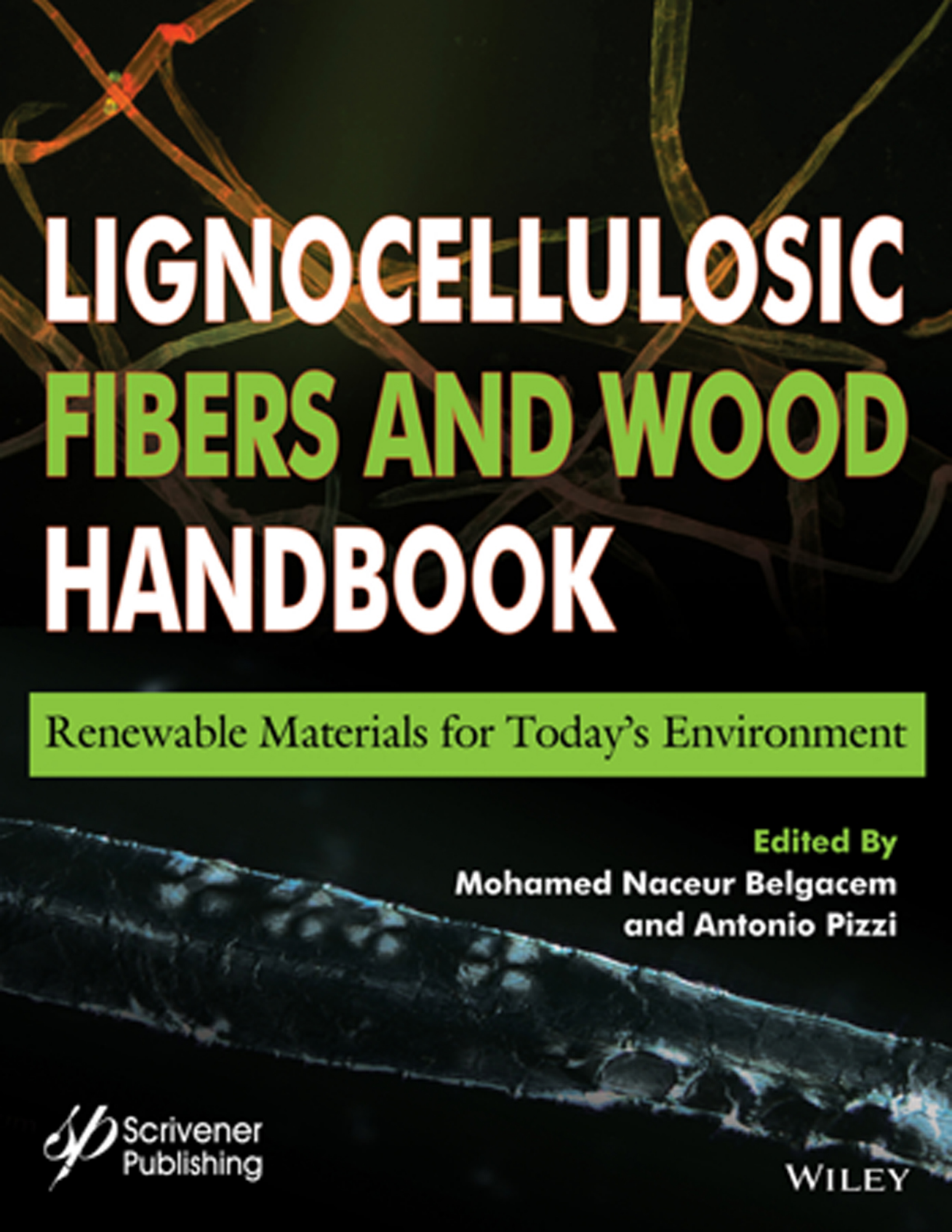


The background of the cover is a composite of microscopic images of plant fibers. The top half shows a network of thin, yellowish-brown fibers against a dark background. The bottom half features a larger, more detailed view of a single fiber, showing its cellular structure and a blueish tint.

LIGNOCELLULOSIC FIBERS AND WOOD HANDBOOK

Renewable Materials for Today's Environment

Edited By
Mohamed Naceur Belgacem
and Antonio Pizzi

 **Scrivener
Publishing**

WILEY

Lignocellulosic Fibers and Wood Handbook

Scrivener Publishing

100 Cummings Center, Suite 541J
Beverly, MA 01915-6106

Publishers at Scrivener

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Co-published by John Wiley & Sons, Inc. Hoboken, New Jersey, and Scrivener Publishing LLC, Salem, Massachusetts.
Published simultaneously in Canada.

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Cover design by Russell Richardson

Library of Congress Cataloging-in-Publication Data:

Names: Belgacem, Mohamed Naceur, editor. | Pizzi, A. (Antonio), 1946-
editor.

Title: Lignocellulosic fibers and wood handbook : renewable materials for
today's environment / edited by Naceur Belgacem and Antonio Pizzi.

Description: Hoboken, New Jersey : John Wiley & Sons, 2016. |

Includes bibliographical references and index.

Identifiers: LCCN 2015049859 | ISBN 9781118773529 (cloth) |

ISBN 9781118773833 (Adobe PDF) |

ISBN 9781118773550 (epub)

Subjects: LCSH: Lignocellulose. | Renewable natural resources.

Classification: LCC TP248.65.L54 L55 2016 | DDC 333.7--dc23 LC record
available at <http://lcn.loc.gov/2015049859>

ISBN 978-1-118-77352-9

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Dedicated to the memory of Menachem Lewin of the Polytechnic Institute of New York who first originated the idea of such a volume

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In addition to food demand, men need energy, materials and fine chemicals. Today, the main source to supply these non-food requirements is based on fossil resources, viz. petrol, natural gas and coal. These sources are unfortunately not renewable within a time scale compatible with human life. Such a situation made the market prices of petrol very fluctuating making difficult the world industrial activity and inducing localized geopolitical instabilities.

The major part of petroleum is used for energy purposes (around 90% of the 4 billion of tons consumed every year in the world). The rest is composed of 6–7% destined for polymer synthesis and 3–4% for pharmacy and cosmetics. The production of petroleum-based polymers is around 250 Million of tons. To replace (at least partially) these organic material, wood could be considered as a potential source of raw material. One of the major constituents of this remarkable natural material is lignocellulosic fibers. Wood has been used for ever as a raw material for shelters, and later, for paper, textile, cellulose derivatives (films, binders, explosives... Wood contains various components, namely: (i) cellulose fibers, essentially for papermaking, but also as reinforcing elements in composite materials; (ii) lignin as a

macromonomer for novel plastics, or as a source of valuable chemicals like vanillin; (iii) bark tannins for leather treatment and as components for resins, plastics, foams and adhesives; and (iv) specific minor chemicals.

This book focuses on one topic within this broad issue, namely the use of lignocellulosic fibers to prepare various materials in the papermaking and panel and timber fields. It concentrates the efforts of a number of specialists whose purpose is each to contribute by a comprehensive chapter to cover the state of the art and the perspectives related to the numerous facets of these materials. It starts with chapters dealing with the isolation of these fibers followed by two sections devoted to the two selected applications and finishes with a section covering the characterization of the prepared fiber-based materials. We hope that this handbook will constitute a useful tool for all those developing research programs associated with natural fibers, which we consider as *the fibers of the future*.

Mohamed Naceur Belgacem and
Antonio Pizzi
January 12, 2016

Part 1

WOOD AND FIBRES: RAW MATERIALS

