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Book Reviews

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*Book Reviews**

"**An Introduction to Molecular Electronics**", edited by Michael C. Petty, Martin R. Bryce, and David Bloor, Oxford Univcrsity Prcss, New York, 1995; ISBN: 0-10-521156-1; xiv + 387 pages; $42.50.

This book was developed from a series of short courses given at the University of Durham during the summers of 1987–1991. Many of the chapters are contributed by re; the original lecturers. The book is an attempt to bridge the boundaries of traditional disciplines, and it is aimed at final year undergraduates and research students from diverse backgrounds. The topics covered in this book have considerable overlap with those found in 'Molecular Electronics', edited by G. 1. Ashwell, John Wiley & Sons, 1992, although there is considerably more coverage of biological topics in the present volume. This book deals with both the use of molecular materials for electronic, optical, and magnetic applications as well as electronic phenomena in molecular scale devices.

Following an overview chapter by D. Bloor and one on theory by R. W. Munn, the remaining 14 chapters deal with physical phenomena and molecular materials that exhibit them (e.g., conductive polymers), classes of materials and the phenomena they exhibit (e.g., liquid crystals), experimental techniques (e.g., scanning tunneling microscopy), potential applications (e.g., biosensors), and a turistic essay ("Molecular Electronic Logic and Architectures").

In Chapter 8, "Conductive Charge-transfer Complexes", the statement that 'the first *stable* highly-conducting organic solids were reported by workers at DuPont laboratories in 1962" is inaccurate. The DuPont work on conductive TCNQ saits was reported earlier: D. S. Acker, *et al.*, *J. Am. Chem. Soc.*, 82, 6408 (1960).

In Chapter 4, "Molecular Magnets", the authors correctly express reservations about the quality of the characterization of some of the materials claimed to be bulk ferromagnets. Their characterization of some of the claims as "irreproducible or even false' should probably have simply been termed irreproducible. They correctly call for substantiation of claims of materials reported to be bull, rrromagnets. In that spirit, the Book Review Editor and his collaborators (M. LevincfJn, P. G. Rossoni, and E. A. Yost, unpublished experiments, 1991) reproduced the claim of ref. 23 of Chapter 4 of I bulk ferromagnetism in polyaryl resins. However, the weight percentage of carbon and hydrogen in these amorphous materials decreased as a function of time.

In spite of the reservations noted above, students and individuals seeking initial information about the topics covercd will find the chapters in this book quitc rcadablc and generally useful.

"**Polymers For Second-Order Nonlinear Optics**" edited by Geoffrey A. Lindsay and Kenneth D. Singer, American Chemical Society Symposium Series Volume 601, 1995; ISBN 0-8412-3263-6; xiv + 545 pages; $139.95.

This book was developed from a symposium co-sponsored by the ACS Divisions of Polymer Chemistry, Inc. and Polymeric Materials: Science and Enginering, Inc., and the

*Unsigned book reviews are by the Book Review Editor

Optical Society of America held at the 208th National Meeting of the American Chemical Society, Washington, D. C., August 21–25, 1994. While the symposium itself included other topics such as third-order materials, electroluminescence, and passive waveguides, the book deals only with second-order nonlinear optical polymers (NLOP).

The book consists of an overview chapter on second-order NLOP by G. A. Lindsay, and sections titled "Chromophores: Design, Synthesis, and Optical Measurements"(8 chapters); ": Polymers: Synthesis and Characterization"(8 chapters); "Chromophore Alignment"(5 chapters); "Long-Term Thermal, Photo, and Oxidative Stability"(7 chapters); and "Thin Film Devices"(8 chapters). The book contains author, affiliation, and subject (19 pages) indeces. The author list indicates that many of the important contributors participated and is international in character with contributions from many labs in Europe and Asia as well as North America.

Lindsay's overview chapter summarizes not only the relevant issues of this subject as it evolves toward practical devices but aso an indication of the chapters that describe useful developments. The references include all of the standard treatises on the subject. The eight chapters on chromophores summarize the most recent quantum chemical approaches to the design of new materials with useful$^{(2)}$ values. This volume will clearly be useful to those active in the study of second-order NLOP as the subject moves in more practical directions.

The book is dedicated to the memory of the late Ronald Andrew Henry who had made numerous contributions to the subject of second-order NLOP.

"Molecular Engineering for Advanced Materials", edited by J. Becher and K. Schaumbrug, NATO ASI Series C Vol.456. Kluwer Academic Publishers, Dordrecht, Boston, London, 1995; ASBN 0-7923-304-0, xx + 376 pages: $189.00.

This book contians the proceedings of the NATO Advanced Research Workshop in Molecular Engineering for Advanced Materials held in Hindsgavl, Denmark on May 7-11, 1994. In the Introduction, the eidtors note that the terms "Molecular Engineering" and "Advanced Materials" are not well defined. It is apparent that the subject is multidisciplinary and that topics such as molecular assemblies, supramolecular chemistry, self assembly, and transitions from supramolecues to materials are important. The book consists of twenty chapters concerning synthesis and characterization of both molecular and polymeric systems. Eight chapters are devoted to recent developments in tetrathiafulvalence materials, as researchers seek new systems to go beyond existing organic metals and superconductors. Four chapters are devotged to rotaxanes and two to calixarenes. Several chapters are particularly noteworthy. J.F. Stoddart gives a useful overview of his work in catenanes and rotaxanes. K. Müllen presents an interesting overview of the role of synthesis in the search for new electronic materials with a strong emphasis on the role of oligomers as models for the properties of polymers M.P. Cava reports an interesting summary of heterocyclic annulenc chemistry emphasizing synthesis and characterization of thiophene systems.

The book also gives a list of participants at the workshop, an author index and subject index.