

Books

WOOD STRUCTURE AND PROPERTIES, by P. O. Kettunen. Trans Tech Publishers, Inc. (Distributor: Blackwell North America, Blackwood, NJ) Materials Science Foundations (monograph series). Vol. 29–30. 401 pp. ISBN/ISBN-13: 0-087849-487-1/978-0-87849-487-3. USD: 178/EUR: 129.00

This book is designed to be a textbook for students in materials science with a particular interest in wood structure and properties. Even though it was written principally for European students, it is this reviewer's opinion that it would serve as an excellent text for wood science programs anywhere because it is nicely comprehensive. A wealth of technical information is provided *in detail* in this volume. In addition, the text could be useful in non-European settings because there are many "non-traditional" wood types included as examples and illustrations, and the unit system is strictly SI. It is a European text nonetheless, and some of the terminology is slightly different from that used in North America.

The book is intended to provide a basic level of knowledge upon which to build advanced studies. Wood, in the sense of this book, is meant to be tree stem wood. In fact, the book has a motto printed prior to the preface that guides us in how to think about wood as we study from this text: "Wood is an organic, fiber reinforced, multilayered laminate-type composite material having a cell-type structure produced by nature." The book's author is Professor Emeritus of Materials Science at Tampere University of Technology in Finland and, in this reviewer's opinion, understands well what it takes to provide a good textbook, both from the instructor's and the student's viewpoint. As detailed below, this text doesn't just contain the many aspects of fundamental wood material science, it attempts to synthesize them under its cover.

Basic knowledge of polymeric materials and composites is recommended in the book's preface as background for an understanding of wood; however, the author goes on to indicate that the book is meant to be understandable without such background. Content is spread across eleven chapters, three appendices, and 401 pages. Each chapter includes exercises that are well composed and what one might expect at the end of book chapters. Questions are posed for the student to ponder, terms are expected to be defined, relationships formed based on that chapter's coverage plus what was to have been learned in previous chapters; and case studies are staged for flexing one's muscles with the newly-acquired knowledge.

The first three chapters are those typical in a wood structure and properties volume, e.g., wood structure, wood and water relations, and density; but this text extends its reach by delving into some of the more specialized subjects such as thermal, electrical, and acoustical properties. Structure of wood, both anatomical and chemical, is covered in Chapter 1 including subsections on branches, the tree's outer surface (inner and outer bark), and structural defects which are considered knots, grain deviations, reaction wood, and juvenile wood. Chapter 2 covers "liquids" in the wood structure; but the liquids are actually water and water-based solutions. Density is described in Chapter 3. Thermal, mechanical, electrical, and acoustical properties are addressed in Chapters 4–7. Deterioration of wood and chemical degradation are covered in Chapters 8 and 9. Chapter 10 is a summary, and lastly, Chapter 11 has a few closing words.

Beyond completeness, one of the more useful aspects of this text is just the sheer number of illustrations. There are almost 400 of them to aid the student in understanding content, some unique and unexpected in a fundamentals text-

book. Unfortunately, all the illustrations are in gray scale, so some of the finer points of microscopic examination and data presentation are missed.

That aside, this is a nicely done textbook with hundreds of illustrations and broad coverage of the fundamentals for studying wood as a material. It would serve well as the sole textbook for traditional wood structure and property classes or equally well as a supplement to such classes with texts already established. While the depth maybe beyond what short courses or workshops might need, it would be a very good reference for anyone working with wood as a material.

CHARACTERIZATION OF THE CELLULOSIC CELL WALL. D. D. Stokke and L. H. Groom, eds. April 2006. Wiley-Blackwell. 274 pp. ISBN: 9780813804392 http://www.wiley.com/WileyCDA/Wiley_Title/productCd-0470999705.html (E-book, \$149.99; Hardcover \$159). More details at <http://www.blackwellpublishing.com/book.asp?ref=9780813804392>

These proceedings consist of eighteen papers from a meeting held in August 2003 in Grand Lake, Colorado. The stated purpose of the meeting was to utilize a wide array of interdisciplinary approaches for investigations into the cellulosic cell wall structure, characterization, and application. The proceedings are organized into three sections: Cell Wall Assembly and Function, New Frontiers; Probing Cell Wall Structure, Advances in Analysis; and Mesostructure and Applications, Science in Practice.

The first section on cell wall assembly and function contains five papers and covers a rather diverse range of topics and techniques. The various disciplines include cell culturing, molecular biology, confocal microscopy, micromechanics, nanocomposites, and biomechanical modeling.

The second section concentrates on the characterization of the structure of the cell wall and consists of six papers. The new and novel approaches discussed in this chapter include: utilization of model plants species, near infrared

spectroscopy, Fourier transform infrared imaging, and X-ray diffractometry. This section provides useful understanding about the information that can be obtained from these new and emerging techniques.

The third section is concerned with the mesostructural applications and is the largest of the three sections with eight contributions. It is directed primarily towards the application of investigations at the mesostructural level and the utilization of lignocellulosic materials for new products. The areas discussed involve the mechanical properties of earlywood and latewood of plantation-grown southern pine, fiber properties of pulp fibers, chemical fractionation of rice straw, characterization of MDF fibers with respect to water-soluble components and refiner pressure, adhesive mechanisms, and bond strength.

The book is well illustrated with many drawings, graphs, figures, and micrographs. The quality of reproduction of the black and white micrographs could be better; however, the inclusion of a section of color illustrations and micrographs is greatly appreciated and adds significantly to the value of the proceedings. The index is quite thorough, and specific topics are quite easily identified and located.

A unique feature of this book is that many of the chapters include a section entitled "Application" in which the authors discuss how their work may be utilized in future investigations and applications. These discussions are an important asset to the chapters and provide valuable insights for the reader.

Characterization of the Cellulosic Cell Wall is a useful reference for new approaches and applications of investigations for the characterization of the cell wall. These proceedings do in fact reflect the stated purpose of the meeting to utilize a wide array of interdisciplinary approaches for the investigation of cell wall structure, characterization, and application. Investigators will find this volume a useful addition to their libraries.