

# Preface

Today, cellulose and related polysaccharides are well recognized as high-potential polymers to be further materialized for both commodity and specialty uses. The currently more vital research on microscopic composition of cellulose may be demonstrative of the general recognition. As a part of the compositional research, the present monograph covers basic and applied studies of cellulosic blends and graft copolymers. Polymer blending and grafting techniques can offer opportunities not only to improve the processability and original physical properties of cellulose, but also to design new, cellulose-core polymeric materials exhibiting wide-ranging or synergistic functions unattainable in gross mechanical mixtures as well as in single-component materials.

The main purpose of this monograph is to survey the fundamental aspects associated with molecular mixing, molecular motions, and supramolecular structuring for cellulosic blends and graft copolymers, and to demonstrate functional aspects linked to their practical applications as advanced films and fibers, as well. Industrially important organic esters of cellulose, such as cellulose acetate, propionate, and butyrate, are employed as representative of the cellulosic component. The monograph is organized into five chapters, each written in a measure commensurate to the respective subject matters as follows: methods for miscibility estimation and structural designing (Chap. 1); typical examples of detailed characterization (Chaps. 2–4); embodiment of high-functional optical films (Chaps. 2 and 4), biodegradable/biocompatible moldings (Chaps. 3 and 4), and melt-spun green fibers (Chap. 5).

The constitutive chapters have their own share to accomplish the above main purpose in reasonable correlation with each other. A sequence of results compiled into this book will provide useful suggestions on the designing of functionality-rich multicomponent materials based on cellulose, which in turn will contribute toward more expanding the availability of cellulose. Therefore, this book will hopefully be helpful to many scientists and technologists engaged on cellulose and renewable materials research in academia and in industry, and, of course, to graduate students touching bio-based polymers in universities.

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Toward the Design and Development of Advanced Films  
and Fibers

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