



EDITED BY  
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**SAFETY ASPECTS OF**  
**ENGINEERED**  
**NANOMATERIALS**



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# Preface

In numerous prospective studies on technological development, technologies are identified which in future will have a significant and supporting impact on the global economic development. These technologies, for example, cover information and communication technology, biotechnology, and also materials technologies. The challenge here is that these technologies often show different levels of abstraction and are clearly distinguishable from one another. At a time when the overlaps between the basic disciplines physics, chemistry and biology as natural sciences have increased significantly in the sense of forming so-called converging technologies, this difficult challenge is not getting any easier. This applies to just a few of the identified key technologies which in most cases form the subject matter of such studies and is especially true of nanotechnology, which, so to speak, is one if not the very prime example of a converging technology. This also applies to the partial area of nanomaterials.

In the past three decades, nanotechnology has developed from a scientific field, only known by experts, to a prominent international research and development trend. The dynamics of nanotechnology development manifest themselves not only in a steep rise in public subsidies, the number of patents and publications of the past years but also in the increasing spread of nanotechnological products in the world markets. Nanotechnology opens up new market opportunities due to smaller, quicker, more efficient and "more intelligent" system components. This applies both to new products with substantially improved functions and to completely new functionalities. Although a number of products with nanotechnological components have already been established on the market, the major part of nanotechnological knowledge will only unfold its potential in products in a few years, partially even in decades.

One important issue is to ensure the safe and responsible use of nanomaterials. Potential (eco)toxicological side effects have to be taken into account. Potential risks of nanotechnology in the field of consumer, work and environmental protection will influence the public perception as well as the general acceptance

of nanotechnology. Risks can turn out to be an impediment to the merchandizing of nanotechnological products and might influence the level of public funding. Comprehensive risk research, precautionary risk management and transparent and open risk communication are, therefore, of utmost importance. Open questions regarding standardization and the regulatory handling of nanotechnology are only answerable at the supranational level and require intensive international coordination.

This book deals with the question regarding the current status of the safety aspects of engineered nanomaterials. Apart from a definition which is viable in this context, it discusses economic potentials and the time perspectives for the realization of possible fields of application. This forms the basis for a comprehensive approach to security-relevant aspects of nanomaterials and their applications, as well as for a debate on risk communication and regulatory issues.

**Axel Zweck**  
**Wolfgang Luther**  
May 2013

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