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Chain Bridging in Semicrystalline Multiblock Copolymers MANAS SHAH¹, VENKAT GANESAN², The University of Texas at Austin — The structure development in semicrystalline/rubbery multiblock copolymers involves complex interplay between two self-ordering mechanisms – microphase separation and crystallization of one of the components. Experiments have suggested connection between the mechanical properties and the molecular architecture of such linear copolymers, especially the role of bridging conformations in multiblock copolymers. We present a theoretical study to evaluate the bridging/looping fractions in these multiblock copolymers as a function of the morphology and the molecular architecture. We model the non-crystalline (rubbery) component as a flexible Gaussian chain and the crystalline component as a semiflexible chain with a temperature dependent rigidity and a favorable tendency to form parallel bonds. We calculate the domain spacing in lamellar phases of diblock copolymer where one flexible chain is attached to the semiflexible chain and compare the scaling exponents with existing scaling theories for semicrystalline diblock copolymers. Using self-consistent field theory, the bridging fractions of the various domains in these complex multiblock copolymers (triblock and pentablock) are evaluated as a function of the sequence of the chains and other parameters in the system.

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