and the relationships between them, the many exceptional figures and tables, and the detailed description of the numerous experimental techniques used in these studies more than compensate for the poor index and the numerous annoying, and occasionally amusing, errors in grammar and spelling (e.g., genetic, rather than generic, index of formulas). This volume is an excellent reference book and could be used as a textbook if the instructor provides suitable background material. It is also a very timely book; recent supplementary discussions of sensors and smart devices can be found in several articles in *Physics Today*, July, 1998, and in *Principles of Chemical and Biological Sensors*, D. Diamond, Ed., J. Wiley & Sons, Inc., 1998.

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Supramolecular Chemistry of Anions. Edited by Antonio Bianchi (University Florence), Kristin Bowman-James (University of Kansas), and Enrique Garcia-España (University of Valencia). Wiley-VCH: New York. 1997. $79.95. xiv + 461 pp. ISBN 0-471-18622-8.

Despite the fundamental importance of anionic species in biology and chemistry, interest in the recognition of these species has lagged significantly behind the coordination and recognition chemistry of cations. Nevertheless, interest in anion coordination chemistry has developed rapidly in recent years, to the extent that the time is now ripe for a volume that summarizes the critical aspects of the field. *Supramolecular Chemistry of Anions* constitutes both a good introduction to the topic of anion coordination chemistry for neophytes and a valuable repository of detailed information for the expert practitioner.

The book comprises a series of chapters contributed by an international group of experts in the field, and covers physical, structural, and technological aspects of anion recognition. Since it comprises a series of articles contributed by different authors, it suffers somewhat from an inconsistency of style, and newcomers to the field will find some topics to be more accessibly introduced than others. Overall, *Supramolecular Chemistry of Anions* is a welcome addition to the literature of supramolecular chemistry, complementing the many existing works on cation recognition.

Chapter 1, Physical Factors in Anion Separations, by Bruce A. Moyer and Peter V. Bonnesen, is intended as a description of "presupramolecular anion chemistry": in other words a summary of more classical anion separation techniques such as ion exchange and liquid−liquid extractions. The intention appears to have been to provide benchmarks for evaluating the effectiveness of the supramolecular systems to be described in the remainder of the book. In practice, the chapter comes across as a lengthy treatise on the physical chemistry underlying anion separation techniques. Although the information contained in the chapter will undoubtedly be of interest to advanced readers, the chapter does little to set the stage for the upcoming descriptions of supramolecular chemistry, and seems out of place as the first chapter of the book. Newcomers to the field of supramolecular chemistry would be well advised to skip to the second chapter if they wish to learn what the majority of the book is about.

Chapter 2, Historical View on the Development of Anion Coordination Chemistry, by Bernard Dietrich and Mir Wais Hosseini, provides a succinct and accessible overview of the development of synthetic anion-binding hosts, organized in order of increasing anion complexity, and provides an excellent introduction to the subject matter of the book. Chapter 3, Natural Anion Receptors; Anion Recognition by Proteins, by Stefano Mangani and Marta Ferraroni, uses analyses of the interactions revealed in a number of X-ray crystal structures of protein−anion complexes to describe some of the principles underlying the ability of proteins to act as exquisitely selective hosts for substrates. The idea behind the chapter is well-conceived, showing how nature is able to fine-tune enzyme−substrate interactions to accomplish an incredible degree of specificity for a particular host, providing a paradigm for chemists' efforts to prepare synthetic receptor molecules.

The following two chapters, Artificial Anion Hosts. Concepts for Structure and Guest Binding, by F. P. Schmitchen, and Structural and Topological Aspects of Anion Coordination, by Jerry Atwood and Jonathon W. Steed, cover complementary aspects of essentially the same topic—the architecture of synthetic supramolecular hosts for the binding of anions. The former chapter provides an extensive summary of a wide range of synthetic hosts, organized according to the functional groups involved in the anion−host interactions, while the latter chapter focuses on detailed structural analysis of the host−guest interactions as revealed by X-ray crystallographic data. Between them, these two chapters provide an excellent summary of the types of receptors that have been synthesized to date, and provide a coherent picture of the nature of the host−guest interactions. These two chapters are complemented by the following chapter (Chapter 6), Thermodynamics of Anion Complexation, by Antonio Bianchi and Enrique Garcia-España, which continues to develop the readers' insight into the factors affecting binding strength and selectivity in host−guest interactions. The chapter provides a quantitative description of binding interactions, with plenty of numerical data to illustrate the points being made, without getting too bogged down with equations and physical data. An appendix describing practical methods for determining binding constants provides an excellent overview for the newcomer to the field of supramolecular chemistry.

