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An in-situ Study of Kinetics of Rapid Self- assembly in Lamellar Forming Poly (styrene-b- lactic acid) (PS-b-PLA) Block Copolymer during Microwave Annealing PARVANEH MOKARIAN-TABARI, Department of Chemistry, University College Cork and Tyndall National Institute, Cork, Ireland (2) Amber Centre, Trinity College Dublin, Ireland, CIAN CUMMINS, Department of Chemistry, University College Cork and Tyndall National Institute, Cork, Ireland, MICHAEL A. MORRIS, Department of Chemistry, University College Cork and Tyndall National Institute, Cork, Ireland (2) Amber Centre, Trinity College Dublin, Ireland — This work exploits the effect of microwave annealing on kinetics of pattern formation for lamellar PS-*b*-PLA film. A well-ordered pattern lamellar PS-*b*-PLA is formed on UV/ozone treated Si in less than one minute upon exposure to microwave energy in presence of THF. To understand the interaction of polymers with microwave radiation, we carried out an *in-situ* temperature measurement of the Si substrate during the annealing. Our *in-situ* experiment shows neither Si nor PS-*b*-PLA go through dramatic temperature rise during exposure to microwave energy. We suggest the dopant level in our Si is not high enough to activate the microwave absorption. Also, the high frequency of the electromagnetic field does not allow polar substances like PLA enough time to oscillate. We believe THF which is a polar liquid contribute significantly to the rapid self-assembly of the film. The vapor pressure of THF rises from 19.8 kPa to 70 kPa (at 55 °C) within few seconds. The high pressure plasticizes the polymers. The highly mobilized chains phase separate quickly due to high- χ parameter. The results are compared with conventional thermal annealing method.

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