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In-Situ Hot Stage Atomic Force Microscopy Study of Poly(E-Caprolactone) Crystal Growth in Ultrathin Films ROBERT E. PRUD'HOMME, Department of Chemistry, University of Montreal, Montreal, Canada H3C 3J7, VINCENT H. MAREAU, Department of Chemistry, CERSIM, Laval University, Quebec, Canada G1K 7P4 — Morphologies, growth rates and melting of isothermally crystallized ultrathin (200 to 1 nm) poly(e-caprolactone) (PCL) films have been investigated in real-time by atomic force microscopy. The flat-on orientation of the lamellar crystals relative to the substrate was determined by electron diffraction. The truncated lozenge shape PCL crystals observed at low undercooling become distorted for films of thicknesses equal or thinner than the lamellar thickness, which depends on the crystallization temperature but not on the initial film thickness. The melting behavior of distorted crystals differs from that of undistorted ones, and their growth is slower and non-linear. The crystal growth rate decreases greatly with the film thickness. All these observations are discussed in terms of the diffusion of the polymer chains from the melt to the crystal growth front.

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