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Directed self-assembly of ABA triblock copolymer on chemical contrast pattern for sub-10nm nanofabrication by solvent annealing SHISHENG XIONG, Institute for Molecular Engineering, University of Chicago, LEI WAN, YVES-ANDRE CHAPUIS, THOMAS ALBRECHT, RICARDO RUIZ, HGST, a Western Digital Company, PAUL F. NEALEY, Institute for Molecular Engineering, University of Chicago — We report a room temperature solvent annealing method for directed self-assembly of symmetric ABA triblock copolymer to form perpendicularly oriented lamellae on chemical patterns. The phase separation of ABA triblock copolymer is analogous to the counterpart AB diblock copolymer with half molecular weight. However, a much broader neutral window for surface wetting was found for the triblock. After exposing to the solvent vapor for a certain time, thin films of a symmetric poly (2-vinylpyridine-styrene-*b*-2-vinylpyridine) (P2VP-b-PS-*b*-P2VP) triblock copolymer self assemble, while the nanostructure is retained after rapid solvent evaporation. The perpendicular lamellae with sub-10nm feature size can be assembled with density multiplication on lithographically defined chemical pre-patterns to form registered periodic arrays of striped patterns with exacting precision in continuously varying period and spacing. Using block-selective infiltration (Atomic layer deposition with sequential long soaking/purge cycles), the alumina composite with high etch resistance was specifically incorporated into the polar and hydrophilic P2VP domains. The sub-10nm scale surface pattern was stransferred into Si substrates by plasma etching.

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