

Supramolecular Design for Biological Applications.

Edited by Nobuhiko Yui (Japan Advanced Institute of Science and Technology, Ishikawa). CRC Press: Boca Raton. 2002. xiv + 410 pp. \$139.95. ISBN 0-8493-0965-4.

This monograph summarizes but also greatly extends the material presented at The Sixth World Biomaterials Congress (May 2000). Three broad areas are defined in discrete sections, each containing several chapters with relevant subtopics. The first section is entitled “Basic Strategies for Supramolecular Architectures”, which includes individual chapters about the “forces” that drive supramolecular interactions and self-assembly: hydrophobic effects, electrostatics, and hydrogen bonding. Because the theoretical aspects of these forces have not changed dramatically during the history of chemistry, these chapters are a concise summary of vast older literature. However, they also include many recent examples of exquisite design, wherein these forces are harnessed with increasing control at the molecular level. Also included in this section are chapters describing physical adsorption at surfaces, polymer networks, and interlocking molecules. The relevance of these topics to modern biomaterial design is made clear.

The second and largest section, “Biological Applications of Supramolecular Architectures”, includes chapters about smart polymers, biodegradable polymers, and polymeric micelles and their utility in drug delivery, gene delivery, sensing and diagnosis, cellular modulation, and catalysis. The scope is wide and includes molecular imprinting, stimuli responsive systems, and self-replicating molecules. Although the chemistry behind these varied topics is sometimes unrelated, this chapter does a superb job of illustrating the real and potential impact of supramolecular design in biomedical and biotechnological applications. Supramolecular design adequately emerges as the common denominator.

The final section, entitled “Future Aspects of Supramolecular Architectures”, is quite brief, consisting of a single chapter on mesoscopic supramolecular assemblies. Although it contains exciting examples including dendrimers, metal ion arrays, and bucky tubes, it revisits many of the design principles and concepts explored in the earlier chapters. Such duplication is unavoidable in monographs that contain multiple authors. Still,

the extension of these principles to the mesoscopic scale nicely punctuates the amazing potential of this type of chemistry. In particular, this chapter contains very recent literature citations, and it is as “up-to-date” as can be expected in this rapidly moving area.

Overall, this collection is a perfect blend of exciting new examples of supramolecular assemblies and the fundamental theory and historically important research on which they are based. The book makes excellent use of graphics, which make each subtopic easily accessible to researchers from other areas. In fact, it is difficult to imagine any chemist who would not be fascinated by the countless examples of “molecular tinker toys”. Because this book describes so many different types of molecular assemblies based on diverse components, it should be viewed as a resource with “something for everyone”.

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CRC Handbook of Chemistry and Physics. 83rd

Edition. Edited by David R. Lide (National Institute of Standards and Technology). CRC Press: Boca Raton. 2002. + 2664 pp. \$139.95. ISBN 0-8493-0483-0.

The 83rd edition of this well-known reference book continues to provide current, critically evaluated chemical and physical data. New topics introduced in this edition include *Thermodynamic Constants for Buffers used in Biological Research*, *Viscosity of Liquid Metals*; *Eutectic Temperatures of Low-Melting Alloys*; *Correction of Barometer Readings*; *Sensitivity of the Human Eye to Light of Different Wavelengths*; *Characteristic Bond Lengths in Free Molecules*; *Viscosity and Density and Concentrated Hydroxide Solutions*, and *Thermodynamic Functions, Equations, and Relations*. Also, a directory of sources of physical and chemical data has been added as an appendix, which includes listings of data journals, data centers, other handbooks, and useful Web Sites. Many tables that appeared in previous editions, such as *Standard Thermodynamic Properties of Chemical Substances* and *Standard Atomic Weights*, have been expanded and updated.

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