PCL Solidification Investigation Using Fast Scanning Calorimeter Nuclei Formation in Wide Range of Time-Temperature Scale

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Poly (ε-caprolactone) (PCL) has been widely used as one of the homopolymers in diblock and triblock copolymers and in binary blends. This favourable position is due to its low temperature adhesiveness, its ability to disperse pigments and its miscibility with various commercial polymers. Additionally, Poly (ε-caprolactone) lacks toxicity and is biodegradable, characteristics of the materials used in the controlled-release drugs field. Previously it was studied by means of conventional DSC, Temperature Modulated DSC, DMA and Dielectric Spectroscopy and combinations. The observations support the theory of pre ordering or nucleation in polymer melt before crystallization [1]. The newly developed Fast Scanning Calorimeter [2] gives a possibility to investigate these effects utilizing a combination of high sensitivity and high scanning rates. In this paper, we present PCL solidification kinetics studied over a wide range of scanning rates.

[1]. Wurm A, Soliman R, Schick C. Early Stages of Polymer Crystallization – A Dielectric Study. Polymer 2003:44(24):7467-7476.
[2]. Zhuravlev E, Gao Y, Schick C. Actively Power Compensated Differential Scanning Calorimeter for Studying of Solidification of Metals and Polymers on Millisecond Time Scale. NATAS 36, Atlanta, GA, 2008.