Nanostructured Materials for Solar Energy Conversion

Tetsuo Soga (ed.)
Elsevier • 2006 • 614 pp
ISBN: 978-0-444-52844-5
$195 / £110 / €165

A wide variety of inorganic and organic materials and device types are covered in this book. It comprehensively deals with the subject from the basics of semiconductor physics through modeling of nanostructured solar cells to conventional and ground-breaking concepts in the solar cell area. Unlike other books, which tend to concentrate on conventional *p-n* junction solar cells, this text focuses on new concepts in the area.

Physical Properties of Crystals

Siegfried Haussühl
Wiley • 2007 • 453 pp
ISBN: 978-3-527-40543-5
$90 / £50 / €75

The subject of crystalline substances is complex and sometimes difficult to understand. This books aims to assist in the comprehension of the diverse range of peculiarities often observed in crystalline compounds. It covers the properties of both two- and three-dimensional crystals and provides practical advice to assist with their measurement.

High T_c Superconductors and Related Transition Metal Oxides

Annette Bussmann-Holder and Hugo Keller (eds.)
Springer • 2007 • 320 pp
ISBN: 978-3-540-71022-6
$199 / £115.50 / €149.95

This book contains special contributions in honor of the 80th birthday of K. Alex Müller, the founder of high temperature (T_c) superconductivity. The main focus of this book is on recent developments in the high-T_c superconductivity area. It includes both experimental and theoretical contributions from eminent researchers in the field.

Expert
Graduate
Undergraduate

The science behind repeating units

There are few books that provide a good introduction to polymer chemistry; this new text aims to do just that for an undergraduate audience and beyond.

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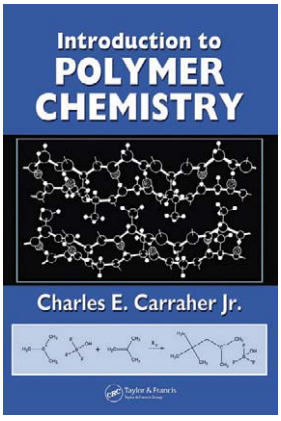
Introduction to Polymer Chemistry aims to fill a perceived gap in the literary canon of polymer science in that it is a textbook aimed primarily at an undergraduate audience. Certainly, polymer science is an important interdisciplinary subject that is often under-represented, if not neglected, in degree courses. For this reason, perhaps, there are relatively few written resources that tackle the subject at a level suitable for such a readership. Throughout the book there is an interesting commentary on the historical contexts and an appropriate level of emphasis placed on the importance and utility of polymeric materials in the modern world, supported by pertinent examples. The author stresses the notion that the work extrapolates the fundamentals taught in other science courses to the world of macromolecules; it is thus an accessible work, and can serve postgraduate students as well as a general science audience.



The book is organized into 16 chapters and offers the broad subject coverage of synthetic and natural polymers that one would expect from a textbook of this nature. Polymer history, structure, synthesis, characterization, modification and technology are all covered extensively in a clear, easy to read format. The depth of coverage is reasonably consistent throughout and keeps the mathematical treatment of certain subjects at a sensible yet still informative level. A summary, glossary, list of exercises in support of the learning objectives, and up-to-date list of further reading appear at the end of each chapter.

Chapters 1-3 provide a clear introduction to the world of macromolecules, setting in place both the historical perspectives, the state-of-the-art (albeit from a somewhat US-centric perspective), polymer structure, and the molecular weight of polymers. The latter introduces the reader to the concept of average molecular weights and a number of methods used to measure molecular weight, including colligative-properties, light scattering analysis, and viscometry.

Chapter 4 is dedicated to the increasingly important field of naturally occurring polymers. This is followed (Chapters 5-7) by a detailed treatment of organic polymers prepared by step-growth and chain-growth polymerizations, the latter including ionic chain reaction and complex coordination polymerizations. Coverage of the kinetics and mechanisms, as well as the properties and uses of the products, is provided.

Organometallic, metalloid, and inorganic polymers are discussed in Chapters 9 and 10. Here, the focus is on synthesis, structure, and properties. Polymers described include polysiloxanes, cements, silicates, and superconductors. Some organic polymers (e.g., graphites and carbon nanotubes) are also included.

The remaining chapters deal with the reactions of polymers (Chapter 11), their spectrometric characterization and testing (Chapters 12 and 13), polymer additives (Chapter 14), the synthesis of reactants and intermediates (Chapter 15), and polymer technology (Chapter 16). As with the rest of the book, the information is presented in a clear, accessible fashion and at an appropriate level.

The book is not without some weaknesses, however. While I found the text clear and easy on the eye, albeit with a few typographical errors, the quality and the formatting consistency of several of the figures could be improved. More seriously, I was distracted by a surprising number of errors that appeared in the chemical structures. While the coverage of the subject matter in *Introduction to Polymer Chemistry* is generally good, it would have benefited from the inclusion of yet more inspirational examples of cutting-edge polymer science in action.

From a teaching and learning perspective, this book is a useful resource and complements other books aimed at an undergraduate/postgraduate audience.

Overall, *Introduction to Polymer Chemistry* hits the mark in terms of its target audience and represents a useful teaching and learning resource for undergraduate courses in polymer chemistry.

Charles E. Carraher Jr.
Introduction to Polymer Chemistry
CRC Press • 2006 • 503 pp • ISBN: 978-0-849-37047-2
$79.95 / £39.99