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Nanometer scale patterning using di-block copolymer ZUOMING ZHAO, TAE-SIK YOON, WEN FENG, BIYUN LI, YA-HONG XIE, UCLA — Di-block copolymer thin films of PS-PI, PS-PB and PS-PMMA are investigated on Si substrates. The morphology evolution with polymer thickness is studied using optical microscopy. As-coated polymer exhibits a very smooth surface. After annealing polymer over glass-transition temperature, the polymer exhibits a smooth surface only at certain thickness L_0. Transmission electron microscopy is used to study the microphase separation in polymer at different stages. Clear phase separation is observed in the polymer after staining with osmium tetraoxide (OsO_4). Long time annealing increases the long-range ordering. After treatment with ozone, disappearance of dark dots due to staining of Os and appearance of white hole indicate that the polymer with double-bond is removed from copolymer film. Scanning electron microscopy shows that polymer films after reactive ion etching give a regular hole pattern which can serve as mask for nanometer scale patterning.

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