

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Atomic Force Microscopy Study of Viscoelastic Response of Polymer Films near Their Glass Transitions** GUANWEN YANG, NANXIA RAO, DA-MING ZHU, University of Missouri-Kansas City, ZEJIE YIN, University of Science and Technology of China, DEPARTMENT OF MODERN PHYSICS, UNIV OF SCIENCE AND TECHNOLOGY OF CHINA COLLABORATION — Despite the fact that atomic force microscopy (AFM) has been increasingly used in the study of glass transitions in polymer films, the characteristic behaviors of viscoelastic response measured using AFM and their correlations with the macroscopic mechanic behavior of bulk samples are still to be understood. We have studied viscoelastic response of polymer films near their glass transitions using atomic force microscopy. The response of a polymer film probed by an atomic force microscope is calculated using a Burger's model with four adjustable parameters. It is found that the force distance curve measured with the AFM is strongly affected by the viscosity of the film. The exact shapes of the force distance curves depend on both the temperature and measuring speed. It is also found that the viscoelastic property of the film is strongly affected by the adhesion force between the AFM tip and the polymer film. Several characteristics in a force distance curve near the glass transition will be discussed

Guanwen Yang

Date submitted: 01 Dec 2004

Electronic form version 1.4