

Risk awareness at ARC division “Nano-System-Technologies”

Health, environment, safety and ethics are considered as important issues for all new technologies, especially if they result in products that are placed on the market. As “nanotech” products have already started to emerge in everyone’s life, potentially negative effects of these innovative techniques and their products have to be taken into account. Therefore potential “nanotech”-implications have to be continuously monitored and evaluated in order to deal with resulting risks in a responsible and professional manner.

In Austria, the discussion concerning safety of all “nano” and “nano”-related issues has already started. Both in the scientific and industrial community as well in the national funding bodies, discussions have been more intense than reported in mass media, and have led to various measures. However, since gain in knowledge about the possible dangers and risks of nanotechnology is still in flow, these measures need to be set into their changing context again and again in order to maintain the high standards proposed.

The issues that need to be addressed can be summarized as:

- 1) Work and safety practices of handling “Nano” during research, development and manufacture
- 2) Health and safety to integrate “Nano” in products
- 3) Consequences of bringing these “Nano”materials in the environment

In Austria, nanomaterials underlie the GKV 2005 decree (Grenzwerteverordnung, decree of exposure limits) regulating the use of biologically inert particulate matters. The ASchG, BGBl 450/1994 §4 concretely requires evaluation and minimization of risk, the DOK-VO (Verordnung über die Sicherheits- und Gesundheitsschutzdokumente) enforces the documentation of all relevant activities, measures, accidents and noticeable incidents. Within this existing framework, these decrees, putting national law in practice, already force companies to continuously deal with safety and health matters in “nanotech”. Product safety is covered by national and EC laws (REACH programme). The latter of the aforementioned issues is the most unknown part but research is still under progress. Therefore, no generally-accepted standards and norms exist to date.

The division “Nano-System-Technologies” develops and integrates nanotechnology to build up new devices. Our products are meant to steadily improve the quality of life, with many projects being correlated to the improvement of healthcare and health-related issues. Therefore, responsible handling of new technologies is our top priority, in order to not jeopardize our commitment in own product and process development.

Nanotechnology itself covers a wide area, and so do possible risks and hazards. Nanoscale modified surfaces, for example, are not supposed to be overall toxic because these are stable nanostructures which are bound to a solid substrate and do not leak into the environment (Most of the nanomaterials in “Nano-System-Technologies” are of this kind). Free nanoparticles, in contrast, play a key role in all risk assessments, because they may reach delicate deeper parts of respiratory system, thus reminding on the situation with asbestos and other dust-scale materials. Thus, although eventual toxic effects are still largely unknown and currently under investigation, “Nano-System-Technologies” is extremely careful when dealing with free nanoparticles. The most effective way to handle possible dangers of nanoparticles to date is neither to give nanoparticles way to pollute the air nor to be inhaled afterwards or during production. In order to avoid any leakage of nanosized particles into the environment the two kinds of relevant nanostructures, nanocolloids and nanowires, are therefore either kept in solution or chemically attached to solid substrates at all stages of research.

Our policy on nanomaterials therefore implies to take every possible measure in order to protect employees in our labs, customers and consumers, and environment from any possible risk.