Principles of Polymerization, *4th Edition*

George Odian
(John Wiley & Sons, 2004)
812 pages; $98.50
ISBN 0-471-27400-3

Principles of Polymerization has long been one of the most popular textbooks for undergraduate and graduate courses in polymer science. The strength of this textbook is its thorough kinetic analysis of various polymerization methods. Classical topics such as polymerization kinetics, molecular weight control, polydispersity, branching, and cross-linking are discussed in detail. It may be difficult, however, for a student without any chemistry background to read this very comprehensive book. Chemists, chemical engineers, and material scientists who want to know more about the chemistry and structural control of polymers would find extensive information in this book; however, it may be dissatisfying for readers looking for characterizations of polymers, mechanical properties of polymers, or polymer physics.

The fourth edition has a layout identical to previous editions, with chapters on step polymerization, radical chain polymerization, emulsion polymerization, ionic chain polymerization, chain copolymerization, ring-opening polymerization, stereochemistry of polymerization, and reactions of polymers. The effects of reaction parameters on the molecular weight, molecular weight distribution, and structure of the resulting polymer in the three types of polymerizations; step polymerization; addition polymerization; and ring-opening polymerization are the main focus of the discussion. The applications of these polymerizations to make copolymers, liquid-crystalline polymers, high-performance polymers, and stereospecific polymers are also topics of interests in the book. Problem sets at the end of each chapter cover the important concepts discussed in the book and provide a self-examination opportunity for students.

Since the publication of the third edition in 1991, significant progress has been made in living radical polymerization, metathesis, and dendrimer synthesis. Newly added or expanded coverage on these topics is a noticeable improvement in this new edition. I had hoped to find more profound information on conjugated polymer synthesis as well in this new edition, even though brief information on conjugated polymers has been included since the third edition. Conjugated polymers have become very important active materials in electroluminescence devices, optical transducers, field-effect transistors, plastic lasers, and chemical sensors. Therefore, palladium chemistry used to prepare conjugated polymers such as Suzuki coupling, Sonogashira coupling, and Heck coupling, would be an area of interest for many chemists, chemical engineers, and materials scientists.

Reviewer: *Jinsang Kim is an assistant professor of materials science and engineering, chemical engineering, macromolecular science engineering, and biomedical engineering at the University of Michigan in Ann Arbor. Kim's research group uses various polymerization methods in developing conjugated polymers, block copolymers, and hybrid polymers for smart polymeric device fabrication.*

Superplasticity: Microstructural Refinement and Superplastic Roll Forming

Oscar A. Kaibyshev and Farid Z. Utyashev
(Futurepast, ISTC Science & Technology Series, 2005)
386 pages; $165.00
ISBN 0–9710464–2-5

The book is an excellent resource on various aspects of superplastic deformation. In the early chapters, the authors explain the phenomena of superplasticity and the different methods of materials forming based on microstructural requirements. Key attention has been paid to that of commercial alloys. The second part consists of chapters dedicated to the structural refinement of various metals and alloys, and this section is particularly useful to graduate students specializing in this field. Important emphasis in this part has been paid to microcrystalline

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materials, especially the different methods of achieving them. A few chapters devoted to scaleup as it relates to large-scale billets are very refreshing and useful.

Part 3 is especially useful for the practicing engineer, as it relates to the shaping of parts in the superplastic state. The authors have gone into substantial detail in this chapter, extensively covering both the geometry of parts, their complexity, and methodologies and processes for superplastic deformation. There is ample mathematical treatment of the processes without making it very complicated. In addition, practical information about the various industrial equipment is also excellent. In keeping with the practical theme, the final chapter takes the economics and efficiency of superplastic deformation into consideration. This chapter is especially useful for people contemplating, or in, production since it brings the whole subject matter of superplastic deformation into the "real world."

Throughout the book, the use of clear figures and tables, and the generous use of data, makes the book easy to follow and puts all the information into proper perspective. A special mention should be made of the delightful treatment of former Soviet research and metallurgical practices to share with others in the rest of the world.

