

Abstract Submitted
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Thermal Properties of Trogamid by Conventional and Fast Scanning Calorimetry¹ PEGGY CEBE, JOHN MERFELD, BIN MAO, Tufts University, ANDREAS WURM, EVGENY ZHURAVLEV, CHRISTOPH SCHICK, University of Rostock — We use conventional slow scan rate differential scanning calorimetry, and fast scanning chip-based calorimetry (FSC), to investigate the crystallization and melting behavior of Trogamid, a chemical relative of nylon. Fundamental thermal properties of Trogamid were studied, including the melt crystallization kinetics, heat of fusion, and the solid and liquid state heat capacities. Using slow scan DSC (at 5 K/min), Trogamid displays a glass transition relaxation process at ~133 C, melting endotherm peak at 250 C, and is stable upon repeated heating to 310 C. When using slow scan DSC, the isothermal melt crystallization temperatures were restricted to 225 C or above. Trogamid crystallizes rapidly from the melt and conventional calorimetry is unable to cool sufficiently fast to prevent nucleation and crystal growth prior to stabilization at lower crystallization temperatures. Using FSC we were able to cool nano-gram sizes samples at 2000 K/s to investigate a much lower range of melt crystallization temperatures, from 205-225 C. The experimental protocol for performing FSC on semicrystalline polymers to obtain liquid state heat capacity data will be presented.

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