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Microphase Separation Induced by the Differential Monomer-Monomer Interactions in Diblock Copolymer/Homopolymer Blends JIAJIA ZHOU, AN-CHANG SHI, Department of Physics and Astronomy, McMaster University — Phase diagrams of blends composed of diblock copolymer (AB) and homopolymer (C) are obtained using the random phase approximation and self-consistent field theory. Emphasis is placed on the special case where all three monomer pairs, A/B, B/C and C/A, are miscible. Despite the miscibility of the binary pairs, a close-loop immiscible region exists in the AB/C blends when the pair interaction parameters are sufficiently different. Inside the close-loop, the system undergoes microphase separation, exhibiting different morphologies. This phenomenon is enhanced when the homopolymer interacts much strongly to one of the blocks of the diblock copolymer. The theoretical results are used to explain some recent experiments.

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