REVIEWS

NANOTECHNOLOGY: HEALTH AND ENVIRONMENTAL RISKS
By Jo Anne Shatkin
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167 pages

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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 next 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.
However, we need to match this progress with careful evaluation of the possible environmental health and safety impacts of nanomaterials and nanotechnology across their life cycle, both to protect health and also to protect the sustainability and benefits of nanotechnology. With NanoImpact, we aim to publish the most high quality, novel and rigorous science and technology in the field to support its continued growth. Nanotechnology: unknown impacts. They could be posing risks we are unaware of, so it’s important that researchers continue to assess the potential harmful effects of nanomaterials. Take silver nanomaterials. Context - Nanotechnologies refer to technologies which exploit the unique properties of tiny particles of nanometre size (millionths of a millimetre). Nanotechnologies represent a fast-growing market; they are already being used in a variety of technologies and consumer products. (Click here for a list of such products). However, materials containing nanoparticles may be of concern for human health and the environment, and the risks of these recently developed materials need to be assessed. Are the existing methodologies to assess these risks appropriate? An assessment by the European Commissi Nano SLCRA (Shatkin 2008. Nanotechnology Health and Environmental Risks CRC Press). CEA Comprehensive Environmental Assessment (Davis 2007). Screening Approaches can still be data intensive. Innovation is inherently risky. The environmental, safety and health aspects of innovative materials are not well understood and are perceived as risky. Everyone benefits from a proactive approach to identify and address potential risks early in the innovation cycle. Screening Level Risk Assessment is a useful tool for identifying and managing amidst uncertainty. 38.