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Synthesis and Evaporative Self-Assembly of Polystyrene Nanotubes under Confinement LU ZHANG, JODIE LUTKENHAUS, Texas A&M University, TEXAS A&M UNIVERSITY TEAM — Synthesis and manipulation of anisotropic building blocks into ordered structures has attracted increasing attention in recent years as nanowires and nanotubes (NWs/NTs) show great potential in many emerging technologies such as novel electric devices, optical units and biosensors. Here we use evaporation to align polystryrene NWs/NTs into distinct and interesting patterns. We synthesized polystyrene (PS) NWs/NTs of varied aspect ratio using anodic aluminum oxide (AAO) templates (200 nm pore size) using a melt-wetting technique. The template was removed, and NWs/NTs of controllable length ranging from several hundred nanometers to a few micrometers were released from the bulk PS film under ultrasonication. We further investigate the evaporative self-assembly of the synthesized polystyrene NTs under confined and "open" geometries and observe the alignment and assembled structures of the polystyrene NTs using scanning electron microscopy. Confocal laser scanning microscopy was also used to monitor the kinetics of the alignment process during evaporation. Results indicate that many factors (solvent, aspect ratio) contribute to the degree of NW/NT alignment relative to the evaporation front.

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