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Determination of *Fddd* phase boundary in polystyrene-*block*-polyisoprene diblock copolymer MYUNG IM KIM, SATOSHI AKASAKA, TSUTOMU WAKADA, MIKIHITO TAKENAKA, HIROKAZU HASEGAWA, Department of Polymer Chemistry, Graduate School of Engineering, Kyoto University — We previously reported the discovery of a novel bicontinuous microdomain structure with *Fddd* symmetry in polystyrene-*block*-polyisoprene (SI) diblock copolymer. In this study, we investigated the phase behavior of eight SI diblock copolymer samples having slightly different compositions ($0.627 \leq f_{PI} \leq 0.653$) by SAXS and TEM to determine the phase boundary of the *Fddd* structure in the phase diagram of SI. The SI having the lowest f_{PI} (= 0.627) showed only disorder-lamella (L) transition but no order-order transition. The SI having the largest f_{PI} (= 0.653) showed disorder-gyroid (G)-L transition with decreasing temperature, but did not show *Fddd* phase. The other six SI samples having f_{PI} values between these two exhibited disorder-G-*Fddd*-L transition with decreasing temperature. Consequently, we could determine the compositional region where *Fddd* phase is thermally stable, which is in good agreement with that predicted by SCFT.

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