

## REVIEWS

### NANOTECHNOLOGY: HEALTH AND ENVIRONMENTAL RISKS

By Jo Anne Shatkin

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167 pages

Md. Ershadul Karim\*

This is a series book of nine books published by CRC Press, Taylor & Francis Group, on April 28, 2008. The Series: *Perspectives in Nanotechnology*, is a group of short, readable paperback books, not about technical details, dedicated to expand knowledge about nanotechnology has started with the Patrick Boucher's *Nanotechnology: Legal Aspects* on March 28, 2008. Dr. Jo Anne Shatkin's one on *Nanotechnology: Health and Environmental Risks* is the second one of the series.

Nanotechnology is the next industrial revolution and big thing after the internet. All aspects of government, business and academia are subject to the influence of nanotechnology. All vertical industrial sectors will be impacted by nanotechnology— aerospace, health care, transportation, electronics and computing, telecommunications, biotechnology, agriculture, construction and energy. Billions of dollars have been being invested all over the world in laboratories to invent nano materials. Therefore, it is crucial for the companies and stakeholders to understand different risk associated with it.

In this regard, Shatkin's book meets the demand of the time in light of her professional experience. Dr. Shatkin is an expert recognized for over two decades in strategic environmental initiatives, human health risk assessment, technical communications, and environmental aspects of nanotechnology. Since, technology and risks are bosom friends and always follow each other, the book is written with the serious concern of the consequences of not identifying potential problems created by nano particles early.

The book contains nine chapters. Chapter 1 introduces, *inter alia*, nanotechnology, its roots, nanotechnology risks, environmental aspects of nanotechnology and definition of risks. Chapter 2 sheds focus on different relevant aspects of risk assessment. In doing so, it explores the importance of risk assessment for nanotechnology, use of risk analysis in decision making, and its development as a field of analysis and a policy tool. Important issue in this Chapter is the four steps of risk analysis, i.e., hazard identification, exposure assessment, dose-response assessment and risk characterization.

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Chapter 3 considers the “opportunity costs” inherent in current nanotechnology development, environmentally friendly nanotechnologies, the possibilities for using nanotechnology to create a sustainable future, environment risk issues, life cycle analysis for sustainable nanotechnology. Careful attention was attributed on carbon nanotubes as the nest Asbestos.

Chapters 4 and 5 deal with potential health and environmental risks of nano materials. Chapter 4 is contributed by Dr. Brenda Barry, senior toxicologist at ENSR in Westford, Massachusetts, who introduces the topic of toxicology of nanoscale materials and impacts of specific nanoscale materials on people and shared the five Ds- *Dose, Deposition, Dimension, Durability, Defense* of particle toxicology for nanomaterials, different types of toxicological studies. In Chapter 5, environmental impacts and exposure — a crucial component that distinguishes *hazard analysis* from *risk analysis* are discussed. Simultaneously, the screening framework of the International Life Sciences Institute-Risk Sciences Institute (ISLI-RSI) in assessing risk is also shared.

Chapters 6 and 7 can be treated as the most important contributions of the author in the book. In Chapter 6, the author introduces a ten-step Life Cycle Risk Assessment, NANO LCRA, a proposed framework for nanotechnology that incorporates adaptive management and life cycle thinking into a streamlined screening-level risk assessment process. For better understanding, an example in the form of a case study is also included. Alternative methods for evaluating risks of nanoscale materials and nanotechnologies, including a discussion of Comprehensive Environmental Assessment is contributed by J. Michael Davis, Senior Science Advisor in the U.S. Environmental Protection Agency's National Center for Environmental Assessment in Chapter 7.

Dr. Barry has contributed Chapter 8, which describes the current practices for managing hazards and risks of nanoscale materials — who is doing what in this arena, and the state of the art. Finally, the book is wrapped up by discussing the current state of numerous efforts taken internationally to address risks and to develop science and policy for nanotechnology in Chapter 9.

Nanotechnology is an inter-disciplinary subject, and it is a matter of serious concern that the world community is yet to reach to an international consensus on this vital issue. Standing on such a stage, the writer deserves special thanks for realizing the importance of the issue and to come up with the book which is based on her invaluable practical experience. Since in the book, many technical or scientific terms are referred, inclusion of glossary in the future edition of the book will definitely add something to its weight. This is undoubtedly a readymade handbook and reference for the researchers in technology in general and nanotechnology in particular, and thus highly recommended.