Chapter 7, Electrochemical Aspects of Anion Chemistry, by Antonio Doménech Carbó, encompasses both the analysis of coordination equilibria by electrochemical methods as well as applications aspects, including electrochemical detection of anionic species and the effects of complexation on electron transfer reactions. The chapter presents a good introduction to electrochemical methods for the reader who is willing to work through the rather large number of equations. A number of specific examples are discussed throughout the chapter, but the scope of these is largely limited to the behavior of one particular type of receptor (polyazamacrocycles). That discussion of other receptor systems is limited to a final catchall section (7.8 - other issues) significantly diminishes the generality and quality of the chapter.

Chapter 8, Photochemistry and Photophysics of Supramolecular Species Containing Anions, by L. Moggi and M. F. Manfrin, provides brief but lucid coverage of an aspect of anion coordination chemistry that is clearly in its infancy. Chapter 9, Anion-Binding Receptors: Theoretical Studies by Joanna Wiórkiewicz-Kuczera and Kristin Bowman-James, summarizes the results of a variety of computational studies. Unlike many of the other chapters in the book, the coverage assumes that the reader is familiar with the language and techniques of computational chemistry, and will be of more use to an expert reader than to a newcomer. Nevertheless, the chapter describes a number of successful studies that help to elucidate some of the most important interactions contributing to the stability of supramolecular complexes.

Chapters 10 and 11 both describe applications of anion recognition. Chapter 10, Application Aspects involving the Supramolecular Chemistry of Anions, by J. L. Sessler, P. I. Sansom, A. Andrievsky, and V. Kral, provides a detailed and engaging review of many applications of supramolecular chemistry in technology. Topics covered include transport of physiologically relevant anions for medical applications, catalysis through supramolecular interactions, and analytical applications, such as ion-selective electrodes and chromatographic methods. Chapter 11, Supramolecular Catalysis of Phosphoryl Anion Transfer Processes, by Mir Was Hosseini, traces the development of a specific application of supramolecular catalysis, from early studies on nucleotide binding through the development and elucidation of a detailed catalytic mechanism. Chapters 10 and 11 end the book on a high note, leaving the reader with a sense that the field of anion recognition is only beginning to realize its full potential.

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Interfacial Aspects of Multicomponent Polymer Materials. Edited by David J. Lohse (Exxon Research and Engineering Co., Annandale, NJ), Thomas P. Russell (University of Massachusetts, Amherst, MA), and L. H. Sperling (Lehigh University, Bethlehem, PA). Plenum: New York. 1997. viii + 303 pp. $95.00. ISBN 0-306-45718-0.

This volume is a written record of many of the presentations made at the workshop and symposium of the same name hosted by the ACS Division of Polymeric Materials: Science and Engineering in 1996 at the Orlando, FL, American Chemical Society meeting. Twenty-one written adaptations of the more than 50 presentations and posters are presented in this book, which includes the recent work of recognized leaders in the field of multicomponent polymers.

According to the editors, despite some early advances in the field, the science of polymer blend and composite interfaces truly began in 1989, and has since exploded, assisted largely by major advances in instrumentation and experimental methods. That interfacial science and research is largely a young science is reflected in the fact that few references in the treatises are older than 1992, with the majority being fewer than 5 years old.

