

Book reviews

Advanced polymer chemistry – a problem solving guide

Manas Chanda Marcel Dekker Inc., New York, USA;
2000, ISBN: 0-8247-0257-3

Polymer science has made significant advances in synthesis and application of new materials during the last decades. Novel areas, such as tissue engineering and drug delivery, have added a more biologically oriented group of potential users to the traditionally very interdisciplinary spectrum of polymer chemists and physicists. The intention of this text book is to provide a background in polymer chemistry and its basic principles to those scientists entering the field from various other disciplines. Emphasis is put on mechanism and kinetic aspects of polymer synthesis. Numerous worked out problems and exercises are offered to the interested reader.

The book is divided into a total of ten chapters (852 pages), covering in the first part basic definitions and concepts, chain structure and thermal transitions, polymers in solution, and a detailed discussion of polymer molecular weights. In the second part polymer reactions, such as step growth polymerization, radical chain polymerization, copolymerization, living chain polymerization, coordination addition polymerization and ring-opening polymerization are discussed in detail. Each chapter comprises 50–100 pages, various worked out problems, a short bibliography and a long list of exercises. These exercises require mostly numerical answers and may be also attractive for teaching purposes. A solution manual is available for instructors.

This textbook will be suitable for advanced undergraduate students in polymer sciences looking for an exercise in theoretical aspects of polymer chemistry. It will make a very difficult reading for those scientists who enter the field from more biologically oriented disciplines. For them the numerical problem solving approach can only develop its full beauty when additional reading and/or instruction is provided.

Also the title ‘Advanced’ is somewhat misleading, because recent advances in specialty polymers ranging from polymer liquid crystals, polymers for the electronic industry to synthetic biopolymers are not even mentioned in this textbook. In the chapter on ring-opening polymerizations for instance, one would have expected at least some hints on biodegradable polyesters in an advanced textbook.

From a ‘problem solving guide’, so the sub-title of this textbook, one would expect more guidance in terms of polymer characterization. Why for instance most spectroscopic methods, foremost NMR spectroscopy, have been ignored is

difficult to understand. In general, little insight is provided how the numbers in various exercises were generated and, therefore, problem solving mostly pertains to the theory of polymerization reactions

For those not easily drawn to the joys of mathematics and physical chemistry a word of caution should be added. The authors assumes that the students have accumulated a ‘basic’ knowledge of mathematics, chemistry and physics. While this knowledge may be sufficient to solve some of the simpler problems, an in-depth understanding of polymer physics is required to make profit from the concept of this book. The encyclopaedic character of this book will be helpful to those well-advanced in polymer sciences looking for guidance in solving mechanistic questions. Also those involved in teaching polymer chemistry and physics may find it a useful source for exercises.

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PII: S0939-6411(01)00208-9

Biologically Active Peptides: Design, Synthesis and Utilization

W.V. Williams, D.B. Weiner (editors), Technomic Publishing Co., Inc., Lancaster, Basel, pp. 360, ISBN 0-87762-935-8

The book, belonging to the series ‘Biomedical Applications in Biotechnology’ marks the first in a row addressing the impact of the newest aspects of biotechnology in clinical and experimental medicine. Peptides play a key role in modern biotechnology and the intention of the book is to lead the reader through the successive steps in the development of biologically active peptides, namely design, synthesis, and evaluation.

Each of these three sections contains 4–5 chapters written by experts in the respective fields. Specifically, the first section about structural approaches to peptide design starts with a discussion of structural homologies, molecular modelling and computational chemistry with examples of bioactive peptides that have been developed based on active

site structures. In the second chapter biocomputational simulation of peptide energy minimization and design strategies using minimization and molecular dynamics are explained. The next two chapters outline the available information relating to antibody active sites and the principles of nuclear magnetic resonance spectroscopy as applied to determine peptide structures.

The second section of the book deals with chemical synthetic aspects of peptide production. The four chapters of this section explain in detail synthetic processes including solid-phase synthesis, liquid-phase synthesis strategies and recombinant DNA technologies. Peptide modification like phosphorylation or glycosylation are discussed as well as recent progress in synthesis of more stable peptide analogues or peptidomimetics, which has led to the development of a variety of new drugs including ACE inhibitors or HIV protease inhibitors.

The third section of the book is devoted to the utilization of bioactive peptides: The first examples are synthetic peptide-based vaccines and antiviral agents including anti-HIV compounds as model system. Problems of antigenicity and immunogenicity are explained and examples of peptides as viral antagonists are given. Further examples are peptides as molecular probes of immune responses, structural features of MHC binding peptides and biology

and chemistry of extracellular matrix cell attachment peptides. The final chapter gives an overview about recent developments in the design of peptide analogue inhibitors of proteolytic processes.

The book gives excellent examples for a rational design, synthesis and use of peptide drugs. It is illustrated throughout by b/w images with one coloured table and each chapter is completed by a comprehensive list of secondary literature. Due to the complexity of the development of pharmacologically active peptides it cannot completely cover the field. However, the intention of the editors was rather to highlight specific examples, from which general strategies can be deducted. As such, the book turned out well, although it presupposes some knowledge from the reader in peptide design and chemistry. Despite its relatively high price it can be recommended to those, who want to get deeper insights into peptide drug design.

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PII: S0939-6411(01)00211-9