

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Nonsolvent-induced dewetting of thin polymer films**<sup>1</sup> TONG-FEI SHI, LIN XU, LI-JIA AN — The dewetting of thin liquid films is important to various technological processes. Most of the studies on dewetting are through thermal dewetting, whereas solvent-induced dewetting has received very little attention. Generally the main difference between thermal dewetting and solvent-induced dewetting is that the cause of instability is the long-range force of van der Waals interactions in the thermal dewetting whereas it is the short-range force of polar interactions in the solvent-induced dewetting. In these reports on solvent-induced dewetting, nearly all solvents, which are chosen, can dissolve the polymers. However, few reports focus on the dewetting induced by nonsolvent, which cannot dissolve polymer. In this work, the process of nonsolvent-induced dewetting of thin polystyrene (PS) films on hydrophilic surfaces at room temperature has been studied by using water as a nonsolvent. It is observed that the process of nonsolvent-induced dewetting is greatly different from other previous dewetting processes. The PS film is in non-viscous state. A mechanism of nonsolvent-induced dewetting, different from other previous dewetting mechanisms, is deduced: penetration, replacement and coalescent.

<sup>1</sup>Supported by the NSFC (50503022) Programs and the Fund for Creative Research Groups (50621302), and subsidized by the Special Funds for National Basic Research Program of China (2003CB615600).

Tong-Fei Shi

Date submitted: 05 Nov 2007

Electronic form version 1.4