FUNDAMENTAL SCIENCES *Chemistry*

CELLULOSE SCIENCE AND TECHNOLOGY

Jean-Luc Wertz, Olivier Bédué and Jean P. Mercier

EPFL Press
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First Foreword

It is a common statement to say that cellulose is the world's most abundant polymer. In view of its importance to mankind, an enormous research effort, substantiated by myriads of reports and patents, has been devoted to this biopolymer in the last 150 years. The periodical appearance of textbooks presenting in perspective the major developments of the science of cellulose is therefore crucial for those who want to stay abreast, without being submerged by the overwhelming primary literature.

It is in this context that *Cellulose Science and Technology* is written, summarizing some of the major progress of cellulose science in the last 20 years. During this period, significant advances that are reviewed have been made in the understanding of the biological role of cellulose in nature, either in the deciphering of its biosynthesis mechanism or in following the path of its biodegradation. Other major advances have been obtained in the structural definition of cellulose at the molecular and supramolecular level. Such a definition, which is comprehensively described, has fundamental implications in every aspect of cellulose science. Throughout the chapters that successively present the biology, chemistry, physics and technology of cellulose, one of the merits of this book is to account for the special morphology of cellulose and its implication in the various processes that are reviewed.

There is no doubt that this book will serve as a reference for those who are already active in the field of cellulosics as well as for those who are interested in biomass utilization and/or in the production of eco-friendly materials from sustainable non-food resources.

Henri Chanzy
Honorary Scientist
CERMAV-CNRS

February 2009

Second Foreword

Biomass has provided for many centuries a major contribution to human development, both for food (humans and animals) and non-food supplies (buildings, ships, textiles, papers, energy...).

Biomass is even at the origin of oil, gas and coal; now, many stakeholders would like to release this dependence on these fossil fuels, replacing part or all of them by renewable sources of energy.

Biomass could be one of those renewable sources for energy, but it brings its own dilemmas; if biomass combustion is known from the early stages of humanity, still providing one tenth of primary energy supplies, it is too often at the cost of non-sustainable deforestation practices; if biofuels can be manufactured from sugars, starch, vegetable oils, they could readily enter in direct competition with food markets if they develop without all the necessary cautions.

This is why energy players devote so much attention now to ligno-cellulosic materials, and its possible transformation in modern energy vectors, especially motor fuels or chemicals. But all the specialists know this is not an easy issue;

if cellulose is the most abundant biopolymer, it has been made very stable by Nature, and therefore not so easy to de-structure.

This is why I do welcome *Cellulose Science and Technology*, by Jean-Luc Wertz, Olivier Bédué, Jean P. Mercier, all Total Group colleagues during their careers, providing us with an in depth understanding of this extraordinary biopolymer, cellulose. No doubt their book will be considered as a reference, both for energy and materials applications of cellulose.

Jean-Michel Gires,
Executive Vice President
Sustainable Development and Environment,
Total

April 2009

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