Fate and Exposure models for you - www.nanofase.eu

Nanomaterial Fate and Speciation in the Environment

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Background

Progress is needed in the **prediction of environmental distribution, concentration and form (speciation) of nanomaterials**, to allow early assessment of potential environmental and human exposure and risks, facilitate safe product design and to include fate models in nano regulation.

NanoFASE, a progression of FP7 NanoFATE, is part of the EU NanoSafety Cluster (www.nanosafetycluster.eu) which works to maximize synergies between EU research projects addressing all aspects of nanosafety including toxicology, ecotoxicology, exposure assessment, mechanisms of interaction, risk assessment and standardization.

General Aim

The **overarching objective** of NanoFASE is to deliver an **integrated Exposure Assessment Framework** comprising protocols, models, parameter values, and associated guidance that:

- Allows all stakeholders to assess the environmental fate of nano releases from industrial nano-enabled products,
- Is acceptable in regulatory registrations and can be integrated into the EUSES model for REACH assessment,
- Allows industry a cost-effective product-to-market process, and
- Delivers the understanding at all levels to support dialogue with public and consumers.

The NanoFASE concept includes:

- Treating Environmental compartments as “Reactors” and where possible working with relevant (transformed) nanomaterials;
- Reducing complexity through identification of “Functional fate groups” as a tool to understand groups of nanomaterials that end up in similar final forms in the different environmental compartments;
- Showing by example how the Exposure assessment framework catalogue of models, parameters and methods can be integrated into existing models through updating SimpleBox4Nano;
- Building a research level Multimedia fate model to verify consequences of using simplified models to feed regulatory models.

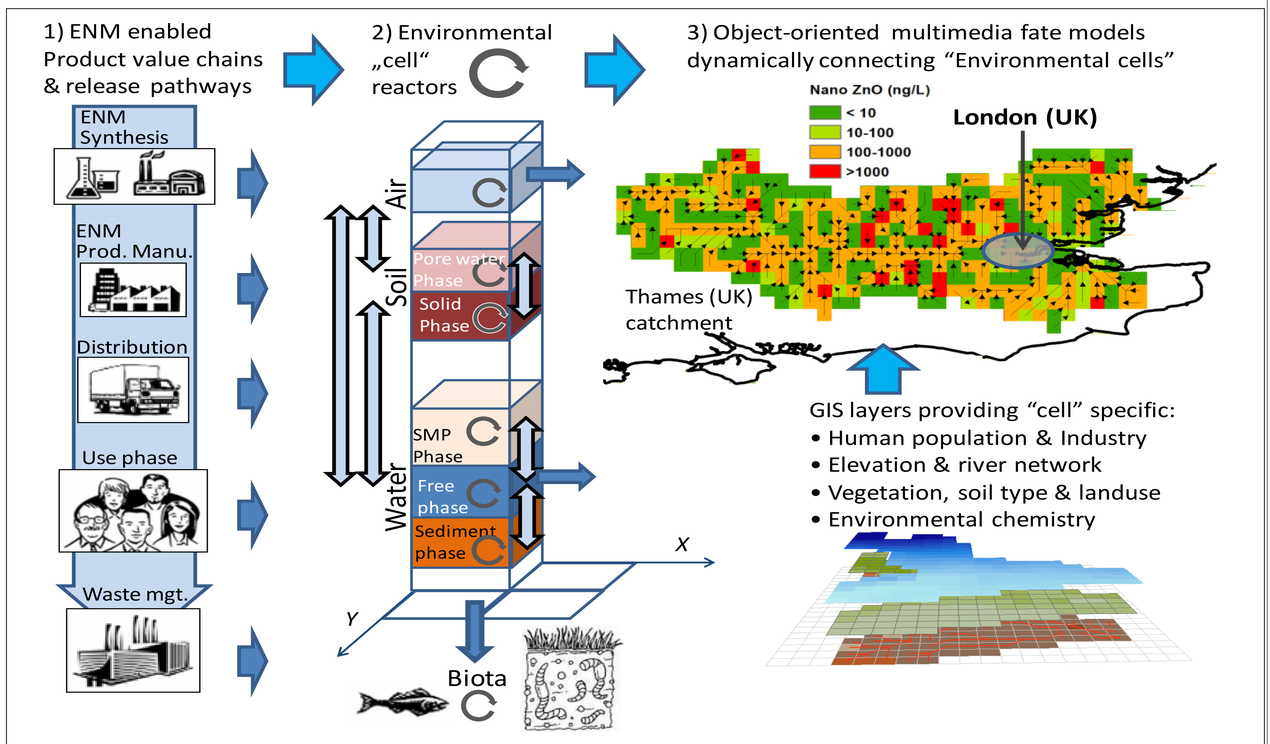

Fig.1 NanoFASE conceptual workflow for delivering dynamic multimedia fate prediction both in a generalised model environment and GIS enabled mode.

Visit the ‘clickable framework’ on NanoFASE.eu – find our newsletters and reports there too, as well as descriptions of each work package.

Objectives

NanoFASE will:

- Enable form-specific release modelling, by development of detailed understanding of
  - i) product-type and product-use based release forms; and
  - ii) release pathways of engineered nanomaterials (ENMs) across ENM-enabled product chains.
- Optimise current, routine methods for ENM characterisation in simple solutions to deliver repeatable and reproducible results in environmentally relevant complex matrices.
- Develop a catalogue of process-informed environmental compartment models, to describe the transformation across time of populations of ENM forms entering all key waste management or environmental compartments.
- Work closely with research, industry and policy stakeholders to develop a fate and exposure assessment framework comprising validated standard operating procedures (SOPs), product value chain and waste management release modules, parameterized transformation algorithms and multimedia fate/exposure models, along with guidance for stakeholder use.
- Ensure that the method and model developments have the widest and highest possible impact, by working with relevant communities (ECHA,OECD...) to enable uptake of NanoFASE methods and protocols into standards, into existing exposure prediction tools, and into mainstream chemical assessment tools, policy and regulation (e.g. EUSES & REACH, Industrial Emissions Directive, Waste Framework Directive).

Main Outcomes

A fit-for-purpose, road-tested and future-proofed Exposure Assessment Framework for engineered nanomaterials (ENMs), comprising:

- A state-of-the-art, flexible and future-proof dynamic multimedia model incorporating environmental specific fate process models utilizing the concept of environmental reactors.
- A novel and practical approach to classification of ENMs into Functional Fate Groups to streamline fate assessment requirements.
- A fully operationalised version of the existing screening model SimpleBox4Nano, incorporating the parameterisations of ENM transformation processes developed inside and outside NanoFASE.
- Parameter values and model catalogues supporting the derivation of individual process models, describing transformation and transport processes in waste streams, air, soil and water/ sediment and uptake and accumulation in biota.
- Validated methods and standardised operating procedures for the detection and quantification of ENMs in environmental media.

Partners

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