

Abstract Submitted
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Dynamic characterization of jets of polymer solutions DARRELL RENEKER, University of Akron — Polymer jets that are accessible for detailed observation are created by electrospinning and by mechanical extension of a polymer solution. Laser Doppler experiments measure the velocity in the axial direction of the jet, and at the same time, the diameter of the jet. The tensile stress along a jet is measured by observation of the widening of a short lateral displacement pulse as the pulse moves along the jet. Observation of the colors produced by subtractive interference of particular wavelengths from a beam of white light provide a dynamic measurement of jet diameter in the range from around 1 micron to 15 microns. Microscopic observation of the birefringence of a jet between crossed polarizers provides information about the molecular relaxation time as a function of concentration. Observations of moving glints of reflected light accent the development of curvature in the jets, which is particularly useful for electrospinning jets. Stereographic videography shows the shape of the flow modified Taylor cone. Such observations of jets provide new information about the behavior, in extensional flow, of polymer molecules in solutions of changing concentration.

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