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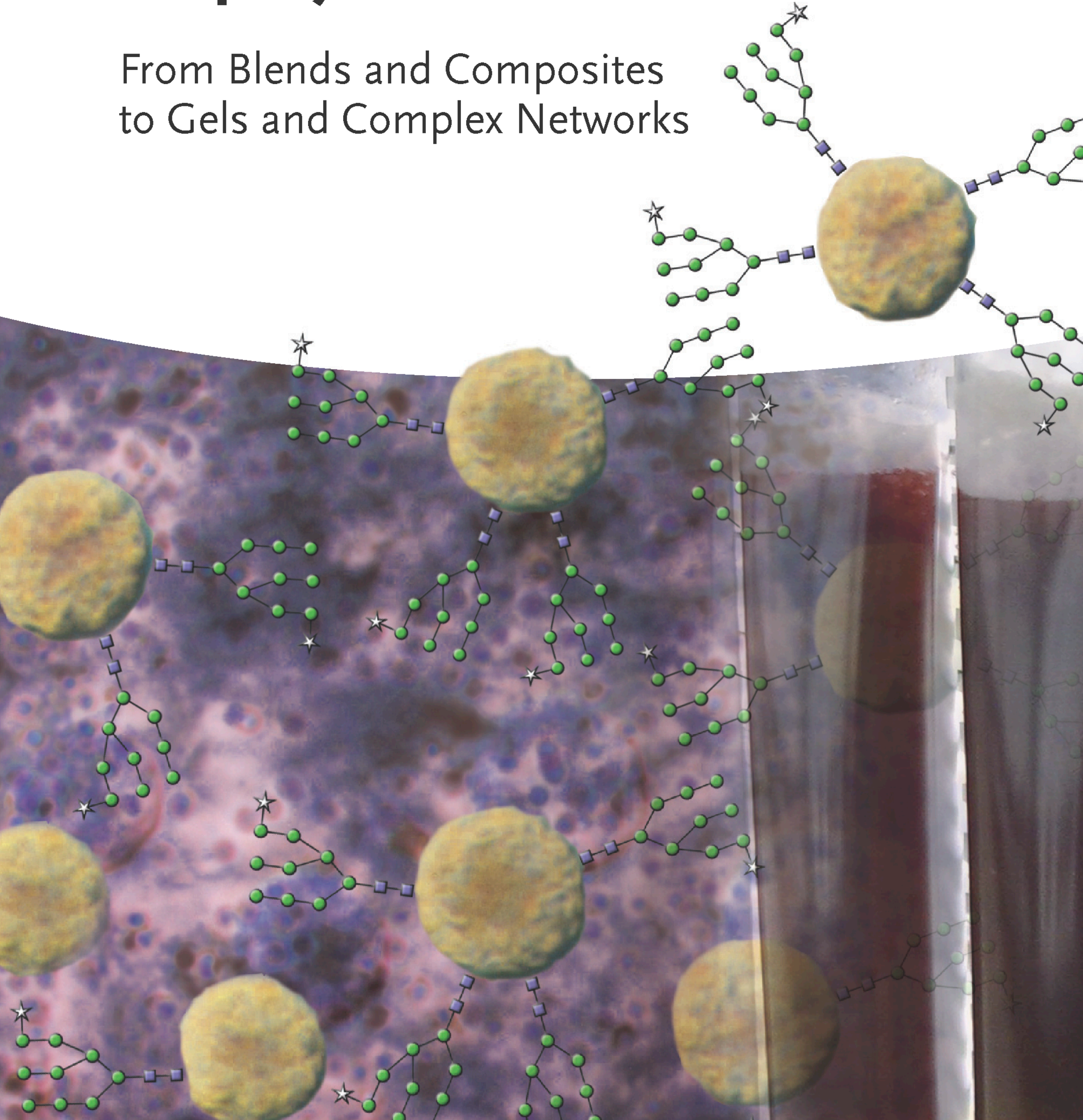
From Blends and Composites to Gels and Complex Networks



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Dominique Durand,
Christophe Chassenieux, and
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Handbook of Biopolymer-Based Materials

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Christophe Chassenieux, and P. Jyotishkumar

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Contents

Foreword *XXIII*
List of Contributors *XXV*

1 **Biopolymers: State of the Art, New Challenges, and Opportunities** *1*
Christophe Chassenieux, Dominique Durand, Parameswaranpillai Jyotishkumar, and Sabu Thomas
1.1 Introduction *1*
1.2 Biopolymers: A Niche For Fundamental Research in Soft Matter Physics *3*
1.3 Biopolymers: An Endless Source of Applications *4*
1.4 Topics Covered by the Book *5*
1.5 Conclusions *5*
References *6*

2 **General Overview of Biopolymers: Structure, Properties, and Applications** *7*
Charles Winkworth-Smith and Tim J. Foster
2.1 Introduction *7*
2.2 Plant Cell Wall Polysaccharides *11*
2.2.1 Cellulose *11*
2.2.1.1 Cellulose Extraction *12*
2.2.1.2 Nanocellulose *13*
2.2.1.3 Microfibrillated Cellulose *14*
2.2.1.4 Cellulose Nanowhiskers *14*
2.2.2 Hemicelluloses *15*
2.2.2.1 Galactomannans *15*
2.2.2.2 Konjac Glucomannan *19*
2.2.2.3 Xylan *19*
2.2.2.4 Xyloglucan *20*
2.2.3 Pectins *21*
2.3 Biocomposites *23*
2.3.1 Natural Fiber Composites *23*

