

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**A simple method to control the porosity in thin block-copolymer films** WONJOO LEE, XIN ZHANG, ROBERT M. BRIBER, University of Maryland, College Park — We report a simple way developed to control the porosity in block-copolymer films. PS-P4VP block copolymer/P4VP homopolymer was dissolved in THF at 80 °C for 12 hours and cooled to room temperature. Depending on the amount of P4VP homopolymer added to PS-P4VP solutions in THF, the ratio of P4VP and PS was changed from 3 to 45 wt%. The solutions were spincoated onto various substrates such as silicon wafer and mica. The morphology of the resulting films was examined using AFM or TEM. Interestingly, large scale of macrophase-separation was not found regardless of the ratio of P4VP and PS. Instead, it was found that microphase-separation occurred during the spincoating process for all concentrations of P4VP homopolymer studied. The size of the microphase-separated domains increased as the ratio of P4VP to PS increased, indicating that the added P4VP homopolymer was contained within the P4VP microdomains. The PS-P4VP/P4VP blend films were then immersed for 3 hours in ethanol which induced a reconstruction of the film structure and removed the P4VP homopolymer. The resulting morphology exhibited nanoscale porosity with the pore size increasing with increasing concentration of P4VP homopolymer. A possible mechanism for the microphase-separation for the formation of the nanoporous structure will be discussed.

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Date submitted: 20 Nov 2008

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