

Exposure models and risk mitigation measures during the production of ENMs and nano-enabled products

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Nanotechnology is a widely applied cross-sectional technology with innovations and potential applications in almost all industry sectors. The unique properties of Engineered NanoMaterials (ENMs), including their much larger specific surface area and surface activity, may result in new health and environmental hazards, different from the bulk substance.

Studies conducted so far point out that a significant release of single particles, aggregates and agglomerates (< 1000 nm) can be expected during the production and subsequent use of ENMs. Additionally, incidental nanomaterials (INMs) can also be generated in accidental spills or releases from wear and tear of materials containing ENMs, leading to non-negligible exposure levels.

As a way to safely design the ENMs and the working places, different models have been developed to model how the concentration of an ENM evolves with time in a working environment and from there how severe is the worker's exposure.

The exposure to ENMs out of the workplace is difficult to characterize mainly because its diverse origin. Outdoors, the different sources are intermingled and may even recombine and undergo changes at the physicochemical level.

Despite the growing concern about the effects of ENMs, information regarding exposure levels and well-established techniques of characterization are lacking. Besides, there is no agreed verification procedure of the effectiveness of the containment measures.

References

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Figures

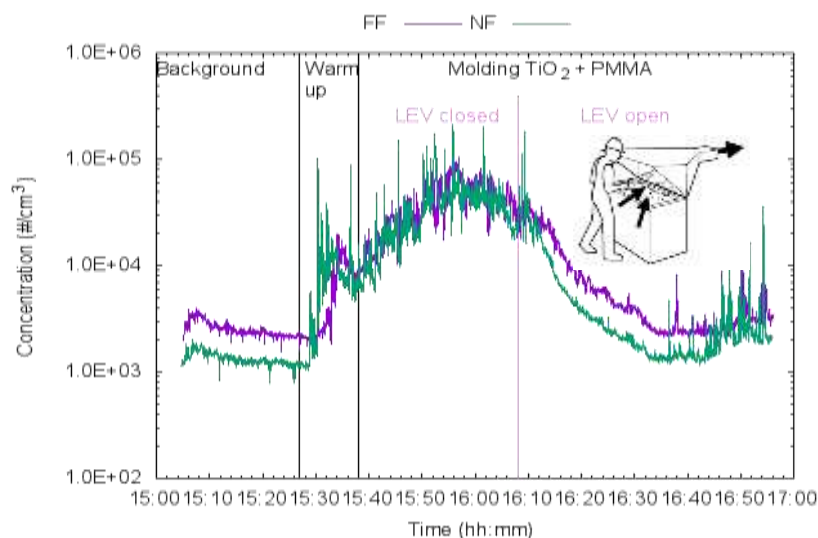


Figure: Example of exposure to a process of injection molding with ENMs and effectivity of ventilation systems.