

Tuned Phase Behavior of polystyrene-*block*-poly(*n*-alkyl methacrylate) Copolymers Induced by Random Copolymer for Methacrylate Block

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The phase behavior of polystyrene-*block*-poly(*n*-butyl-*ran*-*n*-hexyl) methacrylate (PS-*b*-Pn(B-*r*-H)MA) copolymers and polystyrene-*block*-poly(*n*-octyl-*ran*-methyl) methacrylate (PS-*b*-Pn(O-*r*-M)MA) copolymers were investigated by using small angle X-ray scattering, birefringence and rheometry. When the total molecular weight and composition of random copolymers were judiciously controlled, the closed-loop consisting of a lower disorder-to-order transition and an upper order-to-disorder transition was observed. The phase behavior by including a random copolymer as one of the blocks was explained by a compressible mean field approach. We found that these block copolymers also exhibited excellent baroplasticity.