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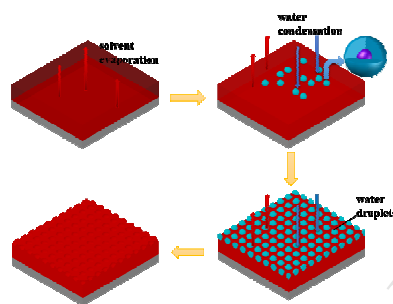
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Static Miscible Vapor Environment Controlled Honeycombed Morphology in Polystyrene-*b*-Poly(methyl methacrylate) Films

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Breath figure (BF) technology involves a concise process to obtain large sized honeycombed morphology in polymer film. The vapor condensability and the affinity between the condensed vapor and the polymer play key roles in the film morphology. A static breath figure technology was introduced here to control the porous film morphologies of homo-polystyrene (homo-PS), homo-polymethyl methacrylate (homo-PMMA), and block copolymer polystyrene-*block*-polymethyl methacrylate (PS-*b*-PMMA) with different total molecular weights and PS contents by using miscible vapor consisting of ethanol/water or acetone/water as atmospheric environment. The results showed that the vapor including component with low evaporation enthalpy led to larger droplets and favored to form regular honeycombed morphologies. The pore size depended strongly on the total block copolymer molecular weights and PS contents: the larger the total molecular weight and the lower the hydrophobic PS content, the larger the pore size.

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