

Preface

There is growing interest in biopolymer-based materials all over the universe, especially if the materials are based on renewable raw materials. The use of renewable resources is becoming more and more important in present civilizations. It is intensively connected to natural bioresources, agricultural production, and new developments in biobased materials. In fact, sustainable development has become a key idea. Sustainable development over the next century requires the use of natural polymer-based materials from renewable resources as alternatives to the Earth's limited petroleum resources. The 21st century offers enormous challenges but also exciting opportunities at economic and environmental levels.

Among various materials, natural biopolymers are the most abundant polymer found in nature; they are found in plants and trees, along with other biomass. Though this research in general has become prevalent, studies pertinent to biobased materials are limited compared to synthetic polymers. The prime reason for this is the inherent disadvantages of these materials such as hydrophilic nature and poor resistance to chemicals/weathering conditions. Improvements in the surface modification of biopolymers through graft copolymerization are enormously important because they will widen the scope of their applications. The development of new graft copolymer materials from biopolymers with excellent mechanical and barrier properties has been an important research challenge for industries for promising applications of their products. Hence advances in graft copolymerization of biopolymers with excellent mechanical and barrier properties have been an important research challenge. *Biopolymer Grafting: Applications* is organized in such a manner to provide the most relevant and realistic information on natural polymer-based graft copolymers for different applications including automotive, toxic ion removals, biomedical, defense, etc. The book bridges the knowledge gap between the scientific principles and industrial applications of polymer grafting.

This volume of the book series *Advances in Polymer and Fibers* is solely focused on the "applications" of biopolymer-based graft copolymers. Some of the important topics include, but are not limited to: graft copolymerization: a revolutionary approach; grafting of hydroxyapatite for biomedical applications; grafting of hydrophilic monomers onto cellulosic polymers for medical applications; surface functionalization with biopolymers via plasma-assisted surface grafting and plasma-induced graft polymerization; synthesis and application as programmable water-soluble adhesive of polyacrylamide grafted gum; radiation grafting of biopolymers and synthetic polymers: synthesis and biomedical applications; processing and characterization of grafted biocomposites; derivatized chitosan: fundamentals to applications; grafted copolymerized chitosan and its applications as a green biopolymer; grafting onto biopolymers: application in targeted drug delivery; chitosan grafted copolymers for drug delivery applications; fibroin grafting onto wool fibers: recent advances and applications; and grafting modification of wood for high performance.

Several critical issues and suggestions for future work are comprehensively discussed in this volume with the hope that the book will provide a deep insight into the state-of-the-art of "Biopolymer Grafting: Applications" of the biopolymer-based graft copolymers. I would like to thank Elsevier and Jennifer Pierce for the invaluable help in the organization of the editing process. Finally, I would like to thank my parents and spouse for their continuous encouragement and support.

Vijay Kumar Thakur, PhD
Cranfield University, United Kingdom