2.3.2 Cellulose Composites *25*
2.3.3 Cellulose–Polymer Interactions *26*
2.3.4 Semi-Solid Composites *27*
2.4 Future Outlook *28*
References *29*

3 Biopolymers from Plants *37*
Maria J. Sabater, Tania Ródenas, and Antonio Heredia
3.1 Introduction *37*
3.2 Lipid and Phenolic Biopolymers *38*
3.2.1 The Biopolymer Cutin *38*
3.2.1.1 Cutin Monomers: Biosynthesis and Physicochemical Characteristics *39*
3.2.1.2 Molecular Architecture of Cutin *40*
3.2.1.3 Cutin Biosynthesis *41*
3.2.2 Lignin *42*
3.2.2.1 Monomer Precursors and Chemical Reactivity *42*
3.2.2.2 Lignin Biosynthesis *43*
3.2.3 Suberin *45*
3.2.3.1 Chemical Composition *45*
3.2.3.2 Biosynthesis and Fine Structure *47*
3.3 Carbohydrate Biopolymers: Polysaccharides *48*
3.3.1 Structural Polysaccharides *49*
3.3.1.1 Cellulose *49*
3.3.1.2 Hemicellulose *54*
3.3.1.3 Pectin *57*
3.3.2 Storage Polysaccharides *59*
3.3.2.1 Starch *59*
3.3.2.2 Fructans: Inulin *63*
3.3.3 Other: Gums (Guar Gum, Gum Arabic, Gum Karaya, Gum Tragacanth, and Locust Bean Gum) *66*
3.4 Isoprene Biopolymers: Natural Rubber *67*
3.4.1 *cis*-Polyisoprene *67*
3.4.1.1 Occurrence *67*
3.4.1.2 Composition, Structure, and Properties *67*
3.4.1.3 *cis*-1,4-Polyisoprene Biosynthesis *68*
3.4.1.4 Applications *73*
3.4.2 *trans*-Polyisoprene *73*
3.5 Concluding Remarks *74*
References *75*

4 Bacterial Biopolymers and Genetically Engineered Biopolymers for Gel Systems Application *87*
Deepti Singh and Ashok Kumar
4.1 Introduction *87*
4.1.1 Nucleic Acid Biopolymers: Central Dogma *89*

4.2 Microbial Polysaccharides as Biopolymers 90
4.2.1 Synthesis and Applications 90
4.3 Microbial Biopolymers as Drug Delivery Vehicle 92
4.3.1 ε-Poly-L-Lysine (ε-PL) and Its Applications 92
4.3.2 Polyhydroxyalkanoates and Its Applications 92
4.4 Polyanhydrides 93
4.5 Recombinant Protein Polymer Production 94
4.6 Recombinant Genetically Engineered Biopolymer: Elastin 95
4.7 Collagen as an Ideal Biopolymer 97
4.7.1 Microbial Recombinant Collagens: Production in *Pichia Pastoris* 97
4.8 Biopolymers for Gel System 99
4.9 Hydrogels of Biopolymers for Regenerative Medicine 99
4.9.1 Polysaccharide Hydrogels 99
4.9.2 Cellulose-Derived Biopolymers-Based Hydrogels 100
4.9.3 Protein Biopolymers-Based Hydrogels 100
4.10 Supermacroporous Cryogel Matrix from Biopolymers 100
4.10.1 Protein Cryogel 101
4.11 Biopolymers Impact on Environment 102
4.12 Conclusion 103
References 104

5 Biopolymers from Animals *109*
Khaleelulla Saheb Shaik and Bernard Moussian
5.1 Introduction 109
5.2 Chitin and Hyaluronic Acid in the Living World 110
5.3 Milestones in Chitin History 110
5.4 From Trehalose to Chitin 112
5.5 Chitin Synthase 115
5.6 Regulation of Chitin Synthesis in Fungi 117
5.7 Organization of Chitin in the Fungal Cell Wall 118
5.8 Organization of Chitin in the Arthropod Cuticle 119
5.9 Chitin-Organizing Factors 123
5.10 Secretion and Cuticle Formation 126
5.11 Transcriptional Regulation of Cuticle Production 128
5.12 Chitin Synthesis Inhibitors 130
5.13 Noncuticular Chitin in Insects 131
5.14 Chitin as a Structural Element 133
5.15 Application of Chitin 134
5.16 Conclusion 135
References 135

6 Polymeric Blends with Biopolymers *143*
Hero Jan Heeres, Frank van Maastrigt, and Francesco Picchioni
6.1 Introduction 143
6.2 Starch-Based Blends 146

6.2.1 Polymer Selection for Starch Blending *147*
6.2.2 Starch Structure *150*
6.2.3 Uncompatibilized Blends *152*
6.2.4 Compatibilization *155*
6.2.5 Composites *157*
6.3 Blends with Chitosan (One Amino Group Too Much . . .) *158*
6.4 Future Perspectives *161*
6.4.1 Biopolymer Plasticization *161*
6.4.2 Blend Morphology and Compatibilization *162*
6.4.3 Blend Processing: Technological Aspects *163*
References *164*

