Book Reviews

Macromolecular Symposia, Volume 81 *Statistical Mechanics of Polymers* contains the lectures given at the international conference: *Statistical Mechanics of Condensed Polymer Systems: Theory and Simulations* at the University of Mainz in October 4–6 1993. The book is entirely devoted to the theory of polymers, covering pure analytic and theoretical approaches, computer simulations and computer experiments as well as theoretical material science. Current topics as the new and contraversy developments in the theory of glass transition, the simulation of these systems and the formation of a glass are discussed. Disorder effects on the static and dynamic behavior of polymers in a random media, networks, network formation and polymerisation are studied. Complex structures like copolymers near surfaces, networks, polyelectrolytes and ionomers, being of extreme importance in the development of new applications, are investigated by theoretical means like molecular modeling in order to bridge the gap between theory and experiment. The book gives a broad overview on this rapidly narrowing gap, standing on the side of the theoreticians.

Th. Fischer (Leipzig)

Dynamics of Polymers, Macromolecular Symposia 79 (1994), ISSN 1022–1360 covers the invited lectures given at the 33rd Microsymposium on Macromolecules *Optics and Dynamics of Polymers* in Prague, July 12–15 1993.

An emphasis is put on the investigation of the dynamic behavior of polymers studied by light scattering methods (12 of 15 lectures), although other optical and nonoptical techniques are discussed as well. The first contribution comes from Professor Pierre Gilles de Gennes on the interfacial rheology of polymers. P. N. Pusey gives a lecture on time- and ensemble averaging in non-ergodic partially frozen polymeric gels. P. Wiltzius reports on dynamics of wetting in phase separating mixtures. There are several contributions to the study of diffusion of polymers near order-disorder transitions (T. P. Lodge and G. Fytas) and in micronetworks (H. Sillescu). T. Kotaka explains how to access the chain dynamics in polymer blends by introducing dielectricly sensitive probe polymers.

The book includes systems like heterogeneous and dense media, dynamic properties and relaxation phenomena of concentrated and glass forming materials, phase separation phenomena, polyelectrolytes and solutions of rigid rods. The book therefore gives a broad overview on the current research going on in the progressive field of dynamics and optical properties of polymers and is of special importance for those interested in light scattering and ist broad range of possibilities of studying dynamic excitations and relaxation processes in macromolecular systems.

Th. Fischer (Leipzig)

Macromolecular Symposia: Macromolecule-Metal Complexes Macromolecular Symposia Vol. 80, Macromolecular Metal Complexes reports on the lectures held at the 5th International Symposia on Macromolecular Metal Complexes in Bremen, Germany on August 30th till September 3rd, 1993. The interest is devoted to fundamental and applied research in the rapidly expanding interdisciplinary field of macromolecule metal complexes. The topic is subdivided into four major directions, taking into account the different approaches to the subject from chemical, physical and biological points of view. In the first topic *Fundamental aspects of macromolecule metal complexes* an historic overview is given followed by discussions about haemoglobin as example for dynamics and allosteric phenomena, organic resins and inorganic supports as carriers for metal complexes and host (zeolites) - guest interactions. Further on the formation of polymeric structures of monopyridyl substituted porphyrins and polymers with phthalocyanines and naphthalocyanines as ligands is shown. In the second topic *Related biological systems and medical, clinical aspects* three articles deal with the role of metal ions in living systems, anticancer activity of metal compounds and the release of drugs in polypyrole systems. Topic three *Catalysis and separation processes* contains chemical aspects of macromolecule metal complexes such as their properties and applications in zeolite matrices, their use for separation of oxygen and nitrogen and the application of Pd(II) coordinated to polyheterocycles as catalysts. In the 4th topic *Electron and photon induced processes* electrochemical quarz crystal microbalance measurements on thin films of various macromolecule metal complexes are discussed. Also photochemical hole burning experiments involving various porphyrins in host polymers and potential applications of macromolecule metal complexes in optoelectronic devices are shown.

