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Online Monitoring Rheological Property of Polymer Melt during Injection Molding

Authors : Chung-Chih Lin, Chien-Liang Wu

Abstract : The detection of the polymer melt state during manufacture process is regarded as an efficient way to control the molded part quality in advance. Online monitoring rheological property of polymer melt during processing procedure provides an approach to understand the melt state immediately. Rheological property reflects the polymer melt state at different processing parameters and is very important in injection molding process especially. An approach that demonstrates how to calculate rheological property of polymer melt through in-process measurement, using injection molding as an example, is proposed in this study. The system consists of two sensors and a data acquisition module can process the measured data, which are used for the calculation of rheological properties of polymer melt. The rheological properties of polymer melt discussed in this study include shear rate and viscosity which are investigated with respect to injection speed and melt temperature. The results show that the effect of injection speed on the rheological properties is apparent, especially for high melt temperature and should be considered for precision molding process.

Keywords : injection molding, melt viscosity, shear rate, monitoring
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