

Lignin: Properties and Materials. Edited by Wolfgang G. Glasser and Simo Sarkanen, ACS Symposium Series, American Chemical Society, Washington, DC, 1989. ISBN 0 8412 1631 2. Price: \$143.95.

Lignin is considered to be one of the most complex polymers of the natural high molecular weight materials. Lignin represents 25–30% of the total weight of wood, and 12–15% of the weight of annual plants.

Partially degraded lignin, in the form of lignin sulphonate or kraft lignin is potentially available in large quantities, but most of this material is used at the site of generation as a fuel to provide heat for the pulping processes. However, there is a clear and positive trend favouring the modification of lignin for uses other than industrial fuels. Lignin is becoming a candidate for use in engineering plastics and other polymeric materials.

The current research on all aspects of lignin, particularly recent progress in elucidating some of the more difficult aspects of lignin preparation, is brought together in the 41 chapters of the book *Lignin: Properties and Materials*. Various methods for studying the structure of lignin, mostly dealing with molecular weight determinations, are presented in the 13 chapters, which are part of the first section 'Macromolecular Structure and Properties'. Discussions of polymer products derived from the modification of lignin are discussed in the six chapters of the section 'General Materials'. 'Water-soluble Polymers', the third section, describes the water-sodium lignosulphonate system, cationic flocculants from kraft lignin and lignin graft copolymers.

Organosolv pulping, wood adhesives and enzymatic lignin modification are the subjects contained in the chapters of the section called 'Phenolic Compounds'. The last two sections outline various products, such as polyols, polyurethanes, polyblends, grafts, epoxies, and acrylics, obtained from lignin. Despite the very expensive price for only one volume, this book might be of interest to scientists specialising in biopolymers, forestry and agriculture, as well as postgraduate students, biotechnologists, biochemists and those working in the paper, engineering and polymer science areas. It can also be recommended to anyone interested in renewable resources as potential sources of polymeric materials.

Eduardo H. M. Melo
John F. Kennedy