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Introduction to Molecular Motion in Polymers (Book Review)

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them to interact with each other, and that chirality is an important mode by which molecules orient themselves spatially relative to each other. This property arose from early, simple reaction schemes. In general, the topics are stimulating and exciting, but unfortunately, the book is not easily understandable. Several straightforward remedies would have improved comprehension. These include providing at the beginning a full list of abbreviations commonly used throughout the book (the brief list provided is not sufficient); avoiding the use of identical phrases or sentences several times on the same page (a concluding paragraph would have been better); and using better figures for introducing and illustrating chirality in small molecules. In addition, the text needs clearer descriptions of some of the experimental results (e.g., how cytosine crystals have the cytosine molecules arranged in a helical manner via intermolecular interactions). **Summing Up:** Optional. ★ Upper-division undergraduates and above.—*M. Rossi, Vassar College*

48-6907 QD MARC

Pethrick, Richard A. **Introduction to molecular motion in polymers,** by Richard A. Pethrick, Taweechai Amornsakchai, and Alastair M. North. Whittles Publishing, 2011. 214p bibl index ISBN 1849950083 pbk, $79.95; ISBN 9781849950084 pbk, $79.95

This unique work, focused on polymer physics, is an update to *Molecular Motion in High Polymers* by R. T. Bailey, North, and Pethrick (1981). In the first half of the book, Pethrick (Univ. of Strathclyde, UK), and Amornsakchai and North (both, Mahidol Univ., Thailand) explore the effect of molecular weight and molecular structure on polymer dynamics in a mostly qualitative manner. The authors explain the molecular basis of most thermal transitions in a style suitable for advanced undergraduates. The middle chapters describe the effects of molecular motion on melt behavior in polymer systems; the later chapters are more specialized and look at topics such as diffusion, conductivity, and photophysics. The final chapter outlines techniques used in studying molecular motion. The book addresses most of the practical aspects of polymer chain motion. The prose is clear and easy to follow, and there are sufficient, understandable illustrations. Even readers without a background in polymer physics would benefit, although a basic knowledge of polymer chemistry, organic chemistry, and physics would be helpful for the undergraduate reader. This book could be used as the basis for a short course or as an adjunct to a course in polymer behavior. **Summing Up:** Recommended. ★★ Upper-division undergraduates and graduate students.—*J. H. Glans, Sacred Heart University*

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Photochemistry and photophysics of polymer materials, ed. by Norman S. Allen. Wiley, 2010. 689p bibl index ISBN 0470137967, $149.95; ISBN 9780470137963, $149.95

This work is a very complete review of the latest developments in the photochemistry and photophysics of polymer science, an important field with applications in many areas in science and technology (e.g., computing, printing, electronics, environmental science, agriculture, etc.). Chapter contributors cover a wide range of topics including optics, luminescence, photoinitiators, photovoltaics, and photoimaging processes and phenomena. The book also explores future discoveries and potential applications, and evaluates their significance. In addition, there is excellent coverage of photodegradation and photostabilization techniques, which are so critical to the work of material engineers. All of this content leaves readers with an excellent understanding of the development of polymer photoprocesses, and knowledge of the experts and the literature of the field. The book includes concise reviews of the basic science and underlying mathematics for each topic without overwhelming the reader. Numerous conveniently located, elegant figures and chemical schemes further enhance the presentations. Each chapter includes an excellent listing of references for further exploration. **Summing Up:** Highly recommended. ★★★ Advanced upper-division undergraduates, graduate students, researchers/faculty, polymer chemists, and materials scientists.—*K. Bennett, emeritus, Kalamazoo Valley Community College*

48-6909 QD461 MARC

Tutorials in molecular reaction dynamics, ed. by Mark Brouard and Claire Vallance. Royal Society of Chemistry, 2010. 481p bibl index ISBN 9780854041589, $79.00

Six years ago, R. D. Levine, long recognized as an expert in molecular chemistry, wrote *Molecular Reaction Dynamics* (CH, Sep'05, 43-0328). Here, editors Brouard and Vallance (both, Univ. of Oxford, UK) collect 12 chapters from 25 experts who redefine the field and its future. Defining the chapters as "tutorials" creates a focused purpose to them—an excellent idea. Relevant "asides" are packaged as "Study Boxes." Each tutorial/chapter ends with a few insightful problems (which often rely on information from "Study Boxes" to complete). Example boxes and an occasional worked-out problem are strategically placed and useful, and each chapter ends with a well-conceived "Conclusion and Outlook" section. The collection introduces readers to some of the basic instrumentation and concepts associated with studies of molecular collisions that may or may not lead to reactions at the most fundamental level. Compared to Levine's 2005 work, this book helps readers clearly see the evolution of the field, as concepts such as RRKM theory give way to more sophisticated approaches and new methods such as femtochemistry and ultracold collisions evolve. Though some topics may be too specialized for a generalized overview, the balance between fundamentals and new directions, and theory and experiment, is, overall, excellent. **Summing Up:** Highly recommended. ★★★ Graduate students and above.—*J. Allison, The College of New Jersey*

Earth Science

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Cuif, Jean-Pierre. **Biominerals and fossils through time,** by Jean-Pierre Cuif, Yannicke Dauphin, and James E. Sorauf. Cambridge, 2011. 490p bibl indexes ISBN 0521874734, $115.00; ISBN 9780521874731, $115.00

Biominerals (minerals produced by organisms) have been increasing in scientific value during the last two decades as the techniques for examining and analyzing them have improved exponentially. Mineralized shells, bones, and other structures in life can record in exquisite detail the surrounding environmental conditions during their growth, usually through incorporated stable isotopes and subtle changes in crystal structures. Understanding these patterns, though, depends on knowledge of biomineralization and the "vital effects" of the many mineralizing species. This is no small task, considering that there are over 60 biominerals known, with countless structural and compositional varieties. This is the most comprehensive book to date on biomineralization and fossils. Cuif (Paris South Univ., France), Dauphin (Univ. of Paris VI, France), and Sorauf (Binghamton Univ. SUNY) cover the history of the topic as well as the latest observations, hypotheses, case studies, and