

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Mechanism of Interfacial Instability in Thin Polymer Film in Controlled Solvent Atmosphere PARVANEH MOKARIAN-TABARI, JONATHAN. R. HOWSE, SASHA Y. HERIOT, MARK GEOGHEGAN, RICHARD A.L. JONES, Department of Physics and Astronomy, The University of Sheffield, Sheffield, S3 7RH, UK — Thin films of immiscible polymers made by spin coating have potential for many practical applications like field-effect transistors, LEDs and photovoltaic devices. We have developed a technique based on small angle light scattering and reflectivity to study the process of phase separation in spin cast films *in situ* during formation. Previous experiments¹ proposed formation of a transient wetting layer which is followed by interfacial instability and leading to lateral phase separation. In our recent work the origin of this instability has been studied. Experiments have been designed to test the Marangoni instability by spin coating the PS/PMMA film in a controlled toluene vapour atmosphere. A fast evaporation rate leads to laterally phase separated structure whereas slow evaporation lowers the solvent gradient inside the film and leads to a self stratified structure. By comparing the data to a model a better understanding of film evolution has been established.

¹*Heriot, S.Y. and R.A.L. Jones, Nature Materials, 2005. 4 (10): p. 782-786*

Parvaneh Mokarian-Tabari
Department of Physics and Astronomy,
The University of Sheffield, Sheffield, S3 7RH,UK

Date submitted: 26 Nov 2007

Electronic form version 1.4