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Phase behavior of multi-arm star-shaped polystyrene-*block*-poly(methyl methacrylate) copolymer SANGSHIN JANG, HONG CHUL MOON, DUSIK BAE, JONGHEN KWAK, JIN KON KIM, Pohang University of Science and Technology — We synthesized star-shaped polystyrene-*block*-poly(methyl methacrylate) copolymer (PS-*b*-PMMA) by utilizing α-cyclodextrin (α-CD) as a core of the star-shaped block copolymer. Eighteen hydroxyl groups on α-CD were transformed to bromine by the reaction with α-bromoisobutyryl bromide. We found that the number of bromine substituted arms per one α-CD was higher than 16, which was determined by nuclear magnetic resonance and Matrix-assisted laser desorption/ionization. We could control molecular weight of block copolymers by changing polymerization times. The block copolymers were characterized by gel permeation chromatography and nuclear magnetic resonance. Phase behaviors of these star-shaped block copolymers were investigated by small angle X-ray scattering and transmission electron microscopy.

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