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Probing Kinetic and Thermodynamic Effects on Self-Stratified Polymer Blends[1] SAMANTHA RINEHART, MARK DADMUN, Univ of Tennessee, Knoxville — Coatings are used on everyday surfaces for protection and to improve durability. An intriguing development of the coating industry is the self-stratification of multi-component systems. However, current use of self-stratification utilizes polymer blends specific for optimizing properties of the desired application and does not fully investigate the driving forces that control the process. Understanding the respective role kinetic and thermodynamic effects have on final film morphologies formed by self-stratification is fundamental in optimizing polymer structure and improving the properties of thin films. We probe these effects by combining three themes: understanding solution phase behavior, monitoring film formation in-situ, and determining the depth profiles of the final film. Primary studies include thin films consisting of Poly(3-hexylthiophene-2,5-diyl) (P3HT), and Poly(methyl methacrylate) (PMMA). This polymer blend has provided promise of improving organic field effect transistors (OFET). Although this groundwork surveys stratification for applications in OFET, this research has potential to develop a global understanding of self-stratification and to impact a wide range of technologies by developing a cost efficient method for multi-layer film deposition.

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