

Find PDF

Export...

Add to Marked List

2 of 3

Characterization of poly (lactic acid)/poly (ethylene) glycol blends prepared for melt drawn spinning process

By: Atiqah, MAN (Atiqah, M. A. Nur)^[1]; Sharifah, ISS (Sharifah, I. S. S.)^[1]; Yose, FB (Yose, F. B.)^[1]; Maizatunlisa, O (Maizatunlisa, O.)^[1]; Norhashimah, S (Norhashimah, S.)^[1]

MATERIALS TODAY-PROCEEDINGS

Volume: 17 Pages: 889-897 Part: 3

Published: 2019

Document Type: Proceedings Paper

Conference

Conference: 6th International Conference on Recent Advances in Materials, Minerals and Environment (RAMM)

Location: MALAYSIA

Date: NOV 27-29, 2018

Abstract

In this study, PLA/PEG blends were prepared using solvent (chloroform) casting methods. PEG was incorporated with increments of 5 wt.% up to 30 wt.% into PLA. Multiple test methods were used to characterize the thermal and structural properties of these blends; Differential Scanning Calorimeter (DSC), Thermogravimetric Analysis (TGA), Fourier Transform Infrared Spectroscopy (FTIR) and optical microscopy (OM). DSC thermograms showed that the incorporation of PEG significantly decreases the glass transition temperature from 55.56 degrees C to 37.35 degrees C and crystallization temperature from 97.14 degrees C to 79 degrees C of the blend. TGA thermograms indicated that the initial and maximum decomposition temperatures for all composition shifted systematically to lower temperature compared to the pure PLA. As the incorporation of PEG into PLA increases, the values of -CH stretching, C=O, C-O wavenumber shifted to lower wavenumber. Lastly, smooth and uniformed fibers were then successfully drawn using an in-house built mini fiber-drawing equipment with an average diameter ranging from 27 to 50 μ m. (C) 2019 Elsevier Ltd. All rights reserved.

Keywords

Author Keywords: Poly(lactic acid); Poly(ethylene glycol); Fibre

KeyWords Plus: MORPHOLOGICAL PROPERTIES; POLYETHYLENE-GLYCOL; PLASTICIZED PLA

Author Information

Reprint Address: Sharifah, ISS (reprint author)

+ Int Islamic Univ Malaysia, Kulliyah Engn, Dept Mech Engn, Gombak 53100, Malaysia.

Addresses:

+ [1] Int Islamic Univ Malaysia, Kulliyah Engn, Dept Mech Engn, Gombak 53100, Malaysia

E-mail Addresses: shaimihezri@iium.edu.my

Funding

Funding Agency	Grant Number
International Islamic University Malaysia, IIUM	RIGS17-052-0627

[View funding text](#)

Publisher

ELSEVIER, RADARWEG 29, 1043 NX AMSTERDAM, NETHERLANDS

[See more data fields](#)

2 of 3

Citation Network

In Web of Science Core Collection

0

Times Cited

[Create Citation Alert](#)

25

Cited References

[View Related Records](#)

Use in Web of Science

Web of Science Usage Count

1

Last 180 Days

1

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection

- Conference Proceedings Citation Index-Science

Suggest a correction

If you would like to improve the quality of the data in this record, please suggest a correction.

Cited References: 25Showing 25 of 25 [View All in Cited References page](#)*(from Web of Science Core Collection)*

1. **Natural-based plasticizers and biopolymer films: A review** Times Cited: 578
By: Adeodato Vieira, Melissa Gurgel; da Silva, Mariana Altenhofen; dos Santos, Lucielen Oliveira; et al.
EUROPEAN POLYMER JOURNAL Volume: 47 Issue: 3 Pages: 254-263 Published: MAR 2011
2. **Disintegrability under composting conditions of plasticized PLA-PHB blends** Times Cited: 68
By: Arrieta, M. P.; Lopez, J.; Rayon, E.; et al.
POLYMER DEGRADATION AND STABILITY Volume: 108 Special Issue: SI Pages: 307-318 Published: OCT 2014
3. **Enzymatic degradation of polymers: a brief review** Times Cited: 1
By: Banerjee, A.; Chatterjee, K.; Madras, G.
Mater. Sci. Technol. Volume: 0836 Published: September, 2014
4. **Fatigue properties of highly oriented polypropylene tapes and all-polypropylene composites** Times Cited: 91
By: Barkoula, N. -M.; Alcock, B.; Cabrera, N. O.; et al.
POLYMERS & POLYMER COMPOSITES Volume: 16 Issue: 2 Pages: 101-113 Published: 2008
5. Title: [not available] Times Cited: 2
By: Beyler, C.; Hirschler, M.
Thermal Decomposition of Polymers Pages: 110-131
6. Title: [not available] Times Cited: 1
By: Brady, J.; Drig, T.; Lee, P. I.; et al.
Polymer properties and characterization. Published: 2016
[\[Show additional data\]](#)
7. **Poly(lactic acid)/Poly(ethylene glycol) Polymer Nanocomposites: Effects of Graphene Nanoplatelets** Times Cited: 131
By: Chieng, Buong Woei; Ibrahim, Nor Azowa; Yunus, Wan Md Zin Wan; et al.
POLYMERS Volume: 6 Issue: 1 Pages: 93-104 Published: JAN 2014
8. **A literature review of poly(lactic acid)** Times Cited: 1,882
By: Garlotta, D
JOURNAL OF POLYMERS AND THE ENVIRONMENT Volume: 9 Issue: 2 Pages: 63-84 Article Number: UNSP 1566-2543/01/0400-0063/0
Published: APR 2001
9. **Effect of Processing Method on Thermal Behavior in PLA/PEG Melt Blending** Times Cited: 3
By: Hashim, N.; Retenam, K.; Somderam, S.; et al.
Advanced Materials Research Volume: 1134 Pages: 185-90 Published: 2016
10. **Preparation of plasticized poly (lactic acid) and its influence on the properties of composite materials** Times Cited: 9
By: Li, Decai; Jiang, Yang; Lv, Shanshan; et al.
PLOS ONE Volume: 13 Issue: 3 Article Number: e0193520 Published: MAR 1 2018
11. **Effect of polyethylene glycol on the crystallization and impact properties of polylactide-based blends** Times Cited: 1
By: Li, F.; Zhang, S.; Liang, J.; et al.
Polym. Adv. Technol. Published: June, 2015
[\[Show additional data\]](#)
12. **The effects of plasticizers on the dynamic mechanical and thermal properties of poly(lactic acid)** Times Cited: 257
By: Ljungberg, N; Wesslen, B
JOURNAL OF APPLIED POLYMER SCIENCE Volume: 86 Issue: 5 Pages: 1227-1234 Published: OCT 31 2002
13. **Biobased additive plasticizing Poly(lactic acid) (PLA)** Times Cited: 24
By: Maiza, Mounira; Benaniba, Mohamed Tahar; Quintard, Guilhem; et al.
POLIMEROS-CIENCIA E TECNOLOGIA Volume: 25 Issue: 6 Pages: 581-590 Published: NOV-DEC 2015