

# Polymer Science And Technology Solution

***The purpose of this 4-volume book is to examine some of the applications of lasers in polymer science and technology. Now available for the first time, up-to-date information on this fascinating subject is compiled and presented in compact form. This book focuses on current research and developments in the application of lasers in polymer and biopolymer chemistry. It includes experimental and theoretical details, apparatus, techniques, and applications. This book is a useful source for researchers, students, polymer chemists, and physicists involved in this astonishing field of high technology. Fluoropolymers continue to enable new materials and technologies as a result of their remarkable properties. This book reviews fluoropolymer platforms of established commercial interest, as well as recently discovered methods for the preparation and processing of new fluorinated materials. It covers the research and development of***

**fluoropolymer synthesis, characterization, and processing. Emphasis is placed on emerging technologies in optics, space exploration, fuel cells, microelectronics, gas separation membranes, biomedical instrumentation, and much more. In addition, the book covers the current environmental concerns associated with fluoropolymers, as well as relevant regulations and potential growth opportunities. Concepts, studies, and new discoveries are taken from leading international laboratories, including academia, government, and industrial institutions.**

**This book is a collection of the addresses of the keynote speakers and invited lecturers as well as manuscripts of a few outstanding papers which were delivered at the First Pacific Polymer Conference organized by the Pacific Polymer Federation in Maui, Hawaii, 12-15 December, 1989. The First Pacific Polymer Conference covered a wide variety of topics in macromolecular science, demonstrating the emphasis given to polymer research in the Pacific Rim countries. The keynote speakers and**

***invited lecturers are excellent scientists and leaders of effort who covered their fields expertly and in many cases gave their own perspective on the future of polymer science and engineering. A panel discussion on the role of polymers in the arts interested the attendees and emphasized the pervasiveness of polymers in all facets of life. The meeting was attended by over 500 scientists from all over the world. The participants left the meeting with renewed feeling for the importance of polymers in the material sciences and impressed by the progress in polymer research and development. This book, therefore, provides a wide -angle snapshot of the polymer research as we enter the 1990's. It is a useful book for all scientists interested in polymers and the progress of our science in the countries of the Pacific Rim. We hope that many attendees were stimulated by the meeting and that new ideas and new collaborations will result which will further enrich research, and lead to new useful polymers for all countries. Principles of Polymer Science and Technology in Cosmetics and Personal***

## Care

### **Applied Polymer Science**

### **Encyclopedia of Polymer Science and Technology**

### **Progress in Pacific Polymer Science**

### **Progress in Pacific Polymer Science 2**

### **Fundamentals of Polymer Science**

*This is an introductory textbook on polymer science aimed at lecturers/professors, undergraduate and graduate students of polymer science and technology courses as well as engineering (materials, chemical, civil, food, etc.), chemistry, and physics. It is also aimed at engineers and technologists. Each chapter is written starting from simple concepts and progressively getting more complex towards its end, to help the reader decide how deep to go into each topic. Each chapter also presents the solution of many proposed problems, guiding the reader to solve numerically the everyday problems polymer technologists face, by applying theoretical concepts. Additionally, at every chapter's end there is a list of problems for the reader to check his/her understanding of the topics. The book contains a list of more than 10 experiments to perform in the laboratory, linked to some of the concepts discussed in the book. It also serves as a long-term reference with many figures, diagrams, tables, chemical equations containing frequently needed information. It contains as well an appendix with a long list of chemical structures of the main commercially available polymers.*

*June 04-05, 2018 London, UK Key Topics : Polymer Science -The Future, Polymers In Industries, Polymer Material Science, Polymer Engineering, Polymer Nanotechnology, Polymer Chemistry, Composite Polymeric Material, Advanced Polymers, Role Of Polymers In Biology And Biological Systems, Polymer Physics, Bioplastics And Biopolymers, Applications Of Polymer Materials, Polymers In Wastes And Their Environmental Impact,*

