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Rapid thermal processing of self-assembling block copolymer thin films on flat surfaces and topographically defined patterns MICHELE PEREGO, FEDERICO FERRARESE LUPI, TOMMASO J. GIAMMARIA, GABRIELE SEGUINI, Laboratorio MDM, IMM-CNR, VALENTINA GIANOTTI, DIEGO ANTONIOLI, KATIA SPARNACCI, MICHELE LAUS, DISIT, Università del Piemonte Orientale "A. Avogadro", EMANUELE ENRICO, NATASCIA DE LEO, LUCA BOARINO, NanoFacility Piemonte, INRIM, CHRISTOPHER K. OBER, Department of Materials Science and Engineering, Cornell University — Self-assembling block copolymers generate nanostructured patterns, which are potentially useful for a wide range of applications. However, their technological implementation is prevented by the very long time required to drive the process. In this contribution, we demonstrate the capability to control the morphology of the self-assembling process of cylinder forming PS-b-PMMA diblock copolymer (DBC) thin films deposited on un-patterned and topographically patterned surfaces by means of a Rapid Thermal Processing (RTP) machine. Highly ordered patterns were obtained on flat surfaces for perpendicular-oriented cylindrical PS-b-PMMA block copolymers in less than 60 s. The BCs morphology evolution within topographically defined structures was systematically investigated as well. Irrespective of the surface neutralization, an irreversible orientational flipping of the BCP microdomains inside the trenches was observed. This effect was attributed to de-swelling of the polymeric film as a consequence of a progressive desorption of the solvent retained inside the film.

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