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Using chemically patterned substrates to suppress thermal placement errors in the directed self-assembly of block copolymer multicylinder linear arrays CORINNE CARPENTER, KRIS DELANEY, GLENN FREDRICKSON, Univ of California - Santa Barbara — Directed self assembly (DSA) of block copolymers is a promising alternative approach for ˜10nm microelectronics patterning, both for feature-size reduction and rectification. One prototypical application of DSA is the use of vertical interconnect access (VIA) cylinders for fabricating conducting channels between circuit layers. Typically a compromise exists between the fidelity and low defect density obtained by using a small number of cylinders per pre-pattern guide and the objective to further increase feature density. In particular for 1D linear arrays of multiple VIAs in a single prepattern, prior experimental and theoretical work has demonstrated that thermal fluctuations in larger arrays cause cylinder placement to vary widely around the equilibrium positions in a manner analogous to the collective excitations in a simple 1D coupled oscillator model (Landau-Peierls instability). In the present work, we assess the efficacy of using chemically patterned substrates to suppress the thermal placement errors using both a phenomenological oscillator model and full field theoretic simulations.

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