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Anomalous χ for Polydisperse Polystyrene-*b*-Poly(octyl acrylate)[1]

JUMI LEE, Dankook University, HYUNGJU AHN, DU YEOL RYU, Yonsei University, KWANWOO SHIN, Sogang University, JUNHAN CHO, Dankook University

— We have performed small-angle neutron scattering (SANS) measurements on a disordered block copolymer from deuterated polystyrene (dPS) and self-adhesive poly(octyl acrylate) (POA) in order to elicit the effective Flory-Huggins χ, which carries the essence of the copolymer phase behavior. The sample for the measurement was prepared by blending two polydisperse dPS-*b*-POAs of different molecular weights for the purpose of adjusting the average size to a proper value. The SANS profiles for the copolymer were fitted to Leibler's scattering function for a polydisperse copolymer system described by Schulz-Zimm distribution. It was shown that the resultant χ as a function of inverse temperature has a strong entropic contribution and a weak enthalpic contribution. By adopting a simple analysis for specific interactions, it was found that the entropically dominated χ for dPS-*b*-POA arises from the steric hindrance of long alkyl side groups of POA.

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Junhan Cho
Dankook University

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