*This companion volume to “Fundamental Polymer Science” (Gedde and Hedenqvist, 2019) offers detailed insights from leading practitioners into experimental methods, simulation and modelling, mechanical and transport properties, processing, and sustainability issues. Separate chapters are devoted to thermal analysis, microscopy, spectroscopy, scattering methods, and chromatography. Special problems and pitfalls related to the study of polymers are addressed. Careful editing for consistency and cross-referencing among the chapters, high-quality graphics, worked-out examples, and numerous references to the specialist literature make “Applied Polymer Science” an essential reference for advanced students and practicing chemists, physicists, and engineers who want to solve problems with the use of polymeric materials.*

*Offers a comprehensive overview of membrane science and technology from a single source Written by a renowned author with more than 40 years’ experience in membrane science and technology, and polymer*

*science Covers all major current applications of membrane technology in two definitive volumes Includes academic analyses, applications and practical problems for each existing membrane technology Includes novel applications such as membrane reactors, hybrid systems and optical resolution as well as membrane fuel cells Principles of Polymer Science and Technology in Cosmetics and Personal Care*

*Integration of Fundamental Polymer Science and Technology—2*

*Proceedings of 4th Edition of International Conference on POLYMER SCIENCE AND TECHNOLOGY 2018*

*Encyclopedia of Polymer Science and Technology, Concise*

*Structural Studies of Polymers by Solution Nmr*

**The compact, affordable reference, revised and updated The Encyclopedia of Polymer Science and Technology, Concise Third Edition provides the key information from the complete, twelve-volume Mark's Encyclopedia in an affordable, condensed format. Completely revised and updated, this user-friendly desk reference offers quick access to all areas of polymer science, including important advances in nanotechnology, imaging and analytical techniques, controlled polymer architecture, biomimetics, and more, all in one volume. Like the twelve-volume full edition, the Encyclopedia of Polymer Science and**

**Technology, Concise Third Edition provides both SI and common units, carefully selected key references for each article, and hundreds of tables, charts, figures, and graphs.**

**This valuable book helps readers -- primarily in chemical engineering, materials science, and chemistry -- master the fundamentals of polymer science and engineering and keep up to date on the latest materials and their technological applications. In addition to its basic coverage of synthetic polymer chemistry, the book also covers the properties of polymers in various states (solution, melt, rubber, and solid) ... a survey of the important categories of plastics ... basic polymer processing principles ... the latest polymer applications in the medical, biotechnology, electronics, and chemical industries ... and more. An ideal reference for engineers and chemists working in research and development in synthetics and plastics and chemical process industries.**

**This book summarizes the latest knowledge in the science and technology of ionic liquids and polymers in different areas. Ionic liquids (IL) are actively being investigated in polymer science and technology for a number of different applications. In the first part of the book**

**the authors present the particular properties of ionic liquids as speciality solvents. The state-of-the art in the use of ionic liquids in polymer synthesis and modification reactions including polymer recycling is outlined. The second part focuses on the use of ionic liquids as speciality additives such as plasticizers or antistatic agents. The third part examines the use of ionic liquids in the design of functional polymers (usually called polymeric ionic liquids (PIL) or poly(ionic liquids)). Many important applications in diverse scientific and industrial areas rely on these polymers, like polymer electrolytes in electrochemical devices, building blocks in materials science, nanocomposites, gas membranes, innovative anion sensitive materials, smart surfaces, and a countless set range of emerging applications in different fields such as energy, optoelectronics, analytical chemistry, biotechnology, nanomedicine or catalysis. Now in its second edition, this widely used text provides a unique presentation of today's polymer science. It is both comprehensive and readable. The authors are leading educators in this field with extensive background in industrial and academic polymer research. The text starts with a description of the types of**

**microstructures found in polymer**  
**Fundamentals of Polymer Science and**  
**Technology Solutions Manual**  
**Experimental Methods in Polymer Science**  
**Plastics, Rubbers, Blends and Composites**  
**European Plastics & Rubber Directory.**  
**Integration of Fundamental Polymer Science**  
**and Technology**

