

H. Dautzenberg, W. Jaeger, J. Kötz, B. Philipp, Ch. Seidel, D. Stscherbina: Polyelectrolytes, Formation, Characterization and Application. 360 pages, 116 figures, 37 tables, 930 references. Hanser Publishers, Munich, Vienna, New York (1994) Hardcover DM 168,-/Sfr 167,-/ÖS 1311,-/£ 75,- (ISBN 3-446-17127-4)

Polyelectrolytes play an important role in many branches of modern technology, they are indispensable in solving environmental and soil problems. In spite of scientific challenge and practical relevance of polyelectrolytes the number of up-to-date textbooks and monographs available is small. Recent developments of polyelectrolyte synthesis and application are mostly published in special journals or monographs of the industrial branch concerned.

The textbook deals with the chemistry, physics and application of these polymers, centered on water-soluble electrolytes. After a definition and general description of polyelectrolytes the following chapter describes the synthesis of these polymers by free-radical, ionic, stepwise polymerisation and by polyaddition, polycondensation or by chemical modification of synthetic polymers. Polyelectrolyte models and theoretical predictions, electrochemical and spectroscopic characterisation of PEL, characterisation of macromolecular parameters in PEL-solutions, structure formation in PEL-systems, followed by application of PEL. The last chapter gives general conclusions from the present state of knowledge and challenges for further experimental and theoretical studies.

The book is primarily intended for graduates of chemistry, biochemistry, physics, chemical engineering and postgraduates in these areas of science. It will be very useful to scientists and engineers active in polymer production and processing as well as professionals in the environmental and life science.

H. Domininghaus (Dreieich)

Martin Poke (ed): Process Control Engineering. 475 pages, 455 figures, 14 tables, 813 references. VCH Verlag Chemie, Weinheim, New York, Basel, Cambridge, Tokyo, 1994. Hardcover DM 159,-/£ 64,- (ISBN 3-527-28689-6)

Besides the classical production factors—energy, labor, raw materials and proven production technology information—has become not just an additional factor but probably the most important one. CIM and CIP are not merely slogans today. Demands by

society, environmental awareness, better and more consistent quality, improved delivery and more economical management necessitate production facilities and processes with greater flexibility and ease of operation.

Since the fifties a number of events have convinced the management that classical or signal-oriented measurement and control technology is being supplanted by information-oriented process control engineering.

Thus the time has come for presenting an integrated, information-oriented comprehensive exposition of the whole subject. The introductory chapter is followed by chapters on information structures in process control engineering, knowledge about the processes, from process knowledge to process control, the systems and its elements (process sensors and actuator systems), control system and its elements (information logistics), the computer aided systems, design and construction of process control systems, operation, standards, committees and associations, integration of knowledge-based systems in process control engineering followed by an appendix with glossary abbreviations and references.

The book is intended for process control engineers as well as interested nonspecialists. It will be helpful in identifying individual tasks and organizing them into a coherent whole.

H. Domininghaus (Dreieich)

* Information

Beier, Ernst: "Umweltlexikon für Ingenieure und Techniker" (Environmental Encyclopedia for Engineers and Technicians) 392 pages, 80 figures 64 tables. VCH Verlagsgesellschaft, Weinheim, New York, Basel, Cambridge, Tokyo 1994. Hardcover DM 135,- (ISBN 3-527-28654-3)

This book is an environmental encyclopedia for engineers and technicians as well as interested nonspecialists that are either engaged or interested in this special field of modern technology becoming more and more important to everybody. It contains a comprehensive basic vocabulary covering terms used in all fields of interest concerning the environment whether it be materials, air, water, soil and waste, environmental chemistry, decrees concerning environment and its protection. All terms and circumstances are covered by making sparing use of specialists terminology but are very often explained by means of examples. All terms are expressed so that the reader who originally was interested in the explication of one word only is stimulated to leaf through the book and to dwell on many points. Most of the presented

statistics have been brought up-to-date until the very last day of delivery of the manuscript. Thus the reader is able to evaluate the trends.

The book is also of interest of students engaged in getting familiar with environmental problems as well to all people interested in this actual subject.

H. Domininghaus (Dreieich)

M. Gerlach, and E.C. Constable: Transition Metal Chemistry (The Valence Shell in d-Block Chemistry) 211 pages, 78 figures, 19 tables 38 references VCH Verlagsgesellschaft Weinheim, New York, Basel, Cambridge, Tokyo, 1994. Softcover DM 58,-/ ÖS 452,-/ Sfr 56,-. (ISBN 3-527-29219-5)

Transition metals comprise roughly half of the periodic table of elements. Their known chemistry occupies a large fraction of noncarbon research literature. A central theme in the approach of this book is to focus on the changing chemistry, associated with higher, middle and lower oxidation state compounds. The chemical stability of radical species and open-shell Werner type complexes as well as the governance of the 18-electron rule are presented as consequences of the changing nature of the valence shell in transition-metal species of different oxidation state.

