

Abstract Submitted  
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**Viscoelastic properties of ultrathin polystyrene films by dewetting from liquid glycerol**<sup>1</sup> JINHUA WANG, GREGORY MCKENNA, Department of Chemical Engineering, Texas Tech University, Lubbock, Texas, 79409 — There is considerable interest in studying the behaviors of polymers at the nanoscale. A liquid dewetting device originally proposed by Bodiguel and Fretigny[1] was built in our lab to study the size effect on the viscoelastic behaviors of ultrathin polystyrene (PS) films. PS with molecular weight of 278 kg/mol and 984 kg/mol and various thermal treatments were examined. The glass transition temperature ( $T_g$ ) reduction and film stiffening were observed in films less than 20 nm in thickness and the properties of ultrathin PS films are different from the bulk PS. The value of the plateau compliance changes linearly with film thickness. No molecular weight effect was found on the liquid dewetting behaviors of these PS films. Interestingly, even though the dewetting occurs on liquid glycerol, the apparent  $T_g$  reductions are less than observed in  $\text{SiO}_2$  substrate supported films.

[1] H. Bodiguel and C. Fretigny, “Viscoelastic dewetting of a polymer film on a liquid substrate,” *Eur.Phys. J. E.*, 19, 185-193 (2006).

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