To conclude, the book provides considerable details of superplastic deformation and is written in a very concise, informative manner. The topics covered are wonderfully illustrated with graphs, photomicrographs, and tables.

Reviewer: *Sudhi Sant is president and founder of Twin Technologies Inc., Garden Grove, California, and has more than 16 years of materials science and metallurgical engineering experience covering a range of processes, materials, and applications.*

The following recently published books, relevant to materials research, have come to *MRS Bulletin's* attention. Some of the books listed here may be reviewed in future issues of *MRS Bulletin*. To review a book from the list or to offer recommendations of additional books, contact K. Wilson, Editorial Assistant, *MRS Bulletin*, 506 Keystone Drive, Warrendale, PA 15086-7573, USA; e-mail bulletin@mrs.org.

Applications of Materials

Adhesion: Current Research and Applications, Wulff Possart, John Wiley & Sons, 2005, 608 pp., $210.00, ISBN 3-527-31263-3.

Emulsions, Foams, and Suspensions: Fundamentals and Applications, Laurier L. Schramm, John Wiley & Sons, 2005, 464 pp., $320.00, ISBN 3-527-30743-5.

Modelling of Cathodic Protection Systems, R.A. Adey, Editor, WIT Press, 2005, 272 pp., $145.00, ISBN 1-85312-889-9.

Nanotribology in Nanomechanics: An Introduction, Bharat Bhushan, Editor, Springer, 2005, 1148 pp., $99.00, ISBN 3-540-24267-8.

Photonic Crystals: Towards Nanoscale Photonic Devices, J.-M. Lourtioz, H. Benisty, V. Berger, J.-M. Gerard, D. Maystre, and A. Tchelnokov, Springer, 2005, 430 pp., $99.00, ISBN 3-540-24431-X.

Surfactant Science and Technology, *3rd Edition*, Drew Myers, John Wiley & Sons, 2005 380 pp., $115.00, ISBN 0-471-68024-9.

Thermoelectrics Handbook: Macro to Nano, David Michael Rowe, Editor, CRC Press, 2005, 1008 pp., $149.95, ISBN 0-8493-2264-2.

Thin Films and Heterostructures for Oxide Electronics, Satisshchandra B. Ogale, Editor, Springer, 2005, 419 pp., $149.00, ISBN 0-387-25802-7.

Biomaterials

Activated Carbon Adsorption, Roop Chand Bansal, CRC Press, 2005, 520 pp., $189.95, ISBN 0-8247-5344-5.

Chemical and Biological Kinetics: New Horizons (Biological Kinetics, *Vol. 2*), E.B. Burlakova and S.D. Varfolomeev, Editors, Brill Academic Publishers, 2005, 500 pp., $203.00, ISBN 90-3764-4315.

Experimental Techniques

Adhesion Measurement Methods: Theory and Practice, Robert Lacombe, CRC Press, 2005, 456 pp., $139.95, ISBN 0-8247-5361-5.

Characterization of Bulk Solids, D. McGlinchey, Editor, CRC Press, 2005, 150 pp., $149.95, ISBN 1-4051-1624-2.

Lifetime Spectroscopy: A Method of Defect Characterization in Silicon for Photovoltaic Applications (Springer Series in Materials Science, *Vol. 85*), Stefan Rein, Springer, 2005, 489 pp., $179.00, ISBN 3-540-25303-3.

Modern Luminescence Spectroscopy of Minerals and Materials, Michael Gaft, Renata Reisfeld, and Gerard Panczer, Springer, 2005, 356 pp., $129.00, ISBN 3-540-21918-8.

Physical Principles of Electron Microscopy: An Introduction to TEM, SEM, and AEM, Ray F. Egerton, Springer, 2005, 202 pp., $69.95, ISBN 0-387-25800-0.

History, Biography, and Unclassified

The Art of Belonging: A Memoir, Robert Wolfgang Cahn, The Book Guild Ltd., 2005, $40.00, ISBN 1-85776-993-7.

Dazzle 'em with Style: The Art of Oral Scientific Presentation, Robert R.H. Anholt, Elsevier, 2005, 192 pp., $29.95, ISBN 0-12-369452-3.

