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Rigid Amorphous Fraction in PLA Electrospun Fibers[1] PEGGY CEBE, QIAN MA, Tufts University, ERIKA SIMONA COZZA, University of Genoa, MAREK PYDA, BIN MAO, YAZHE ZHU, Tufts University, ORIETTA MONTICELLI, University of Genoa — Electrospun fibers of poly(lactic acid) (PLA) were formed by adopting a high-speed rotating wheel as the counter-electrode. The molecular orientation, crystallization mechanism, and phase structure and transitions of the aligned ES fibers were investigated. Using thermal analysis and wide angle X-ray scattering (WAXS), we evaluated the confinement that exists in as-spun amorphous, and heat-treated semicrystalline, fibers. Differential scanning calorimetry confirmed the existence of a constrained amorphous phase in as-spun aligned fibers, without the presence of crystals or fillers to serve as fixed physical constraints. Using WAXS, for the first time the mesophase fraction, consisting of oriented amorphous PLA chains, was quantitatively characterized in nanofibers.

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