



ASINA Monitoring Campaign

Are Nanomaterials Safe for People Working in Nanomanufacturing?

ASINA project data measurement campaign at Wiva Group plant

The ASINA project aims to promote safe-by-design (SbD) nano-enabled products, through the design of safer materials and nanomanufacturing processes. Monitoring nanoforms emission and exposure in occupational setting, is a priority for achieving this goal and ASINA project was able to organise a monitoring campaign in one of its industrial plant before the end of the first year. From 15th to 19th February 2021, Wiva Group (Italy) hosted researchers from CNR-ISAC, the Institute of Atmospheric and Climate Sciences of Bologna and CNR-ISTEC the Institute of Science and Technology of Ceramic Materials of Faenza that measured and collected nanoforms released during a spray-coating process. The campaign produced data about concentration and particle size distribution of airborne nanoparticles and nano-enabled products to be tested for their performance attributes. We obtained around 40 linear meters of textile or polymethyl metacrylate foils coated by antimicrobial nano silver and photocatalytic nano-titania. This will allow to correlate process parameters to process efficiency (amount of nanoparticles deposited per concentration of feeding suspension and time unit), as well as to product technical features (washing fastness, abrasion resistance, functionalities) and safety attributes. Beyond the optimisation of process conditions, the important aspect that was taken into consideration was the quantification of nanoparticles inside and outside the chamber of deposition in order to assess the exposure for operators and be sure that all the containment measures were put in place for mitigating the potential risk.

Focus on the Results

The campaign at Wiva Group offered to researchers the chance to apply the nanomaterials developed within ASINA by means of a relevant industrial plant and provided a representative experience of the spray coating upscaling, with the preparation of coated substrates as effective Nanoenabled products (NEPs) useful to ASINA implementation. Polyester fabrics and [polymethyl metacrylate](#) foils were coated with AgHEC or TiO₂-N, two nanomaterials prepared in a safety by design perspective, for application as antimicrobial masks/gowns and photocatalytic air purifiers.

The applied NMs were easily sprayed, pointing out the advantage of having stable and low viscous nanosuspensions. To identify the best spray coating parameters able to ensure the optimal balance between functional performances and nanoparticles release into the work environment, three different NM concentrations were combined with three different flow rates at the spraying nozzles.

Preliminary data indicated that the spray coating line in WIVA is equipped with efficient suction and safety devices enabling to carry out the experiments within representative industrial conditions that are supposed to play a key role in the next future for nanotechnology.

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Images: Experimental setup: inside the chamber of deposition (left), near the chamber of deposition (middle) and far from the chamber (right).

About the ASINA Project

[Anticipating Safety Issues at the Design Stage of NAno Product Development](#)

ASINA has the ambition to promote consistent, applicable and scientifically sound Safe-by-Design nano-practices, considering all the of nano-enabled products design dimensions: functionality, production technologies, safety, environmental sustainability, cost effectiveness and regulatory requirements, in line with research responsible innovation policy.

Expected Impacts

- Safe-by-design approaches and tools at an early stage of the nanomaterial development process
- Quality workplaces that ensure maximum technical and economic performance in line with acceptable risk levels
- Control and mitigate exposure after release of NMs from products
- Develop and validate low-cost techniques for delivering an integrated exposure driven risk assessment and the associated design of the required post-use monitoring
- Increased industrial competitiveness
- Impact on human health, environment and regulations

For more information, visit <https://www.asina-project.eu/>

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