7 Macro-, Micro-, and Nanocomposites Based on Biodegradable Polymers *173*
Luc Avérous and Eric Pollet
7.1 Introduction *173*
7.2 Biodegradable Polymers *174*
7.2.1 Classification *174*
7.2.2 Agro-Polymers: The Case of Starch *175*
7.2.2.1 Native Starch Structure *175*
7.2.2.2 Plasticized Starch *176*
7.2.3 Biodegradable Polyesters *177*
7.2.3.1 Polyesters Based on Agro-Resources *177*
7.2.3.2 Petroleum-Based Polyesters *179*
7.3 Biocomposites *181*
7.3.1 Generalities *181*
7.3.2 The Case of Biocomposites Based on Agro-Polymers *181*
7.3.2.1 Cellulose Fiber Reinforcement *181*
7.3.2.2 Lignin and Mineral Fillers *182*
7.3.3 The Case of Biocomposites Based on Biopolyesters *182*
7.3.3.1 Generalities *182*
7.3.3.2 The Case of Biocomposites Based on Aromatic Copolyesters *183*
7.4 Nanobiocomposites *186*
7.4.1 Generalities *186*
7.4.2 Nanobiocomposites Based on Agro-Polymers (Starch) *187*
7.4.2.1 Whisker-Based Nanobiocomposites *190*
7.4.2.2 Starch Nanocrystal-Based Nanobiocomposites *190*
7.4.2.3 Nanoclay-Based Nanobiocomposites *190*
7.4.3 Nanobiocomposites Based on Biopolyesters *193*
7.4.3.1 Poly(lactic acid)-Based Nanobiocomposites *193*
7.4.3.2 Polyhydroxyalkanoate-Based Nanobiocomposites *194*
7.4.3.3 Polycaprolactone-Based Nanobiocomposites *195*
7.4.3.4 Biodegradable Aliphatic Copolyester-Based Nanobiocomposites *197*
7.4.3.5 Aromatic Copolyester-Based Nanobiocomposites *199*
References *200*

8 IPNs Derived from Biopolymers *211*
Fernando G. Torres, Omar Paul Troncoso, and Carlos Torres
8.1 Introduction *211*
8.2 Types of IPNs *212*
8.3 IPNs Derived from Biopolymers *214*
8.3.1 Alginate *215*
8.3.2 Agarose *215*
8.3.3 Chitosan *215*
8.3.4 Starch *216*
8.3.5 Dextran *217*
8.3.6 Gum Arabic *217*
8.3.7 Fibrinogen *217*
8.3.8 Collagen and Gelatin *217*
8.3.9 Cellulose and Cellulose Derivatives *218*
8.3.10 Polyhydroxyalkanoates *218*
8.3.11 Lactide-Derived Polymers *219*
8.4 Manufacture of IPNs *220*
8.4.1 Casting–Evaporation Processing *220*
8.4.2 Emulsification Cross-Linking Technique *220*
8.4.3 Miniemulsion/Inverse Miniemulsion Technique *221*
8.4.4 Freeze Drying Technique *222*
8.5 Characterization of IPNs *222*
8.5.1 Morphological and Structural Characterization *222*
8.5.2 FTIR Spectroscopy *223*
8.5.3 Mechanical Characterization *224*
8.5.4 Rheological Characterization *225*
8.5.5 Swelling Behavior Characterization *225*
8.5.6 Thermal Characterization *226*
8.6 Applications of IPNs *226*
8.6.1 Drug Delivery Applications *226*
8.6.2 Scaffolds for Tissue Engineering *227*
8.6.3 Other Biomedical Applications *227*
8.6.4 Antibacterial Applications *228*
8.6.5 Sensor, Actuators, and Artificial Muscle Applications *228*
8.7 Conclusions *229*
References *229*

9 Associating Biopolymer Systems and Hyaluronate Biomaterials *235*
Deborah Blanchard and Rachel Auzély-Velty
9.1 Introduction *235*
9.2 Synthesis and Self-Association of Hydrophobically Modified Derivatives of Chitosan and Hyaluronic Acid in Aqueous Solution *237*
9.2.1 General Aspects of Association in Amphiphilic Polyelectrolytes *237*
9.2.2 Synthesis and Behavior in Aqueous Solution of Hydrophobically Modified Water-Soluble Derivatives of Chitosan *239*

9.2.3 Synthesis and Behavior in Aqueous Solution of Hydrophobically Modified Water-Soluble Derivatives of Hyaluronic Acid *242*
9.3 Design of Novel Biomaterials Based on Chemically Modified Derivatives of Hyaluronic Acid *248*
9.3.1 Nanoassemblies Based on Amphiphilic Hyaluronic Acid *249*
9.3.2 Hydrogels for Cell Biology and Tissue Engineering *254*
9.3.2.1 Strategies for the Cross-Linking of HA to Obtain Scaffolds for Cells *254*
9.3.2.2 Engineering Biological Functionality in Hyaluronic Acid-Based Scaffolds *260*
9.3.2.3 Patterning of Hyaluronic Acid *261*
9.4 Conclusions *271*
References *271*

