

Accepted Manuscript

Production of carboxymethylated lignin and its application as a dispersant

Mohan K. Konduri, Fangong Kong, Pedram Fatehi

PII: S0014-3057(15)00376-6

DOI: <http://dx.doi.org/10.1016/j.eurpolymj.2015.07.028>

Reference: EPJ 6994

To appear in: *European Polymer Journal*

Received Date: 15 April 2015

Revised Date: 26 June 2015

Accepted Date: 15 July 2015



Please cite this article as: Konduri, M.K., Kong, F., Fatehi, P., Production of carboxymethylated lignin and its application as a dispersant, *European Polymer Journal* (2015), doi: <http://dx.doi.org/10.1016/j.eurpolymj.2015.07.028>

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.

Production of carboxymethylated lignin and its application as a dispersant

Mohan K. Konduri,¹ Fangong Kong^{1,2} and Pedram Fatehi^{1*}

¹Department of Chemical Engineering, Lakehead University, 955 Oliver Road, Thunder Bay, ON, Canada, P7B 5E1

²Key Laboratory of Pulp and Paper Science and Technology of Education Ministry of China, Qilu University of Technology, Jinan, China, 250353

*Corresponding author; Email: pfatehi@lakeheadu.ca, Tel: 807-343-867, Fax: 807-346-7943

Abstract

Kraft lignin is currently combusted in the pulping process to produce heat. It can be extracted from the process and converted to value-added products, but its limited water solubility hampers its end use applications. The main objective of this study was to investigate the carboxymethylation of hardwood kraft lignin to produce an anionic water soluble product. The results showed that the optimal conditions for carboxymethylation were 1.5 M NaOH concentration, 3 mol/mol sodium chloroacetate (SCA)/lignin ratio, 40 °C, 4 h and 16.7 g/L lignin concentration. The produced lignin had a charge density and carboxylate group of 1.8 meq/g and 1.68 mmol/g, respectively. The carboxymethylated lignin was further characterized using thermogravimetric analyzer (TGA), Fourier Transform Infrared (FTIR) spectrophotometer, Nuclear magnetic resonance spectroscopy (HNMR) and elemental analyses. Moreover, the application of carboxymethylated lignin as a dispersant for a clay suspension was successfully analyzed by means of a photometric dispersion analyzer.

Keywords: kraft lignin, biopolymers, carboxymethylation, grafting, charge density, clay

1. Introduction

The gradual depletion and the availability of oil are major concerns these days [1]. As natural products are renewable, the production of natural based products and the replacement of these products for oil based products would help develop more sustainable society [2]. Lignin is the most abundant aromatic (phenolic) sustainable polymer in nature after cellulose [3, 4]. Due to its large production worldwide, kraft lignin has been recognised as a potential raw material for preparing high valued products, such as phenols, carbon fibers and fuels [5, 6]. Kraft lignin is

Download English Version:

<https://daneshyari.com/en/article/7805030>

Download Persian Version:

<https://daneshyari.com/article/7805030>

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