

## Book Reviews \*

**Industrial Color Testing—Fundamentals and Techniques.** Edited by Hans G. Volz (formerly of Bayer AG, Krefled-Uerdingen, FRG). VCH: New York. 1995. xiii + 377 pp. \$115.00. ISBN 3-527-28643-8.

This book is the first self-contained treatment of color testing. The author provides numerous practical examples for each test method described. An up-to-date evaluation of the theoretical (Part 1) and practical (Part 2) aspects of pigments, dyes, and pigmented and colored coatings. A concise overview of all formulas necessary for computer programming is accompanied by tables and flow charts. This book will be beneficial for all practical scientists in the production, processing, and application of colorants and binders.

JA955280A

**Advances in Molecular Electronic Structure Theory, Volume 2.** Edited by Thom H. Dunning, Jr. (Pacific Northwest Laboratory). JAI Press: Greenwich, CT. 1994. xii + 209 pp. \$97.50. ISBN 0-89232-9578-2.

This volume is a collection of four review articles on a topic which is of growing interest to chemists: the extension of classical ab initio methods to clusters and condensed phases. They are well written and complement each other well. The first, *Electronic Structure Theory and Atomistic Computer Simulations of Materials*: by R. Messmer, focuses on the use of ab initio valence bond methods to parameterize force fields which include electronic degrees of freedom and can be applied to simulations on clusters, surfaces, and bulk solids. The second review, *Calculation of the Electronic Structure of Transition Metals in Ionic Crystals*: by N. Winter, D. Temple, V. Luana, and R. Pitzer, documents methods of determining optical properties of foreign ions in ionic lattices where cluster–lattice interactions along with correlation and realistic effects are included. In the third chapter, *AB Initio Studies on Molecular Models of Zeolitic Catalysts* by J. Sauer, with a focus on zeolites, first reviewed ab initio methods on finite clusters with and without the inclusion of periodicity and then covered lattice dynamics simulations using analytical potential functions. Finally, in the last chapter, *Ab Initio Methods in Geochemistry and Mineralogy*, A. Hess, M. McCarthy, and P. McMillan review a variety of ab initio methods applied to large systems without long-range order or infinite systems where translational symmetry can be exploited.

It is notable that, by design, the contributors did not give a comprehensive survey of the literature but chose to discuss the recent advances in the field by using specific examples on which they have worked. This choice resulted in four very knowledgeable and clear treatments of the material. The downside of this is that the papers lacked references to some of the more recent work. Except for the fourth review, none of the chapters gave a detailed description of the methods, but deferred to a brief description of the calculational procedures and a more thorough discussion of the merits of the various methods. This choice makes this an excellent and very readable volume for those chemists who want a broad familiarization of the topics without becoming mired in specific details.

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**Stereoselective Synthesis: A Practical Approach, 2nd Edition.** By M. Nogradi (Technical University of Budapest, Hungary). VCH: Weinheim, New York, Cambridge, Basel, and Tokyo. 1995. xviii + 368 pp. \$45.00. ISBN 3-527-29243-8 (VCH: New York).

This eight-chapter book is the second edition of the book published by the same author in 1987. The author has thoroughly revised and updated the first edition. Condensing this rapidly evolving field into 300 pages is a formidable task, and the author does a very good job at presenting an overview of this field. In most instances, the best methods in each category up to 1992 are briefly presented.

The first chapter (44 pages) presents an overview of the general concepts of stereoselective synthesis including definitions and a description of the kinetics and thermodynamics of stereoselective reactions. This chapter is by no mean complete, but it gives general guidelines that would constitute a good introduction for a chemistry course.

The second chapter (36 pages) contains a very good discussion of stereoselective catalytic reductions (homogeneous hydrogenation, catalytic hydrosilylation, and heterogeneous hydrogenation).

The stereoselective noncatalytic reductions of ketones to alcohols and of imines to amines is the subject of Chapter 3 (42 pages). A review of the various chiral lithium aluminum hydrides and boron derived reagents is presented in the first part of the chapter. Various diastereoselective ketone reductions are discussed from both mechanistic and practical points of view. Quite intriguingly, a number of catalytic methods are also described in this chapter (i.e., Corey's catalytic oxazaborolidines).

Chapter 4 (12 pages) gives a surprisingly short overview of stereoselective oxidation reactions (chiral *N*-sulfonyl oxaziridines, Sharpless epoxidation and dihydroxylation, Jacobsen's epoxidation, Kagan's oxidation of sulfide to sulfoxide, etc.). Considering the numerous applications of these various methodologies in natural product synthesis, it is surprising to see that the discussion in this chapter was so brief.

Both, Chapters 5 (78 pages) and 6 (44 pages) constitute the bulk of this book. In Chapter 5, the chemistry of allyl metals and of the stereoselective aldol condensation are discussed; conjugate additions and alkylation of enolates constitute the main part of Chapter 6.

A brief discussion of the stereoselective pericyclic reactions ([4+2], [3+2], [2+2], carbene chemistry, [3,3]- and [2,3]-sigmatropic rearrangements] is found in Chapter 7 (36 pages).

Finally various, stereoselective carbon–heteroatom bond-forming reactions are presented in Chapter 8 (18 pages).

The book ends with an appendix which gives the costs of some commercially available chiral reagents or ligands highlighted in the book. I think that this section was not sufficiently developed to permit the analysis of the relative efficiencies of the numerous methodologies presented in the book by a nonexpert reader. It would have been particularly useful if the advantages of the chiral auxiliaries (installation and cleavage), chiral reagents, or catalysts would have been pointed out throughout the book since these features are extremely important when evaluating the efficiency of a synthetic method. References to procedures for the preparation of chiral auxiliaries would have been a useful addition.

The wealth of information presented is supported by over 1800 references. In addition, the book is now available in paperback for a reasonable price. This is also a major improvement since the first edition because this book should be especially appealing to graduate students. What I also found particularly interesting is that the author usually gives the historical background on each topic and gives credit to the chemists who made important early contributions. Furthermore, he clearly elaborates on the state of the field in each subject at the time of publication.

However, the methods are often presented as equations with little or no mechanistic evidences or models to explain the observed stereoselectivity of a given reaction. This is unfortunately true for reactions involving acyclic stereocontrol in which the concept of allylic strain is not covered at all throughout the book or used to explain the diastereoselectivities observed in many reactions (except for one sentence with no definition on page 231). Another weak point is the lack of references for use of the methods presented in the synthesis of more complex molecules (e.g., natural products), and little emphasis is placed on the limitations of the methods presented. Finally, a more systematic presentation in some parts of the book would have helped readers to find specific information (i.e., chiral auxiliaries for syn or anti aldol additions).

Knowing that this is the second edition of the book, it was surprising to find many errors especially in the new material. [spelling errors (Cream's rule page 240), drawing errors (pages 119, 166, 167, 194, 216, etc.), and references wrong or missing (for example, ref 477 on page 203, ref 203 on page 239, ref 314 on page 244, etc.)].

Overall, the amount of information presented is certainly worth the cost of this book, would be a useful complement to a synthetic course, and should be especially useful for graduate students who want to get acquainted with this field.

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