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Effect of mid-block on the morphology and properties of PDLA-softblock-PDLA/PLLA Blends SAHAS RATHI, E. BRYAN COUGHLIN, SHAW LING HSU, University of Massachusetts Amherst — A novel method to overcome the brittleness of PLLA is by kinetically trapping a continuous low Tg amorphous phase. This morphology has been accomplished by exploiting the significant difference in the crystallization temperatures of the neat PLLA versus its stereocomplex with the PDLA isomer. This morphology is formed by blending and co-crystallizing triblock copolymer with a configuration of the form PDLAn- Soft Blockm- PDLAn with PLLA. The type of morphology formed and the improvement in the sample toughness strongly depends on the miscibility of the midblock in the triblock copolymer with the matrix PLLA. This work explores the effect of the chemical nature of the midblock on the stereocomplex crystallization between the PDLA end-blocks and the PLLA matrix polymer and the blend morphology formed. It is found that miscible midblocks give rise to a soft continuous amorphous phase morphology while in case of immiscible midblocks a glassy phase separated amorphous phase morphology is formed. Dramatically different physical properties can be obtained for various PLLA/tri-block copolymer blends giving access to tough, semicrystalline PLLA blends.

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