10 Polymer Gels from Biopolymers *279*
Esra Alveroglu, Ali Gelir, and Yasar Yilmaz
10.1 Introduction *279*
10.2 Experimental Methods *279*
10.3 Polymerization and Gelation Kinetics *281*
10.3.1 Fluoroprobe–Polymer Interactions *283*
10.3.2 Real-Time Monitoring of Monomer Conversion *286*
10.4 Sol–Gel Transition and Universality Discussion *287*
10.5 Imprinting the Gels *292*
10.6 Heterogeneity of Hydrogels *301*
10.6.1 Effect of Ion Doping on Swelling Properties and Network Structure of Hydrogels *301*
10.6.2 Current Measurements for Searching the Internal Morphology of the Gels *302*
10.7 Ionic p-Type and n-Type Semiconducting Gels *303*
10.7.1 Electrical Properties of Ionic p-Type and n-Type Semiconducting Gels *304*
10.7.2 Polymeric Gel Diodes with Ionic Charge Carriers *305*
10.8 Conclusions *307*
References *308*

11 Conformation and Rheology of Microbial Exopolysaccharides *317*
Jacques Desbrieres
11.1 Introduction *317*
11.2 Conformation of Polysaccharides *318*
11.3 Secondary Solid-State Structures for Microbial Polysaccharides *318*
11.3.1 No Secondary Solid-State Structure *319*
11.3.2 Single-Chain Conformation *319*
11.3.3 Simple or/and Double Helices *321*
11.3.4 Double Helix *323*
11.3.5 Triple Helix *323*

11.4 Conformation in Solution: Solution Properties and Applications *325*
11.4.1 Dextran and Pullulan *325*
11.4.2 Hyaluronan *326*
11.4.3 Xanthan *331*
11.4.4 Succinoglycan *334*
11.5 Gelling Properties in the Presence of Salts *336*
11.5.1 β(1→4)-D-Glucuronan *336*
11.5.2 Polysaccharide 1644 *337*
11.5.3 Gellan and Similar Polysaccharides *337*
11.5.4 β(1→3)-D-Glucans *341*
11.5.5 YAS 34 *342*
11.6 Conclusions *345*
References *345*

12 Sulfated Polysaccharides in the Cell Wall of Red Microalgae *351*
Shoshana (Malis) Arad and Oshrat Levy-Ontman
12.1 Introduction *351*
12.2 Sulfated Polysaccharides from Red Microalgae – General Overview *352*
12.3 Sulfated Polysaccharides of Red Microalgal Cell Walls: Chemical Aspects *354*
12.4 Proteins in the Cell Wall of Red Microalgae *355*
12.5 Rheology of Red Microalgal Polysaccharide Solutions *356*
12.6 Modifications of the Sulfated Polysaccharides *359*
12.7 Red Microalgal Sulfated Polysaccharide Bioactivities *362*
References *365*

13 Dielectric Spectroscopy and Thermally Stimulated Current Analysis of Biopolymer Systems *371*
Valérie Samouillan, Jany Dandurand, and Colette Lacabanne
13.1 Introduction *371*
13.2 Theory and Principle of Dielectric Analyses *372*
13.2.1 Theoretical Background *372*
13.2.1.1 Polarization Mechanisms in Materials *372*
13.2.1.2 Orientation Polarization *373*
13.2.2 Dynamic Dielectric Spectroscopy *376*
13.2.2.1 General Principle *376*
13.2.2.2 DDS Relaxation Map *377*
13.2.2.3 Analysis of DDS Responses *378*
13.2.3 Thermally Stimulated Currents *379*
13.2.3.1 General Principle *379*
13.2.3.2 Complex TSC Thermograms and Experimental Decomposition *380*
13.2.4 Relaxation Time *382*
13.3 Characterization of Biopolymers *383*
13.3.1 Native Biopolymers *383*
13.3.2 Role OH Hydration in Biopolymers Dynamics *389*

13.3.2.1 Soluble Biopolymers *389*
13.3.2.2 Fibrillar Proteins *390*
13.3.3 Biological Systems and Biomaterials *395*
13.4 Conclusion *398*
References *398*

14 Solid-State NMR Spectroscopy of Biopolymers *403*

Garrick F. Taylor, Phedra Marius, Chris Ford, and Philip T.F. Williamson

14.1 Introduction *403*
14.2 NMR of Biological Polymers *404*
14.3 Methods for the Study of Biological Polymers *405*
14.3.1 Static Powder Samples *406*
14.3.2 Oriented Fibers *407*
14.3.3 Magic Angle Spinning *408*
14.4 Solid-State NMR Experiments Employed for the Analysis of Biopolymers *409*
14.4.1 Cross-Polarization *409*
14.4.2 Heteronuclear Decoupling *411*
14.4.3 Correlation Spectroscopy of Unoriented Samples *412*
14.4.4 Correlation Spectroscopy of Oriented Samples *414*
14.4.5 Magic Angle Spinning Dipolar Recoupling/Correlation Spectroscopy *415*
14.4.6 Homonuclear Dipolar Recoupling Methods *415*
14.4.7 Heteronuclear Dipolar Recoupling Methods *418*
14.4.8 Analysis of Dynamics in Biopolymers *420*
14.5 Application of Solid-State NMR to Biopolymers *422*
14.5.1 Silk *422*
14.5.2 Structural Studies of Silks Derived from Silkworm *423*
14.5.3 Structural Studies of Silks Derived from Spiders *425*
14.5.4 Collagen *428*
14.5.5 Elastin *432*
14.6 Conclusions *436*
References *436*

15 EPR Spectroscopy of Biopolymers *443*

Janez Štrancar and Vanja Kokol

15.1 Introduction *443*
15.2 Theoretical Background *445*
15.3 Biopolymers *451*
15.3.1 Biopolymers Structure and Molecular Motions Determination *451*
15.3.2 Biopolymers Degradation Dynamic Study *453*
15.3.2.1 Thermal Degradation *453*
15.3.2.2 Radiolytic and Photolytic Irradiated Degradation *453*
15.3.2.3 Radical Degradation Pathways of Polymers Due to Involved Redox Reactions of Transition Metal Ions *458*

