

Abstract Submitted  
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**Co-assembly of polymer covered cyclic peptide nanotubes and block copolymer in thin films** CHEN ZHANG, THOMAS LAZZARA, Department of Materials Science and Engineering, University of California, Berkeley, CHANGYI LI, Department of Chemical Engineering, University of California, Berkeley, BRETT HELMES, The Molecular Foundry, Lawrence Berkeley National Laboratory, TING XU, Department of Materials Science and Engineering, University of California, Berkeley — Nanotubular structures have gained prevalent interest for their unique hollow structures and high aspect ratio and their potential applications ranging from molecular separation to nanocomposite membranes. We used nanotube forming cyclic peptide (CP) as the structural motif and studied the self-assembly of polymer conjugated CPs in block copolymer (BCP) matrix in thin films. The co-assembly process is mainly driven by thermodynamic quantities, namely Flory-Huggins polymer-polymer interactions that governs the interaction between CP and BCP, interfacial interactions that affects polymer chain orientation, and thin film commensurability. In addition, due to the dynamic nature of the nanotube formation, the co-assembly process is also pathway-dependent. Thus, processing conditions are critical in co-assembling CP nanotubes and BCP in thin films. Our result shows that the initial aggregation state of polymer covered CP nanotubes determines the pathway the system takes and hence the final morphology of the films. The co-assembly of polymer-conjugated CPs and BCPs demonstrates the feasibility of assembling 1D nanotubes in supramolecular thin films and opens up a new avenue for the generation of novel nanotubular structures.

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