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Confinement effects on the dynamics of polymers HUGUES BODIGUEL, GUANG YIN JING, CHRISTIAN FRETIGNY, CNRS, PPMD TEAM —
Dewetting experiments of thin polystyrene films on a liquid substrate are performed in the vicinity of the glass transition. It is shown that this technique reveals the extensional creep compliance function of the polymer. The viscosity in the flow regime is very much reduced when the film thickness becomes comparable to the gyration radius of the polymer. This long time behaviour may be associated with the large length scales involved in the viscous flow which should be modified by confinement. On the contrary, the rubbery plateau remains unaffected by the confinement up to a fraction of the coil size. This can be related to the short length scales involved in the rubber elasticity. In the viscoelastic region, physical aging of the sample is clearly evidenced: Structural recovery complicates the short times dewetting response. Preliminary results are presented of the confinement effects on aging properties of ultra thin films as revealed in this original way.

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