

## Filling the gap in hybrid materials

While many publications have covered the burgeoning field of hybrid materials for experts, a new work aims to bring this interdisciplinary area and its applications to a wider audience.

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The field of hybrid organic-inorganic materials is a burgeoning one. The possibility of combining inorganic and organic domains into a hybrid composite brings novel materials with new tunable properties. As well as being interesting from a fundamental point of view, hybrid materials have already reached the market in automotive paint, TV screen coatings, filtration membranes, etc. After being covered by several special journal issues and books for specialists in the last few years (especially the excellent *Functional Hybrid Materials* (Wiley-VCH, 2004) edited by Gómez-Romero and Sanchez), the area is now mature enough for an introductory text.

Hybrid materials constitute an interdisciplinary field that has advanced dramatically thanks to the efforts of researchers from diverse origins: sol-gel science, polymers, colloids, surfaces, inorganic materials, crystallography, physical chemistry, etc. This book aims to "fill the gap" between experts and newcomers to this dynamic field, bringing the concepts behind hybrid materials to a broader, interdisciplinary audience.

The book contains eleven chapters and the topics encompass the subjects of current interest in this broad field. Several chapters are focused in nanodispersed hybrids, reflecting the growing interest in processing hybrid materials for nanotechnology-related applications.

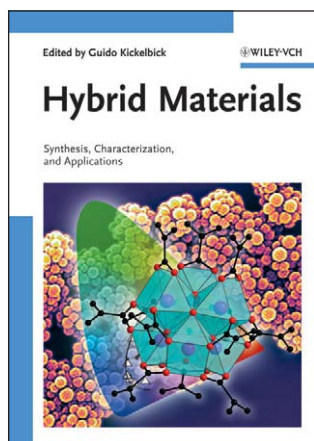
The articles are well written; a brief introduction is followed by soundly developed examples and applications. All chapters strive to give a clear presentation of the subject without sacrificing the scientific content. Schemes help to capture the spatial structures; this is a very important point in order to apprehend the structural complexity of the systems. However, some of the articles could benefit from a deeper presentation and discussion of experimental data. There is also some disparity in the reference sections; some chapters have ample well-classified and up-to-date references, others could be improved with suggestions for further reading.

The introductory chapter presents a broad overview of the field and the brief account of the general synthesis strategies and characterization techniques

is useful. A short 'perspectives' section at the end is desirable though. Chapter 2 deals with polymer/nanoparticle systems, giving a complete introduction to the subject, including applications. In Chapter 3, the synthesis routes and characterization of hybrid particles with controlled size, morphology, and structure are thoroughly described. The compact fourth chapter presents intercalation compounds and clay nanocomposites with some relevant examples. Chapter 5 deals with hybrids with controlled micro- or mesoporosity, and Chapter 6 is an excellent

introduction to polysilsesquioxane-based hybrids. Chapter 7 is devoted to complex hybrid biomaterials, both natural and those obtained by so-called biomimetic routes. Biomineralization is also introduced, and the importance of the organic-inorganic interactions in the shape and function of the final material is stressed.

The last four chapters describe applications. Chapter 8 presents medical applications, emphasizing issues such as biocompatibility, bioactivity and biodegradability of



Guido Kickelbick (ed.)

*Hybrid Materials: Synthesis, Characterization, and Applications*

Wiley-VCH • 2007 • 516 pp

ISBN: 978-3-527-31299-3

\$190 / £100 / €150

hybrid materials, and their use as coatings, scaffolds, membranes, or drug delivery agents. Chapter 9 is a thorough introduction to optical properties of hybrids and Chapter 10 looks at applications in electronics and electrochemistry. Finally, Chapter 11 describes hybrid coatings, emphasizing polymer matrix-based materials.

Overall, this is a useful book, ideal as a starting point in this thriving field; it can adequately supplement more advanced books in this subject. The level is adequate to establish a lecture-based course in hybrid materials. In spite of the variety of styles expected from a multi-author volume, the high quality, didactic, and well-referenced sections will undoubtedly guide the interested reader to the primary sources.

## Fundamentals of Radiation Materials Science: Metals and Alloys

Gary S. Was

Springer • 2007 • 827 pp

ISBN: 978-3-540-49471-3

\$129 / £77 / €99.95

Radiation causes metals and alloys to swell, distort, blister, harden, soften, and deform. Was describes the basics behind particle-atom interactions, the amount and spatial extent of the damage caused to materials, the physical effects of irradiation, and the resulting changes in mechanical behavior of irradiated metals and alloys. The book includes examples, a further reading list, and problems.



## Advanced Bioimaging Technologies in Assessment of the Quality of Bone and Scaffold Materials

L. Qin et al. (eds.)

Springer • 2007 • 700 pp

ISBN: 978-3-540-45454-0

\$299 / £168.50 / €219

Many new scaffold biomaterials are being developed for use in musculoskeletal tissue repair. This book takes a look at the advances in imaging techniques used to study such materials, including microcomputer tomography, magnetic resonance imaging, and ultrasound. The use of imaging contrast-enhancement materials to enhance bioimaging is also discussed.



## The Chemistry and Biology of Winemaking

Ian S. Hornsey

Royal Society of Chemistry • 2007

316 pp • ISBN: 978-0-85404-266-1

\$59.95 / £29.95 / €48.90

Before you set off for a quick drink with your research group, take a look at *The Chemistry and Biology of Winemaking*. The book begins with the history of wine. It then describes the science behind winemaking, starting with the grapevine itself and leading right up to the aging and maturation of wine.



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