NANOTRANSPORT-Project

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Abstract:

The NANOTRANSPORT project addresses t**he behaviour of aerosols released to ambient air from nanoparticle manufacturing.** The aim of the project is to analyse and typify relevant exposure scenarios of workers to manufactured nanoparticle aerosols at industrial workplace and to develop recommendations to the Commision regarding realistic test conditions in terms of test aerosols characteristics for use within toxicology studies, but also for testing the efficiency of existing engineering control systems and personal protective equipment.
Our approach includes:

- Determine typical scenarios of release and transport of airborne nanoparticles in an occupational setting;
- Select model parameters controlling physical change which airborne nanoparticles will undergo after release in workplace environment
- Identify methodologies for generating test aerosols and measuring the relevant parameters
- Carry out experiments to explore the relevance of model parameters of change and model exposure scenarios
- Develop recommendations based on experimental results

The experimental results allow drawing a number of key conclusions of significance in the context of the development of recommendations. Our results show, that nanoaerosols evolve considerably with time: the average particle size increases while the number concentration decreases due to homogeneous coagulation processes. Another important conclusion is that natural background aerosols are scavengers for NP by heterogeneous coagulation. This leads to the occurrence of the physical/chemical presence of nanoparticles in size classes other than the one in which they were originally emitted. Filtration of nanoparticles can be done with high efficiency using state of the art filters. However, the shift of nanoparticles to larger size classes by both homogeneous and heterogeneous coagulation may lead to the occurrence of nanoparticles in the size range where filters are least efficient, the most penetrating particle size (MPPS) in the range of about 80-200 nm.
Based on the experimental results a set of recommendations to the Commission has been prepared and is now under discussions with experts and stakeholders.