Here some of topics of the book: Introduction to transition-metal chemistry, focus on the d"-configuration, crystal-field splittings, intensities of 'd-d' spectra, spin and magnetism, ligand fields, bonding and the valence shell, steric effects, of open d-shells, complex stability and energetics, chemical consequences of the d-electron configuration and the lanthanoid series.

This book is an eminently readable introduction to the structure of transition metal chemistry. Additional details and special topics are discussed in boxes sections within the text.

This book will be invaluable to students and instructors alike for its non-mathematical, yet thoughtful, account of key concepts and as a source of explanations and references to sources of further information.

H. Domininghaus (Dreieich)

H. Streitwieser, C.H. Heathcock, E.M. Kosower: Organische Chemie, 2. Auflage (Organic Chemistry, 2nd ed.), 1374 pages, 363 figures (12 in colour), 117 tables, VCH Verlagsgesellschaft Weinheim, New York,

Basel, Cambridge, Tokyo, 1994. Hardcover DM 128,- (ISBN 3-527-29005-2).

Chemical engineers, chemists and last but by no means least the students of organic chemistry have to thank the publisher VCH for having published the second German edition of "Organische Chemie" based on the fourth English language edition (published by Macmillan Publishing Company). This book presents the very comprehensive field of organic chemistry in 36 chapters all enriched by numerous figures, tables and explanations. The essentials of each section are condensed and presented in separate boxes. Besides this each section is completed by corresponding questions that have to be answered for better remembering.

Here some of the topics dealt with:

Electron structure and bonds; structure of organic compounds; organic reactions; alkanes; reactions of alkanes; stereoisomers; alkylhalogenids and organo-metal compounds; nucleophilic substitution; alcohols and ethers; alkanes; alkynes and nitriles; nuclear-magnetic resonance spectroscopy; aldehydes and ketones, enols, organic syntheses; IR-spectroscopy; carbonic acids, derivatives of carbonic acids; conjugation; benzene and the aromatic ring; orbital molecule theory; electrophilic aromatic substitution; amines, other nitrogen compounds; sulfur, phosphor and silicon compounds; hydrocarbons, amino acids, peptide and proteins; aromatic halogenides, phenols, phenolethers and chinones, polycyclic aromatic hydrocarbons, heterocyclic compounds, molecular identification: nuclear acids and some biological catalysts, mass spectroscopy, chemical literature, special fields such as: organometal compounds of transition metals; organic dye stuffs; photochemistry; polymer-chemistry; natural substances such as: terpenes, steroids and alkaloids.

The appendix contains tables on: reaction enthalpies, bond dissociation energies, average bond energies, constants of acid dissociation; chemical translations of protons, infrared spectrum, symbols and abbreviations; survey of the presentation of functional groups.

H. Domininghaus (Dreieich)

Claus Bliefert: Umweltchemie (Environmental Chemistry) 453 pages, 183 figures, 178 tables, 385 references, VSH Verlagsgesellschaft Weinheim, New York, Basel, Cambridge, Tokyo, 1994. Softcover DM 68,- / ÖS 530,- / Sfr 60, (ISBN 3-527-20692-6)

This book is based on lectures on environmental chemistry given at the advanced technical colleges of Muenster. It's the aim of the author to give a precise survey on the earth – its origin and the actual state – on

the areas: air, water and soil as well as the danger of materials relevant to environment, and on waste. All facts are backed up by actual data.

The survey on environment is divided into five main chapters: Environment and materials (I), air (II), water (III), soil (IV) and waste (V). Here some of the main topics of each part:

Part I: Environmental chemistry, origin and structure of the earth, materials of the environment, protection of the environment, decrees concerning environment, chemicals and dangerous materials.

Part II: Atmosphere of the earth, carbon dioxide, carbonmonoxide, sulfure compounds, nitrogee oxides, volatile organic compounds, ozone in the stratosphere, aerosols, decrees concerning protection against emissions.

Part III: Water, its fundamentals, hydrological cycle and contamination, special pollutions, water extraction and waste water cleaning, water pollution control.

Part IV: Soil: Fundamentals, contamination, heavy metals, burden of the past, soil conservation decrees.

Part V: Waste: General survey, disposal of household waste, recycling, special wastes.

Each chapter contains a selection of the respective literature.

This book is an invaluable help to chemists, physicists and engineers engaged in this more and more significant field; it does not deal with the technological solutions of environmental problems.

