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BOOK REVIEWS

Bio-inorganic Hybrid Nanomaterials: Strategies, Synthesis, Characterization and Applications. Edited by Eduardo Ruiz-Hitzky (Instituto de Ciencia de Materiales de Madrid, Spain), Katsuhiko Ariga (National Institute for Materials Science, Tsukuba, Ibaraki, Japan), and Yuri Lvov (Louisiana Technical University, Ruston, LA, USA). Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim. 2008. xviii + 504 pp. $ 215. ISBN 978-3-527-31718-9.

The synthesis of complex hierarchical inorganic materials in a process called biomineralization is very common in Nature. Biomineralization typically involves self-assembly of inorganic precursors with biomolecules and/or biomolecule-initiated nucleation and growth processes. This results in various biomaterials having complex structures, shapes, hybrid organic−inorganic or hybrid biomolecule−inorganic compositions, and, most of all, properties such as increased strength and hardness that are beneficial for the living organism. Examples of these include our own bones and teeth, the seashells of many sea organisms, and the colorful opals in butterfly wings. By mimicking these natural biomineralization processes, materials scientists, chemists, and biomedical engineers alike have synthesized complex synthetic hierarchical materials for various biological, medical, nanoelectronic, and other technological applications. In particular, the synthesis of such complex biomaterials with nanoscale structures has been drawing much attention over the past several years due to the unique properties of the nanoscale structures combined with the robust material properties of hybrid biomaterials.

The 15 chapters of this book provide a comprehensive review of different synthetic methods for and the potential applications of various classes of bioinorganic nanomaterials, which combine two classes of materials, biological and inorganic, at two extremes in the materials world. The chapters are well written and have appropriate schematics and figures that definitely aid in understanding the discussion. The synthetic strategies, hybridization, and assembly of many biounit building blocks with various inorganic precursors into many bioinorganic nanomaterials are clearly outlined. The authors also discuss a range of potential applications for the different materials, and a wealth of recent and pertinent references are provided.

The book truly reflects the complementary nature of chemical, materials, and biological synthetic approaches to novel nanomaterials, which will be useful for a number of researchers in various disciplines. Moreover, it demonstrates the pace and advancement of research in these areas while showing several examples that are of interest to wider audiences. Many researchers should benefit from the important information regarding synthesis, characterization, properties, and applications of various types of bioinorganic nanomaterials. The book can further serve as a guide for many years to come for researchers striving to advance the pace of research in bioinorganic nanomaterials.

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Asymmetric Synthesis with Chemical and Biological Methods. Edited by Dieter Enders (RWTH, Aachen, Germany) and Karl-Erich Jaeger (Institut für Molekulare Enzymtechnologie der HHU Düsseldorf im FZ Jülich, Germany). Wiley-VCH Verlag GmbH and Co. KGaA: Weinheim. 2007. xxiv + 446 pp. $215. ISBN 978-3-527-31473-7.

To write a critical review of a book is no easy task, particularly when you have sat in the editor's chair and put together books of your own, the faults of which you feel all too well and hope others will not notice. *Asymmetric Synthesis with Chemical and Biological Methods* is interesting in that it amounts to a rather unusual contribution to the literature. It is a diverse compilation of research conducted under the auspices of the Sonderforschungsbereich (SFB) 380, one of a number of special thematic cooperative research efforts that have been and continue to be funded by the Deutsche Forschungsgemeinschaft. From 1994 to 2005, SFB 380 was dedicated to research as described by the book's title. After a little over 10 years, the SFB ended and the results obtained were very impressive. This book appears to be the final research report.

The first 70% of the book deals with both stoichiometric and catalytic aspects of asymmetric synthesis. Here we find an update on RAMP/SAMP reactions and related chemistry by Enders, contributions by Gais and Bolm on various aspects of sulfoximine chemistry, discussions of Daniphos, phosphaferrocenes, paracyclophanes, Quinaphos, and other species as ligands in asymmetric catalysis, and a variety of other topics. The last portion of the book deals with biological methods for asymmetric organic synthesis. The areas covered include carbon−carbon bond-forming reactions, such as those involving aldolases, lyases, and ketolases, and asymmetric reduction, with dehydrogenases, for example. There is a small section on the engineering aspects of asymmetric synthesis including discussions of membrane reactors and biphasic chemistry, especially with respect to the use of enzymes.

