

Structural biological materials

M. Elices (Ed.); Elsevier, Oxford, 2000, 376 pages, ISBN 0-08-043416-9 (\$146.00)

Throughout evolution, nature has produced materials that are perfectly adapted to fulfil specific functional roles, with properties of durability, strength, mechanisms of programmed self-assembly and biodegradability. Because processing and recycling are subjects of major concern, natural biological materials provide material scientists with inspiration and ingenuity, as biological compounds are biosynthesised under benign processing conditions and are biodegradable; excellent models for the production of advanced novel materials. The scopes of structural biological materials, which are characterised by hierarchical architectural design with lengths scales ranging from the molecular to macroscopic, are vast and impressive.

Structural biological materials is part of the Pergamon Materials Series, and adopts a multidisciplinary approach, focusing on recent advances in physics, chemistry and molecular biology. The book aims to show some examples of the relationships between the structures, properties and functions of biological materials: features that represent desirable objectives in the design and manufacture of synthetic structural materials. In the text, new areas are covered and updates on some topics are given. Themes not mentioned in earlier publications are also dealt with.

The book starts with an introduction followed by a section covering general concepts on the nature of natural materials and principles of structure–property relationships. Subsequent sections explore three sub groups of structural biological materials. The fundamental relationship between structure, property and aspects of design and engineering are explored in each sub group. The importance placed on the properties and specific functions of these materials are illustrated with relevant examples.

The section on hard tissue engineering, focusing on cortical bone, describes the main structural features of bone with details of its histology and mechanical properties, especially elastic constants and fracture and fatigue properties. The section on soft tissue engineering covers more ground, concentrating on characteristics and mechanical properties of cartilage and tendon, in addition to information on bioartificial implants and biomimicry. The engineering characteristics of fibre are covered in the final section, with information given on several fibrous biological systems, as well as silk fibres. A chapter on computer models for mechanical properties of fibres in general, and another chapter on the modelling of stress–strain behaviour of spider dragline is also included.

Structural biological materials contains numerous diagrams and illustrations and a glossary. It is an important reference book for graduates, academic researchers and scientists involved in the biological materials field.

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The Handbook of Enology

Vol. 1; The Microbiology of Wine and Vinifications, P. Ribéreau-Gayon, D. Dubourdieu, B. Donèche, A. Lovaud; Wiley, Chichester, 2000, 454 pp., ISBN 0-471-97362-9, £75.00. Vol. 2; The Chemistry of Wine Stabilization and Treatments, P. Ribéreau-Gayon, Y. Glories, A. Maujean, D. Dubourdieu; Wiley, Chichester, 2000, 404 pp., ISBN 0-471-97363-7, £75.00 (2 Vols set, ISBN 0-471-49865-3, £125.00)

Wine growing and production has become an important part of the international economy. Since the 19th century, our understanding of wine, wine composition and transformations has greatly progressed in function of advances in relevant scientific fields as chemistry, biochemistry, and microbiology. Each applied development has led to better control of winemaking and ageing conditions, providing wine quality. In order to continue this approach, researchers and winemakers must strive to remain up to date with the latest scientific and technical developments in enology.

The role of enology is to express the characteristics of the grape specific to variety and vineyard practices, as well as maturation conditions, which are dependent on soil and climate. Science has improved all steps in the production process of wine, starting with the biology of plants, the chemistry of the soil, the technology of picking and pressing the grapes and the microbiology of the fermentation processes. High performance technology is essential for the production of great wines, since a lack of control of winemaking parameters can easily compromise their quality.

For the understanding of current advances in winemaking, *Handbook of Enology Volume 1: "The Microbiology of Wine and Vinifications"* and the second volume of the *Handbook of Enology Volume 2: "The Chemistry of Wine Stabilization and Treatments"* has been proposed. These books are edited by the Director of one of the leading

wine institutes in the world, The Institut d'Oenologie de l'Université de Bordeaux — Pascal Ribéreau-Gayon.

Handbook of Enology Volume 1: "The Microbiology of Wine and Vinifications" describes microbial fundamentals of winemaking combining a scientific knowledge with its application during harvest, from grape-picking to the end of the fermentation processes in the cellar.

Handbook of Enology Volume 2: "The Chemistry of Wine Stabilization and Treatments" uniquely combines chemical theory with the description of day-to-day work in latter stages of winemaking from clarification and stabilization treatments to ageing processes. The second volume of the Handbook discusses methods such as sedimentation, centrifugation and precipitation and their use in ensuring an end product of top quality.

The goal of these two books was to choose the most relevant and significant publications in the particular field of research. A large number of references to French enological research have been included in order to make this information available to a larger English speaking audience.

Volume 1 describes the first phase of winemaking or "vinification" (as has been used in this book). It comprises all technical aspects from grape maturity and harvest to the end of alcoholic and malolactic fermentation. The second phase of winemaking is described in *Volume 2* "maturation, stabilization and treatment", which refers to wine aging. Since the first stage concerns microbiology, and the second chemistry, the individual operations could be linked to their particular sciences.

The description of the different steps of enology does not always obey logic as precise as the title of these books may lead to believe. Microbial contamination during ageing and storage are covered in *Volume 1*. Ageing of white wines and the resulting chemical transformations cannot be separated from vinification and are therefore covered in *Volume 1*.

Our understanding of phenolic compounds in red wine is based on complex chemistry. All aspects related to the nature of the corresponding substances, their properties and their evolution during grape maturation, vinification and ageing are therefore covered in *Volume 2*.

Handbook of Enology is an interdisciplinary resource for winemakers, students of ecology, and chemists interested in winemaking. Theoretical interpretations as well as solutions are presented to resolve the problems encountered most often in wineries.

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Microreactors

Wolfgang Ehrfeld, Volker Hessel, Holger Löwe Wiley-VCH Verlag GmbH, Weinheim, 2000, xi + 288 pages, ISBN 3-527-29590-9, £80.00

Microreaction technology is an extremely interesting and rapidly developing interdisciplinary field. New concepts of chemical synthesis have resulted in increasing the demand for miniaturization and more complex systems. Microreaction technology completely opens new possibilities for chemical engineering, combinatorial chemistry and biotechnology. Small, inexpensive, independent and versatile devices ensure many reactions achieve maximum selectivity, minimum waste, minimum investment, better control of the process, safe manufacture and production on command, to create a more efficient process. This book outlines fabrication techniques of microfluidic components, unit operations of micro chemical engineering and current worldwide activities. It also includes requirements with respect to the needs of the chemical industry.

Microreactors comprises eleven chapters and the contents of the book are divided into two major parts, with the beginning of each chapter aimed to present general aspects of a specific class of microdevices, while the details are discussed in separate sections. Initial chapters cover state of the art microreaction technologies, modern micro-fabrication techniques for microreactors, micromixers, and micro heat exchangers. Later chapters discuss microseparation systems and specific analytical modules for microreactors, microsystems for liquid phase reactions and for gas phase reactions, and gas/liquid microreactors. Finally, microsystems for energy generation and for catalyst and material screening, and methodologies for distributed production are covered.

Microreactors is written for both newcomers and experts interested in this exciting field, as well as for researchers from industry and research institutions. The book contains numerous illustrations and detailed references are included at the end of each chapter. It is a well presented and well structured state of the art review, which may be of great interest to chemists, chemical engineers, biotechnologists, process engineers, and microsystem technicians in the