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**Sub-10 nm block copolymer patterns with mixed morphology and period using electron irradiation and solvent annealing** JEONG GON SON, Korea Institute of Science and Technology, JAE-BYUM CHANG, KARL K. BERGGREN, CAROLINE A. ROSS, MIT — High resolution patterns with controllable period and feature geometry are of intense interest for nanolithography applications, but to date this has been challenging to accomplish from a single block copolymer, which produces patterns of a fixed period and morphology. Here we show how patterns consisting of coexisting sub-10 nm spheres and cylinders and sphere patterns with a range of periods can be created using a combination of serial solvent anneal processes and electron-beam irradiation of selected areas of a film of poly(styrene-block-dimethylsiloxane). We also additionally combined with topographical templates consisting of either removable polymeric regions to make patterns with highly aligned lines, dots and featureless regions, or post arrays which can simultaneously align and register the line and dot arrays. These techniques offer the possibility of forming a wide range of aperiodic pattern geometries including single lines or ordered line segments, and significantly extend the ability of block copolymer lithography to produce patterns essential for nanoscale device fabrication.

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