

Thermotropic Liquid Crystals, Fundamentals. By *G. Vertogen* und *V. A. de Jeu*. Springer-Verlag, Berlin 1988. xi, 324 pp., hard cover, DM 134.00.—ISBN 3-540-17946-1

The chemistry and physics of liquid crystals is certainly one of the most fruitful areas of modern materials science. However, despite the enormously growing literature there are only a few books available treating this subject. The classical treatise by *de Gennes* ("The Physics of Liquid Crystals", Oxford 1974) is no longer up-to-date, despite the clarity of presentation. The book by *Vertogen* and *de Jeu* aims to fill this gap. It is the clear intention of the authors to focus solely on fundamental aspects of thermotropic liquid crystals.

The book is organized in four sections. Part I is devoted to an introduction of the subject, and gives a very clear descriptive account of the various liquid crystalline phases. Here the reader finds an overview of some more recent developments, such as smectics with bond orientational order. However, other topics of interest such as discotic or polymeric liquid crystals are dealt with in a very brief manner. Part II deals with continuum theory, introduced entirely in tensor notation. Experiments relating to the orientational behavior of liquid crystals are described from a theoretical point of view in Part III. The final part outlines the present state of the theories of liquid crystalline order.

In all chapters the material is treated in a rigorous mathematical way. This makes the book rather tedious reading for the beginner, but is very useful for those who are more advanced in this field. A very thorough introduction of the Landau theory, and the treatment of molecular statistical theories starting from the theory of simple liquids, is certainly of particular interest, since it may not be found in other books. However, the choice of experimental examples has been restricted to only a few selected samples. Consequently the book is not a guide to current experimental work in this field. One wonders if a treatise on thermotropic liquid crystals can virtually omit areas such as polymer liquid crystals or discotics without being regarded as incomplete. Nevertheless, the consistent and vigorous presentation of the selected topics makes this treatise a highly useful and indispensable book for everyone working seriously in the field of liquid crystals.

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Synthesis and Separations Using Functional Polymers. By *D. C. Sherrington* and *P. Hodge*. Wiley, Chichester 1988. x, 454 pp., bound, £ 52.50.—ISBN 0-471-91848-2

Coming into prominence some 25 years ago as supports for solid phase peptide synthesis, synthetic functional polymers have emerged as a class of novel materials with a multitude of applications, such as supports for biotechnology, solid phase organic synthesis, and separation techniques, as well as for several other purposes. The obvious

advantages of these heterogeneous systems (ease of separation, recycling etc.) have stimulated a great deal of research interest in this area, which is evident from the many research papers and review articles on these topics. During the development of the field it became evident that the technique is far more complex than was initially thought; this warrants careful consideration of the chemical and physical properties of the polymeric supports used, and of optimizing the specific reaction conditions necessary with these systems. To apply them correctly requires a thorough understanding from the standpoints of organic chemistry (or biochemistry) and polymer chemistry.

In bringing out this volume to provide researchers with an in-depth and up-dated overview covering all these aspects, *D. C. Sherrington* and *P. Hodge* have done a commendable job with the help of a group of well-known scientists. By summarizing the published work of many leading practitioners of polymer supported chemistry, this book provides a critical review of some of the most important aspects. The present volume is a sequel to the first book on this topic ("Polymer-supported Reactions in Organic Synthesis") by the same editors, published nearly a decade ago. While some of the chapters of the earlier book have merely been updated since 1979, others are new additions.

The book is divided into eleven chapters dealing with several interesting aspects of the applications of functional polymers in chemical operations (syntheses and separations). It appears that the chapter authors were persuaded to cover the entire story instead of highlighting their own scientific accomplishments. Thus, with the exception of one chapter, a wide and balanced coverage of the specific topics has been achieved.

The book begins with a chapter by *Guyot*, which gives an authoritative and comprehensive account of the design and structural characterization of polymeric supports. Support design appears to be critically important for success in this field. The second chapter by *Hodge* provides a detailed review of the applications of functional polymers in synthetic organic chemistry. Further interesting aspects of the applications of functional polymers covered in this book include: "Polymeric Phase Transfer Catalysts" (*Tomoi* and *Ford*); "Polymeric Models of Reactive Biological Systems" (*Challa* and *van den Berg*); "Polymers in Affinity Chromatography" (*Jervis*); "Polymeric Ligands in Hydrometallurgy" (*Warshawsky*); "Polymer Bound Transition Metal Complex Catalysts" (*Garrou* and *Gates*) and "Use of Chiral Polymers for the Separation of Enantiomers" (*Pirkle* and *Mohler*), which provide valuable information on the state of the art in these research topics. Somewhat more specialized applications are dealt with in the chapters on "Design and Industrial Applications of Polymeric Acid Catalysts" (*Widdecke*), and "Properties of Polymeric Rose Bengals—Polymers as Photochemical Reagents" (*Neckers*). The last chapter of the book, "A Wider Perspective of Polymeric Supports and Reactive Polymers"

by *Sherrington*, deals with broader aspects of this field, covering new types of supports, polymeric vesicles, microcapsules, polymeric drugs, photoresists, etc. This clearly demonstrates the interdisciplinary aspects of functional polymers, and should stimulate further research interest.

