v%), the nanostructure deviates significantly from the morphology of supramolecular nanocomposites in bulk or in thin film, suggesting that frustrated NP packing, in addition to simple supramolecule templating, may play a significant role in the self-assembly process. The present studies demonstrate that 2-D confinement can be an effective means to tailor self-assembled NP structures and may open further opportunities to manipulate the macroscopic properties of NP assemblies.

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