H. Groothues (Leipzig)

Macromolecular Symposia: Fluorinated Polymers The Macromolecular Symposia Vol. 82. *Fluorinated Polymers* reports on the 34th Microsymposium on Macromolecules. Fluorinated Monomers and Polymers held in Prague, Czech Republic in July 19th till 22nd, 1993. This volume contains the texts of nineteen invited main and special lectures. In organic chemistry the fluorinated materials gained a specific interest because of their unique chemical and biological properties. These are discussed in detail. Different types of synthesis are described, such as copolymerisation and anionic polymerisation of fluorinated monomers and others. An overview is given how to influence properties for example by using homochiral or racemic monomers it is shown that the structure may be changed from crystalline to amorphous. It is described how to use fluoroacrylic esters as synthons in annelation reactions. Further on the synthesis and characterisation of fluorinated fullerenes is investigated. The surface active fluorosilicon polymers are discussed with respect to lubrication phenomena. For scientists involved in organic fluorine chemistry this volume gives a broad overview on the current trends in this rapidly growing field.

H. Groothues (Leipzig)

Plastics Additives Handbook (Plasticizers, Fillers, Reinforcements, Stabilizers, Processing Aids, Colorants for Plastics) by R. Gächter and H. Müller (eds.) 970 pages, 154 figures, 228 tables, 1181 references. Hanser Publishers Munich, Vienna, New York, Barcelona (1993) Hardcover: DM 148,-; £ 56,- US $ 87, 50
ISBN 3-446-17571-1 (C. Hanser Verlag München, Wien)
ISBN 1-56990-153-8 (Hanser/Gardner Publication In. Cincinnati

Because of comprehensive orientatives in the whole field of additives for plastics, be they chemical agents of many kinds, fillers or reinforcing fibers, a new edition of this book was necessary. In 20 chapters the authors deal with antioxidants, metal desactivators, UV stabilizers, PVC stabilizers, plasticizers, lubricants, polymers as processing aids and impact modifiers of PVC, fillers, reinforcing fibers, colorants, flame resistant agents, antistatics, fluorescent brightness, biostabilizers, foaming agents, organic peroxides, crosslinking and nucleating agents, aspects regarding the effect of additives on hygiene, environment and health.

The last chapter deals with the analysis of additives by a number of spectroscopical methods, followed by a trade name and subject index.

Chemists, physicists, engineers, technicians and converters of plastics enduser industries of plastics parts and components, lecturers, and graduate students in the field of polymer science and technology will welcome this resource.

H. Domininghaus (Dreieich)

Technische Thermoplaste, Technische Polymer-Blends (PC + ABS)-Blends, (PC + PBT)-Blends, PPE-Blends, Band 3/2 des Kunstrtoff-Handbuchs (Hrg. G.W. Becker und D. Braun).
"Technical Thermoplastics, Technical Polymer-Blends" (PC + ABS)-Blends, (PC + PBT)-Blends, PPE-Blends, vol. 3/2 of "Plastics Handbook" by G.W. Becker and D. Braun (eds.) 308 pages, 222 figures, 85 tables, 588 references. C. Hanser Publishers, Munich (1993) Hardcover: 228,-. Subscription price DM 198- to order Vols. 3/1; 3/2; 3/3; 3/4.
ISBN 3-446-16369-7.

In consideration of the great technical and economical significance that technical thermoplastics have gained in many fields of industry and daily life, this volume is dedicated to polymer blends. The presented vol. 3/2 deals with those polymer blends that have their own specific character, i.e., above all, the blends based on polyphenylene-ether and polystyrene followed by (PC + ABS)- and (PC + PBT)-blends. The large number of blends based on other polymers will be dealt with in future volumes, such as POM blends in vol. 3/1.

