
# Kinetics and mechanism of hemicelluloses removal from cellulosic fibers during the cold caustic extraction process

Jianguo Li, Huichao Hu, Hailong Li, Liulian Huang, Lihui Chen, Yonghao Ni

PII: S0960-8524(17)30296-1
DOI: http://dx.doi.org/10.1016/j.biortech.2017.03.026
Reference: BITE 17730

To appear in: *Bioresource Technology*

Received Date: 12 February 2017
Revised Date: 3 March 2017
Accepted Date: 4 March 2017

Please cite this article as: Li, J., Hu, H., Li, H., Huang, L., Chen, L., Ni, Y., Kinetics and mechanism of hemicelluloses removal from cellulosic fibers during the cold caustic extraction process, *Bioresource Technology* (2017), doi: http://dx.doi.org/10.1016/j.biortech.2017.03.026

# Kinetics and mechanism of hemicelluloses removal from cellulosic fibers during the cold caustic extraction process

Jianguo Li [1, 2, 3], Huichao Hu [1, 2], Hailong Li [2, 4], Liulian Huang [1], Lihui Chen [1], Yonghao Ni [1, 2]*

1. College of Material Engineering, Fujian Agriculture and Forestry University, Fuzhou 350002, China;

2. Limerick Pulp and Paper Centre, Department of Chemical Engineering, University of New Brunswick, Fredericton, New Brunswick E3B 5A3, Canada;

3. Key Laboratory of Pulp and Paper Science & Technology of Ministry of Education/Shandong Province, Qilu University of Technology, Jinan 250353, China;

4. Tianjin Key Laboratory of Pulp and Paper, Tianjin University of Science and Technology, Tianjin, 300457, China

*Corresponding Authors: Yonghao Ni, E-mail: yonghao@unb.ca, Tel +1 506-451-6857, Fax +1 506-453-4767.

**Abstract:**

The effective separation of hemicelluloses and cellulose is desirable for the production of high-purity cellulose, which is a sustainable raw material for many value-added applications. For this purpose, the kinetics and mechanism of hemicelluloses removal from the cold caustic extraction (CCE) were investigated in the present study. The hemicelluloses removal process consists of: 1) the bulk phase, characteristic of significant hemicelluloses removal; 2) the transition phase, hemicelluloses transferring from the inner to the outer region of the fiber wall, with negligible overall hemicelluloses removal; 3) the residual phase, presenting a weak but continuing hemicelluloses removal. Furthermore, the enzymatic peeling method was adopted to study the fundamentals of hemicelluloses removal. The results showed that the molecular weight of hemicelluloses is the main parameter governing their diffusion/dissolution processes, and that the low molecular weight hemicelluloses are