

## **Investigating the Impact of Nanoparticle Production**

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As the field of nanotechnology is rapidly emerging, the use of nanoparticles is becoming more widespread. Nanotechnology is used in a wide spectrum of services, but the potential exposure and the subsequent impact nanoparticles can inflict on humans is currently unknown. Comprehensive studies are useful to identify optimization potentials throughout the life-cycle of nanomaterials and it would therefore be desirable to examine all impacts in Life-Cycle Assessment studies. However, data on different production technologies, uses, disposal techniques and on the environmental fate of nanoparticles is still too scarce for completing such a life-cycle assessment. This study attempts to fill some of these gaps by examining exposures and quantifying emissions in nanoparticle production sites. We used particle counters and detectors to quantify workplace concentrations, identify emission sources and compute emission rates to the workplace and to the environment. These allow for the quantification of real-time size and number distributions of the particles in the workplace during production and that are subsequently emitted to the environment. The results show that concentrations in the workplace are elevated and can be an order of magnitude higher than background levels in terms of number concentration. The concentration measurements were used in model calculations for estimating emission factors and characterization factors for human health.