

Experimental resources dedicated to nanomaterials

INERIS is developing expertise in nano-safety. The Institute has skills and experimental platforms which are made available to professionals for assessing nano risks throughout the life cycle of a product and managing the risk associated with exposure of personnel at the workstation.

Risk Assessment Platform of NANO-S Nanomaterials

Comprising 4 dust-controlled laboratories, spread over 300 m², it is dedicated to metrology, characterization of the physicochemical hazards of nanomaterials, characterization of exposure and assessment of associated risks.

It aims to develop scientific knowledge and expertise in order to access nanotechnologies that are clean and safe by design.

NANO-S offers business solutions for the management of risks throughout the life cycle of nanomaterials and allows:

- **Assessing the safety and physical hazards parameters** of powdered nanomaterials (flammability, explosiveness, static electricity) in order to size and improve existing safety features,
- **Developing field instruments** dedicated to nanomaterials and more efficient and specific than the existing ones,
- **Analyzing and modeling the behavior** of nano-powders (rheology, suspension, dispersion potential) and investigating mechanisms of agglomeration,
- **Characterizing the emissivity during the life cycle** of nanomaterials subject to external aggressions of a mechanical type (abrasion, machining), a thermal type (combustion, incineration), a chemical type (acid, base) or an environmental type (ultraviolet, humidity, temperature).



A National Platform in Life Sciences

It incorporates in-vivo and in-vitro test resources to study the toxicity of nanomaterials in particular, commercial products in the form of nano-powders or dispersed in solution:

- specifically dedicated to pulmonary toxicity studies, it can be used also in neurotoxicology, food toxicology...
- with the objective of producing reference data (GLP) and validating alternative methods to animal testing (biological component based models and numerical tool).

It also includes test facilities dedicated to the ecotoxicity of nanomaterials.



INERIS

controlling risks
for sustainable development



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A platform for characterizing the physicochemical properties of nanomaterials

It aims in particular to assess the **nanoparticulate nature** of materials:

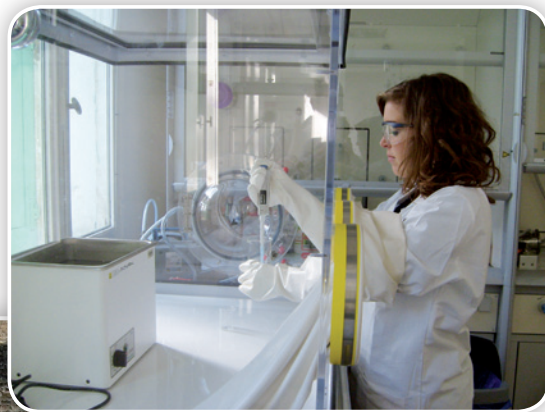
- determining the **morphology** and **particle size**
- determining the **specific surface**
- global and local **chemical composition** (heterogeneity)
- **degree of aggregation** or agglomeration.

A platform for studying waste and materials containing nanomaterials (ARDEVIE)*

The **experimental platform** is dedicated to the evaluation of the behavior of materials or waste over time. It consists of laboratories (leaching, percolation...) and outdoor plurimetric drivers (controlled lockers, lysimeters...).

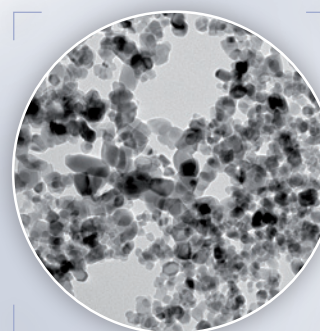
The platform allows:

- **identifying** the presence of nanomaterials in complex media (leachable fractions)
- **understand** aging/alteration of waste and materials containing nanomaterials due to chemical or environmental aggressions
- **modeling** geochemistry and transport through the ground to the water table.

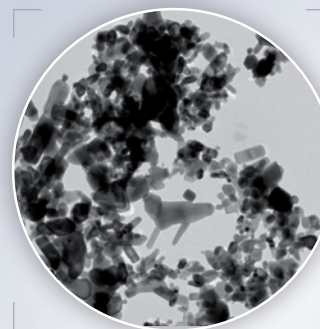


Outdoor facilities for real environmental aging studies.

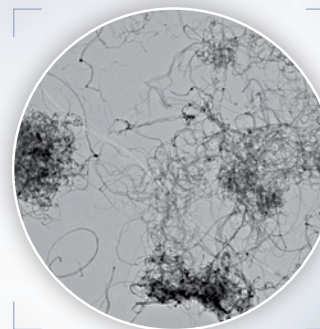
* ARDEVIE : INERIS-CNRS-CEREGE common platform.



Titanium Dioxide
TiO₂



Zinc Oxide
ZnO



Carbon nanotubes
CNT

Standardization work

INERIS is a member of the major groups dedicated to the standardization of nanotechnology: AFNOR/x457 Commission at the national level, CEN/TC352 at the European level and ISO TC229 at the international level.

INERIS is:

- **ISO 9001 certified**
- **GLP recognized** (Good Laboratory Practices)

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