

Abstract Submitted
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Controlled Deposition of Ordered Block Copolymer Thin Films by Electrospray¹ HANQIONG HU, Department of Chemical Engineering, Yale University, SOFIA RANGOU, APOSTOLOS AVERGOPOULOS, Department of Materials Science and Engineering, University of Ioannina, Greece, CHINEDUM OSUJI, Department of Chemical Engineering, Yale University — Electrospray offers a potentially useful platform for the controlled delivery of a variety of materials, but surprisingly, its application to block copolymer thin film deposition remains unexplored. Here we show that under appropriate conditions, well ordered films of PEO cylinder-forming poly(styrene-*b*-ethylene oxide) may be continuously deposited by electrospray. Ordered film formation is predicated on fast thermal equilibration relative to rate of deposition. We conduct time-resolved observations and investigate the effects of process parameters that underpin film morphology including solvent selectivity, substrate temperature and flow rate of the electrospray feed solution. For the particular system studied, we uncover a wide temperature window from 90°C to 160°C and an ideal flow rate (2 μ L/min) for ordered film growth, but no strong influence of solvent selectivity was observed. PEO cylinders were observed to align with their long axes perpendicular to the substrate at optimal spray conditions.

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