



electronics, optics, biomedicine, energy, and photonics. In addition, it explores various examples of nanostructured materials, including quantum dots, nanowires, nanoparticles, carbon nanotubes (CNTs), fullerenes, semiconductor nanostructures, organic nanostructures, and hybrid nanostructures.

The first four chapters focus on basic concepts: the fundamentals of nanotechnology (chapter 1); properties, synthesis, and applications of nanomaterials (chapter 2); and the definition, types, and physical and chemical properties of nanostructures (chapters 3 and 4). The following two chapters describe types of nanostructures, such as CNTs, fullerenes, and dendritic (chapter 5); and semiconductor, organic, and hybrid nanostructures (chapter 6).

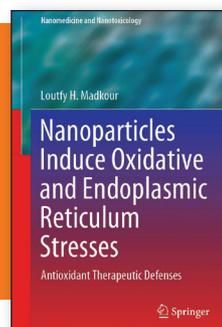
Chapters 7 through 10 are devoted to the properties, design approach, functionalization, and technical analysis of nanostructured materials. Chapter 11 explains techniques used to fabricate nanostructures. It discusses substrates, lithography, and etching processes including wafer bonding and packaging.

The subsequent four chapters emphasize the applications of nanostructures in: optics and electronics (chapter 12), bioapplications (chapter 13), photonics (chapter 14), environmental remediation (chapter 15), and miscellaneous applications from aerospace to cosmetics (chapter 16). The final two chapters provide a discussion on nanomaterial toxicity and its impact on human health and ecosystems (chapter 17), and an overview of

methods for R&D and applied life-cycle assessment models (chapter 18).

The diversity of topics and focus on key issues in nanostructured materials make this book a great reference in three aspects: (1) summarizing the fundamental aspects of synthesis, properties, and characterization of these materials; (2) describing different types of these materials and their characteristics; and (3) demonstrating the practical importance of these materials, detailing their applications in various areas. It is a good resource for anyone interested in studying the fundamentals and applications of nanostructured materials.

Reviewer: Mariana Amorim Fraga, *Visiting Professor, Universidade Federal de São Paulo, Brazil.*



Nanoparticles Induce Oxidative and Endoplasmic Reticulum Stresses: Antioxidant Therapeutic Defenses

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This book is a reference work focused on the role and interactions of nanoparticles and free radicals that are responsible for oxidative and endoplasmic reticulum (ER) stresses, with deep insights into the intimate mechanisms of their ecotoxicology, cytotoxicity, nanotoxicity, and genotoxicity.

The rapid development of nanoscience and nanotechnologies and their intersections with biological sciences during the 21st century has resulted in an explosion of information produced by numerous inter- and multidisciplinary research projects on nanomedicine. These are directed toward understanding topics such as nano-bio-interactions caused by nanoparticles with beneficial or adverse effects on the environment and human health. The author has organized the scientific sources to be accessible and useful. In this respect, the book is structured into 13 chapters as a collection of scientific review papers, each of which contains a short abstract, keywords,

introduction, and explanatory and development sections. A vast list of updated references is included as well.

Each chapter is self-contained, causing repetition in some concepts, definitions, and explanations. The author clearly explains the oxidative stress by the imbalance produced between antioxidants and radical oxygen species (ROS) actions, either by depletion of antioxidants or accumulation of ROS. However, recent research reported in this book has shown that ROS are not simply detrimental because of their high reactivity causing oxidative stress, but they also play an important regulator role in many physiological and pathophysiological redox processes. ROS production can interfere with microbe and virus elimination through various mechanisms, but also could contribute to increasing pathogen burden as occurs in autoimmune inflammation, causing tissue damage. These findings offer perspectives

for the use of antioxidants against particular infections.

As a result of recent advances in nanofabrication, there is an extensive application pallet of nanomaterials in industry, consumer products, and medicine, which raises serious concerns regarding the potential toxicity of nanoparticles in humans by generating reactive radicals. Both oxidative and ER stress parameters are analyzed in connection with improvement-testing strategies for aligning nanomaterial safety assessment and oxidative stress responses. The final goal is to highlight the correlation between the roles of antioxidant therapeutic defenses toward redox biology and regulation of immune responses. The book is generously illustrated with figures and diagrams and closes with general conclusions and future perspectives.

This book is recommended for both early-career and experienced researchers and specialists, being extremely useful for graduate students to aid in understanding the fundamentals in molecular biology and mechanisms of oxidative and ER stresses, while also being a resource for the development of new findings in nanomedication and innovative therapies.

Reviewer: Aurelia Meghea, *Emeritus Professor, University Politehnica of Bucharest, Romania.*



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