Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Toward Single-Chain Crystallisation Kinetics MICHAEL V. MASSA, KARI DALNOKI-VERESS, Physics and Astronomy, McMaster University — By dewetting a thin film of a crystallisable polymer on an unfavourable substrate, one can create an ensemble of isolated and impurity-free droplets, in which homogeneous crystal nucleation can occur. Previously we have demonstrated (PRL, 92, 255509, 2004) that for bulk-like droplets (containing on the order of 10ˆ9 chains) the homogenous nucleation rate scales with the *volume* of the droplet. However, as the domain size is reduced far below these length scales, the confinement of polymer chains to dimensions less than the radius of gyration, the increase in the ratio of surface area to volume, and the decrease in the number of neighbouring chains can all potentially lead to changes in the crystallisation kinetics. With the same sample geometry, we extend our study of homogeneous nucleation to smaller droplet length scales. Crystallisation is monitored using ellipsometry, which offers a very sensitive probe to changes in the sample density, even for extremely small quantities of material. With complimentary results from atomic force microscopy, we follow the homogeneous crystallisation of a supercooled melt, from bulk length scales down to single-chain dimensions.

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Date submitted: 30 Nov 2005

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