Although the contributions made to chemistry by the authors are considerable, the range of what is covered is a bit narrow because they focus very heavily on the chemistry they produced as part of SFB 380. Consequently, the reader does not get a comprehensive view of that area of chemistry by reading these chapters. In addition, chemistry that is outside the timeline of SFB 380 does not appear to be covered. I also felt that a bit more detailed mechanistic information could have been included in some of the chapters. This would have been especially helpful and important for newcomers to the areas presented in the text.

Overall, this is a reasonable contribution to the literature and indeed is a fantastic testimony to SFB 380 and its many talented

Unsigned book reviews are by the Book Review Editor.

10.1021/ja803891f CCC: $40.75

participants. It would be a useful book for a library. However, I wonder if it is it appropriate to publish a book that sums up the work of an SFB and ask people to pay for it? There are well over 100 of these research entities in existence. Are we to see books from all of them? As chemical information grows, it is going to be increasingly important for publishers, editors, and authors to select how information is disseminated. The answers will not be easy, but this type of book, however fine its content and talented its contributors, does not seem to be the way to go. By writing this review, I have earned a personal copy, but it is doubtful that I would have purchased one for individual use otherwise. I prefer a broader scope in a book bearing this kind of title. There exists another review of this book that might be of interest to readers (see Mahrwald, R. *Angew. Chem., Int. Ed.* **2007**, *46*, 6221). It presents more details about the content and varies with the present review with respect to perspectives on the book's overall value.

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Inorganic and Organometallic Macromolecules: Design and Application. Edited by Alaa S. Abd-El-Aziz (University of British Columbia, Okanagan), Charles E. Carraher, Jr. (Florida Atlantic University, Boca Raton), Charles U. Pittman, Jr. (Mississippi State University, Mississippi State), and Martel Zeldin (University of Richmond, Virginia). Springer Science + Business Media, LLC: New York. 2008. xii + 476 pp. $119.00. ISBN 978-0-387-72946-6.

This book has 18 chapters that, taken collectively, provide a good overview of the very broad scope of polymer science involving metallic and/or main group elements. The reviews (typically 20−40 pages in length) are current and include extensive lists of references. There is also a comprehensive index that is useful for locating a specific topic that may be covered in multiple chapters. Although the chapters are by several different authors, the book has a consistent style and format throughout, reflecting thoroughness and attention to detail by the editors.

Only three chapters (dealing with vanadium, hafnium, and antimony) take the traditional one-element-at-a-time survey approach. Instead, most chapters involve a more thematic—and probably more useful—approach involving general synthetic methods, properties, or applications. The first two chapters are especially noteworthy in this regard, focusing on the vast synthetic versatility and structural modularity that is currently being achieved in linear, block, and hyperbranched organometallic macromolecules. Other major themes that are well covered in one or more chapters include biochemical/biomedical materials, e.g., metal-binding studies of ferrocene peptides, platinum derivatives as antiviral or antitumor drugs, and organotin polymers for bacterial inhibition; optoelectronic and photophysical properties/applications, e.g., of metal-acetylide polymers and various systems containing azo dyes, diphosphines, or diisocyanides; and high-temperature/preceramic polymers, such as those based on borazine, carboranyl, siloxane, or silarylene chemistry.

In general, scientists engaged in a variety of areas of polymer chemistry, biomedicine, catalysis, electronics, etc. will find significant topics of interest in this book. It could also serve as a primary text or major reference volume for a graduate-level special topics course in organometallic polymers.

Robert H. Neilson, *Texas Christian University*

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Macromolecules, Volume 3: Physical Structures and Properties. By Hans-Georg Elias (Michigan Molecular Institute, Midland, MI). Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim. 2008. xxxiv + 666 pp. $290. ISBN 978-3-527-31174-3.

This third book of the series *Macromolecules* is preceded by Volume 1, published in 2005, covering chemical structures and the principles of macromolecular synthesis, and Volume 2, published in 2007, on industrial polymers and their syntheses. The present volume concerns the physical structures and properties of macromolecules, including single macromolecules and polymers. There is discussion of basic chemical structures, molar mass averages and distributions, microconformations, macroconformations, scattering methods, physical structures in the solid state, the properties of polymers in solution as well as in the molten and bulk states, and mechanical properties. Each chapter concludes with historical notes, general literature, and specific references. The latter are contained in legends for figures and do not appear to be associated with the narrative itself; moreover, very few of them are more recent than 2000. The book is completed by a subject index and a five-part Appendix consisting of tables of SI and common physical quantities and units, a list of terminologies for concentrations and ratios of physical quantities, and a list of the names and constitutions of the polymers discussed in the book.

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