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The kinetics of swelling in block copolymer thin films during "solvo- microwave" and solvo- thermal annealing: The effect of vapour pressure PARVANRH MOKARIAN-TABARI, University College Cork and Tyndall National Institute; Centre for Research on Adaptive Nanostructures, TIMOTHY COLLINS, CIAN CUMMINS, University College Cork and Tyndall National Institute, CLAUDIA DELGADO SIMÃO, CLIVIA SOTOMAYOR, ICN2, Campus de la UAB, Barcelona 08193, Spain, MICHAEL A. MORRIS, University College Cork and Tyndall National Institute; Centre for Research on Adaptive Nanostructures — Long annealing time associated with high chi block copolymers is a major disadvantage for their integration in industrial applications. Microwave-assisted microphase separation appears to offer considerable benefits in reducing annealing times for BCPs. However, despite the promise of this technique, little is known about the mechanism of how microwave irradiation might sponsor the molecular motion that accompanies microphase separation. In our earlier work we carried out an *in situ* temperature measurement during "solvo-microwave" annealing of poly(styrene-b-lactic acid) (PS-*b*-PLA) in presence of THF and also in the conventional oven. Comparing the results indicated that vapour pressure of THF might have a major role to achieve fast self- assembly (60 seconds) in PS-*b*-PLA film. Here, we study the kinetics of swelling by monitoring the pressure through *in situ* pressure experiments during "solvo-microwave" and solvo-thermal annealing. The preliminary data suggest that the rate at which the THF pressure increases is the key factor. This suggests that kinetics, i.e., the rate of film swelling and diffusion, affects the order and the coherence length of the pattern. We estimated the defect density in the patterns by our recently developed defect analysis software.

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