

Accepted Manuscript

Enhancing Glass Transition Temperature and Mechanical Properties of Poly (propylene carbonate) by Intermacromolecular Complexation with Poly (vinyl alcohol)

Shaoying Cui, Li Li, Qi Wang



PII: S0266-3538(16)30094-X

DOI: [10.1016/j.compscitech.2016.03.007](https://doi.org/10.1016/j.compscitech.2016.03.007)

Reference: CSTE 6355

To appear in: *Composites Science and Technology*

Received Date: 22 December 2015

Revised Date: 2 March 2016

Accepted Date: 7 March 2016

Please cite this article as: Cui S, Li L, Wang Q, Enhancing Glass Transition Temperature and Mechanical Properties of Poly (propylene carbonate) by Intermacromolecular Complexation with Poly (vinyl alcohol), *Composites Science and Technology* (2016), doi: 10.1016/j.compscitech.2016.03.007.

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.

Enhancing Glass Transition Temperature and Mechanical Properties of Poly (propylene carbonate) by Intermacromolecular Complexation with Poly (vinyl alcohol)

Shaoying Cui, Li Li^{*}, Qi Wang

State Key Laboratory of Polymer Materials Engineering, Polymer Research Institute
of Sichuan University, Chengdu 610065, China

Abstract

Poly (propylene carbonate) (PPC), a promising biodegradable polymer used in medical materials and packaging, is amorphous with low glass transition temperature (T_g), which limits its application. In order to restrain the segment motion of PPC and improve its T_g , based on the supramolecular science theory, polyvinyl alcohol (PVA) with multi-hydroxyl groups was selected to melt blend with PPC to build a unique physical cross-linked network structure by hydrogen bonding between hydroxyl groups of PVA and carbonyl groups or/and terminal hydroxyl groups of PPC. The interactions between PPC and PVA, and the effects of PVA on T_g , thermal behavior, morphology as well as mechanical properties of PPC/PVA composites were investigated. The shift of ν_{O-H} and $\nu_{C=O}$ in FTIR confirmed the formation of intermolecular hydrogen bonding between PPC and PVA, which guaranteed the good compatibility between PPC and PVA, and significantly improved T_g from 34.1 °C of neat PPC to 44.0 °C of 70PPC/30PVA. This interaction also improved low-temperature thermal stability of the composite, which did favor to the thermal

^{*} Corresponding author. Tel: +86-28-85405133; fax: +86-28-85402465.
E-mail address: powerlily@scu.edu.cn (Li Li)

Download English Version:

<https://daneshyari.com/en/article/819963>

Download Persian Version:

<https://daneshyari.com/article/819963>

[Daneshyari.com](https://daneshyari.com)