*'Integration of Fundamental Polymer Science and Technology' is a theme that admits of countless variations. It is admirably exemplified by the scientific work of R. Koningsveld and C. G. Vonk, in whose honour this meeting was organized. The interplay between 'pure' and 'applied' is of course not confined to any particular subdiscipline of chemistry or physics (witness the name IUPAC and IUPAP) but is perhaps rarely so intimate and inevitable as in the macromolecular area. The historical sequence may vary: when the first synthetic dye was prepared by Perkin, considerable knowledge of the molecular structure was also at hand; but polymeric materials, both natural and synthetic, had achieved a fair practical technology long before their macromolecular character was appreciated or established. Such historical records have sometimes led to differences of opinion as to whether the pure or the applied arm should deserve the first place of honour. The Harvard physiologist Henderson, as quoted in Walter Moore's Physical Chemistry, averred that 'Science owes more to the steam engine than the steam engine owes to Science'. On the other hand, few would dispute the*

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*proposition that nuclear power production could scarcely have preceded the laboratory observations of Hahn and Strassmann on uranium fission. Whatever history may suggest, an effective and continuous working relationship must recognize the essential contributions, if not always the completely smooth meshing, of both extremes.*

*The aim of the Rolduc Polymer Meetings is to stimulate interdisciplinary discussions between academic and industrial polymer scientists and engineers. Experts are invited to review selected topics and to initiate discussions relating to future trends and developments. The general theme of these meetings is 'Integration of Fundamental Polymer Science and Technology'. In order to serve this goal, all participants are accommodated in Rolduc Abbey, a well-preserved medieval monument in Limburg (The Netherlands) to provide an optimum atmosphere for the exchange of ideas. About 350 participants took part in the 4th Rolduc Polymer Meeting, which was held from 23 to 27 April 1989. This volume contains invited and selected contributed papers on topics such as solution properties, chemistry, emulsion polymerization, liquid crystalline polymers, structure/morphology and blends/composites. We are fully aware of the fact that the reader will not find an integrated presentation of lectures in this volume. Unfortunately, it is impossible to put down in writing the atmosphere of this and previous meetings. However, we hope that the reader will be stimulated to present his own views in forthcoming meetings after*

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*reading these proceedings. We wish to thank all contributors to this volume. P.I.L.*

*Successful characterization of polymer systems is one of the most important objectives of today's experimental research of polymers. Considering the tremendous scientific, technological, and economic importance of polymeric materials, not only for today's applications but for the industry of the 21st century, it is impossible to overestimate the usefulness of experimental techniques in this field. Since the chemical, pharmaceutical, medical, and agricultural industries, as well as many others, depend on this progress to an enormous degree, it is critical to be as efficient, precise, and cost-effective in our empirical understanding of the performance of polymer systems as possible. This presupposes our proficiency with, and understanding of, the most widely used experimental methods and techniques. This book is designed to fulfill the requirements of scientists and engineers who wish to be able to carry out experimental research in polymers using modern methods. Each chapter describes the principle of the respective method, as well as the detailed procedures of experiments with examples of actual applications. Thus, readers will be able to apply the concepts as described in the book to their own experiments. Addresses the most important practical techniques for experimental research in the growing field of polymer science The first well-documented presentation of the experimental methods in one consolidated source Covers principles, practical techniques, and actual*

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*examples Can be used as a handbook or lab manual for both students and researchers Presents ideas and methods from an international perspective Techniques addressed in this volume include: Light Scattering Neutron Scattering and X-Ray Scattering Fluorescence Spectroscopy NMR on Polymers Rheology Gel Experiments*