H. Domininghaus (Dreieich)

Richard D. Gilbert (ed.): Cellulosic Polymers, Blends and Composites. 256 pages, 103 figures, 40 tables, 682 references. Hanser Publishers, Munich, Vienna, New York (1994). Hardcover DM 98,- Sfr 100, 10 / ÖS 765,- US \$ 59,60 / £ 39,-. (ISBN 3-446-16521-5)

In spite of the development of an enormous variety of synthetic polymers, usage of renewable, natural resource based cellulose and its derivatives such as fibers, films, engineering plastics, coatings, paper, wood products, composites and suspension agents continues to grow on a worldwide basis. Besides their well-known importance polysaccharides are attracting our attention as abundant marine biomass, as substances with bioactivities or medical functions in living bodies. Artificially synthesized polysaccharides were found to have anti-HIV activities. Thus polysaccharide science has become more significant in terms of both ecological and functional points of view in material and biological science.

Following the Cellucon '89 conference covering a multitude of developments in cel-

lulose and the derivatives R.D. Gilbert published the papers of twenty-one authors, each an authority in their particular aspect of cellulose chemistry.

Here some of the main topics: allomorphs of cellulose and other polysaccharides, lyotropic cellulose liquid crystals, thermotropic cellulose derivatives, polymer solvent interactions in liquid crystalline cellulose derivative systems, hyperfine composites of cellulose with synthetic polymers, lignocellulosic composites, derivatization of wood in composites, applications and limitations of LiCl/N,N-Dimethylacetamide in the homogeneous derivatization of cellulose, water-soluble cellulose derivatives and their commercial use, recent advances in cellulose membranes, applications of bacterial cellulose triacetate: a material for separating chiral isomers and finally bacterial cellulose composites.

The book is an indispensable resource for chemists, physicists, chemical physicists and graduate students in research and development of cellulose products and their applications.

H. Domininghaus (Dreieich)

Glenn V. Gordon and Montgomery T. Shaw (eds.): Computer Programm for Rheologists. 344 pages, 81 figures, 23 tables, 235 references. Hanser Publishers, Munich, Vienna, New York 1994. Hardcover DM 148,- / US \$ 89,- / £ 60,- / Sfr 147,- / ÖS 1.155,- (ISBN 3-446-16290-9)

While the theoretical assumptions behind the rheological procedures are made quite clear in the more comprehensive textbooks the numerical and statistical aspects are often neglected. The purpose of this book is to provide the practicing rheologist with computer algorithms for performing these common computational tasks, but with due attention to the statistical aspects of the analysis. The suitability of any empirical model is determined and errors in the fitted parameters are calculated. Illustrative examples are provided to test the algorithms and serve as guides in the execution of the programs. The programs presented here conform to the American National Standard Institute Standard X 3.9 – 1978 and were compiled in Microsoft[®] Fortran (Version 5.1) in a PC-DOS environment with the floating point option.

Here some of the main topics dealt with: tensile stress analysis, tensile modulus of elastomers: constant-force method, physical relaxation in elastomers, molecular weight distribution from the viscosity function, superposition of linear properties, squeeze-flow analysis, parallel-plate torsional flow, capillary data analysis, modeling the viscosity function, predicting stresses with non-

linear integral models and appendix A: program dependencies, B: subprogram listings.

H. Domininghaus (Dreieich)

Vincent B. F. Mathot (ed.): Calorimetry and Thermal Analysis of Polymers. 368 pages, 223 figures, 14 tables, 775 references. Hanser Publishers Munich, Vienna, New York, 1994. Hardcover DM 148,- / Sfr, 147,- / ÖS 1155,- / US\$ 88,- / £ 59,- (ISBN B-446-17511-3)

Growing interest in materials development and the increased availability of commercial equipment are the main reasons for the increasing number of analysis professionals and users. In particular the study of the thermal properties of polymers by differential thermoanalysis (DTA) and more specifically by differential scanning calorimetry (DSC) has become widespread. Variable scanning rate, careful tuning and perfected methods improve the accuracy of the results. The peripheral equipment for computerization of the measuring process is available, resulting in expanded possibilities of control and data manipulation.

Here some of the topics of the book: thermodynamics, calorimetric methods, fundamentals of DSC and DTA, DSC on polymers: Experimental conditions, thermal characterization of states of matter, the glass transition region, curing of thermosets, thermal transitions and gelation in polymer solutions, the crystallization and melting region, microcalorimetry, reaction calorimetry for polymerization studies, coupled techniques: thermogravimetry, DTA and mass spectroscopy. Evolved gas analysis of polymers by gaschromatography, fourier transform infraredspectroscopy and mass spectroscopy.

The book is intended to deepen the insight of experienced analysts and as an aid in the training of thermal analysts in the field of calorimetry and thermal analysis on polymers.

