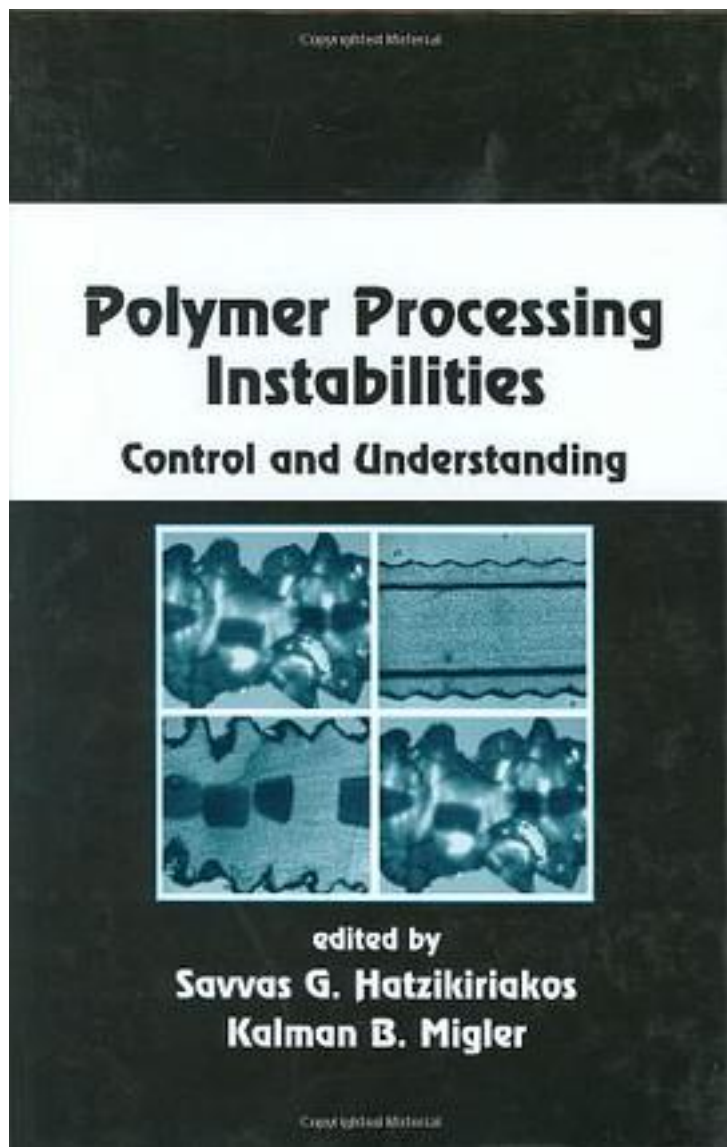


Polymer Processing Instabilities



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"Polymer Processing Instabilities: Control and Understanding" offers a practical understanding of the various flows that occur during the processing of polymer melts. This book pays particular attention to flow instabilities that affect the rate of production and the methods used to prevent and eliminate flow instabilities in order to increase production rates and enhance manufacturing efficiency. "Polymer Processing Instabilities: Control and Understanding" summarizes experimental observations of flow instabilities that occur in numerous processing operations such as extrusion, injection molding, fiber spinning, film casting, and film blowing for a wide range of materials, including most commodity polymers that are processed as melts at temperatures above their melting point or as concentrated solutions at lower temperatures. This book first presents the fundamental principles in rheology and flow instabilities. It relates the operating conditions with flow curves, the critical wall shear stress for the onset of the instabilities, and new visualization techniques with numerical modeling and molecular structure. It reviews one-dimensional phenomenological relaxation/oscillation models describing the experimental pressure and flow rate oscillations, analyzes the gross melt fracture (GMF) instability, and examines how traditional and non-traditional processing aids eliminate melt fracture and improve polymer processability. It supplies a numerical approach for the investigation of the linear viscoelastic stability behavior of simplified injection molding flows and examines a newly discovered family of instabilities that occur in co-extrusion. "Polymer Processing Instabilities: Control and Understanding" is unique in that it fills a gap in the polymer processing literature where polymer flow instabilities are not treated in-depth in any book. It summarizes state-of-the-art developments in the field, particularly those of the last ten years, and contains significant data based on this research.

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