

Abstract Submitted
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Glass formation in a continuum of nanostructured polymers from surfactant-laden nanolayers to block copolymers¹ WESTON MERLING, DAVID SIMMONS, The University of Akron — Evidence suggests that dynamics and glass formation behavior of polymers and other glass forming liquids can be altered in the nanoscale vicinity of an interface. While much of the early literature in this field focused on polymer thin films, recent efforts have elucidated similar effects in polymers with internal nanostructure. However, the precise physical nature of these alterations and their dependence on details of the polymer and interface remain poorly understood. One open question is to what extent trans-interface covalent bonds, such as those in block copolymers, alter interface effects on dynamics. To answer this question, here we report molecular dynamics simulations of a continuum of nanostructured polymers ranging from pure nanolayers to surfactant-modified nanolayers to block copolymers. Results suggest that the chi parameter of the polymers constituting the two domains can play a larger role in determining glass formation behavior than does the density of interfacial covalent grafting. These findings suggest an equivalence between glass formation behavior in block copolymers and nanolayered polymers, while pointing to the potential to decouple interfacial energy from near-interface dynamics via surfactants.

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