15.3.3 Determination of Antioxidant Activity of Biopolymers *460*
15.3.4 Penetration of Small Molecules through Biopolymer Structures *461*
15.3.5 Biopolymers Functionalization, Polymerization, and/or Cross-Linking *462*
15.3.6 Biopolymer Surface/Interface Interactions *462*
15.3.7 Biopolymer Blends Morphology and Temperature-Dependent Behavior *463*
15.3.8 Biocatalytic Oxidation/Reduction of Biopolymers *465*
15.4 Conclusion *466*
References *467*

16 X-Ray Photoelectron Spectroscopy: A Tool for Studying Biopolymers *473*
Ana Maria Botelho do Rego, Ana Maria Ferraria, Manuel Rei Vilar, and Sami Boufi
16.1 Introduction *473*
16.2 XPS Basics *474*
16.2.1 Qualitative Aspects *475*
16.2.1.1 Binding Energy and Chemical Shift *475*
16.2.1.2 Charge Shifts and Auger Parameter *478*
16.2.2 Quantitative Aspects *480*
16.2.2.1 Atomic Relative Amounts *480*
16.2.2.2 Heterogeneities in Depth *481*
16.2.3 Degradation Induced by X-Ray *483*
16.3 Cellulose *483*
16.3.1 Ultrathin Cellulose Films: A Good Tool for Cellulose Surface Studies *484*
16.3.2 Adsorption of a Phthalocyanine on Ultrathin Cellulose Films *485*
16.3.3 Activation of Cellulose Film with Isocyanate Derivatives *488*
16.3.4 Activation of Cellulose with Imidazole Derivatives *492*
16.3.4.1 Surface Grafting of Hemin on Cellulose Films *492*
16.3.4.2 Growth of Metallic Nanoparticles on Cellulose Surface *496*
16.3.4.3 Controlled Surface Modification of Cellulose Fibers by Amino Derivatives *499*
16.3.5 Other Works *506*
16.4 Starch *507*
16.4.1 Ability of XPS to Characterize Native Starch *508*
16.4.2 Starch Functionalization *508*
16.5 Chitin and Chitosan *509*
16.5.1 Chitin *510*
16.5.2 Chitosan *511*
16.6 Gums *511*
16.6.1 Ability of XPS to Characterize Natural Gums *512*
16.6.2 Adsorbed Metals and Nanoparticles on Natural Gums *512*
16.7 Complementary Techniques *513*

16.7.1 Infrared Spectroscopy *513*
16.7.1.1 Activation of Cellulose Film with Isocyanate Derivatives *513*
16.7.1.2 Activation of Cellulose with Imidazole Derivatives: Functionalization with Hemin *517*
16.7.1.3 New Hybrid Films Based on Cellulose and Hydroxygallium Phthalocyanine *518*
16.7.1.4 Hybrid Systems of Silver Nanoparticles Generated on Cellulose Surfaces *519*
16.7.2 Atomic Force Microscopy *521*
16.7.2.1 Hydroxygallium Phthalocyanine Physisorbed on Cellulose Films Studied by AFM *522*
16.7.2.2 Silver Nanoparticles on Cellulosic Films Studied by AFM *524*
16.8 Conclusions *525*
References *526*

17 Light-Scattering Studies of Biopolymer Systems *533*
Taco Nicolai and Dominique Durand
17.1 Introduction *533*
17.2 Static Scattering *534*
17.2.1 Theoretical Background *534*
17.2.2 Applications of Static Scattering Methods to Study Particular Structures and Processes *539*
17.2.2.1 Dilute Systems *539*
17.2.2.2 Undiluted Systems *543*
17.3 Dynamic Light Scattering *545*
17.3.1 Theoretical Background *545*
17.3.2 Applications of Dynamic Scattering Methods to Study Particular Structures and Processes *548*
17.4 Cross-Correlation Dynamic Light Scattering *552*
17.4.1 Theoretical Background *553*
17.4.2 Applications of Cross-Correlation Dynamic Light Scattering *553*
17.5 Turbidimetry *556*
17.5.1 Theoretical Background *556*
17.5.2 Applications of Turbidimetry *557*
17.6 Diffusive Wave Spectroscopy *558*
17.6.1 Theoretical Background *558*
17.6.2 Applications of Diffusive Wave Spectroscopy *560*
17.7 Micro Rheology Using DLS and DWS *561*
17.8 Conclusion *563*
References *563*

18 X-Ray Scattering and Diffraction of Biopolymers *567*
Yoshiharu Nishiyama and Marli Miriam de Souza Lima
18.1 Basics *567*
18.1.1 Interaction of X-Ray with Electron *567*

18.1.2 Structure Factor and Scattered Intensity *568*
18.1.3 Diffraction *569*
18.1.4 Model System for Small-Angle X-Ray Scattering (SAXS) *570*
18.1.5 Explicit Model *572*
18.2 Practical Consideration *573*
18.2.1 Line- or Point-Focused Beam *573*
18.2.2 Monochromator and Filters *573*
18.2.3 Choice of Wavelength *573*
18.2.4 Beam Size *574*
18.3 Examples *574*
18.3.1 Molecular Conformation *574*
18.3.2 Polydisperse Particles *575*
18.3.3 Molecular Shape from Fiber Diffraction *576*
18.3.4 Precise Crystallographic Coordinates from Fiber Diffraction or Single Crystal Diffraction *577*
18.3.5 Microfocus Capacity and Beam Damage *578*
18.4 Conclusions *580*
References *580*

