Nanoethics: The Ethical and Social Implications of Nanotechnology

Fritz Allhoff, *et al.* (eds.)
Wiley • 2007 • 385 pp
ISBN: 978-0-470-08417-5
$39.95 / £21.50 / €30.10

The pros and cons of the nanotechnological age are examined by forty diverse contributions in this book. It begins by explaining the basis of nanotechnology and nanoethics, touching on issues such as privacy, nanomedicine, education, global regualtion, space exploration, artificial intelligence, human enhancement, and life extension.

Nanotechnology for the Regeneration of Hard and Soft Tissues

Thomas J. Webster (ed.)
World Scientific • 2007 • 260 pp
ISBN: 978-981-270-615-7
$81 / £44

The role of nanotechnology in improving the success of implants is outlined in this book. It focuses on the potential of nanophase materials for enhancing hard and soft tissue growth. The book documents successes in various areas of tissue growth, including bone, cartilage, vascular, and nervous system tissues, as a result of using nanophase materials for implantation. Chapters on vascular nanostents, carbon nanostructures, and the possible effects of nanoparticles on human health are included.

Nanocharacterisation

John Hutchison (ed.)
Royal Society of Chemistry • 2007
304 pp • ISBN: 978-0-854-04241-8
$159 / £79

In this handbook, a global team of contributors overview microscopic techniques regularly used to characterize nanostructures. The book outlines experimental procedures and a range of techniques including transmission electron microscopy, electron tomography, tunneling microscopy, electron energy loss spectroscopy, and electron holography.

Expert
Graduate
Undergraduate

Building on nanobiotechnology

A new book gives a substantial and realistic compendium of the key concepts and realities that are involved in nanobiotechnology.

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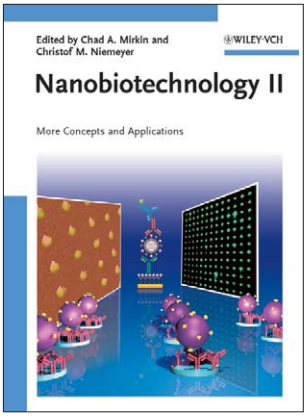
Nanobiotechnology: Concepts, Applications and Perspectives, Volume I was published in 2004 to provide a systematic and comprehensive framework of specific research topics in nanobiotechnology. Its success led to *Nanobiotechnology II – More Concepts and Applications*. The collection of articles again emphasizes the high degree of interdisciplinarity in the converging technologies of nanobiotechnology and nanosciences.

The majority of the chapters are concerned with the development of nanoparticle science and applications, and the refinement of scanning probe microscopy related methods. Additional topics have been identified, leading to contributions on small-molecule- and peptide-based self-assembly, the use of nanomaterials in medical applications, and the use of biomolecular machinery in creating hybrid devices.



Section I concerns novel principles in self-assembly and nanoparticle-based systems. Self-assembled nanostructures from artificial transmembrane ion channels (Chapter 1), coiled-coil peptides (Chapter 2), and DNA (Chapter 5) are reviewed. The second half is devoted to the synthesis and assembly of nanoparticles using bio-derived templates (Chapter 3) and biocatalytic growth of nanoparticles for sensors and circuits (Chapter 6). Chapter 4 reviews protein-functionalized nanoparticles that hold potential for the next generation of biosensing and catalysis materials and devices.

Section II reflects the increasing importance of nanostructures in analytical applications. The first three chapters detail bottom-up assembly of functional nanostructures describing the developments of nanoparticle-based technologies. Inorganic ions incorporated within nanoparticles offer unique opportunities for measuring protein and nucleic acid analytes (Chapter 7). As shown in Chapter 8, quantum dot biolabeling is moving toward sophisticated applications in cell and tissue imaging. Chapter 9 describes how the combination of nanoparticle technologies and spectroscopy form the basis for a novel class of biosensors. The following four chapters take advantage of micro- and nanosized probe structures fabricated by conventional top-down methodologies. The development of micromechanical cantilever array sensors for bioanalytical assays (Chapter 10), shear-force-controlled scanning ion conductance microscopy, which gives well-resolved images of fine surface structures, e.g. of membrane proteins on living cells (Chapter 11), nanotube-based sensors for label-free detection of biomarkers for cancer and other diseases (Chapter 12), and the preparation of arrays of nanoscale features of biomolecular compounds using dip-pen nanolithography (Chapter 13) are reviewed in a highly readable manner.

Section III focuses on the development of nanoparticle-based drug delivery systems and the use of nanoparticles in imaging. After an introductory overview on biological barriers to nanocarrier-mediated delivery of therapeutic and imaging agents (Chapter 14), the development of monodisperse biocompatible organic nanoparticles, which have great potential as functionalized carriers in nanomedicine (Chapter 15), is summarized. Chapter 16 reports on dendrimer-based multifunctional nanoparticles as carriers for drug delivery into tumor cells. The development of magnetic and perfluorocarbon nanoparticles for molecular imaging and targeted drug delivery (Chapters 17 and 19) completes this topic. The design of scaffolds for tissue engineering to control and study cell-cell and cell-substrate interactions, as well as to fabricate organs with controlled architecture (Chapter 18) is reviewed.

Chad A. Mirkin and Christof M. Niemeyer (eds.)
Bionanotechnology II: More Concepts and Applications
Wiley-VCH • 2007 • 459 pp • ISBN: 978-3-527-31673-1
$200 / £100 / €150

Section IV is devoted to nanomotors. Chapter 20 describes the fabrication of hybrid devices using organic and inorganic structures. Finally, current approaches for fabricating biologically inspired hybrid nanodevices like protein-based mechanical devices and cellular power generation devices, both combining biological molecules with synthetic host structures, are summarized in Chapter 21.

In summary, this book represents a fine collection of chapters describing current thinking on this subject with a substantial and realistic compendium of the key concepts and realities of modern nanobiotechnology.