*This completely new Third Edition of the Mark Encyclopedia of Polymer Science and Technology brings the state-of-the-art to the 21st century, with coverage of nanotechnology, new imaging and analytical techniques, new methods of controlled polymer architecture, biomimetics, and more. Whereas earlier editions published one volume at a time, the third edition is being published in 3 Parts of 4 volumes each. Each of these 4-volume Parts is an A-Z selection of the latest in polymer science and technology as published in the updated online edition of the Mark Encyclopedia of Polymer Science and Technology (available at [www.mrw.interscience.wiley.com/epst](http://www.mrw.interscience.wiley.com/epst)). Order the 12 volume set (ISBN 0471275077) now for the best value and receive each of the 4 volume Parts as they publish. The complete list of titles to appear in Part 1 of this new third print edition can be viewed at [www.mrw.interscience.wiley.com/epst](http://www.mrw.interscience.wiley.com/epst) and clicking on "What's New". Check this website often as new articles are added periodically.*

*Macromolecules in solution and Brownian relativity.  
Volume 15*

*International Polymer Science and Technology  
Integration of Fundamental Polymer Science and*

*Technology-4*

*The Fractal Physical Chemistry of Polymer Solutions  
and Melts*

*Polymer Science and Technology*

Chain movement, chain mobility, segmental mobility, segmental dynamics, chain orientation are the primary subjects of this monograph having utmost importance in polymer science and technology, medicine, pharmaceutical, and many other applications.

Keynote and lectures from invited speakers given at the Second Pacific Polymer Conference in Otsu, Japan, are collected in this book. Eminent Polymer Scientists from both academic and industrial fields around the Pacific Basin contributed on the following topics: - Polymer Synthesis and Reactions - Polymer Characterization - Structure-Property-Relationships - High Performance Polymers - Bio-Related Polymers With contributions by H.R. Allcock, R.G. Davidson, T. Inoue, Y.H. Kim, E.A. McCullough, J.E. McGrath, G.F. Meijjs, T. Nishi, Y. Nishida, I. Noda, R.M. Nowak, M. Okamoto, R.E. Prud'homme, J.P. Riggs, D.N. Schulz, D.H. Solomon, J. Sunamoto, M. Takayanagi, a.o.

Volume Four discusses the applications of radiation curing and provides a synopsis of the latest research in coatings; graphic arts; microelectronics; optical fibres; adhesives; 3D machining; membranes and holographic optical elements as well as considering the worldwide trends in the market.

Acyclic Acids: Advances in Research and Application:

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2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Acyclic Acids. The editors have built Acyclic Acids: Advances in Research and Application: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Acyclic Acids in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Acyclic Acids: Advances in Research and Application: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Introduction to Polymer Science and Technology

Answers to Study Questions

Integration of Fundamental Polymer Science and Technology—3

Encyclopedia of Polymer Science and Technology: , v. 5.

Acoustic properties to cyclopentadiene and dicyclopentadiene

Interface Science and Technology

Your search for the perfect polymers textbook ends here - with Polymer Science and Technology. By

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incorporating an innovative approach and consolidating in one volume the fundamentals currently covered piecemeal in several books, this efficient text simplifies the learning of polymer science. The book is divided into three main sections: polymer fundamentals; polymer formation and conversion into useful articles; and polymer properties and applications. Polymer Science and Technology emphasizes the basic, qualitative understanding of the concepts rather than rote memorization or detailed mathematical analysis. Since the book focuses on the ultimate property of the finished product, it minimizes laborious descriptions of experimental procedures used for the characterization of polymers. Instead, the author highlights how the various stages involved in the production of the finished product influence its properties. Well-organized, clear-cut, and user-friendly, Polymer Science and Technology is an outstanding textbook for teaching junior and senior level undergraduates and first year graduate students in an introductory course

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covering the challenging subject of polymers.

