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Hierarchically Organized Structures Engineered from Controlled Evaporative Self-Assembly ZHIQUN LIN, MYUNGHWAN BYUN, WEI HAN, Iowa State University, NED BOWDEN, University of Iowa — By constraining an asymmetric comb block copolymer (CBCP) toluene solution to evaporate in a wedge-on-Si geometry composed of a wedge lens situated on a Si substrate, gradient concentric stripe-like surface patterns of CBCP at the microscopic scale were yielded as a direct consequence of *controlled* evaporative self-assembly of CBCP. The formation of either straight stripes or jagged stripes was dictated by the height of the wedge. Upon subsequent solvent vapor annealing, hierarchically organized structures of CBCP were produced, resulting from the interplay of solvent vapor-assisted, unfavorable interfacial interaction-driven destabilization of CBCP from the Si substrate at the microscopic scale and the solvent vapor-promoted reconstruction of CBCP nanodomains within the stripes at the nanometer scale. This facile approach of combining *controlled* evaporative self-assembly with subsequent solvent vapor annealing offers a new platform to rationally design and engineer self-assembling building blocks into functional materials and devices in a simple, cost-effective manner.

Zhiqun Lin
Iowa State University

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