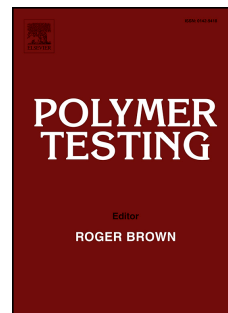


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Modeling and Characterization of Crystallization during Rapid Heat Cycle Molding

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Abstract: Rapid heat cycle molding (RHCM) is an injection molding process that has been developed in recent years. Recent studies of RHCM have mainly focused on heating technologies and process optimization. Few studies have examined the evolution of crystallization behavior. In this study, a novel method is proposed to determine the crystallization evolution information of polymers during the RHCM process. The influence of temperature and shear rate on crystallization was considered. The non-isothermal crystallization process was first divided into a series of isothermal processes. Next, mathematical model parameters were obtained through isothermal crystallization experiments, and then the crystallization information during the RHCM process could be determined. Finally, for comparison, the degrees of crystallinity for the final product in different positions were measured using wide-angle X-ray diffraction (WAXD). Experimental results showed that the proposed method is both accurate and effective. It is also simple and has broad application prospects in characterizing crystallization information during the molding process.

Keywords: Rapid Heat Cycle Molding; Crystallization; Non-isothermal; Shear rate;

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