The treatises cover a broad range of topics relevant to the study of interfaces, and most are written in such a way as to be understood by those with a background in polymers but who are not already experts in the analysis of polymer phases or interfaces. The first chapter in the book is an introduction which briefly reviews definitions, instrumental methods of analysis of surfaces and interfaces, and the thermodynamics and kinetics of phase separation. Some chapters are theoretical, and discuss using self-consistent field theories to study the phase behavior of multicomponent systems or modeling fracture in polymer blends. Several chapters describe the use and value of specific instrumental methods of analysis of interfaces with methods ranging from laser scanning confocal microscopy to scanning force microscopy, a brief review of interface characterization using solid-state NMR, and methods of characterization and depth profile analysis of multilayer systems. Yet other chapters deal with such diverse topics as studying the segregation process and growth of wetting layers, studying different aspects of compatibilization, and studying the phase structures and fracture surfaces of a variety of different compatibilized blends. The range of subjects discussed in the book resulting from this symposium should ensure it will have value for anyone interested in the field of multicomponent polymers.

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Advances in Catalytic Processes, Vol. 2: Asymmetric Catalysis. Edited by Michael P. Doyle (University of Arizona). JAI Press: New York. 1997. 287 pp. ISBN 0-7623-0068-X.

Catalysis and asymmetric synthesis using transition metals dominates much of the current research focus in the area of organic synthesis. This volume, edited by Doyle, highlights some of the recent advances in the field through a series of nine reviews covering a broad range of topics. In several chapters the authors focus primarily on work from their laboratories (e.g., RajanBabu, Nishiyama, and Hayashi) while in other cases a more general review of the field is presented (e.g., Bolm, Burgess, Müller, Tolman, Stanley, and Roos).

The contents of the volume can be roughly divided into two main themes. The primary focus of most chapters is on the design of new ligands and their utility in inducing asymmetry in a variety of reactions. The other contributions examine the utility of various ligands on a specific asymmetric transformation. Some of the chapters incorporate both themes. The volume is remarkably free from typographical errors.

RajanBabu and co-workers present a detailed description of their recent studies in ligand design and tuning (using a sugar as a scaffold) as it relates to the hydrocyanation and hydrogenation reactions. The principles they outline can be generally applied when trying to improve enantioselectivity. Bolm provides a short but informative review of the recent advances in catalyzed Baeyer−Villiger reactions including acid-catalyzed, metal-catalyzed, and enzyme-catalyzed processes. Hayashi describes some of the useful reactions of MOP−palladium complexes and also the thinking that went into the design of this very useful ligand. Asymmetric hydrosilylation, reduction, and hydroboration are all covered. Similarly Nishiyama presents his group's work on the pybox ligand as it applies to the cyclopropanation and hydrosilation of ketones. He also describes how this ligand has been used in other asymmetric processes including enantioselective Meerwein−Pondorf−Verley, Diels−Alder, and Mukaiyama aldol reactions. Keyes and Tolman discuss the synthesis and reactivity of C_3-symmetric ligands in a chapter with a primary emphasis on the preparation and coordination properties of this emerging class of ligands.

The area of metal transfer reactions is described in reviews by Müller on nitrene transfer and Roos and Raab on carbene transfer. There is some overlap between the chapters and also with the Nishiyama chapter, which has a significant component dedicated to carbene transfer. However, this does not detract from the value of the individual contributions. Stanley reports on the recent improvements in the asymmetric rhodium-catalyzed hydroformylation reaction with an emphasis on the work of Nozaki and (the late) Takaya along with his own work on bimetallic rhodium complexes.

Finally Burgess's very brief chapter of approximately 10 pages provides an overview of the emerging use of combinatorial approaches to find new transition metal complexes and improve upon existing transition metal complexes which are useful in organic synthesis. To date most work has focused on building libraries of ligands to rapidly screen their binding properties to metals. One can easily imagine this field will undergo significant growth in the coming years, but a review of this type might help catalyze further applications.

While the upcoming publication of *Comprehensive Asymmetric Catalysis* will undoubtedly be the ultimate reference source for the next few years, the volume assembled by Doyle should be on the bookshelves of scientists in academia and industry interested in asymmetric synthesis.

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