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Chain Exchange Kinetics in Tadpole, Linear & Mixed Linear/Tadpole Diblock Copolymer Micelles[1] PRHASHANNA AMMU, ELENA DORMIDONTOVA, University of Connecticut, PROF. ELENA LAB TEAM —
With advancements in polymerization techniques, a variety of new chain architectures have become available. Chain architecture is known to control macro-molecular self-assembly and furthermore affect in a complex way nanostructure stability. In the present study, using dissipative particle dynamics simulations the equilibrium properties and chain exchange kinetics of tadpole-shaped core-forming block copolymer micelles are evaluated and compared with that for the linear block copolymers of similar block length. Tadpole block copolymer micelles are found to have smaller aggregation number and exhibit faster chain exchange kinetics at equilibrium compared to linear block copolymers of similar chemical nature and block length. We also studied mixed micelles of tadpole/linear block copolymers. In mixed micelles, the tadpole chains are found to be located near the periphery of the micelle core. The chain exchange between mixed micelles is determined to be slower than in tadpole micelles, but quicker than in linear diblock copolymer micelles. Furthermore, the chain exchange kinetics of individual components in mixed micelles is influenced by the presence of other component, as will be discussed.

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