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Nucleation in polydisperse polymer mixtures DADONG YAN, SHUANHU QI, Institute of Chemistry, Chinese Academy of Sciences — The effect of polydispersity on nucleation in a metastable mixture of polydisperse polymer A and monodisperse polymer B is studied using self-consistent field theory. We adopt the continuous Schulz chain length distribution to describe the polydispersity of A species. The results show that the free energy barrier, as well as many other properties of the critical nucleus, is sensitive to the polydispersity, especially in the highly polydisperse case. This should be attributed to the fact that longer chains have stronger tendencies towards nucleation. As a result, the distribution of the volume fraction as a function of chain length in the nucleus becomes different from that in the bulk. The chain length which corresponds to the maximum contribution to the volume fraction in the nucleus becomes larger than the number-average chain length. Meanwhile, the interface between the critical nucleus and the parent metastable bulk phase broadens. This phenomenon is obvious when the polydispersity is high.

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