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 biomimickry. 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