One would have wished to find additional chapters on the applications of functional polymers for immobilization of enzymes and microorganisms, as well as on polymer-supported synthesis of oligonucleotides, which are likely to be some of the more rapidly expanding areas of research involving polymer supports. Nevertheless, this book serves as an excellent source of information on the applications of functional polymers. The bibliography is extensive (over 1500 citations) and up-to-date. In one particular chapter, citations are sometimes given for less accessible periodicals, even though the same results have also been published in more generally available journals. Figures and formulas are quite clear and the presentation of the book is excellent, with a colorful waterproof cover. It should find its place in all chemical libraries, and is highly recommended to all scientists working with polymeric supports, as well as to aspiring newcomers to this field. It is likely to serve as the standard monograph for some years to come.

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Polymer Modified Textile Materials. By *J. Wypych*, Wiley, New York 1988. xiii, 317 pp., bound, £ 70.00.—ISBN 0-471-83959-0

Composites have been treated frequently in reviews and monographs; polymer-coated textile fibers, however, have been considered to a much lesser degree in the literature, although the materials and their interactions are similar. It is true that in the latter materials the polymer constitutes only a small fraction of the total mass, but it plays a key role in the often highly sophisticated applications of these textile materials.

The raw materials for coating polymers, textile materials and release papers are treated in the first chapter. In particular, solutions, emulsions/dispersions and plastisols are discussed. The second chapter deals with machines and equipment for compounding, coating, heating and finishing. Six commonly used processes, namely spreading, dipping, spraying, immersion, melt coating and lamination are treated in detail. Many photographs and diagrams of machines giving useful information are included, particularly in conjunction with examples of applications, cost analysis and ecological aspects. Production lines are described in Chapter 5, in a manner similar to that in Chapter 2, but it is incomprehensible why these two chapters were not kept together in their logical sequence.

"The scope of application of coating methods", with emphasis on end-use, type of resins, and technical demands, is discussed in Chapter 3. Topics included are consumer items, industrial uses, technical products, geotextiles and -membranes, special yarns, and PTFE-coated glass fibers. Chapter 4 describes some interesting developments, including products with advanced mechanical, thermal, and optical properties, textiles with improved dimensional stability, permeability to water and air, and special properties with regard to burning, abrasion, cleaning and ageing behavior, to give only a few examples.

Chapters 6–8 treat the rheology of the coating processes and the most important factors affecting the processes. Numerous scanning electron micrographs showing the structure of the coated materials are included. Heat and mass transfer in coating processes are discussed in relation to recent achievements of chemical engineering.

The last two chapters are concerned with toxicity (LD₅₀ values, smoke production, water pollution) and waste aspects, with particular consideration of recycling and separation methods, topics which have become increasingly important.

The organization of the material in the monograph is not entirely convincing. Furthermore, the presentation is strong in some chapters and weak in others – as is to be expected for a book written by a single author and covering such a broad field. Finally, some editorial effort would certainly have improved the text.

Nevertheless, the book gives a most valuable review of the state of the art of applying polymers to textile materials to improve their properties and make them suitable for special applications.

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Foams and Biliquid Foams—Aphrons. By *F. Sebba*, Wiley, Chichester 1987. vii, 236 pp., bound, £ 29.59.—ISBN 0-471-91685-4

It is not easy to assign this book to a specific category. On the one hand it is intended as a textbook on foam systems, while on the other hand it contains a number of sections which are more in the nature of popular scientific writing. The author tends very much towards a simplified style of presentation. This is certainly an advantage for readers who are not specialists in colloid chemistry. In the diagrams too one finds that only the essential relationships are outlined. The illustrations look as though they have been taken from a set of lecture notes. Furthermore the whole book makes a similar impression.

The most important of the 13 chapters have the following titles: Forces Operating at Interfaces; Thin Liquid Films; Polyhedral Gas Foams; Colloidal Gas Aphrons;