

MOLECULAR CHARACTERS OF SHARKSKIN PHENOMENON IN METALLOCENE LINEAR LOW DENSITY POLYETHYLENES

C. Deeprasertkul*, C. Rosenblatt**, and S.-Q. Wang*

* Department of Macromolecular Science, ** Department of Physics,
Case Western Reserve University, Cleveland, OH, USA

Abstract

The effect of molecular weight on sharkskin dynamics is systematically studied using three metallocene-catalyzed linear low density polyethylenes(mLLDPE) of different molecular weights. A new experimental method is developed to enable *in-situ* characterization of the time scale τ on which the sharkskin forms the extrudate. This laser scattering technique directly measures the periodic variation of the scattered light off the rough sharkskin-like extrudate surface. It is found that τ increases with molecular weight as strongly as the overall molecular chain relaxation time τ^* , determined from oscillatory shear measurements. The observed molecular weight dependence provides additional support for the recently proposed interfacial stress growth/relaxation mechanism for sharkskin formation.