NANOSAFETY THROUGH STANDARDS

IN BRIEF

- Nanomaterials, like all new technical developments, are associated with advantages but also major uncertainties.
- International standards in the field of nanotechnology create global application standards and ensure greater safety.
- To date, science as a stakeholder has been underrepresented in standardisation work.
- Austrian expertise in nanotechnology helps to create greater awareness of the importance of standardisation work at international level.

WHAT IS IT ABOUT?

Novel materials such as nanomaterials are associated with many uncertainties in addition to their advantages. Standardising terminology and nomenclature as well as detection and measurement methods are essential steps towards making the development and application of these materials safer. Standardisation activities should first establish a common and binding understanding of matter and processes at the nanoscale. Materials that are typically below 100 nanometres exhibit size-dependent phenomena that are often unusual and differ from the macro-scale, yet enable novel applications (such as colour change, change in electrical conductivity, or shape memory). There are standardisation projects on nanotechnologies and nanomaterials at international level, such as the European committee CEN/TC 352 "Nanotechnologies" and the corresponding international committee ISO/TC 229. Various working groups address questions related to consumer protection, occupational health and safety, environmental protection, and food safety. The specific tasks of the international standardisation committees on nanotechnology include the development of standards for the classification, terminology, and nomenclature of nanomaterials, such as a multipart vocabulary, and the creation of standards for measurement and detection methods as well as specifications for reference materials. Since the CEN committee was established, several guidelines have been published, such as those on life cycle analysis and, most recently, on the disposal of waste from the manufacture and processing of nano-objects.

Image: ITA

Linking standardisation more closely with science

In general, scientific institutions are rarely represented in standardisation committees. On the one hand, this is because standardisation work is time-consuming and requires human resources. On the other hand, it is difficult to exploit specific standardisation work academically as it receives little recognition. In Austria, these activities are regularly monitored and commented on by the responsible standardisation committee 052.73 "Nanotechnology" at the Austrian Standards Institute (ASI). This committee is transdisciplinary and consists of experts from ministries, authorities, and, by now, also from the scientific community (General Accident Insurance Institution (AUVA), Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), TU Wien, University of Natural Resources and Life Sciences Vienna (BOKU), Austrian Academy of Sciences (ÖAW), BioNanoNet, and others). To increase scientific expertise in the committee, experts were deliberately and directly recruited from various scientific institutions. A specific ITA project focused on interlinking the work of this committee with Austrian nanotechnology expertise to raise awareness of the importance of standardisation work and to make Austrian expertise in nanotechnology visible in international committees.

KEY DATA

Project title:	Standardisation of nano-technologies
Project team:	Gazsó, A., Pavlicek, A.
Duration:	10/2019 - 01/2021
Funded by:	BMVIT

KEY RESULTS

The project's objective was to establish a systematic mediation process between institutions with different orientations and tasks. First, international standards relevant to the Austrian research landscape needed be identified, with the next step consisting of the submission of corresponding scientific comments to respective standardisation projects in due form.

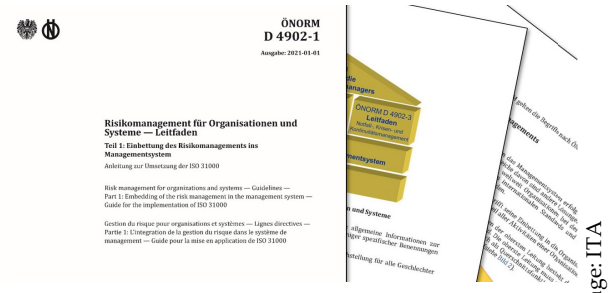

Image: ITA

Technology assessment represented in the standardisation of nanotechnology

A key result of this time-consuming, communication-intensive process was the sending off of Austrian nano-research representatives as delegates to relevant international standardisation committees so that they could participate in the working sessions. By now, technology assessment (TA) experts, too, are officially represented at CEN and ISO level to comment on, for example, commercialisation and stakeholder involvement, nanomaterials' effects on health and the environment, and waste management and recycling issues. Similarly, Austrian scientists are also involved in the working groups on safe-by-design and "advanced and emerging materials", which have been active since 2019. The former working group is concerned with integrating safety-relevant topics into the development process of new products as early as possible. The group on "advanced and emerging materials" discusses possibilities for the evaluation of innovative materials for which no verified data are available yet. Of great importance, especially for community building, is the regular reporting at the meetings of the Austrian Nano Information Commission (NIK). This ensures that the latest developments in the field of nanotechnology standards can be passed on directly to the Austrian nanotechnology community. Furthermore, and if necessary, it is possible to comment on the latest developments directly, which accelerates the placement of Austrian expertise.

WHAT TO DO?

International standardisation work not only reduces uncertainties where the use and application of nanomaterials are concerned, it also improves their safety. The contributions of science to standardisation work result in high-quality standards for businesses, industry, and the economy. For this, the following activities are necessary:

- Raising awareness for the time-consuming but essential process of standardisation in science and research.
- Targeted involvement of Austrian experts in relevant standardisation committees and working groups to increase scientific involvement therein over the coming years. TA is of particular importance here as it is in a position to introduce additional safety-relevant and risk-related aspects into the design process.
- Increasing the efforts to form an Austrian community for standardisation work in the field of nanosafety to promote the exchange of knowledge and experience at national level, for example within the framework of the NIK.
- This requires a systematic and continuous mediation process between science and standardisation. Since such mediation process is time-consuming and requires a lot of human resources, appropriate resources must be provided.

FURTHER READING

Gazsó, A. & Pavlicek, A. (2021): International Nanotechnology Standards and Austrian Expertise. Final report
epub.oeaw.ac.at/ita/ita-projektberichte/2021-01.pdf

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