Exposure through the Life Cycle, with Material Characterization

CoChairs
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Premise for the Research Need

• Several emerging lines of research are discovering that the detection, characterization, and evaluation of the nano-specific attributes of what is emitted from product-uses of nanomaterials can be highly context dependent.

• Hence, there is an increasing understanding of the need to assess the fate and behaviour of nanomaterials at every stage of their lifecycle, from production through use in products (including wear and tear aspects) through final disposal of the product and potential release of the nanomaterials into the environment.
This includes, potentially:

- Release processes from production, use, to end of life,
- Nanomaterial characterization and exposure evaluation at every stage of the life cycle,
- Transformation, partitioning and biomodification,
- Accumulation in environmental sinks etc.
- Synergism with other potential toxicants as a consequence of the exposure / release / transformation cycles
- Databases and models for exposure evaluation and clustering of nanomaterials
- Basic research efforts have to be backed up by harmonisation and standardisation activities.
Need for a Community of Research

- Concurrent emergence of understanding of the elements of "real world" ENM risk evaluation in multiple laboratories
  - What makes an ENM mixture biologically relevant?
  - How do we measure these "elements" of the ENM?
  - What is the fate of these ENM elements in the environment?
- Products of nanotechnologies are already in commerce and many more beneficial ones in the pipeline
- Tremendous complexity of ENM mixtures analysis makes it unclear WHICH data are relevant, so sharing of emerging data is needed to allow early trend analysis
Benefits

• Value to risk understanding and product development of sharing research findings early in development

• Value to researchers in finding collaborations, new topics, and applications of data

• Value to funding organizations by pooling resources to build knowledge quickly
Plan to initiate

• Provide an online platform for sharing information about
  – Research projects
  – Methods
  – Funding opportunities

• Convene experts on topics within the theme, to
  – Build collaborations
  – Share emerging findings
  – Build knowledge
First two efforts for the CoR

1) Gathering/providing measurement methods information
   – Part of the information sharing platform
   – Gabriele Windgasse
     “Developing a Resource Tool for Concepts and Methods to Analyze Engineered Nano Materials in Environmental Media Throughout their Life Cycle”

2) Focus on Fate Assessment
   – A topical area to convene experts
   – Geert Cornelis
     ”Environmental Risk Assessment of ENP: fate assessments as the way forward”
Goals for discussion this afternoon

Context:

We are proposing to develop a resource for sharing information and for convening experts. The need is critical to understanding real risks of ENP.

Our need from you:

- Specific feedback on the focus areas
- Ideas on how to support the data generation and database maintenance
  - Who hosts, pays, maintains?
  - How to coordinate with other CoRs?
  - How do we promote efficient gathering and availability? (Wiki, Cloud, International Organization, etc)
- Specifics on the data sets and experts
  - What kinds of data and experts are needed, where are they, how do we get access?
  - Structural components of the data sets – what elements are needed
Rapporteurs for this session

• Jerome Rose
  Centre Européen de Recherche et d’Enseignement des Géosciences de l’Environnement/Centre National de la Recherche Scientifique, France

• Stacey Sandridge
  National Nanotechnology Coordination Office, USA