

Phase Behavior and Thin Film Morphology of Star-shaped PS-block-PMMA Copolymers

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Star-shaped 18 arm poly(methyl methacrylate)-block-polystyrene copolymers ((PMMA-b-PS)₁₈) were synthesized by using α -cyclodextrin (α -CD) as a core of the star-shape. Morphology of star-shaped block copolymers were characterized by TEM and small angle X-ray scattering.

We also investigated thin film morphology of (PMMA-b-PS)₁₈ exhibiting lamellar and PMMA cylindrical nanodomains. When a thin film was spin-coated on a substrate, vertically aligned lamellar and cylindrical nanodomains were obtained without any pre- or post-treatment. Moreover, vertical orientations are observed on versatile substrates, for instance, semiconductor (Si, SiO_x), metal (Au), PS or PMMA-brushed substrate, and a flexible polymer sheet of polyethylene naphthalate (PEN).