

Advanced characterisation methodologies to assess and predict the health and environmental risks of nanomaterials (RIA)

TOPIC ID: HORIZON-CL4-2022-DIGITAL-EMERGING-01-35

Deadline date: **05 April 2022 17:00:00 Brussels time**

Expected EU contribution per project: **2-3 M EUR**

Number of projects expected to be funded: **5**

Scope:

- Develop advanced characterization tools and methods for nanomaterials industry to enhance the design and development stages of advanced materials and products contributing to less waste and emissions while improving process quality in line with Life Cycle Assessment framework;
- Develop new in vitro models and tests to assess nanotoxicology;
- Include use cases to validate and demonstrate the approach(es) in industrial settings and involve comprehensive analysis and measurement of process and handling release scenarios and exposure measurements;
- Propose the validated methods to standardization bodies such as ISO or OECD for development of standards, test guidance or a guidance document;
- Demonstrate connectivity with H2020 nanosafety projects and leverage the extensive experience from relevant initiatives. Cooperation with EU funded projects under Industry Commons and other similar initiatives for interoperability and data documentation should be addressed;
- In line with the Union's strategy for international cooperation in research and innovation, international cooperation is encouraged.

Specific Topic Conditions

Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project – see General Annex B.

Cross-cutting Priorities:

International Cooperation

ExpectedOutcome:

The development of reliable and practical tools to ensure the safe and sustainable use of nanomaterials has not kept pace with the rapid commercialization of nanotechnology-enabled products. The dynamic nature of many nanomaterials in complex environmental matrices is recognized as a major challenge for their detection, quantification and characterization. Consequently, there is an urgent need to establish appropriate methods for cost-efficient assessment and prediction of the health and environmental effects of nanomaterials, providing better decision criteria, based on quantitative rather than qualitative information and taking into account the full life cycle of a material. Proposal results are expected to contribute to several of the following expected outcomes:

- Develop high-resolution imaging methods for quantification and characterization of nanomaterials (e.g. nanoplastics) in complex matrices and determinations of their transformations in such environments.
- Increase availability of validated protocols to advance both nanosafety studies and material characterization.
- Ensure appropriate control experiments and more realistic in vitro models to address current gaps in nanotoxicology.
- Deliver reliable data and improved data reporting guidelines, supported by computational modelling, in order to allow the development of grouping and read across methods. Make use of open access database and using standards for data documentation (e.g. CHADA).
- Develop harmonized standardized test methods that can be used in a regulatory framework including test hazard assessment, biodegradability and sustainability for advanced nanomaterials.
- Increase the efficiency and effectiveness of materials and product development by reducing costs and time for product design, time-to-market and regulatory compliance

- Next generation multi-sensing photonic and electronic systems with increased integration of new functionalities, decreased size and cost-effective manufacturing.
- Supporting a European open strategic autonomy in key integration and packaging technologies and related manufacturing value chains.
- Sensing devices and components allowing for reaching the new green deal objectives through enabling high levels of reuse/repair/repurpose, recovery and recycling of waste and materials or helping to reduce overall power consumption of a system by at least a factor of 2.
- Reinforcing European industrial leadership in high performance multi-sensing systems and components for sectors such as healthcare and well-being, environmental monitoring and protection, transport and automated driving, manufacturing, aerospace and security.