quantum dots (small in all three dimensions) are more recent. In spite of the nonclassical limit that this classification of nanomaterials implies, systems that are not small enough to show quantum confinement effects are also commonly referred to as "nanoscale". This wider definition has been adopted by Gary Hodes when assembling the component chapters of this book, which are written by authors actively pursuing research on the electrochemical synthesis and application of nanoscale materials.

The physics and chemistry of nanoscale materials is a rapidly developing area, so that any book dealing with these topics runs the risk of being out-of-date by the time it is published. At the same time, it is clearly impossible for a book to be comprehensive. Nevertheless, it is disappointing that several important topics have been omitted from this compilation. For example, one would have expected a chapter outlining the fascinating work on the electrochemistry of metal nanoparticles by Schiffrin, Murray, Wilner, and others. Similarly, there is little discussion of the electrodeposition of nanowires. Readers expecting a systematic approach to nanoscale materials will not find it in this book. Instead, Gary Hodes has collected a number of individual essays representing a selection of topics in the field indicated by the title of the book.

Penner opens the book with a comprehensive and well-written account of synthetic routes to nanoparticle arrays based on electrochemical deposition of metallic precursors. The discussion illuminates the advantages and disadvantages of a combined electrochemical/chemical approach compared with chemical routes to nanoparticles on substrates. By contrast, the following chapter by Hodes and Rubinstein gives a less clearly defined overview of electrodeposition of semiconductors that fails to address the central question: why use electrochemical methods for synthesis? Readers familiar with the extensive literature dealing with size-selective chemical preparation methods may find it difficult to see what electrochemistry has to offer. The next chapter by Switzer establishes a sharper goal-orientated focus. The comprehensive discussion of the electrodeposition of two- and three-dimensional structures explains clearly the synthetic objective of the work, and shows how it relates to better-established nonelectrochemical techniques such as molecular beam epitaxy. The next two chapters deal with the electrochemical preparation of porous semiconductors. Kelly and Vanmaekelbergh summarize their work on porous compound semiconductors such as GaP, and Green, Létant, and Sailor give a rather brief account of the preparation and properties of porous silicon. Much of this work has been discussed more comprehensively elsewhere. The two chapters that follow both deal with nanocrystalline systems, with particular reference to dye-sensitized nanocrystalline solar cells. Lindquist and co-authors focus on charge transport in nanostructured films, and their chapter is well researched with an extensive bibliography. By contrast the chapter by Cahen and co-authors on dye-sensitized cells is more self-referential and ignores a substantial body of more recent work. The very substantial overlap in terms of subject matter between these two chapters is surprising, and it demonstrates the lack of interaction between authors during the preparation of the book. The final chapters by Kamat (electrochromic and photoelectrochromic aspects) and by Cassagneau and Fendler (self-assembled ultrathin films) are competent and up-to-date reviews. That by Cassagneau and Fendler is a pleasure to read, since it communicates a feeling for a dynamic and expanding area that will clearly make a real impact in terms of new technology.

After reading this book, I was left with the impression that its chapters had come together by a process of self-assembly. The lack of thematic structure and the absence of editorial influence inevitably detract from the intrinsic importance of the topics covered. A glance at the list of symbols (listed for each chapter at the end of the volume) reveals a series of errors and inconsistencies. The Faraday constant becomes Faraday's number; film thickness is variously L, d, D, and even W. This inconsistent collection of symbols and definitions is likely to confuse readers and set a poor example to graduate students. Perhaps publishers should make editors more aware of the important role that they can play in eliminating such inconsistencies and errors. In spite of these deficiencies, this book is an excellent source of information and a good introduction for readers who wish to know more about the way in which electrochemistry is contributing to the rapid evolution of nanoscale materials and systems.

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Combinatorial Library Design and Evaluation. Edited by *Arup K. Ghose* and *Vellarkad N. Viswanadhan*. Marcel Dekker, New York 2001. 631 pp., hardcover $ 195.00.—ISBN 0-8247-0487-8

This book contains 20 articles by authors from both industry and academia, arranged in four parts. Part 1 consists of a very informative introduction which explains the basic principles of the design of small molecule libraries. Part 2 consists of six articles dealing with the principles of modeling pharmacophores, establishing quantitative structure–activity relationships, molecular docking methods, and the broad topic of scoring functions. Part 3 contains eight articles on topics of current interest in the area of library design. These include detailed discussions of knowledge-based methods, the concept of "drug-likeness", different measures of diversity, special algorithms for virtual screening, combinatorial approaches, and various current ideas for defining and measuring "molecular similarity". Lastly, Part 4 consists of five articles dealing with some special methods and with the practical application of the methods described in the preceding chapters.