Dictionary of Microscopy, Julian P. Heath, John Wiley & Sons, 2005, $49.95, 358 pp., ISBN 0-470-01199-8.

The Science of Complex Alloy Phases, P. Turchi and T. Massalski, Editors, TMS, 2005, $179.00, 544 pp., ISBN 0-87339-593-X.

The Selected Works of John W. Cahn, W. Craig Carter and William C. Johnson, Editors, TMS, 2005, $125.00, 559 pp., ISBN 0-87339-416-X.

Inorganic Chemistry, Electrochemistry, Other Chemistry, and Ceramics

Carbon Fiber: Manufacture and Applications, Vincent Kelly, Elsevier, 2005, 512 pp., $225.00, ISBN 1-85617-430-1.

Dictionary of Gems and Gemology, *2nd Extended and Revised Edition*, Mohsen Manutchehr-Danai, Springer, 2005, 879 pp., $259.00, ISBN 3-540-23970-7.

Encyclopedia of Inorganic Chemistry, *2nd Edition (10 Volume Set)*, R. Bruce King, Editor, John Wiley & Sons, 2005, 6696 pp., $4,765.00, ISBN 0-470-86078-2.

Low Thermal Expansion Glass Ceramics, Hans Bach and Dieter Krause, Editors, Springer, 2005, 248 pp., $179.00, ISBN 3-540-24111-6.

Metal Matrix Composites, Nikhilesh Chawla, Springer, 2005, 401 pp., $99.00, ISBN 0-387-23306-7.

Micro- and Mesoporous Mineral Phases (Reviews in Mineralogy and Geochemistry, *Vol. 57*), Giovanni Ferraris and Stefano Merlino, Editors, Mineralogical Society of America, 2005, 450 pp., $40.00, ISBN 093995069-3.

Materials Processing

Computational Plasticity in Powder Forming Processes, Amir Khoei, Elsevier, 2005, $193.00, ISBN 0-08-044636-1.

An Introduction to Electrospinning and Nanofibers, Seeram Ramakrishna, Kazutoshi Fujihara, Wee-Eong Teo, Teik-Cheng Lim, and Zuwei Ma, World Scientific, 2005, 396 pp., $86.00, ISBN 981-256-415-2.

An Introduction to Nuclear Waste Immobilisation, M.I. Ojovan and W.E. Lee, Elsevier, 2005, 250 pp., $165.00, ISBN 0-08-044462-8.

Nanoparticle Assemblies and Superstructures, Nicholas Kotov, CRC Press, 2005, 648 pp., $199.95, ISBN 0824725247.

Metallurgy

A–Z of Powder Metallurgy, Randall German, Elsevier, 2005, 288 pp., $175.00, ISBN 1-85617-429-8.

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Advances in Fatigue, Fracture, and Damage Assessment of Materials, A. Varvani-Farahani, WIT Press, 2005, 520 pp., $290.00, ISBN 1-85312-836-8.

Analytical Characterization of Aluminum, Steel, and Superalloys, D. Scott Mackenzie and George E. Totten, CRC Press, 2005, 768 pp., $159.95, ISBN 0-8247-5843-9.

Engineering Materials 2: An Introduction to Microstructures, Processing and Design, *3rd Edition*, Michael Ashby and David R.H. Jones, Elsevier, 2005, 352 pp., $49.95, ISBN 0-7506-6381-2.

Handbook of Powders of Non-Ferrous Metals, O.D. Neikov, S.S. Naboychenko, I.B. Murashova, V.G. Gopienko, I.V. Frishberg, and D.V. Lotsko, Elsevier, 2005, 576 pp., $230.00, ISBN 1-85617-422-0.

Light Alloys: From Traditional Alloys to Nanocrystals, Ian Polmear, Elsevier, 2005, 416 pp., $89.95, ISBN 0-7506-6371-5.

Physics and Electronics

Frontiers in Magnetic Materials, Anant V. Narlikar, Editor, Springer, 2005, 800 pp., $299.00, ISBN 3-540-24512-X.

