

Abstract Submitted
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An investigation of the effect of processing conditions on the lamellar and spherulitic morphology of polyhydroxyalkanoates¹ YUPING XIE, YVONNE A. AKPALU, Rensselaer Polytechnic Institute — Polyhydroxyalkanoates (PHAs) have recently attracted much interest because of their biodegradability and biocompatibility. Since the ultimate properties of polymers can be controlled by processing conditions, particularly cooling rates, the systematic and thorough understanding of the effects of cooling rates on the final morphology and the resulting mechanical properties of PHAs is necessary and important. In this presentation, the lamellar (tens of nanometers), fibrillar (several hundred nanometers) and spherulitic ($\sim \mu\text{m}$) morphologies of poly (3-hydroxybutyric acid) (PHB) and the copolymer poly (3-hydroxybutyric acid-co-3-hydroxyvaleric acid) (PHBV) crystallized under different cooling rates were studied using small angle X-ray scattering, ultra small angle X-ray scattering, and polarized optical microscopy, respectively. The morphology was observed to depend strongly on cooling rate. The influence of cooling rate on the morphology and mechanical properties such as toughness, tensile strength and overall stress-strain behavior will be discussed.

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