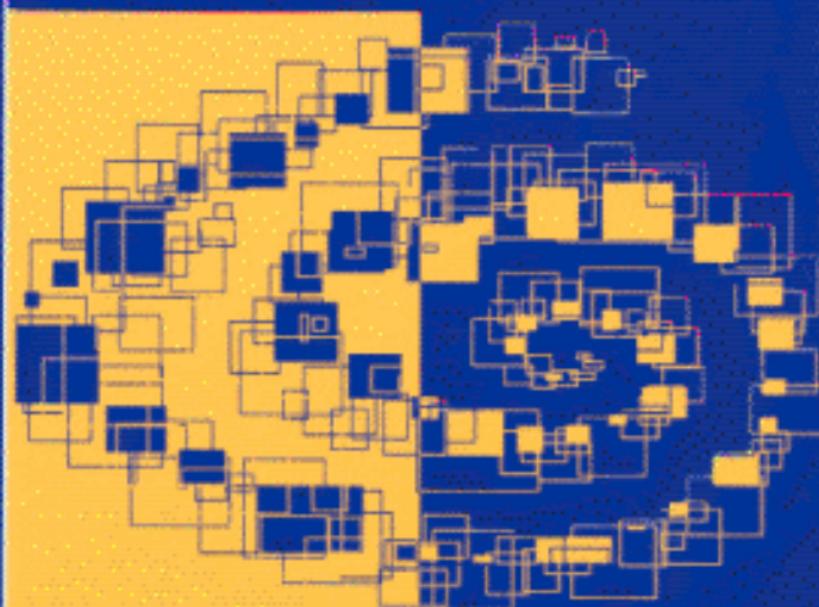


Reflexive Polymers and Hydrogels

**Understanding and Designing
Fast Responsive Polymeric
Systems**



Edited by

Nobuhiko Yui, Randall J. Mrsny, and Kinam Park



CRC PRESS

Contents

SECTION I Learning from Natural Systems..... 1

- Chapter 1** Learning from Nature: Examples of Rapid, Repetitive, Responsive Biological Events 3

Randall J. Mrsny

- Chapter 2** Seismonastic Movements in Plants 17

Nobuyuki Kanzawa and Takahide Tsuchiya

- Chapter 3** Contractile Systems of Muscles 33

Madoka Suzuki and Shin'ichi Ishiwata

- Chapter 4** Bacterial Flagellar Motor 49

Michio Homma and Toshiharu Yakushi

- Chapter 5** Molecular Mechanisms of Cytoplasmic Streaming in Plant Cells 67

Teruo Shimmen and Etsuo Yokota

- Chapter 6** Natural Polymer Gels with Fast Responses 85

Namjin Baek and Kinam Park

SECTION II Theoretical Considerations..... 97

- Chapter 7** Kinetics of Smart Hydrogels 99

Nicholas A. Peppas

- Chapter 8** Polyelectrolyte Properties of Solutions and Gels..... 115

Hiroshi Frusawa and Kohzo Ito

Chapter 9 Kinetics in Cyclic Hydrogel Systems.....	143
<i>Ryo Yoshida</i>	
Chapter 10 Cooperative Binding in Surfactant–Polymer Association: A Brief Overview.....	165
<i>Rupali Gangopadhyay, Jian Ping Gong, and Yoshihito Osada</i>	
Chapter 11 Rate-Limiting Steps in Volume Change Kinetics of Fast Responsive Microporous Gels	189
<i>Norihiro Kato and Stevin H. Gehrke</i>	
SECTION III Synthetic Systems	217
Chapter 12 Fast Shrinkable Materials	219
<i>Mitsuhiko Ebara, Akihiko Kikuchi, Kiyotaka Sakai, and Teruo Okano</i>	
Chapter 13 Fast Swelling Hydrogel Systems.....	245
<i>Richard A. Gemeinhart and Chunqiang Guo</i>	
Chapter 14 Fast Sliding Motions of Supramolecular Assemblies	259
<i>Nobuhiko Yui and Tooru Ooya</i>	
Chapter 15 Light-Induced Molecular Orientations	283
<i>Kunihiro Ichimura</i>	
Chapter 16 Fast Responsive Liquid Crystalline Polymer Systems.....	323
<i>Seiji Kurihara</i>	
Chapter 17 Engineering New Generation Drug Delivery Systems Based on Block Copolymer Micelles: Physicochemical Aspects	355
<i>Eduardo Jule and Kazunori Kataoka</i>	
Chapter 18 Fast Responsive Nanoparticles of Hydrophobically Modified Poly(Amino Acid)s and Proteinoids	373
<i>Jong-Duk Kim, Seung Rim Yang, Yong Woo Cho, and Kinam Park</i>	
Chapter 19 Fast Biodegradable Polymers	401
<i>Wim E. Hennink, Jan Hein van Steenis, and Cornelus F. van Nostrum</i>	

**SECTION IV A Perspective on Reflexive
Systems 425**

**Chapter 20 A Perspective on Current and Future Synthetic Reflexive
Systems..... 427**

Kinam Park, Nobuhiko Yui, and Randall J. Mrsny

Index 439