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The effect of chain stiffness on the structure and phase behavior of diblock copolymer melts[1] G. LEUTY, MESFIN TSIGE, Southern Illinois University at Carbondale — In block copolymers the covalent bond joining the different immiscible block segments prevents the occurrence of macroscopic phase separation of the different components of a copolymer chain. Instead, the block segments give rise to well-organized periodic domain nanostructures whose size and shape mainly depend on the dimensions of the blocks and the segment-segment interaction parameters. Variations in the stiffness of the different block segments can directly affect the morphology of the system and may result in a very rich phase behavior. To the best of our knowledge, there is no theory at the atomic or molecular level that explains how variations in the stiffness of the different block segments can affect the dynamics and morphology of these systems. We have studied the microphase separation of symmetric diblock copolymers with variable block stiffness and different block chain length using coarse-grained molecular dynamics simulations. The morphology of the diblock systems we studied is found to be strongly dependent on the relative stiffness of the two block segments.

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