19 Large-Scale Structural Characterization of Biopolymer Systems by Small-Angle Neutron Scattering *583*
Ferenc Horkay
19.1 Introduction *583*
19.2 Basic Principles of SANS *584*
19.2.1 Advantages of Using SANS *584*
19.2.2 Physical Background *585*
19.2.3 Scattering Contrast *587*
19.2.4 Form Factor *588*
19.2.5 Structure Factor *588*
19.2.6 Zero Average Contrast Method *590*
19.3 Experimental Examples *591*
19.3.1 Similarities between Synthetic and Biopolymer Solutions *591*
19.4 Proteins *593*
19.4.1 Protein Folding *593*
19.4.2 Protein–Water Interaction *594*
19.5 Polynucleic Acids (DNA and RNA) *595*
19.5.1 Ionic Interactions in DNA Solution *595*
19.5.2 DNA Folding *596*
19.5.3 Crowding Effects in DNA *598*
19.5.4 Crowding and RNA Folding *599*
19.6 Polysaccharide-Based Biopolymers *600*
19.6.1 Diversity of Polysaccharides in Nature *600*
19.6.2 Chondroitin Sulfate *601*
19.6.3 Hyaluronic Acid *603*

19.6.4 Aggrecan Assemblies *604*
19.7 Summary *607*
References *608*

20 Microscopy of Biopolymer Systems *611*
Changmin Hu and Wenguo Cui
20.1 Introduction *611*
20.2 Emerging Techniques in Biopolymer Microscopy *612*
20.2.1 Optical Microscopy *612*
20.2.2 Scanning Electron Microscopy *614*
20.2.3 Transmission Electron Microscopy *616*
20.2.4 Cryo Transmission Electron Microscopy *617*
20.2.5 Atomic Force Microscopy *619*
20.2.6 Scanning Tunneling Microscope *621*
20.2.7 Laser Scanning Confocal Microscope *623*
20.3 Microstructure and Application of Biopolymers *625*
20.3.1 Microstructure of Biopolymers *625*
20.3.2 Microspheres *626*
20.3.3 Hydrogels *630*
20.3.3.1 Structure of Hydrogels *630*
20.3.3.2 Applications of Hydrogels *630*
20.3.4 Fibers *632*
20.3.4.1 Structure of Fibers *632*
20.3.4.2 Self-Assembly Fibers *632*
20.3.4.3 Phase Separation in Fiber Formation *633*
20.3.4.4 Electrospinning Fibers *635*
20.3.5 Scaffolds *636*
20.3.5.1 Structure of Porous Scaffolds *636*
20.3.5.2 Sponge-Like Porous Scaffolds *636*
20.3.5.3 Collagen-Like Nanofibrous Scaffolds *637*
20.3.6 Membranes *637*
20.4 Biopolymeric Microstructure for Medical Applications *638*
20.5 Summary *640*
References *641*

21 Rheo-optical Characterization of Biopolymer Systems *645*
Dagang Liu, Rakesh Kumar, Donglin Tian, Fei Lu, and Mindong Chen
21.1 Introduction *645*
21.2 Mechanism and Equipment of Rheo-optics *646*
21.2.1 Polarimetry *646*
21.2.1.1 Theoretical Background *646*
21.2.1.2 Experimental Setup *647*
21.2.2 Light Scattering (Raman) *648*
21.2.2.1 Mechanism and Applications *648*
21.2.2.2 Experimental Setup *650*

21.2.3 Rheo-optical Fourier Transform Infrared Spectroscopy *651*
21.3 Rheo-optical Applications for Biopolymers *652*
21.3.1 Stress *652*
21.3.2 Flow Birefringence *656*
21.3.2.1 Proteins *656*
21.3.2.2 Xanthan Gum Solution *657*
21.3.2.3 Collagens *657*
21.3.2.4 Wormlike Micelles *658*
21.3.2.5 Polysaccharides *659*
21.3.3 Orientation (Liquid Crystal) *660*
21.3.3.1 Method for Determination of Orientation *660*
21.3.3.2 Birefringent Characterization of Fiber Orientation Degree *661*
21.3.3.3 Applications *661*
21.3.4 Size of Phase or Particle *664*
21.3.4.1 Particle Characterization Method *667*
21.3.4.2 Rheo-optical Properties *667*
21.4 Conclusions *668*
References *669*

22 Rheological Behavior of Biopolymer Systems *673*
Tao Feng and Ran Ye
22.1 Introduction *673*
22.2 Rheological Behavior of Polysaccharide Systems *674*
22.2.1 Structure of Polysaccharide regarding Rheological Properties *674*
22.2.2 Mathematical Modeling of Linear Viscoelastic Properties *676*
22.2.3 Rheological Behavior and Modeling of Polysaccharide Systems *677*
22.3 Rheological Behavior of Protein Systems *685*
22.3.1 Rheological Behavior of Milk Proteins *685*
22.3.2 Rheological Behavior of Soy Proteins *688*
22.3.3 Rheological Behavior of Meat Proteins *689*
22.4 Rheological Behavior of Mixture Systems *690*
22.4.1 Rheological Properties of the Mixtures of Milk Proteins and Polysaccharides *690*
22.4.2 Rheological Properties of the Mixtures of Soy Proteins and Other Proteins *693*
22.5 Conclusions *694*
References *694*