Special emphasis is given to the recent trend of using different computer-aided methods in combination, and also the integration of these into strategies for searching for new pharmacologically active agents. Reading the book gives one a clear appreciation that a single method is often insufficient for success, and that in most cases a combination of several molecular descriptions and methods of classification and virtual screening is more likely to achieve the

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desired goal, namely the design of small molecule libraries with high hit rates in biological and biochemical tests.

"Combinatorial chemistry" is the recurring theme that runs through all the chapters. However, it is interesting that the meaning given to this term has changed over the course of the last few years. Whereas combinatorial chemistry methods were previously associated with synthesizing many "diverse" molecules in the most efficient way possible, many of the articles in this book clearly reflect a modern view originating from trends in the industrial development of pharmaceutical agents. According to this, combinatorial chemistry methods, together with new algorithms, enable one to generate "focussed" molecule libraries aimed at achieving a particular biological activity, with active molecule hit rates that can reach several percent, a success rate significantly better than that of "conventional" combinatorial libraries.

This book edited by Arup Ghose and Vellarkad Viswanadhan offers an excellent basis of information for all scientists interested in the subject, and also for students. In addition to easily understandable introductory sections and reviews, it contains practical examples which effectively illustrate the complex subject of computer-aided design of combinatorial libraries, and convey a balanced picture that can also be appreciated by newcomers to the area. The editors have been very successful in combining these functions. The excellent quality of all the articles is complemented by a good standard of production, clearly printed text and formulas, and many informative figures and tables which are a valuable reference source. I hope that the book will reach a wide readership—in my view it is a masterpiece!

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Quaternary Ammonium Salts. Their Use in Phase-Transfer Catalysis. By *R. Allen Jones*. (Series: Best Synthetic Methods.) Academic Press, San Diego 2001. xxii + 565 pp., hardcover $ 159.95.—ISBN 0-12-389171-X

This book is mainly intended for synthetic organic chemists. However, it will be of interest to any chemists who may have a need to employ phase-transfer catalysis in their work.

The book starts with a chapter outlining methods for the preparation of quaternary ammonium salts and a brief discussion of their use as phase-transfer catalysts. There follows a series of chapters organized by reaction type. All of the main reaction processes that can benefit from phase-transfer catalysis (nucleophilic substitutions, base-promoted reactions, oxidations, reductions, etc.) are covered in detail, and the extensive use of tables nicely illustrates the range of substrates and catalysts that can be utilized. As with other books in the series *Best Synthetic Methods*, there is a strong emphasis on practical aspects of the subject. Experimental procedures (over 600 in total) are provided throughout all chapters, and often a number of alternative methods for achieving the same type of transformation are presented. This feature is complemented by a detailed table of contents at the start of the book, which makes it easy for the reader to rapidly locate a reaction of interest.

In general the coverage of the literature is excellent and appropriate references are included at the end of each section. Although citations up to 1999 are included, the vast majority of the content is drawn from work published during the period 1965–1995. This is entirely appropriate for most aspects of this subject, but does mean that some of the recent developments in asymmetric phase-transfer catalysis are not covered.

As might be expected for a first edition, there are a number of minor typographical errors, including occasional numerical errors in the procedures, but these should be obvious to most readers. There are also a few instances where ambiguous terms are used to describe specific quaternary ammonium salts. For example, "Adogen" and "Aliquat" are used when referring to Adogen 464 and Aliquat 336, and the term "quininium salt" is often used when referring to a variety of different cinchona alkaloid derived salts. Apart from these minor quibbles the production quality is of a high standard.

Any book on this subject will inevitably be compared with the classic texts *Phase Transfer Catalysis*, edited by E. V. Dehmlow and S. S. Dehmlow (VCH, Weinheim, 1993), and *Phase-Transfer Catalysis—Fundamentals, Applications, and Industrial Perspectives*, by C. M. Starks, C. L. Liotta, and M. C. Halpern (Chapman & Hall, New York, 1994). This book differs in that it is specifically concerned with quaternary ammonium salts and so does not include information about other types of phase-transfer catalysts (phosphonium salts, crown ethers, etc.). It also lacks the detailed discussion on kinetics and mechanism found in the earlier texts. The value of this book lies in the inclusion of more recent material, and the vast amount of detail relating to practical aspects of the subject. This makes it an ideal starting point for anyone seeking information on how to perform a particular phase-transfer reaction catalyzed by a quaternary ammonium salt.

Overall this book should serve as an excellent resource for anyone involved in synthetic organic chemistry.

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  1433-7851/02/4106-1074 $ 17.50+.50/0 *Angew. Chem. Int. Ed.* **2002**, *41*, No. 6