

Advancement of the project "Nanoinventory" (spring 2008)

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Short description of the theme: Nanoparticles (particles smaller than 100 nm in at least two dimensions) are interesting for industrial and medical applications since they have properties, which are different from those of the same substance at larger size. Many new types of nanoparticles and applications are currently being developed and introduced into industrial processes and consumer products. Currently, the safety and health risks of these novel manufactured nanoparticles are insufficiently evaluated. There is an urgent need to evaluate the risks of these particles to ensure their safe production, handling, use, and disposal. The here presented thesis/study aims at providing more knowledge about industrial exposures in Switzerland

Project parts:

- 1) A pilot-study (2005/2006) about the data available to the safety experts in Swiss companies was done in 2006 as planned. It showed that nanoparticles are not fiction but already reality in Swiss companies. Nanoparticles are already used in up-scaled productions, even though many appear to be still in a research and development state. This pilot study allowed the identification of industrial sectors with established nanoparticle-use and gave valuable information about the knowledge of production and safety managers. It allowed developing a questionnaire to obtain a representative and comprehensive picture of industrial processes, sectors and companies using or producing nanoparticles.
 - Publication: Schmid K., Riediker M. Use of Nanoparticles in Swiss Industry: A Targeted Survey, *Environ. Sci. Technol.*, 42 (7), 2253–2260, 2008. 10.1021/es071818o
- 2) A representative questionnaire-survey (2006/2007) about nanoparticle applications among the SUVA clients (about 85% of the Swiss industries) is ongoing since February 2007. It is supported by the Swiss Federal Offices for Health (OFSP), Environment (OFEV) and Economy (SECO), the Swiss National Accident Insurance Fund (SUVA) and the French Agency for Environmental and Occupational Health Safety (AFSSET). The study considers about two thousand companies, a representative choice for the Swiss industry. The preliminary results have been presented in NanoECO, Monte verita, march 2008 (www.empa.ch/nanoECO)
 - Internal publication: **Intermediate report - Assessment of the usage of nanoparticles in the Swiss industry by letter survey**
 - A peer reviewed publication is in preparation
- 3) A Workplace exposure measurement for typical applications to estimate the likely exposure range of the Swiss working population started in February 2008. The type of sampling may have to be adapted by focusing the selection of companies on the difference of real industrial exposure and exposure by very small amounts (e.g. a spray).
- 4) Due to the very low number of industrial applications, and the occurrence of very small applications (like sprays), the exposure of the whole Swiss working force (2008/2009) will be extrapolated not only from combining the questionnaire data and the measurement data, but will consider an estimation of the difference between small and big applications.

Advancement of the project:

1) The pilot study has been published January 2008, 2) the representative questionnaire-survey has been launched in February 2007, three month after the planned moment and also c) the preparation of the measurement campaign had to be delayed for some month to the beginning of 2008. Never the less the procedure continued as planned: the selection of companies for a workplace exposure measurement campaign will be adapted to the low number of companies dealing with nanoparticles. Some new ideas have to be applied to be able estimating the exposure of the Swiss work force.

Preliminary results of the survey

- The response rate of the layered questionnaire is 58.7%, with a minimum of 45% in the layer with the lowest response rate. The questionnaires were mostly filled out by people of the management of the companies. The mainly occurring answers "no, we don't deal with nanoparticles" has been checked by a representative number of phone calls among the responding companies. The non-responders still need to be checked and compared to the responding companies.
- In less than one percent of the surveyed companies the response was in the sense of "yes we deal with nanoparticles". Nanoparticles were reported to be used in different kind of industries, mostly in small quantities, but sometimes in respectable amounts. The survey did not reveal surprising applications, but confirmed generally the results of the published non-representative telephone-survey (Schmid K, Riediker M. 2008).
- The result: "usage in < 1% of the companies" is unique in the nano-science, because the survey is done in a representative way: (approximately) *representative for a whole country*. The publication of these data will have to be done as fast as possible.

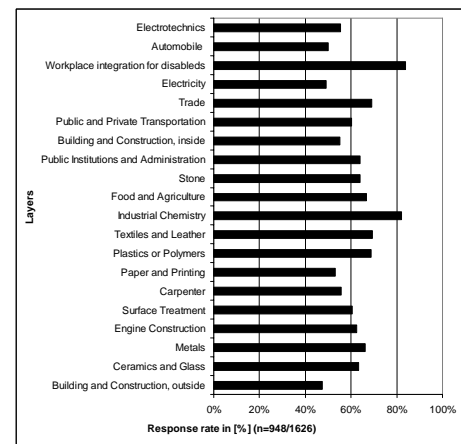


Figure 1: Response rate per layer

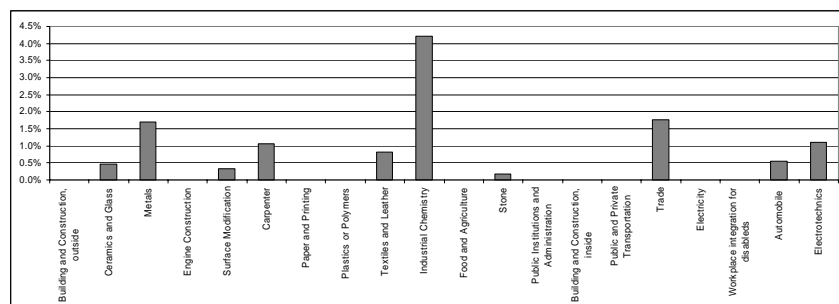


Figure 2: Reported nanoparticle applications per layer