

Abstract Submitted
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Kinetic View of Nanoparticle Assemblies in Supramolecular Nanocomposite Thin Films JINGYU HUANG, University of California, Berkeley — Nanocomposite thin films containing hierarchically structured nanoparticle (NP) assemblies are ideal candidates for the fabrication of metamaterials. However, when the particle and polymer chain have similar feature sizes, macrophase separation between the polymers and NPs are usually observed. Controlling NP diffusivity in polymer matrix provides an opportunity to control the kinetic pathways for NP assembly and to access 3-D NP assemblies in non-equilibrium states. Here, we present the thin film 3-D hierarchical assembly of NPs in block copolymer-based supramolecular thin films under solvent vapor annealing (SVA) by varying the ratio between the particle size and supramolecule periodicity. By manipulating the NP diffusion kinetics in the supramolecular matrix, surface aggregation of NPs was suppressed and NPs co-assembled with supramolecules to form 3-D morphologies in thin films. The present studies opened a viable route to construct functional composite thin films containing large nanoparticles via kinetic control.

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