This successor to the popular textbook, "Polymer Physics" (Springer, 1999), is the result of a quarter-century of teaching experience as well as critical comments from specialists in the various sub-fields, resulting in better explanations and more complete coverage of key topics. With a new chapter on polymer synthesis, the perspective has been broadened significantly to encompass polymer science rather than "just" polymer physics. Polysaccharides and proteins are included in essentially all chapters, while polyelectrolytes are new to the second edition. Cheap computing power has greatly expanded the role of simulation and modeling in the past two decades, which is reflected in many of the chapters. Additional problems and carefully prepared graphics aid in understanding. Two principles are key to the textbook's appeal: 1) Students learn that, independent of the origin of the polymer, synthetic or native, the same general laws apply, and 2) students should benefit from the book

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without an extensive knowledge of mathematics. Taking the reader from the basics to an advanced level of understanding, the text meets the needs of a wide range of students in chemistry, physics, materials science, biotechnology, and civil engineering, and is suitable for both masters- and doctoral-level students. Praise for the previous edition: ...an excellent book, well written, authoritative, clear and concise, and copiously illustrated with appropriate line drawings, graphs and tables. - Polymer International ...an extremely useful book. It is a pleasure to recommend it to physical chemists and materials scientists, as well as physicists interested in the properties of polymeric materials. - Polymer News This valuable book is ideal for those who wish to get a brief background in polymer science as well as for those who seek a further grounding in the subject. - Colloid Polymer Science The solutions to the exercises are given in the final chapter, making it a well thought-out teaching text. - Polymer Science

The purpose of this 4-volume set is to

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examine some of the applications of lasers in polymer science and technology. Now available for the first time, up-to-date information on this fascinating subject is compiled and presented in compact form. This set focuses on current research and developments in the application of lasers in polymer and biopolymer chemistry. It includes experimental and theoretical details, apparatus, techniques, and applications. This set is a useful source for researchers, students, polymer chemists, and physicists involved in this astonishing field of high technology.

Solution-state NMR spectroscopy is generally regarded as the premier technique to characterise polymer structure. This report provides a timely review of the developments in the NMR of polymers in solution in the past few years. An additional indexed section containing several hundred abstracts from the Polymer Library gives useful references for further reading.

Textbook of Polymer Science  
Applications of Ionic Liquids in

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Polymer Science and Technology

Lasers in Polymer Science and

Technology

Handbook of Polymer Science and

Technology

Journal of Polymer Sciences : Volume 4

The Rolduc Polymer Meetings, of which the contents of this volume represent the third, are already on their way to occupying a unique place in the crowded calendar of symposia on every aspect of polymer science and engineering. They combine manageable meeting size with a theme, 'Integration of Fundamental Polymer Science and Technology', which is often discussed but seldom realized in practice. The technological, or applied, areas of polymers have perhaps received more emphasis historically than those of other allied disciplines. Indeed, various plastic and rubber materials were successful items of commerce long before the macromolecular concept itself was firmly established. The more fundamental aspects of the field were also largely developed in industrial laboratories. The early work of Mark and Meyer at IG Farben, and that of Carrothers and Flory at Du Pont, are good examples of this. The present situation, in which polymers are being applied to more and more demanding end uses, from high performance materials on the one hand to the biomedical and electronics fields on the other, calls for an ever greater understanding

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of the basic scientific principles governing their behavior. It is evident, therefore, that interactions between those engaged in the 'pure' and 'applied' parts of the field must be promoted effectively.

The Rolduc Polymer Meetings contribute significantly to such interactions, not only by interweaving technological and scientific presentations, but also by providing a forum for the participants to discuss problems of mutual interest in all their complexity.

Polymer science has matured into a fully accepted branch of materials science. This means that it can be described as a 'chain of knowledge' (Manfred Gordon), the beads of the chain representing all the topics that have to be studied in depth if the relationship between the structure of the molecules synthesized and the end-use properties of the material they constitute is to be understood. The term chain indicates the connectivity of the beads, i.e. the multidisciplinary approach required to achieve the aim, knowledge, here defined as quantitative understanding of the relationship mentioned above in all its parts. Quite a few conferences are being held at which the disciplinary beads themselves are discussed in detail, and new results within their framework are presented. In this respect, the TUPAC Microsymposia in Prague have made themselves indispensable, to mention one successful example. The bi annual TUPAC Symposia on Macromolecules, on the other hand,

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supply interdisciplinary meeting places, which have the advantage and the disadvantage of a large attendance. Smaller-size conferences of a similar nature can often be found on a national level. The organizers of the young, but already well-appreciated, Rolduc Meetings on the interplay between fundamental science and technology in the polymer field struck an interesting chord' when they realized that focussing on the basic science behind technological problems would serve the purpose of concentration on insight along the chain of knowledge and avoid the surrender to too large a size for the meeting to really be a meeting.

