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Undulation instability in drop-cast poly(3-hexylthiophene) film originated from self-assembly MIN SANG PARK, School of Materials Science and Engineering, Georgia Institute of Technology, AVISHEK AIYAR, School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, JUNG OK PARK, School of Materials Science and Engineering, Georgia Institute of Technology, ELSA REICHMANIS, School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, MOHAN SRINIVASARAO, School of Materials Science and Engineering, Georgia Institute of Technology — In this study, we characterize the undulated structures which appear at the edge of drop-cast regio-regular poly(3-hexylthiophene) (rr-P3HT, head-to-tail $> 95\%$) film using optical microscopy and atomic force microscopy. We propose that these periodic structures originate from the undulations of the layered structure of liquid crystal-air interface. Evidence of rr-P3HT solution forming liquid crystalline phases at higher concentrations was obtained by the observation of distinct birefringence and characteristic textures under crossed polarizers using an optical microscope. Synchrotron x-ray diffraction pattern provides additional structural information at the undulated area compared with those at the area without undulated pattern. Based on these experimental results, we propose rr-P3HT solution can form a lyotropic liquid crystal at specific concentrations. This work was partially supported by NSF funding (DMR-0706235).

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