PROJECT FACTSHEET

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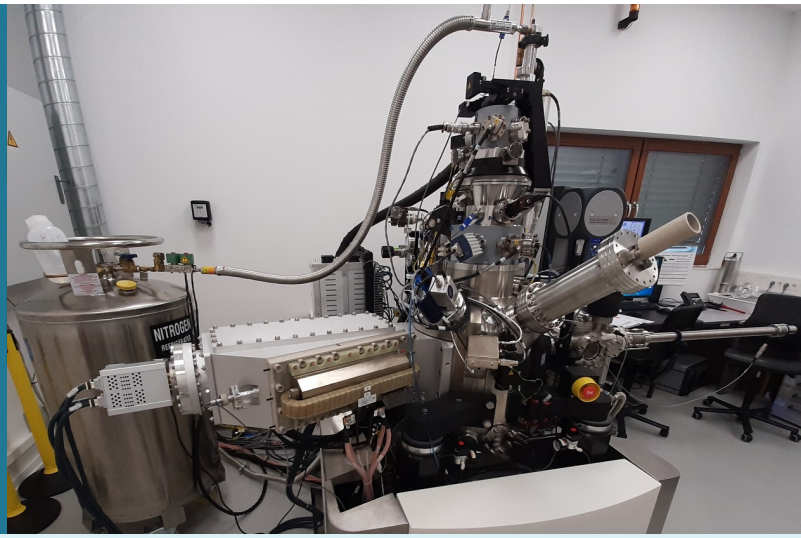
npSCOPE

Developing a new integrated, optimised instrument to provide a comprehensive physico-chemical characterisation of nanoparticles.



INSPIRATION

The current trend in nanotechnology is the modification of materials so that they present specific desired properties for the use in different industrial sectors and to serve different purposes, such as increased hardness/strength, optical properties or antimicrobial protection. Present in our daily life, those nanomaterials can be found in food, cosmetics, textiles, paints, electronic devices, etc. However, the same properties that make nanomaterials desirable in these various applications have the potential to alter biological processes, with potential unknown health risks for humans, the environment and safety. Identifying those risks is crucial and thus requires an adequate physico-chemical characterisation of nanomaterials. Currently a number of techniques are being used, but this multi-technique approach is being performed on separate instruments, making the overall process slow and expensive. To improve this process of strategic importance, npSCOPE partners intend to provide a new integrated tool for nanoparticle toxicology studies that can provide more efficient, comprehensive and accurate data in one single instrument.

INNOVATION

Within the npSCOPE project, a new instrument that couples the extraordinarily high resolution obtained with the finely focussed ion beam provided by a Gas Field Ion Source with sensors for composition (by mass spectrometry) and 3D visualisation (by transmission ion microscopy) will be developed. The tool will allow for an extensive characterisation of individual nanoparticles and their exact location in a given environment (tissue, cells, etc.) leading to a better understanding of their potential risks for human health and/or the environment. Hard- and software based on correlative microscopy approaches along with optimized sample-handling methods will therefore be developed to obtain a complete physico-chemical characterization of nanoparticles.

IMPACT

During this project, an integrated high-resolution chemical imaging microscope allowing for a full characterisation of nanoparticles embedded in different matrices will be developed. Reinforcing the leading position of Europe in the fields of nanotechnology and advanced instrumentation, this instrument will mainly:

- Increase confidence in the physico-chemical characterisation of nanoparticles, providing more reliable and consistent data for safety evaluation of nanomaterials.
- Reduce costs and optimize time related to the physico-chemical characterisation of these materials.
- Seek synergies with applications in other areas such as quality control, product traceability, labelling and counterfeiting. For example, raising quality control in nanomedicine or detecting counterfeiting on cosmetic products.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 720964.

Partners

Carl Zeiss Microscopy GmbH (DE) , Helmholtz-Centrum Dresden-Rossendorf EV - HZDR (DE) , Photonis Netherlands Bv (NL) , Eidgenössische Technische Hochschule Zürich - ETH (CH) , Friedrich-Alexander University Erlangen-Nürnberg - FAU (DE) , The Flemish Institute for Technological Research - VITO (BE) , MJR Pharmjet gmbh - MJR (DE) , Institut National de la Recherche Agronomique - TOXALIM (FR)

Financial Support

Horizon2020

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