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Control of the Dynamic Behavior of The Particle-Copolymer Nanocomposites GANG HE, ANNA BALAZS, University of Pittsburgh — Nanocomposites of linear copolymers and various kinds of particles have long been of great interest to researchers because of their attractive industrial applications. The microphase separation of copolymers can be used to template the particles into regular structure to gain needed optical/magnetical/electrical properties. On the other hand, clustering of the particles can be utilized to influence the morphology of the polymer to improve the properties of the polymer matrix. Theoretical studies on these phenomena have focused mostly on the cases where one of the self-organizing process dominates the behavior of the system. In this computatoinal study, we will focus more on the interplay/competition of two different self assembly processes. Our model combines the cell dynamical equations for the diblock polymers and Langevin dynamics for particles interacting with various potentials. We study particles with different magnetic/electrical properties. The aggregation behavior of these particles can be controlled through external fields and consequently make the behavior of the whole composite controllable through the interplay of the two competing self assembly processes. The results of these studies can potentially pose new avenues to the fabrication and application of the particle-polymer nanocomposites.

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