Polymer Science and Technology: Plastics, Rubbers, Blends and Composites, 2/e is a renewed outcome of an endeavour in this direction. This revised edition of a widely acclaimed reference and text has been enhanced to give a balanced coverage of the science and technology of polymers, which lend themselves useful as rubbers, plastics, fibres, adhesives, coating and composites. The book has also been designed to have an interdisciplinary relevance and would be of immense use not only to college and university students in the subject area but also entrepreneurs and professionals in diverse area of industrial activity

Solution Manual for The Elements of Polymer Science and Engineering

Proceedings of the First Pacific Polymer

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Conference Maui, Hawaii, USA, 12-15 December 1989

An Introductory Text, Second Edition

Applications

Radiation Curing in Polymer Science and Technology

Handbook of Fluoropolymer Science and Technology

**The Definitive Guide to Polymer Principles, Properties, Synthesis, Applications, and Simulations** Now fully revised, **Polymer Science and Technology, Third Edition**, systematically reviews the field's current state and emerging advances. Leading polymer specialist Joel R. Fried offers modern coverage of both processing principles and applications in multiple industries, including medicine, biotechnology, chemicals, and electronics. This edition's new and expanded coverage ranges from advanced synthesis to the latest drug delivery applications. New topics include controlled radical polymerization, click chemistry, green chemistry, block copolymers, nanofillers, electrospinning, and more. A brand-new chapter offers extensive guidance for predicting polymer properties, including additional coverage of group correlations, and new discussions of the use of topological indices and neural networks. This is also the first introductory polymer text to fully explain computational polymer science, including molecular dynamics and Monte Carlo

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methods. Simulation concepts are supported with many application examples, ranging from prediction of PVT values to permeability and free volume. Fried thoroughly covers synthetic polymer chemistry; polymer properties in solution and in melt, rubber, and solid states; and all important categories of plastics. This revised edition also adds many new calculations, end-of-chapter problems, and references. In-depth coverage includes Polymer synthesis: step- and chain-growth; bulk, solution, suspension, emulsion, solid-state, and plasma; ionic liquids, and macromers; and genetic engineering Amorphous and crystalline states, transitions, mechanical properties, and solid-state characterization Polymers and the environment: degradation, stability, and more Additives, blends, block copolymers, and composites—including interpenetrating networks, nanocomposites, buckyballs, carbon nanotubes, graphene, and POSS Biopolymers, natural polymers, fibers, thermoplastics, elastomers, and thermosets Engineering and specialty polymers, from polycarbonates to ionic polymers and high-performance fibers Polymer rheology, processing, and modeling Correlations and simulations: group contribution, topological indices, artificial neural networks, molecular dynamics, and Monte Carlo simulations

This Third Edition of the classic, best-selling polymer science textbook surveys theory and practice of all major phases of

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polymer science, engineering, and technology, including polymerization, solution theory, fractionation and molecular-weight measurement, solid-state properties, structure-property relationships, and the preparation, fabrication and properties of commercially-important plastics, fibers, and elastomers.

This book provides an important structural analysis of polymer solutions and melts, using fractal analysis. The book covers the theoretical fundamentals of macromolecules fractal analysis. It then goes on to discuss the fractal physics of polymer solutions and the fractal physics of melts. The intended audience of the book includes specialists in chemistry and physics of polymer synthesis and those in the field of polymers and polymer composites processing.

Chain Mobility and Progress in Medicine, Pharmaceuticals, and Polymer Science and Technology

Practical aspects and applications

Proceedings of the Second Pacific Polymer Conference, Otsu, Japan, November 26-29, 1991

Acyclic Acids: Advances in Research and Application: 2011 Edition

Modern Methods in Polymer Research and Technology