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# Investigation of Nanostructures in Homopolymer and Copolymer Films by Surface Techniques

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Time-Of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) and Atomic Force Microscopy (AFM) are the useful instruments to measure nanostructures of material surfaces. Surface pattern formation in blending homopolymer and diblock copolymer films was investigated as a function of film thickness and annealing conditions. In this study, surface structures of blending homopolymer [deuterated polystyrene (Mn 20,000), poly (methyl methacrylate) (Mn 18,000)] and diblock copolymer [Poly (deuteratedstyrene(d8)-b-methyl methacrylate) (Mn 19,500-18,100)] films were observed. The AFM result indicated that the nanostructures and film thickness depended on temperature, concentration and solvent. TOF-SIMS depth profiling was obtained for the lamellar morphology of symmetric dPS-b-PMMA which is found to orient parallel to the surface of the substrate. Elemental and molecular depth profiles measured in the negative ion mode by a Cs+ primary ion beam demonstrate variations in hydrogen, deuterium, carbon, oxygen, hydrocarbons and deuterated hydrocarbons within the diblock copolymer according to the depth.

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