

HOLZFORSCHUNG

INTERNATIONAL JOURNAL OF THE BIOLOGY, CHEMISTRY,
PHYSICS AND TECHNOLOGY OF WOOD

EDITOR-IN-CHIEF

Oskar Faix, Germany

EDITORIAL BOARD

G. Daniel, Sweden

H. Militz, Germany

T. Rosenau, Austria

L. Salmén, Sweden

H. Sixta, Austria

T. Vuorinen, Finland

ADVISORY BOARD

D.S. Argyropoulos, USA

M.Y. Balakshin, Canada

J. Barnett, UK

R. Berry, Canada

I. Burgert, Germany

R. Evans, Australia

D.V. Evtuguin, Portugal

C.E. Frazier, USA

K. Fukushima, Japan

G. Gellerstedt, Sweden

W. Gindl-Altmutter, Austria

W.G. Glasser, USA

C. Heitner, Canada

B. Holmbom, Finland

A. Isogai, Japan

J.F. Kadla, Canada

M. Kleen, Finland

G. Koch, Germany

D. Lachenal, France

S.D. Mansfield, Canada

J.J. Morrell, USA

M. Müller, Germany

P. Niemz, Switzerland

A. Pizzi, France

A.J. Ragauskas, USA

J. Ralph, USA

R.W. Rice, USA

J.-G. Salin, Finland

U. Schmitt, Germany

T.P. Schultz, USA

J. Sipilä, Finland

T. Tamminen, Finland

L. Viikari, Finland

J. Welling, Germany

S.M. Willför, Finland

H. Yoshihara, Japan

DE GRUYTER

ABSTRACTED/INDEXED IN Academic OneFile (Gale/Cengage Learning); Aerospace & High Technology Database; Aluminium Industry Abstracts; CAB Abstracts; Ceramic Abstracts/World Ceramic Abstracts; Chemical Abstracts and the CAS databases; Computer & Information Systems Abstracts; Copper Data Center Database; Corrosion Abstracts; CSA / ASCE Civil Engineering Abstracts; CSA Illustrata-Natural Sciences; Current Contents/Agriculture, Biology, and Environmental Sciences; Earthquake Engineering Abstracts; Electronics & Communications Abstracts; EMBiology; Engineering Information: Compendex; Engineering Information: PaperChem; Paperbase; Engineered Materials Abstracts; Journal Citation Reports/Science Edition; Materials Business File; Materials Science Citation Index; Mechanical & Transportation Engineering Abstracts; METADEX; Science Citation Index; Science Citation Index Expanded (SciSearch); Scopus; Solid State & Superconductivity Abstracts; VINITI: All-Russian Institute of Scientific and Technical Information.

The publisher, together with the authors and editors, has taken great pains to ensure that all information presented in this work (programs, applications, amounts, dosages, etc.) reflects the standard of knowledge at the time of publication. Despite careful manuscript preparation and proof correction, errors can nevertheless occur. Authors, editors and publisher disclaim all responsibility for any errors or omissions or liability for the results obtained from use of the information, or parts thereof, contained in this work.

The citation of registered names, trade names, trademarks, etc. in this work does not imply, even in the absence of a specific statement, that such names are exempt from laws and regulations protecting trademarks etc. and therefore free for general use.

ISSN 0018-3830 · e-ISSN1437-434X · CODENHOLZAZ

All information regarding notes for contributors, subscriptions, Open access, back volumes and orders is available online at www.degruyter.com/hfh.

RESPONSIBLE EDITOR(S) Prof. Dr. Oskar Faix, Kornblumenweg 12, 21509 Glinde/Germany, Tel.: 040 7110866, Email: o.faix@holz.uni-hamburg.de

JOURNAL MANAGER Ingrid Grünberg, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany, Tel.: +49 (0)30 260 05 – 245, Fax: +49 (0)30 260 05 – 325, Email: Holzforschung.editorial@degruyter.com

RESPONSIBLE FOR ADVERTISEMENTS Claudia Neumann, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany, Tel.: +49 (0)30 260 05 – 226, Fax: +49 (0)30 260 05 – 264, Email: anzeigen@degruyter.com

© 2016 Walter de Gruyter GmbH, Berlin/Boston

TYPESETTING Compuscript Ltd., Shannon, Ireland

PRINTING Franz X. Stückle Druck und Verlag e.K., Ettenheim

Printed in Germany

COVER ILLUSTRATION Richter, H.G., and Dallwitz, M.J. 2000 onwards. Commercial timbers: descriptions, illustrations, identification, and information retrieval. In English, French, German, Portuguese, and Spanish. Version: 25th June 2009. <http://delta-intkey.com>



Contents

Original Articles

Huizhang Guo, Peter Fuchs, Etienne Cabane, Benjamin Michen, Harald Hagendorfer, Yaroslav E. Romanyuk and Ingo Burgert

UV-protection of wood surfaces by controlled morphology fine-tuning of ZnO nanostructures — 699

Yohanna Cabrera, Andrés Cabrera, Flemming H. Larsen and Claus Felby

Solid-state ²⁹Si NMR and FTIR analyses of lignin-silica coprecipitates — 709

Orianne Broussard, Morgane Petit, Nicolas Elie, Stéphanie Baumberger, Alix Arnaud, Paul-Henri Ducrot and Florent Allais

Monitoring of free phenol content in lignosulfonates by ClO₂ titration and UV difference spectroscopy — 719

Hao Li, Yonghong Deng, Haisong Wu, Yuan Ren, Xueqing Qiu, Dafeng Zheng and ChunLi Li

Self-assembly of kraft lignin into nanospheres in dioxane-water mixtures — 725

Kim Granholm, Tomasz Sokalski, Andrzej Lewenstam and Ari Ivaska

Determination of the stability constant of the calcium binding ligand in black liquor (BL) by potentiometric titration — 733

Juris Grinins, Bruno Andersons, Ilze Irbe, Ingeborga Andersone, Anete Meija-Feldmane, Anna Janberga, Gunars Pavlovics and Errj Sansonetti

Thermo-hydro treated (THT) birch veneers for producing plywood with improved properties — 739

Jan-Erik Raitanen, Anna Sundberg, Jonas Konn, Annika Smeds and Stefan Willför

Reactions between peracetic acid and lipophilic extractives – methodologies and implications in post bleaching of kraft pulps — 747

Ali Shalbafan, Johannes Welling and Joachim Hasch

Geopolymers as potential new binder class for the wood based composite industry — 755

Babak Mirzaei, Arijit Sinha and John A. Nairn

Assessing the role of adhesives in durability of laminated veneer lumber (LVL) by fracture mechanics — 763

Review

Simon Aicher, Zachary Christian and Maren Hirsch

Rolling shear modulus and strength of beech wood laminations — 773

Original Articles

Olaf Schmidt, Elisabeth Magel, Arno Frühwald, Lidia Glukhykh, Katharina Erdt and Sergej Kaschuro

Influence of sugar and starch content of palm wood on fungal development and prevention of fungal colonization by acid treatment — 783

Manoj Kumar Dubey, Shusheng Pang, Shakti Chauhan and John Walker

Dimensional stability, fungal resistance and mechanical properties of radiata pine after combined thermo-mechanical compression and oil heat-treatment — 793