Frontiers in Superconducting Materials, Anant V. Narlikar, Editor, Springer, 2005, 1104 pp., $389.00, ISBN 3-540-24513-8.

Graded Ferroelectronics, Transpacitors and Transponents, Joseph V. Mantese and S. Pamir Alpay, Springer, 2005, 158 pp., $139.00, ISBN 0-387-23311-3.

Spectroscopic Properties of Rare Earths in Optical Materials (Springer Series in Materials Science, *Vol. 83*), Guokui Liu and Bernard Jacquier, Editors, Springer, 2005, 550 pp., $179.00, ISBN 3-540-23886-7.

Surface Effects in Magnetic Nanoparticles, D. Fiorani, Editor, Springer, 2005, 300 pp., $99.00, ISBN 0-387-23279-6.

Thermal Conductivity: Theory, Properties, and Applications, Terry M. Tritt, Editor, 2004, 290 pp., $129.00, ISBN 0-306-48327-0.

Polymer Chemistry

Macromolecules Containing Metal and Metal-Like Elements, *Vol. 6:* Transition Metal-Containing Polymers, Alaa S. Abd-El-Aziz, Charles E. Carraher Jr., Charles U. Pittman Jr., and Martel Zeldin, John Wiley & Sons, 2005, 219 pp., $150.00, ISBN 0-471-68445-7.

Macromolecules Containing Metal and Metal-Like Elements, *Vol. 7:* Nanoscale Interactions of Metal-Containing Polymers, Alaa S. Abd-El-Aziz, Charles E. Carraher Jr., Charles U. Pittman Jr., and Martel Zeldin, John Wiley & Sons, 2005, 256 pp., $150.00, ISBN 0-471-68440-6.

Mechanical Properties of Polymers Based on Nanostructure and Morphology, G.H. Michler and F.J. Balta-Calleja, Editors, CRC Press, 2005, 784 pp., $169.95, ISBN 1-57444-771-8.

Plastics for Corrosion Inhibition (Springer Series in Materials Science, *Vol. 82*), V.A. Goldade, L.S. Pinchuk, A.V. Makarevich, and V.N. Kestelman, Springer, 2005, 383 pp., $149.00, ISBN 3-540-23849-2.

PVC Handbook, Charles E. Wilkes, James Summers, and Charles Daniels, Editors, Hanser Gardner, 2005, 723 pp., $199.95, ISBN 1-56990-379-4.

Supramolecular Polymers, *2nd Edition*, Alberto Ciferri, Editor, CRC Press, 2005, 776 pp., $139.95, ISBN 0-8247-2331-7.

Structure of Materials

Discovering the Nanoscale (*2nd Printing*), D. Baird, A. Nordmann, and J. Schummer, IOS Press, 2004, 332 pp., $147.00, ISBN 1-58603-467-7.

First-Principles Calculations in Real-Space Formalism: Electronic Configurations and Transport Properties of Nanostructures, Kikuji Hirose, Tomoya Ono, Yoshitaka Fukimoto, and Shigeru Tsukamoto, World Scientific, 2005, 264 pp., $68.00, ISBN 1-86094-512-0.

Handbook of Materials Modeling, Sidney Yip, Editor, Springer, 2005, 2965 pp., $999.00, ISBN 1-4020-3287-0.

Kinetics, Transport, and Structure in Hard and Soft Materials, Peter F. Green, CRC Press, 2005, 376 pp., $159.95, ISBN 1-57444-768-8.

Material Architecture, John Fernandez, Elsevier, 2005, 288 pp., $49.95, ISBN 0-7506-6497-5.

Molecular Modeling Techniques in Material Sciences, Jörg-Rudiger Hill, Lalitha Subramanian, and Amitesh Maiti, CRC Press, 2005, 328 pp., $119.95, ISBN 0-8247-2419-4.

Principles of Nanotechnology: Molecular-Based Study of Condensed Matter in Small Systems, G. Ali Mansoori, World Scientific, 2005, 360 pp., $86.00, ISBN 981-256-205-2.

Structural Materials, C.J. McMahon Jr., Enfield, 2005, 480 pp., $80.00, ISBN 0-9646598-5-9. □

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