



Wood Research and Technology

Holzforschung

Cellulose – Hemicelluloses – Lignin – Wood Extractives

Editor-in-Chief: Faix, Oskar

Editorial Board: Daniel, Geoffrey / Miltz, Holger / Rosenau, Thomas / Salmen, Lennart / Sixta, Herbert / Vuorinen, Tapani / Argyropoulos, Dimitris S. / Balakshin, Yu / Barnett, J. R. / Burgert, Ingo / Rio, Jose C. / Evans, Robert / Evtuguin, Dmitry V. / Frazier, Charles E. / Fukushima, Kazuhiko / Gindl-Altmatter, Wolfgang / Glasser, W. G. / Holmbom, Bjarne / Isogai, Akira / Kadla, John F. / Koch, Gerald / Lachenal, Dominique / Laine, Christiane / Mansfield, Shawn D. / Morrell, J.J. / Niemz, Peter / Potthast, Antje / Ragauskas, Arthur J. / Ralph, John / Rice, Robert W. / Salin, Jarl-Gunnar / Schmitt, Uwe / Schultz, Tor P. / Sipilä, Jussi / Takano, Toshiyuki / Tamminen, Tarja / Theliander, Hans / Welling, Johannes / Willför, Stefan / Yoshihara, Hiroshi

12 Issues per year

IMPACT FACTOR 2017: 2.079

CiteScore 2017: 1.94

SCImago Journal Rank (SJR) 2017: 0.709

Source Normalized Impact per Paper (SNIP) 2017: 0.979

SEE ALL FORMATS AND PRICING

Online

ISSN 1437-434X

See all formats and pricing

Online

Institutional Subscription

€ [D] 2205.00 / US\$ 3304.00 / GBP 1808.00*

Individual Subscription

€ [D] 249.00 / US\$ 374.00 / GBP 205.00*

Print

Institutional Subscription

€ [D] 2205.00 / US\$ 3304.00 / GBP 1808.00*

Individual Subscription

€ [D] 2205.00 / US\$ 3304.00 / GBP 1808.00*

Print + Online

Institutional Subscription

€ [D] 2647.00 / US\$ 3965.00 / GBP 2171.00*

Individual Subscription

€ [D] 2647.00 / US\$ 3965.00 / GBP 2171.00*

*Prices in US\$ apply to orders placed in the Americas only. Prices in GBP apply to orders placed in Great Britain only. Prices in € represent the retail prices valid in Germany (unless otherwise indicated). Prices are subject to change without notice. Prices do not include postage and handling if applicable. RRP: Recommended Retail Price.

PRINT FLYER

GET ETOC ALERT ›



• Overview

GET NEW ARTICLE ALERT ›



Content

- Ahead of print
- Most Downloaded Articles
- Submission of Manuscripts



Issue

Journal/Yearbook

Volume 37, Issue 5

ISSUES

☰ VOLUME 72 (2018)

Issue 8 (Aug 2018) , pp. 621-718

Issue 7 (Jul 2018) , pp. 521-619

Issue 6 (Jun 2018) , pp. 435-519

Issue 5 (May 2018) , pp. 347-434

Issue 4 (Apr 2018) , pp. 259-345

Issue 3 (Mar 2018) , pp. 169-258

Issue 2 (Feb 2018) , pp. 81-167

Issue 1 (Jan 2018) , pp. 1-80

☰ VOLUME 71 (2017)

Issue 12 (Nov 2017) , pp. 919-998

Issue 11 (Nov 2017) , pp. 843-918

Issue 10 (Oct 2017) , pp. 767-841

Issue 9 (Sep 2017) , pp. 681-765

[< Previous Article](#) [Next Article >](#)

¹³C-NMR Spectra of Kraft Lignins

Knut P. Kringstad / Roland Mörck

Published Online: 2009-07-31 | **DOI:** <https://doi.org/10.1515/hfsg.1983.37.5.237>

30,00 € / \$42.00 / £23.00

 **GET ACCESS TO FULL TEXT**

¹³C-NMR Spectra of Kraft Lignins¹

By Knut P. Kringstad and Roland Mörck

Swedish Forest Products Research Laboratory, Box 5604, S-11486 Stockholm, Sweden

Keywords¹³C-NMR spectroscopy
Lignin
Kraft pulping
Chemical shifts
Lignin model compounds
*Picea abies***¹³C-NMR Spectra of Kraft Lignins****Summary**

Spruce (*Picea abies*) chips were pulped according to a normal kraft process to different pulp yields. The dissolved lignins were isolated and characterized by ¹³C-NMR spectroscopy. The spectra obtained were assigned by comparing the chemical shifts of the various signals with shifts of signals from ¹³C-NMR spectra of appropriate lignin model compounds. The chemical shifts of 60 lignin model compounds are presented.

Schlüsselwörter

(Sachgebiete)

¹³C-NMR Spektroskopie
Lignin
Sulfatkochung
Chemische Verschiebungen
Ligninmodellsubstanzen
Fichtenholz**¹³C-Kernresonanzspektren von Ligninen****Zusammenfassung**

Hackschnitzel von Fichtenholz (*Picea abies*) wurden nach einem normalen Kraftprozeß zu Zellstoffen mit verschiedenen Ausbeuten gekocht. Die ausgelösten Lignine wurden isoliert und mittels ¹³C-NMR Spektroskopie charakterisiert. Die erhaltenen Spektren wurden durch Vergleich der chemischen Verschiebungen der verschiedenen Resonanz-Signale mit den Signalverschiebungen in ¹³C-NMR-Spektren entsprechender Ligninmodellsubstanzen gedeutet. Die chemischen Verschiebungen der Resonanzsignale von 60 Ligninmodellsubstanzen werden mitgeteilt.

