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## **Development of an Online Adaptive Process and Quality Control System for Injection Molding**

*Z. Chen and L.-S. Turng**Polymer Engineering Center, Department of Mechanical Engineering  
University of Wisconsin-Madison, Madison, WI 53706-1572, USA*

An online adaptive control methodology was developed to control the process and quality variables in injection molding. A unique signal of the small (microns) and momentary separation of molding plates was selected for the process control. The mold separation profile was monitored and controlled adaptively by changing the fill-to-pack switchover point and by adjusting the hydraulic pressure during the pack/hold phase. Further, a more sophisticated online adaptive quality control scheme was investigated that incorporates direct online quality control and neural network models in the feedforward loop. The neural network models were extracted from computer-aided engineering (CAE) predictions to predict the process behavior and suggest corrective action in near real time for online adaptive control. Incorporating CAE results in the online quality control fills the gap between a science-based product/process design and an empirics-based process/quality control on the shop floor. This methodology can also be applied to monitor and control other quality variables such as part dimensions.