23 Physical Gels of Biopolymers: Structure, Rheological and Gelation Properties *699*
Camille Michon
23.1 Introduction *699*
23.2 Gel Organization at Different Scales *700*
23.3 Sol–Gel Transition in Polymer Gels: Determination and Applications *703*

23.3.1 Definition of the Sol–Gel Transition *703*
23.3.2 Different Techniques to Follow the Gel Formation *704*
23.3.3 Classical Methods for Determining the Gel Point *705*
23.3.3.1 Determining the Gel Point Using G′(ω) and G″(ω) Spectra *706*
23.3.4 The Method of "tan δ Crossing" Applied to the Study of Mixed Gels *707*
23.4 Gel and Sol–Gel Transition Applications *710*
23.4.1 Uses of Gel to Trap Scattered Elements *710*
23.4.2 Mechanical Reversibility of Physical Gels and Applications *711*
23.4.3 Foams Containing Gelatin. How to Choose the Whipping Temperature *712*
23.5 Conclusion *714*
References *715*

24 Interfacial Properties of Biopolymers, Emulsions, and Emulsifiers *717*
Adamantini Paraskevopoulou and Vassilis Kiosseoglou
24.1 Introduction *717*
24.2 Surface-Active Polysaccharides *720*
24.3 Biopolymer Blends in Emulsions *724*
24.3.1 Incompatible Protein–Polysaccharide Blends *724*
24.3.2 Associative Protein–Polysaccharide Interactions *726*
24.3.2.1 Physical Protein–Polysaccharide Complexes *726*
24.3.2.2 Covalent Protein–Polysaccharide Conjugates *730*
24.4 Concluding Remarks *734*
References *736*

25 Modeling and Simulation of Biopolymer Systems *741*
Denis Bouyer
25.1 Introduction *741*
25.2 Why Modeling (and Simulating)? *741*
25.2.1 Describing the Mechanisms Involved in the Fabrication of Biopolymer Matrices *741*
25.2.2 Discriminating the Elementary Phenomena *742*
25.2.3 Developing a Predictive Tool *742*
25.2.4 Opening New Perspectives *742*
25.3 What Modeling (Transfer, Transport, Chemical Reaction, etc.)? *743*
25.4 Which Validation for a Model? *744*
25.5 Methodology *745*
25.5.1 Description of the Geometry *745*
25.5.2 Definition of the Initial Assumptions *746*
25.5.3 Modeling the Thermodynamics *747*
25.5.4 Mass Balance Equation *747*
25.5.5 Coupling between Mass and Heat Transfer *748*
25.5.5.1 Definition of the Biot Number *748*

25.5.5.2 Lumped Parameter Approach *749*
25.5.5.3 Solving the Heat Equation *749*
25.5.6 Definition of the Initial and Boundary Conditions *749*
25.5.6.1 Initial Conditions for Mass and Heat Transfer *749*
25.5.6.2 Boundary Conditions for Mass Transfer *750*
25.5.6.3 Boundary Conditions for Heat Transfer *750*
25.5.7 Solving the Boundary Displacement *750*
25.5.8 Mass and Heat Transfer Coefficients *751*
25.5.8.1 Free Convection *751*
25.5.8.2 Forced Convection *753*
25.5.9 Numerical Simulation *753*
25.6 Application to Biopolymer Systems *754*
25.6.1 Elaboration of Chitin Hydrogels Using Nonsolvent Vapors *754*
25.6.1.1 Nature of Chitin and Chitosan Biopolymers *754*
25.6.1.2 Preparation of Chitin Matrices *754*
25.6.1.3 Modeling Approach for the Elaboration of Chitin Hydrogel *755*
25.6.1.4 Main Results and Applications *756*
25.6.2 Elaboration of Chitosan Hydrogels by Ammonia Penetration and Chemical Reaction *760*
25.6.2.1 Preparation of Chitosan Solutions *761*
25.6.2.2 Elementary Phenomena Involved in the Vapor Gelation Process *761*
25.6.2.3 Experimental Procedure for Following the Gelation Front *761*
25.6.2.4 Equation System Including the Coupling between Transport and Chemical Reaction *762*
25.6.2.5 Main Results and Applications *764*
25.7 Conclusions *772*
Nomenclature *772*
References *773*

26 Aging and Biodegradation of Biocomposites *777*
Siji K. Mary, Prasanth Kumar Sasidharan Pillai, Deepa Bhanumathy Amma, Laly A. Pothen, and Sabu Thomas
26.1 Introduction *777*
26.1.1 Aging of Biopolymer Systems *780*
26.1.2 Aging Tests *781*
26.1.2.1 Environmental Aging Test *781*
26.1.2.2 Artificial Aging Test *781*
26.1.2.3 Accelerated Aging Tests *781*
26.1.3 Effects of Aging and Moisture on Mechanical Properties *782*
26.2 Biodegradation of Biopolymers *785*
26.2.1 Biodegradation Behavior *786*
26.3 Recycling of Biopolymer-Embedded Biocomposites *790*
26.4 Future Vision *795*
References *795*

