

## Nano Safety and Risk Management

When it comes to the exploitation of nanotechnology, the knowledge and management of nano safety and risk issues is extraordinarily important and will become even more so in the future. The first step to achieve efficient risk management is to realize that "nanotechnology" is not a homogeneous field but has to be divided into several sub-units with independent risk potentials, as exemplified in the following chart:

Materials / Powders	Nanobio / NanoMedicine	Devices	Instrumentation	Nanofactory / Replication
- Novel Materials - Nano Particles - Surfaces	- Biomaterials - Life Sciences	- Optical Devices - Light Sources - Sensors - Energy Storage - Photovoltaics	- Tips and Probes - Data Storage	- Machining - Self Assembly
Environmental Risks	Environmental Risks	Environmental Risks	Environmental Risks	Environmental Risks
Toxicity	Toxicity	Toxicity	Toxicity	Toxicity
Societal Impacts	Societal Impacts	Societal Impacts	Societal Impacts	Societal Impacts
Economic uncertainty	Economic uncertainty	Economic uncertainty	Economic uncertainty	Economic uncertainty
No or little risks	Medium risks	High risks		

Source: Dr. Jürgen Höck, TEMAS AG, CH-9320 Arbon, 2004

In the second step the existing knowledge about health, environmental and societal impacts in the respective fields must be combined and pooled, so as to avoid constant reproduction of existing results. It is highly recommendable to put this process on an international level. Within this pooled knowledge, gaps have to be detected and filled by highly efficient and high level research.

Adequate funding for such basic and applied interdisciplinary research is crucial, but not always granted. With respect to this the European Commission plays a key role by allocating considerable funding to projects related to nano safety and risks.

Building on the new and existing knowledge the third step in efficient management of nano safety and risk issues is to create Codes of best Practice, and finally rules and regulations, preferably on a global level, for the handling of nano-related products.

Included in the risk management process and not to be forgotten is the dissemination and communication of all relevant and approved results to all key players, stakeholders and producers of nano products, as well as to the end users and the public.

As nanotechnology is developing fast, a prominent task of risk management will be to speed up risk assessment, and to develop mechanisms for the fast screening of risk potentials of nano based technologies.

Last but not least, the assessment of the mid and long term impact of nanotechnology on health, environment and society will form a major part of future nano safety and risk management.