H. Domininghaus (Dreieich)

N. C. Hilyard and A. Cunningham (eds): Low Density Cellular Plastics (Physical Basis of Behaviour). 369 pages, 193 figures, 42 tables, 432 references. Chapman & Hall, London, Glasgow, Weinheim, New York, Tokyo, Melbourne, Madras 1994. Hardcover £ 69, 00 (ISBN 0-412-58410-7)

The editors brought together a group of thirteen authors from industry and academia who are at the forefront of research into the physics of low-density solid polymer foams. Unlike other books on polymeric foams, which concentrate on chemistry and process

technology of polymeric foams, it focusses on the essential material science issues of quantification and mathematical modelling of physical behaviour whether it be mechanical, pneumatic, thermal or acoustic.

Here the most essential chapters: Physical behaviour of polymeric foams – an overview: polyurethane flexible foam formation; characterizations of polymer cellular structures; the morphology of flexible polyurethane matrix polymers; heat transfer in foams; thermal ageing; the elastic behaviour of low-density cellular plastics; hysteresis and energy loss in flexible polyurethane foams; impact response; acoustic characteristics of low-density foams.

The book addresses fundamental issues concerning the physics of low-density cellular plastics and is intended for any researcher, whether they be chemist, physicist, material scientist or advanced postgraduate student, majoring in cellular materials involved in the development or application of new low-density cellular polymer product.

H. Domininghaus (Dreieich)

Barbara Elvers, Stephan Harkins, William Russey: Ullman's Encyclopedia of Industrial Chemistry. Fifth, completely revised edition, volume B 6, Analytical Methods II. Volume editor: Helmut Günzler, Process Control Engineering volume B 6, editor: Martin Polke. 760 pages, 681 figures, 96 tables, 1908 references VCH Verlagsgesellschaft, Weinheim, Basel, Cambridge, New York, Tokyo, 1994 Hardcover: DM 600,- / ÖS 4680,- / sFr 470,-, (ISBN 3-527-20136-X)

Conciseness and comprehensiveness are the outstanding features of this volume just as it was with volume B 5 too. Twenty-six internationally renowned authors published part II of the analytical methods whilst thirty-one authors had written the first part of this extensive topic. Twenty-eight scientists are the authors of the second big chapter of volume B6: Process Control Engineering. All articles benefit from knowledge, industrial practice and skill of the authors from a worldwide perspective.

Here some of the main chapters, first the analytical methods dealt with: Thermal analysis and calorimetry, surface analysis, chemical and biochemical sensors, microscopy, rheometry, laboratory information and management systems (LIMS).

The second part: "Process Control Engineering" comprises the following chapters: Information structures, knowledge about the process, from process knowledge to process control, process sensor systems, process actuator systems, distributed control systems, information logistics, computer aided methods, design and construction of process

control systems, operation, standards, committees and associations, integration of knowledge based systems.

The short enumeration of these main chapters imparts an idea of the wealth of information indispensable to chemists, physicists, physicochemists and chemical engineers. The book presents the state of the art of this important field of science.

H. Domininghaus (Dreieich)

Eugene P. Dougherty (ed.): Temperature Control Principles for Process Engineers. 256 pages, 123 figures, 6 tables, 115 references. Hanser Publishers Munich, Vienna, New York, 1994. Hardcover DM 130,- / US \$ 86,80. Hanser/Gardner Publications (ISBN 1-56990-152-X) Hanser Publishers ISBN (3-446-15980-0)

Ordinarily, temperature control is pretty trivial for most process engineers. But for certain operations, precise control or temperature is imperative, and not at all easy to accomplish. Temperature control of highly isothermic chemical reactions, reactive extruders, or batch sterilization units – all very different – can be crucial, but difficult. Due to some major developments in the past few years, in temperature measurement, statistical analysis, computer technology equipment, design and control theory life of a process engineer has been made in some ways easier, in some ways harder.

The purpose and scope of the book is outlined in chapter 1. Chapter 2 deals with the importance of temperature control in biochemical process engineering e.g. on fermentation based production. Nonisothermal effects in polymer reaction engineering are described in chapter 3, followed by temperature-dependant effects in polymer processing, chapter 4. Temperature measurement fundamentals are discussed in the following chapter. Chapter 6 gives details on process control theory: overview and fundamentals, followed by recursive identification, autotuning and adaptive control, chapter 7. Methodologies for temperature control of batch and semi-batch reactors are presented in chapter 8. Chapters 9, 10 and 11 deal with integrated temperature control applications in a computer control environment, servo temperature control of a batch reactor and modifications of a 500-gallon batch reactor to provide better data acquisition and control.

The book is a successful attempt to familiarize the process engineer with some of the new technologies and disciplines.

H. Domininghaus (Dreieich)