27 Biopolymers for Health, Food, and Cosmetic Applications *801*
Robin Augustine, Rajakumari Rajendran, Uroš Cvelbar, Miran Mozetič, and Anne George
27.1 Introduction *801*
27.2 Biopolymers for Health Applications *802*
27.2.1 Introduction *802*
27.2.2 Biodegradable Polymers *802*
27.2.3 Considerations for Selection of Polymers *803*
27.2.4 Proteins and Poly(Amino Acids): Enzymatically Degradable Polymers as Biomaterials *803*
27.2.4.1 Collagen *803*
27.2.4.2 Natural Poly(Amino Acids) *805*
27.2.4.3 Elastin *805*
27.2.4.4 Fibrin *805*
27.2.5 Polysaccharides of Human Origin *806*
27.2.5.1 Hyaluronic Acid *806*
27.2.5.2 Chondroitin Sulfate *806*
27.2.6 Polysaccharides of Nonhuman Origin *807*
27.2.6.1 Chitin and Chitosan *807*
27.2.6.2 Alginic Acid *807*
27.2.6.3 Xanthan Gum *808*
27.2.6.4 Gum Arabic *808*
27.2.6.5 Starch *809*
27.2.6.6 Cellulose *809*
27.2.6.7 Pectin *810*
27.2.6.8 Carrageenan *810*
27.2.7 Polymers with Hydrolyzable Backbone *810*
27.2.7.1 Poly(α-Esters) *810*
27.2.7.2 Polyglycolide *813*
27.2.7.3 Polylactides *813*
27.2.7.4 Poly(Lactide-co-Glycolide) *813*
27.2.7.5 Polycaprolactone *814*
27.2.7.6 Polydioxanone *814*
27.2.7.7 Poly(3-Hydroxyalkanoates)(PHA)s *814*
27.2.7.8 Poly(Ester Amide) *815*
27.2.7.9 Poly(Orthoesters) (POE) *816*
27.2.7.10 Polyanhydrides *816*
27.2.7.11 Poly Propylenefumarate *816*
27.2.7.12 Poly(Alkyl Cyanoacrylates) *817*
27.2.7.13 Polyphosphazenes *817*
27.2.7.14 Polyphosphoester *817*
27.2.8 Conclusions *818*
27.3 Biopolymers for Food Applications *819*
27.3.1 Introduction *819*
27.3.2 Chitin and Chitosan *819*

27.3.3 Dextran *819*
27.3.4 Xanthan *821*
27.3.5 Bacterial Cellulose *822*
27.3.6 Gellan *823*
27.3.7 Curdlan *823*
27.3.8 Pullulan *824*
27.3.9 Starch *825*
27.3.10 Alginic Acid *825*
27.3.11 Gelatin *825*
27.3.12 Cyclodextrins *826*
27.3.13 Carrageenan *826*
27.3.14 Conclusions *826*
27.4 Biopolymers for Cosmetic Applications *827*
27.4.1 General Ingredients of Cosmetic Products *828*
27.4.2 Cosmeceuticals *828*
27.4.3 Biopolymers in Cosmetic Preparations *829*
27.4.3.1 Proteins in Cosmetics *829*
27.4.3.2 Polysaccharides in Cosmetics *836*
27.4.4 Conclusions *843*
References *844*

Index *851*

Foreword

Our industrialized world is driven in large part by petroleum. It is an important source of energy and materials, and many of the products that we depend upon for day-to-day living are derived from it. However, the cost of oil and gas has increased dramatically over the past decade and this upward spiral is expected to continue due to increased demand, finite quantities, and unreliable supply chains. Beyond the monetary cost, our petroleum-based economy comes at a significant environmental price that cannot be sustained. As a consequence, research scientists, university professors, university students, technology developers in industry, and government policy makers focus their interest in the future prospects for a world less dependent on fossil fuels, taking steps to reduce greenhouse gas emissions, and efficiently addressing the significant challenges associated with plastic wastes in the global environment. It is now widely recognized that more cost-effective and environmentally benign alternatives to petroleum and the products derived from it will be required in order to realize a future with a sustainable economy and environment. Since you have this book in your hands, chances are that you are one of these actors. The bio-derived polymers discussed in this book and their applications provide part of the solution to these problems.

This book examines the current state of the art, new challenges, opportunities, and applications in the field of biopolymers. It is organized in two volumes morphology, structure, and properties (Chapters 1–12), and characterization and applications (Chapters 13–27). This book summarizes in an edited format and in a comprehensive manner many of the recent technical research accomplishments in the area of biopolymers and their blends, composites, IPNs, and gels from macro- to nanoscale. The handpicked selection of topics and expert contributors make this survey of biopolymers an outstanding resource reference for anyone involved in the field of eco-friendly biomaterials for advanced technologies. It surveys processing–morphology–property relationship of biopolymers, their blends, composites, and gels. The influence of experimental conditions and preparation techniques (processing) on the generation of micro- and nanomorphologies and the dependence of these morphologies on the properties of the biopolymer systems are discussed in detail. The application of various theoretical models for the prediction of the morphologies of these systems is discussed. This book also illustrates the use of biopolymers in health, medicine, food, and cosmetics.

There are already a number of fine texts that comprehensively cover the subject of biopolymers in great detail, but the content of this book is unique. For the first time, a book deals with processing, morphology, dynamics, structure, and properties of various biopolymers and their multiphase systems. It covers an up-to-date record on the major findings and observations in the field of biopolymers.

Grenoble, Institute of Technology *Alain Dufresne*
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