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Macroscopic Ordering of Block Copolymers into Sequenced Patterns on Topographically Corrugated Surface SUNGJUNE PARK, LARISA TSARKOVA, STEPHANIE HILTL, DWI an der RWTH Aachen e. V., Lehrstuhl für Makromolekulare Materialien und Oberflächen, RWTH Aachen University, Germany, STEFAN ROITSCH, JOACHIM MAYER, Gemeinschaftslabor für Elektronenmikroskopie, RWTH Aachen University, Germany, ALEXANDER BÖKER, DWI an der RWTH Aachen e. V., Lehrstuhl für Makromolekulare Materialien und Oberflächen, RWTH Aachen University, Germany — For the guided block copolymer assembly we used corrugated SiCN ceramic substrates which were fabricated by a facile replication process using non-lithographic PDMS masters. During thermal annealing of polystyrene-b-polybutadiene diblock copolymer, the material transport was guided by the wrinkled substrate to form regular modulations in the film thickness. As a consequence of the thickness-dependent morphological behavior of block copolymers, the film surface appears as sequenced patterns of alternative microphase separated structures. The ordering process is attributed to the formation of reverse terraces which match the substrate topography, so that the resulting surface patterns are free from the surface relief structures within macroscopically-large areas. The issues of the film thickness, the substrate surface energy and the pattern geometry are addressed. Our approach demonstrates an effective synergism of external confinement and internal polymorphism of block copolymers towards complex hierarchically-structured patterned surfaces.

Sungjune Park
DWI an der RWTH Aachen e. V., Lehrstuhl für Makromolekulare Materialien und Oberflächen, RWTH Aachen University, Germany

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