

Nanoscience and Nanotechnology

The highly topical theme that is the subject of this book has already been addressed in several monographs during the last few years. Nevertheless, there still remain enough unanswered questions about the effects of nanomaterials on the environment and on health to justify a new publication.

The book begins with a good overview of the subject, and the reader might expect that to be followed by detailed descriptions of the latest knowledge about the problems associated with nanomaterials. However, although the book certainly makes an important contribution by bringing together many different aspects and thus creating a working basis for new researchers in the area or interested young scientists, readers already active in the field would have preferred a more in-depth discussion of the critical aspects. Although the chapters have extensive lists of references, these omit some key publications on specific topics^[1] and other relevant monographs,^[2] the inclusion of which would have raised the book from being merely average to that of an excellent publication.

The structure of the book and the arrangement of the different topics treated by the chapter authors is logical. In some chapters the main theme “environment” is not given enough prominence (e.g., Chapters 8 and 9), whereas other chapters are of excellent quality and impress with their very good figures as well as the conciseness and precision of the text. However, I find the choice of topics a little difficult to understand. The amount of attention given to the fullerenes, which are given a separate chapter and also mentioned frequently in other chapters, is disproportionate in the environmental context (and in fact their environmental effects are not adequately covered); fullerenes belong to the intermediate region between molecules and particles, and are therefore not very suitable as an example of “nanoparticles”. The discussion of cadmium quantum dots and their effects on natural organisms in a separate chapter is also not very relevant, especially as the toxic element cadmium should certainly not be released into the environment. These two topics somewhat limit the usefulness of the book for advanced students.

Instead, it would have been better to include a more detailed discussion of methods for in vitro and in vivo testing of the biological effects of nanomaterials, which are not yet adequately standardized and urgently need further work. Hopes are raised when one comes to Subchapter 11.4 with the title “Particle-induced artifacts *in vitro*”, but unfortunately the interaction of nanoparticles

with analytical systems is only described superficially, and the chapter fails to mention certain relevant studies, which would have been especially useful for scientists who are new to the area.

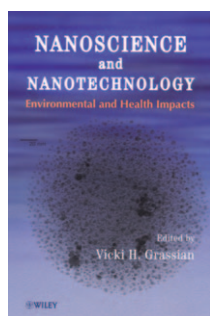
Thus, the book had an opportunity to stand out above other recent publications in this field, but unfortunately it seldom goes beyond the level of a review of the literature, and generally fails to make the leap to a critical engagement with the subject. It also lacks a sufficiently detailed consideration of naturally occurring nanoparticles in comparison with man-made nanoparticles that are released into the environment, intentionally or accidentally. Some interesting new questions, such as whether TiO₂ particles released from sunscreen creams or from photocatalytic surfaces are different from those present in nature, and indeed whether they can be distinguished at all, are not answered.

However, the book gives a very good overview of the effects of nanomaterials on the environment and on health, and it is a valuable source of important information for interested scientists, especially for young newcomers to the field and for students. But although the preface emphasizes the need to provide appropriate advice for politicians and regulatory bodies, that aspect is not covered in the book. That could have been achieved easily by adding a final chapter summarizing all the recommendations contained in the individual chapters, thereby significantly increasing the value of the book.

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DOI: 10.1002/anie.200905555



Nanoscience and Nanotechnology
Environmental and Health Impacts. Edited by Vicki H. Grassian. John Wiley & Sons, Hoboken 2008. 470 pp., hardcover € 89.90.—ISBN 978-0470081037

- [1] Examples for missing primary literature references: R. Behra, H. F. Krug, *Nature Nanotech.* **2008**, *3*, 253–254; L. Belyanskaya, P. Manser, P. Spohn, A. Bruinink, P. Wick, *Carbon* **2007**, *45*, 2643–2648; A. Casey, E. Herzog, M. Davoren, F. M. Lyng, H. J. Byrne, G. Chambers, *Carbon* **2007**, *45*, 1425–1432; L. Guo, A. von dem Bussche, M. Buechner, A. Yan, A. B. Kane, R. H. Hurt, *Small* **2008**, *4*, 721–727; J. M. Wörle-Knirsch, K. Pulskamp, H. F. Krug, *Nano. Lett.* **2006**, *6*, 1261–1268.
- [2] Examples for missing references to books: H. Brune, H. Ernst, A. Grunwald, W. Grünwald, H. Hofmann, P. Janich, H. F. Krug, M. Mayor, G. Schmid, U. Simon, V. Vogel, *Nanotechnology—Assessment and Perspectives*, Springer, Berlin, **2006**; H. F. Krug, *Nanotechnology: Environmental Aspects*, Wiley-VCH, Weinheim, **2008**.