The introductory chapter deals with mixability, morphology and rheology, methods of mixing and properties of polymer blends in general, followed by chapters on PPE, (PC + ABS), (PC + BT) and (PE + PET) blends. Each chapter shows the same structure; processing and properties. (The design engineer may lack demonstration of according to long-term behavior of these materials by the so-called isochronous stress/strain curves). Other chapters deal with different methods of conversion and machining, as well as with many examples of application.

H. Domininghaus (Dreieich)

Physics of Plastics (Processing, properties, materials and engineering) by A.W. Birley, B. Haworth and J. Batcher (eds.) 549 pages, 263 figures, 37 tables, 478 references. Hanser Publishers Munich, Vienna, New York, Barcelona (1993) Hardcover: DM 148,-; US $ 98,-; £ 24, 80.
ISBN 3-446-16274-7

This book is not aimed at chemists and physicists in R&D, but rather at engineers in processing, design and application, students studying polymer technology, and practically oriented people. The knowledge presented in this book will improve the application of plastics on all levels. This knowledge is an indispensable prerequisite for their broad acceptance.

The introductory chapter deals with the structural and morphological characteristics of polymers and their compounds, the methods of analysis included. The next two chapters present the thermal and rheological characteristics, followed by chapters on continuous and batchwise conversion methods, as well as the possible interactions between processing and performance characteristics. Deformation and failure of plastics are discussed in detail. The following chapters deal with electrical and optical properties of polymers. In the last chapter the authors talk about the intractions between plastics and the environment such as chemical attacks, flame resistance, oxidation, hydrolysis, photochemical degradation and the formation of bubbles in UP-laminates after long-term contact with water.

H. Domininghaus (Dreieich)

Polymer Engineering Principles (Properties, Processes, Test for Design)" by R.C. Pagelhof and J.L. Throne: 936 pages, 478 figures, 122 tables, 634 references. Hanser Publishers Munich Vienna, New York, Barcelona (1992) Hardcover: DM 228,-; öS 1779,-; SFr 227, US $ 149,-; £ 75,-
ISBN 3-446-15686-0
Paperback: DM 128,-; öS 999,-; SFr 129,-
ISBN 3-446-77337-4

The objectives of this book are to introduce the design engineer to the fundamentals of polymers and to present inherent polymer characteristics such as glass transition temperature, melt temperature range, molecular weight and its distribution, viscoelasticity and degree of crystallinity. Then these characteristics are related to polymer solid and fluid behavior.

The goal is more understanding of polymer response to testing conditions. Throughout the text the authors stress that there is a basic difference between common metals, minerals, and other natural materials. The characteristics of polymers are not material constants, but rather a function of many outside factors such as kind, level, and duration of load, temperature, rate of deformation, environment, conversion conditions, and design.

The book has two sections. The first deals with the basic understanding of polymers in solid and fluid state. This section includes discussions on the history of polymers, basic polymer nomenclature, crystalline and amorphous morphology, viscosity, chemical nature and mechanical response under load.

The second section deals with the interaction of polymers with their environment, including a brief outline of general processing technology, the role and applicability of testing,

and concepts in the design of plastic parts. This is a textbook that presents problems and examples, and glossaries following some chapters.

H. Domininghaus (Dreieich)

Sheet Molding Compounds (Science and Technology) by Hamid G. Kia (ed.) 266 pages, 115 figures, 78 tables, 250 references. Hanser Publishers Munich, Vienna, New York, Barcelona (1993) Hardcover DM 128,-; US $ 79, 95,
ISBN 3-446-16213-5.

The editor, supported by 15 well-known American specialists, introduces the reader to semifinished goods and parts composed of unsaturated polyester- and vinylester resins. The book is didactically well structured and is very lucid. All important steps of manufacturing, the manifold relevant formulations of materials, resins, initiators, inhibitors, low profile additives, thickening-, filling- and reinforcing substances as well as the most important methods of manufacturing such as in mold coating, bonding, detecting of failures and their repair, the techniques of BMC and ZMC are dealt with, as well as recycling of residues by pyrolysis. A cost comparison in the case of burning is also given.

