Accepted Manuscript

Title: Improving the thermal stability of wood-based cellulose by esterification

Authors: Melissa B. Agustin, Fumiaki Nakatsubo, Hiroyuki

Yano

PII: S0144-8617(18)30229-7

DOI: https://doi.org/10.1016/j.carbpol.2018.02.071

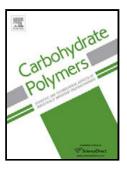
Reference: CARP 13333

To appear in:

Received date: 23-12-2017 Revised date: 14-2-2018 Accepted date: 22-2-2018

Please cite this article as: Agustin, Melissa B., Nakatsubo, Fumiaki., & Yano, Hiroyuki., Improving the thermal stability of wood-based cellulose by esterification. *Carbohydrate Polymers* https://doi.org/10.1016/j.carbpol.2018.02.071

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.



Improving the thermal stability of wood-based cellulose by esterification

Melissa B. Agustin^{1,2}, Fumiaki Nakatsubo¹, Hiroyuki Yano¹

¹Research Institute for Sustainable Humanosphere, Kyoto University, Gokasho, Uji, Kyoto

611-0011, Japan

²Department of Chemistry, Central Luzon State University, Science City of Muñoz, Nueva

Ecija, 3120, Philippines

*E-mail: agustin.melissa.78a@kyoto-u.ac.jp

HIGHLIGHTS

Esterification improved the thermal stability of wood pulp and nanofibers.

Benzoyl and pivaloyl esters gave higher thermal stability than straight-chain esters.

The degree of substitution affects the thermal stability of esterified wood pulps.

Complete esterification of hemicellulose significantly improves thermal stability.

Benzoylation increases the temperature at the onset of degradation of nanofibers.

ABSTRACT

Improvement in the thermal stability of wood-based cellulose; the needle-leaf,

bleached, krafp pulp (NBKP) and the wood cellulose nanofibers (WCNF) obtained from the

NBKP, was achieved by esterification. Initially, four different types of NBKP esters (acetyl,

C2; myristoyl, C14; benzoyl, BNZ; and pivaloyl, PIV) with different degree of substitution

(DS) values were prepared to evaluate the effect of esterifying the hemicellulose. The

findings revealed that an optimum DS, which possibly completely esterifies the hemicellulose

and amorphous cellulose, is needed to achieve significant improvement in thermal stability.

Moreover, BNZ and PIV gave higher thermal stability than that of the C2 and C14.

1

Download English Version:

https://daneshyari.com/en/article/7782574

Download Persian Version:

https://daneshyari.com/article/7782574

<u>Daneshyari.com</u>