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BOOK REVIEWS

Molecular Wires: From Design to Properties. Topics in Current Chemistry, 257. Edited by L. De Cola (Westfälische Wilhelms-Universität, Münster, Germany). Springer: Berlin, Heidelberg, New York. 2005. x + 170 pp. $159. ISBN 3-350-25793-4.

There is little in this disparate compilation to recommend it. The editor begins the preface by asking the rhetorical question "what is a molecular wire?" and then provides a reasonable answer: "... a molecular wire is a molecule or an assembly of molecules able to strongly electronically couple the terminal sites in order to mediate energy and charge transport *over long distance* [italics are mine]." Whatever this book is about, it is not about that. Indeed, the first contribution by Yam and Wong on transition-metal alkynyl complexes as luminescent molecular rods uses the term "wire" in the context that these molecules may find their way into applications as "nonlinear optical materials, liquid crystals, molecular electronics and wires." "Wires" are mentioned only once again.

In the second contribution, Tour and James purport to "review the field" after redefining molecular wires to be "compounds that are proposed to be used in molecular electronic and optoelectronic devices to replace the metal and silicon-based wires in semiconductor devices." This certainly broadens the definition! Based on this notion, a catalyst can now be defined as any compound that is proposed to alter the rate of a chemical reaction. The review is hardly one covering the field and is almost exclusively based on the molecules synthesized in the Tour group, with a brief review of the measurements of conduction (all on small oligomers). The chapter is summarized with an argument that the polymers discussed in the contribution, either proposed or synthesized, are "the best candidates" to replace Al or Cu wiring in logic and memory devices. There is little new information in this contribution and even less evidence presented to support the premise on which it is based.

The third contribution by Chiorboli, Indelli, and Scandola is another variation on a very mature theme: photoinduced electron transfer in binuclear metal complexes, specifically those of Ru(II)−Ru(III) and Ru(II)−Os(II). To work this into a book on "molecular wires", the authors have again strayed from the definition set by the editor. In this case they state "In a very broad sense, this term can be used to designate any molecular structure able to mediate the transfer of electrons between appropriate donor and acceptor sites (electrodes, photo- and redox-active molecular components)." While this definition is probably too broad for the editor, short-range electron transfer and the nature of the donor−acceptor pair are important considerations in the overall process of molecular conduction, and an appropriate treatment of this concept might have been discussed in this volume. Unfortunately, the link is never made between photoinduced electron transfer and molecular wires with thermally populated conduction levels.

The fourth contribution by Weiss, Wasielewski, and Ratner is essentially a review of the theoretical basis for molecular conductivity and should have been the cornerstone upon which the remainder of the volume was based. If this had been the first chapter in the volume, followed by experimental papers that addressed the predictions of the theory of charge transport mechanisms presented here, this might have become the book that the editor intended it to be.

The final contribution by Grozema, Siebbeles, Gelinck, and Warman is about the optoelectronic properties of isolated phenylenevinylene molecules. The word "wire" occurs three times in this manuscript: in the title, the keyword list, and in a discussion of electron−hole mobility, covering a little over 4 of the 30 pages in the chapter. Most of the contribution is a discussion of the photophysics of these molecules. Despite this, some interesting experimental and theoretical work actually related to potential conduction along polymers is presented here, albeit a far cry from the editor's definition of molecular wires.

In summary, there is *some* interesting, perhaps even valuable, material in this book, but little of it has anything to do with molecular wires as defined by the editor.

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Organic Reactions, Volume 66. Editor-in-Chief: Larry E. Overman (University of California, Irvine). John Wiley & Sons, Inc.: Hoboken, NJ. 2005. x + 654 pp. $125.00. ISBN 0-471-68258-6.

This volume of *Organic Reactions* contains a dedication to Blaine Chase McKusick, who died in January 2005, and the following two chapters: "The Allyic Trihaloacetimidate Rearrangement" by Overman and Carpenter and "Asymmetric Dihydroxylation of Alkenes" by Noe, Letavic, Snow, and McCombie. The book concludes with a list of cumulative chapter titles by volume, an author index for Volumes 1−66, and a chapter and topic index for Volumes 1−66.

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Nanotubes and Nanowires. By C. N. R. Rao and A. Govindaraj (Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India). Royal Society of Chemistry: Cambridge. 2005. xii + 272 pp. $149.00. ISBN 0-85404-832-4.

This monograph provides a summary of the published literature on nanotubes and nanowires. The book is divided into three major sections: the first deals with single-wall and multiwall carbon nanotubes, the second, with inorganic nanotubes, and the third, with inorganic nanowires. Each chapter contains a short introduction to the topic, followed by an extensive summary of the literature. The focus is primarily on

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synthesis, but the book also includes more limited information on characterization, chemical functionalization, modification, and applications.

This book should be useful to anyone in the field who needs to quickly sort through the vast amount of scientific literature dealing with nanowires and nanotubes. It provides a relatively complete summary of reported observations and references. Although there are relatively few critical comparisons or connections drawn between different publications that might have provided a broader contextual understanding or identified important unresolved questions, the book does serve as a valuable reference by summarizing observations and pointing the interested reader to many important papers in the relevant scientific literature. The book features more than 1100 references, including many as recent as 2004 and some from 2005. Given the large number of papers and the many methods now used to grow nanoscale materials, this book does a truly admirable job of summarizing the literature in this rapidly changing field.

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Cinnolines and Phthalazines, Supplement II. The Chemistry of Heterocyclic Compounds, Volume 64. Edited by D. J. Brown (Australian National University, Canberra). Series Edited by Edward C. Taylor and Peter Wipf. John Wiley & Sons, Inc.: Hoboken, NJ. 2005. xviii + 482 pp. $425. ISBN 0-471-48587-X.

This book covers the literature on cinnolines and phthalazines from 1972 to 2004. It is a supplement to Volumes 5 and 27 on these two systems as published in 1953 and 1973, respectively. The book concludes with an appendix of tables of simple cinnolines and simple phthalazines, a comprehensive list of references, and an extensive index.

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Progress in Heterocyclic Chemistry, Volume 17. Edited by Gordon W. Gribble (Dartmouth College, Hanover, NH) and John A. Joule (The University of Manchester, UK). Elsevier Science Ltd.: Kidlington. 2005. vii + 450 pp. $275.00. ISBN 0-08-044711-2.

Like previous volumes in the *Progress in Heterocyclic Chemistry* series, this one covers the literature published during 2004 on important heterocyclic ring systems. It opens with two specialized reviews: "Furans as versatile synthons for target-oriented and diversity-oriented synthesis" by Wright and "Synthesis and photochromic properties of naphthopyrans" by Hepworth and Heron. The remaining chapters cover four- through eight-membered and larger ring systems, respectively. Three-membered rings are not reviewed in this volume. An index of the names of systematic heterocyclic ring systems completes the book.

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Encyclopedia of Inorganic Chemistry, 2nd ed. Edited by R. Bruce King (University of Georgia). John Wiley and Sons, Inc.: Hoboken, NJ. 2005. 6696 pp. $5450.00. ISBN 0-470-86078-2.

This 10-volume set contains approximately 300 articles and 1000 short entries in alphabetical order on important concepts in inorganic chemistry. The contents are organized into the following subject areas: main group elements; transition metals and coordination chemistry; organometallic chemistry; bio-inorganic chemistry; solid state, materials, nanomaterials, and catalysis; and general inorganic chemistry, theoretical, and computational methods. The encyclopedia has been expanded by 30% since the first edition was published 10 years ago and now offers color illustrations.

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