

Abstract Submitted
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Self Nucleation and Crystallization of Poly(vinyl alcohol)¹ DAVID THOMAS, PEGGY CEBE, Tufts Univ — Polyvinyl alcohol (PVA) is a hydrophilic, biodegradable, semi-crystalline polymer with uses ranging from textiles to medicine. Film samples of PVA were investigated to assess crystallization and melting behavior during self-nucleation experiments, and thermal degradation, using differential scanning calorimetry (DSC) and thermogravimetric (TG) analysis, respectively. TG results show that degradation occurred at temperatures close to the observed peak melting temperature of 223 C. Using conventional DSC, PVA was heated at a rate of 10 C/min to various self-nucleation temperatures, T_s , within its melting range, briefly annealed, cooled and reheated. Three distinct crystallization regimes were observed upon cooling, depending upon self nucleation temperature. At low values of T_s , below 227 C, PVA only partially melts; residual crystal anneals while new, less perfect crystals form during cooling. Between 228 C and 234 C, PVA was found to crystallize exclusively by self-nucleation. For T_s above 235 C the PVA melts completely. Fast scanning chip-based calorimetry was used to heat and cool at 2000 K/s, to prevent degradation. Results of self nucleation experiments using fast scanning and conventional DSC will be compared.

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