Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Directed Self-assembly of Block Copolymer with Sub-15 nm Domain Spacing Using Nanoimprinted Photoresist Templates ZHIWEI SUN, Univ of Mass - Amherst, ZHENBIN CHEN, Lanzhou University of Technology, WENXU ZHANG, E. BRYAN COUGHLIN, Univ of Mass - Amherst, SHUAIGANG XIAO, Seagate Technology, THOMAS RUSSELL, Univ of Mass - Amherst — There has been increasing interest in preparing block copolymer thin films with ultra-small domain spacings for use as etching masks for ultra-high resolution nanolithography. One method to prepare block copolymer materials with small feature sizes is salt doping, increasing the Flory-Huggins interaction and allowing microphase separation to be maintained at lower molecular weights. Lamellae-forming P2VP-*b*-PS-*b*-P2VP block copolymer with various molecular weight was synthesized using RAFT polymerization with a dual functional chain transfer agent. Copper (II) Chloride or Gold (III) chloride was found to be selectively associated with P2VP block and increase the unfavorable interactions between PS and P2VP blocks, driving the disordered block copolymer into the ordered state. A 14 nm lamellar spacing of P2VP-*b*-PS-*b*-P2VP thin film was prepared using copper (II) Chloride doping after acetone vapor annealing on neutral brushes. Metallic nano-wire arrays were prepared after selective infiltration of platinum salt into the P2VP domain and oxygen plasma treatment. The directed self-assembly of salt doped P2VP-*b*-PS-*b*-P2VP triblock copolymer having long-rang lateral order on nanoimprinted photoresist templates with shallow trenches was also studied.

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Date submitted: 05 Nov 2015 Electronic form version 1.4