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Directed Assembly of Block Copolymers to Pattern Isolated Features and Essential Integrated Circuit Geometries M. P. STOYKOVICH, H. KANG, G. LIU, University of Wisconsin, K. CH. DAOULAS, University of Goettingen, J. J. DE PABLO, University of Wisconsin, M. MUELLER, University of Goettingen, P. F. NEALEY, University of Wisconsin — Block copolymers are being explored for fabricating highly ordered lamellar, cylindrical, and spherical geometries with dimensions of 5-50 nm. The Semiconductor Industry Association's member companies have indicated, however, that successful insertion of self-assembling materials into the lithographic process requires the ability to pattern more complex geometries including long lines, short segments, sharp bends, jogs, T-junctions, periodic arrays of contact openings, and combinations thereof, e.g. the gate layer of integrated circuits. Here we show that this essential set of dense and isolated geometries can be achieved using the directed assembly of block copolymers on chemically patterned surfaces. Dense structures were fabricated by block copolymer domains oriented perpendicular to the substrate, while isolated structures were assembled with neighboring domains oriented parallel and perpendicular to the substrate. The line edge roughness of the block copolymer structures was also considered with respect to imperfections in the surface pattern.

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