

GERMANY

Highlight of developments since the 4th meeting of the WPMN

The NanoDialogue was initiated by the Federal Government and a so called "NanoKommission" was established where stakeholders from authorities, industry, trade unions and NGOs tried to get a common understanding on opportunities and risks of nanotechnology. The NanoKommission had the mandate to develop a report within 2 years by the end of 2008. Three working groups discussed important aspects of the development of nanotechnology:

The first Working Group "Opportunities for Health and Environment" concentrated on the question: How can the use of nanomaterials contribute to sustainable economic and social development in Germany, in particular to environmental/health and consumer protection? The Working Group wanted to identify and describe selected nanoproducts or applications which deliver a special benefit for the environment or for consumers. These opportunities were checked concerning their sustainability throughout their life cycle, at least qualitatively.

A second Working Group was called "Risks and Safety Research" and consequently dealt with the possible risks posed by nanomaterials, especially the gaps in our knowledge, which we need to fill as soon as possible. The aim was to develop a programme for future safety research plus suggestions for concrete projects. Since many products containing nanomaterials are already on the market and we expect a further increase in the future, this working group had to assess the risks for some selected nanomaterials based on present knowledge.

In order to provide preventive protection to employees, consumers and the environment, a third Working Group developed "Guidelines on the Responsible Use of Nanomaterials". The group started the work on a Guideline for worker protection and worked on basic principles on which all Guidelines should be based and on indicators to monitor their implementation. The aim of Working Group 3 was that industry and user companies adopt these Guidelines as a "Code of Good Practice".

The results of the "NanoDialog" were presented at a final conference in November 2008 giving advice to politicians and information to the public. The "NanoDialog" will continue for additional two years.

The English translation of the report 2008 will be available soon. The German version is available www.bmu.de.

The NanoDialog Project is part of this action plan.

Since 2007, the "Nano Initiative - Action Plan 2010" gives a framework across all government departments. The leading Ministry "Education and Research" (BMBF) has started this initiative, together with six others (Environment (BMU), Labour and Social Affairs (BMAS), Food, Agriculture and Consumer Protection (BMELV), Defense (BMVg), Health (BMG) and Commerce and Technology (BMW)). ***Work completed, underway or planned***

1. Any national regulatory developments

No Information

2. Developments related to voluntary or stewardship schemes

No Information

3. Information on any risk assessment decisions

No Information

4. Information on any developments related to good practice documents

No Information

5. Research programmes or strategies designed to address human health and/ or environmental safety aspects of nanomaterials

In the year 2008 the BAuA together with partners from Europe [European Agency for Safety and Health at Work, Spain, the Institut National de Recherche et de Sécurité pour la prévention des accidents du travail et des maladies professionnelles (INRS), France, the Centralny Instytut Ochrony Pracy - Państwowy Instytut Badawczy (CIOP-PIB), Poland, and the Instituto Nacional de Seguridad e Higiene en el Trabajo (INSHT), Spain] finalised the report “Workplace exposure to nanoparticles and ultra-fine particles” in the framework of the EU-OSHA-Topic Centre Risk Observatory. The report will be published online in 2009.

Research Project (Results available: July 2009)

Toxicokinetics of titanium dioxide nanoparticles

Nanotechnology offers a great promise in many industrial applications. However, little is known about health effects of manufactured nanoparticles, the building blocks of nanomaterials. Mammalian and in vitro studies have raised concerns about the toxicity of titanium dioxide (TiO₂) nanoparticles. There is an ongoing discussion that inhaled nanoparticles may translocate from epithelial deposition sites of the lungs to systemic circulation. Therefore this research project addresses the tissue distribution of inhaled TiO₂ particles (4nm particle and P25) 1h, 24h, 1 week and 1 month after application in rat. Using quantitative bio-kinetic analysis of radiolabeled inhaled TiO₂ particles the retained part in selected organs and tissue including excrements will be investigated. Healthy adult Wistar Kyoto rats of both genders are exposed by intratracheal inhalation to vanadium V-48-radiolabeled TiO₂ nanoparticles. A complete V-48 balance of all organs, tissues, excretion and remaining carcass will be performed at each time point.

Research Project (2009-2011)

Developing of Test procedures for Nano-Silver and Titanium Dioxide

The project aims at determining the environmental toxicity to soil and sediment species and environmental behaviour.

6. Information on any public/ stakeholder consultation

The analysis of nanotechnology coverage in German print media was the subject of a research project conducted by the Federal Institute for Risk Assessment (BfR) in 2008. The results: In the media coverage nanotechnology is not presented as a risk technology; most articles stress the benefits of this new technology. The analysis revealed that nanotechnology is not currently a subject of controversy in the

German print media. 70 percent of the articles examined focussed on the positive sides to nanotechnological products and processes. The reports mainly concentrated on applications of nanotechnologies in medicine and in information and communication technology, potential increases in sales revenues and new jobs through the development of nanotechnological products and processes. The articles mostly examine the scientific and economic aspects. Hence, most of the stakeholders, who are quoted in them, are representatives of scientific bodies and companies. Up to now, representatives of political circles and non-governmental organisations have only played a minor role in media coverage.

7. Additional information

There are two research projects by the Federal Environment Agency, available in German. Please find below the English abstracts:

The top priority of the research project “Environmental Relief Effects through Nanotechnological Processes and Products” was to identify and quantify, to the extent possible and by means of selected examples, the environmental and sustainability opportunities and risks associated with this rapidly developing line of technology. Environmental relief potentials are understood here to include not only environmental engineering in the narrower sense (end-of-pipe technologies), but also and specifically process, production, and product-integrated environmental protection. The project consisted of four stages:

1. Analysis of products and processes already on the market or soon to be made available and application
2. Examination and initial qualitative assessment of each of the products and processes with respect to its potential for environmental relief (or burden, as the case may be)
3. In-depth life cycle analysis and assessment of four selected processes or products as compared to conventional processes or products (Manufacture of solderable surface finishes on printed circuit boards, MW carbon nanotube application for foils in the semiconductor industry, Lithium batteries for energy, storage, Ultradur® High Speed plastic)
4. An appraisal of nanotechnology employment effects.

Applications of nanomaterials in environmental protection (UFOPLAN Ref-No. 3707 61 301/05)

Golder Associates GmbH, Celle, Dr.-Ing. Sonja Martens, Dr. Bernd Eggers, Thorsten Evertz

Following comprehensive research nanomaterials or products which were either still in a research/development status or are already available in the marketplace were identified for the water and air sectors.

Based on life cycle assessments for two case studies, it was checked how the potential benefits and impacts on the environment for nanotechnology products or processes compare with those for conventional solutions. The first case study deals with the solar treatment of water contaminated with tetrachloroethylene, comparing nanoscale titanium dioxide (photo-catalysis) and a photo-Fenton process. The second case study on air filtration compares a passenger car cabin-air filter with nanofibres and a conventional filter.