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ABSTRACTS

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Towards a harmonized assessment of the exposure to manufactured nanoobjects, Common approaches in measurement strategy and obstacles - Report of a workshop

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The number of workplace air measurement studies focused on the assessment of exposure to manufactured nano objects has increased substantially, the last few years. However, due to the large variation of exposure situations with respect to the life cycle of nanomaterials and nanoproducts, actual exposure data will remain scarce in the near future. Therefore, it is acknowledged that data that will be generated should enable future use for either exposure scenario building, exposure modelling, or meta-analysis in view of risk assessment or epidemiology. A crucial step in harmonizing data collection is the application of internationally agreed measurement strategies and sampling protocols.

We here report on a workshop under the umbrella of the EU project NanoImpactNet where key players in Europe and the US did discuss the current knowledge and tried to set a path for future progress.

In the first part of the workshop, Brouwer (2009) discussed the literature available through early 2009 (14 studies) with an emphasis on possible ways to cope with the problem of background distinction. One major finding of most of the studies is that during the production and handling of nanoparticles, the workplace particle number concentration of particles below 100 nm is close to the background concentration in companies. The common finding is that aggregates or agglomerates above 100 nm in size were quite often detected at the workplace and correlated with the operations. This is in line with theoretical calculations indicating that most of the particles emitted from processes are agglomerated when reaching the exposed person (Seipenbusch et al [2008]). In summing up the available studies, Brouwer et al. (2009) concluded that the studies are more explorative in character and focused on the potential for emission of manufactured nanoparticles. No shift averages were presented based on particle number concentration or surface area concentration or fibre concentration.

Brower et al. (2009) provided a decision logic, developed in the EU project NANOSH, to cope with the problem of background distinction and explore the likelihood of potential exposure to nanoobjects. NIOSH developed a somewhat different approach to explore potential exposure (emission releases) by relying more on easy-to-use and portable devices like the CPC and OPC in connection with sampling on filters for subsequent elemental and microscopic analysis of the particles. Hodson (Methner et al., 2010a, 2010b) described the Nanoparticle Emission Assessment Technique (NEAT) used by NIOSH and described that in-depth sampling is also applied at some of the workplaces they have evaluated. A participant from industry proposed a tiered approach with a decision logic and criteria taking account of the needs and constraints imposed on a globally acting company. Workshop participants discussed the way to a harmonized framework of measurement strategies serving the different reasons why measurements of nanoobjects are performed.

There are obstacles and uncertainties associated with this approach. Consequently, joint and coordinated efforts and round robin testing were identified as a solution to close this critical gap in exposure assessment.

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