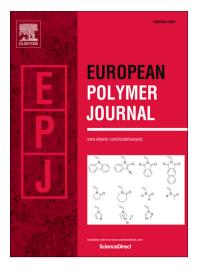
Accepted Manuscript

Accelerated crystallization of high molar mass poly(l/d-lactic acid) by blending with low molar mass poly(l-lactic acid)

Maria Laura Di Lorenzo, René Androsch

PII:	S0014-3057(17)32295-4
DOI:	https://doi.org/10.1016/j.eurpolymj.2018.01.030
Reference:	EPJ 8263
To appear in:	European Polymer Journal
Received Date:	22 December 2017
Revised Date:	24 January 2018
Accepted Date:	26 January 2018



Please cite this article as: Laura Di Lorenzo, M., Androsch, R., Accelerated crystallization of high molar mass poly(l/ d-lactic acid) by blending with low molar mass poly(l-lactic acid), *European Polymer Journal* (2018), doi: https:// doi.org/10.1016/j.eurpolymj.2018.01.030

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Accelerated crystallization of high molar mass poly(L/D-lactic acid) by blending with low molar mass poly(L-lactic acid)

Maria Laura Di Lorenzo^{*1}, René Androsch²

¹ National Research Council, Institute of Polymers, Composites and Biomaterials (CNR-IPCB), Via Campi Flegrei, 34, I-80078 Pozzuoli, Italy

² Interdisciplinary Center for Transfer-oriented Research in Natural Sciences (IWE TFN), Martin Luther University Halle-Wittenberg, 06099 Halle/Saale, Germany

Abstract

The crystallization kinetics of poly(L/D-lactic acid) (PLLA) with a molar mass of around 120 kDa and containing 4% of D-isomers is sizably improved by blending with low amount (<10 m%) of a PLLA of high stereoregularity, made of pure L-isomer, and molar mass of 4 kDa. Blends of the two PLLA's are prepared by solution mixing. The blends are homogeneous in the melt and display a single, composition-dependent glass transition. Increasing concentration of the highly stereo-regular low-molar mass component in the blends results in an earlier onset of crystallization and a higher crystal growth rate. The blend composition affects the crystal polymorphism of PLLA, as increasing content of the highly stereoregular and low molar mass polymer favors growth of α -crystals at lower temperatures than typically observed in unmodified PLLA. It is suggested that the short PLLA molecules of the low-molar mass component, acting as crystal nuclei for the subsequent crystal growth that involves both species.

Keywords: Blends, crystallization kinetics, PLLA, crystal growth rate

^{*} Email: dilorenzo@ipcb.cnr.it

Download English Version:

https://daneshyari.com/en/article/7803851

Download Persian Version:

https://daneshyari.com/article/7803851

Daneshyari.com