Some chapters contain a glossary with explanation about the particular specialist technology.

H. Domininghaus (Dreieich)

Surface Characterization of Advanced Polymers by L. Sabbatini and P.G. Zambonin (eds). 312 pages, 139 figures, 31 tables, 728 references, VCH Verlagsgesellschaft, Weinheim, Basel, Cambridge, New York, Tokyo (1993) Hardcover. DM 220,-; £ 73,-
ISBN 3-527-28512-1 (VCH Weinheim)
ISBN 1-56081-270-2 (VCH New York)

The prerequisite for a correct use of polymers is a well grounded knowledge of the properties of this material. On that score, the surface properties also play an important role regarding adhesion, biocompatibility, stability for the influence of environment, were strength, as well as chemical and catalytical effectiveness.

During recent years a number of very expressive testing methods for the judgment of surfaces and boundaries has been developed, such as photoelectronic spectroscopy (XPS), surface mass spectroscopy (SIMS), electronically induced vibration spectroscopy (HREELS) and ion-scattering spectroscopy (ISS), to mention some.

In the introductory chapter about the fundamentals and the experimental realization of these methods HREELS, SIMS, LEISS and TOF-DRS are described in detail. The variety of possibilities as well as the limits of the different methods are pointed to. Further chapters deal with low-energy ion-scattering spectroscopy of polymersurfaces and structures, the x-ray photoelectronic analysis of conducting polymers, and the analysis of data resulting from them.

This book is of interest to scientists engaged in research, development, and testing of polymers.

H. Domininghaus (Dreieich)

Symmetric und Struktur in der Chemie (Symmetry and Structure in Chemistry) by D. Steinborn: 435 pages, 203 figures, 39 tables, 107 references, VCH Verlagsgesellschaft Weinheim, Basel, Cambridge, New York, Tokyo (1993) Hardcover: DM 148,-
ISBN 3-527-28418-4.

The concept of symmetry is a basic guide to recognize, analyze, and classify structure as well as identities and differences of objects. It is an appreciable help to determine the essence of conformity with a natural law. Symmetry is the architectural plan and mathematics of nature. The introductory chapter presents molecular systems, description, calculation, and properties by means of quantum mechanics, static and dynamic aspects of structure, and the analytical description of molecular systems; followed by comprehensive chapters about fundamentals of group theory, movements in space, symmetry of molecules and crystals, and permutation (inversion) symmetries of molecular systems.

The useful knowledge presented is augmented by many examples. The work is well organized.

Molecular and crystalline structures are dealt with. The book is directed to lecturers and graduate students in chemistry, as well as graduate students and scientists of related disciplines such as physics, crystallography, and mineralogy.

H. Domininghaus (Dreieich)

ISO 9000 leichtgemacht (ISO 9000 made easy) by Winfried Glaap, 192 pages, 30 figures, 50 references, C. Hanser Verlag Munich, Vienna (1993) Hardcover: DM48,-; öS 375,-; SFr 49, 40
ISBN 3-446-17634-9

The reader of technical reviews very often finds the note that this or that production plant has been certified according to DIN 9000 standard series. This procedure up to now has occurred far more by market pressure than by own initiative. The target is the guarantee of quality such as it was introduced in Japan some 40 years ago and came over to Europe via the USA.

This publication is helpful to all those interested in introducing these quality standards in their production plants. The formal structure- the column of marginal notes included the index of subjects and abbreviations, as well as numerous figures facilitate access, orientation, and use of the book as a reference. Necessity, utility, planning, development, kind of organization, as well as the formal plan of a quality guarantee are described in detail. The decisive components; treatment of defective units, internal quality audits, management review and judgement of suppliers are discussed in depth until finally the alternative solution: declaration of conformity or certification has to be decided.

This lucid and easy understandable book offers an indispensable support to managers and quality representatives seeking a quality guarentee (QS) system.

H. Domininghaus (Dreieich)