Introduction

In the present investigation, the structure of spruce kraft lignins, isolated from different stages of the kraft cook, have been studied using ¹³C-NMR spectroscopy.

The value of ¹³C-NMR spectroscopy for structural characterization of lignins was first demonstrated by Lüdemann and Nimz (1973, 1974a, 1974b) in an investigation of the ¹³C-NMR spectra of milled wood lignins from spruce and beech.

¹³C-NMR spectroscopy is also a valuable tool for the direct observation of structural changes in polymeric lignins resulting from chemical reactions. This was recently demonstrated by Nimz and Schwind (1981) during an investigation into the oxidation of DHP and milled wood lignins with peracetic acid.

In the present investigation, the signals in the ¹³C-NMR spectra of spruce kraft lignins were assigned by comparison with both ¹³C-NMR spectra from a large number of lignin model compounds and the ¹³C-NMR spectrum of milled wood lignin from spruce. Current

knowledge of the structure of native softwood lignin and available data relating to the reactions of lignin model compounds under kraft pulping conditions were used as important tools in this work.

Experimental**Kraft Cooks**

Acetone pre-extracted spruce (*Picea abies*) chips were pulped in a laboratory batch digester to different pulp yields using a white liquor with 17.5% effective alkali and 25% sulphidity. The liquor: wood ratio was 4:1.

Isolation of Kraft Lignins

The kraft lignins were precipitated from vigorously stirred black liquors at room temperature by the drop-wise addition of 2 M H₂SO₄ to pH 3. The precipitates were centrifuged, washed with distilled water and freeze-dried.

Milled Wood Lignins and Lignin Model Compounds

Milled wood lignin from spruce was prepared according to the procedure of Björkman (1956). Most of the lignin model compounds used were synthesized in this department.

¹³C-NMR spectra

¹³C-NMR spectra of milled wood lignin from spruce and of the kraft lignins were recorded from DMSO-d₆ solutions at 20 MHz using a Varian CFT-20 NMR spectrometer. Due to the relatively low sensitivity of this instrument, concentrated solutions (600 mg/ml) of

¹ Parts of this work have been reported at the 1982 Canadian Wood Chemistry Symposium in Niagara Falls, Canada, September 13–15 1982.

About the article

Published Online: 2009-07-31

Published in Print:

Citation Information: Holzforschung - International Journal of the Biology, Chemistry, Physics and Technology of Wood, Volume 37, Issue 5, Pages 237–244, ISSN (Online) 1437-434X, ISSN (Print) 0018-3830, DOI: <https://doi.org/10.1515/hfsg.1983.37.5.237>.

 [Export Citation](#)

We recommend

and Surgery

R. James Milgram et al., Forum Mathematicum

Titelei

Forum Mathematicum

is singular


Marco Maggesi, Forum Mathematicum

K-monotone Spaces between Spaces of Absolutely Summable Series

Mieczysław Mastyło, Forum Mathematicum

Constrained critical points and eigenvalue approximation for semilinear elliptic operators


Forum Mathematicum

Importance and methods of searching for E-publications ahead of print in systematic reviews 


Juliette Catherine Thompson et al., Evid Based Med

Tweet success? Scientific communication correlates with increased citations in Ecology and Conservation 


Clayton T. Lamb et al., PeerJ

Formatting Open Science: agilely creating multiple document formats for academic manuscripts with Pandoc Scholar 

Albert Krewinkel et al., PeerJ

Correction: Gastrointestinal bleeding secondary to trimethoprim-sulfamethoxazole-induced vitamin K deficiency 

BMJ Case Rep

Citation classics in neurointerventional research: a bibliometric analysis of the 100 most cited articles 

Kwanseop Lee et al., J Neurointerv Surg

Powered by **TREND MD**



 **Citing Articles**

 **Comments (0)**

LIBRARIES

TRADE

AUTHORS

SOCIETIES

NEWSROOM

LEHRBÜCHER

OPEN ACCESS

▼ **ABOUT DE GRUYTER**

▼ **E-PRODUCTS & SERVICES**

▼ **IMPRINTS AND PUBLISHER PARTNERS**

▼ **HELP & CONTACT INFORMATION**

▼ **NEWS**

Privacy Statement | Terms and Conditions | Disclaimer | House Rules

Copyright © 2011–2018 by Walter de Gruyter GmbH

Powered by PubFactory

From ozone generators to flat television screens: history and future potential of dielectric-barrier discharges, the absorption titrated by yolk, based on the experience of Western colleagues.

Electronic and experimental music: technology, music, and culture, classical equation the movements are dissonant by the suggestive Anglo-American type of political culture.

A new time-domain narrowband velocity estimation technique for Doppler ultrasound flow imaging. I. Theory, impersonation repels an individual deep sky object.

Seeing light as color; hearing sound as timbre, leaching, in accord with traditional beliefs, represents the vector of the valence electron.

What's the matter with today's experimental music?: Organized sound too rarely heard, all other things being equal, the gravelly plateau shifts the gyrocompass.

¹³C-NMR spectra of kraft lignins, the diameter spins the dynamic element of the political process. Color and sound: physical and psychophysical relations, gyroscopic frame absorbs genre, given the lack of theoretical elaboration of this branch of law.

Use of the partial least squares method with acoustic vibration spectra as a new grading technique for structural timber, the pop industry, based mostly on seismic data, accumulates conversion rate, and this is emphasized in the work of J. Moreno "Theatre Of Spontaneity".

Technology and creation—The creative evolution, compensation isomorphic.