

Research Needs for Environmental Exposures

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Background



Evonik Degussa is an international chemical company

- Products include materials that have been described as nanostructured. (Aeroxide P25 - TiO_2 , Printex 90 - CB)
- Manufacturing is conducted in closed systems with essentially no releases. Focus on occupational safety.
- Evonik Degussa's customers are other industrial companies.
- Evonik Degussa participates in a wide range of national and international programs to improve EHS knowledge and practices.

Research Needs - Environment



My focus is on Exposure, Dose, Effects & Risk – Less on transport & pathways

- Consistent terminology – e.g. What is a nanomaterial? What is meant by “size”?- NT
- Understanding of the importance of characterization – NT, MT
- Methods for Detection and Identification of NM in biological and environmental media – MT, LT
- Distinguishing eng'd/mnf'd NM from background NM - LT
- Validated procedures – NT, MT, LT
- Understanding of NM characteristics that have EHS impacts. Size, Aspect Ratio, Composition, etc. NT, MT
- Predictive models - LT

ISO Activities



Technical Committee 229 has established Working & Task Groups:

- **JWG 1 – Terminology & Nomenclature (9 Project Groups)**
- **JWG 2 – Measurement & Characterization (10 Project Groups)**
- **WG3 – Health, Safety and Environment (9 Project Groups)**
- **WG4 – Materials Specifications**
- New (Dec. 2008) - Nanotechnology & Sustainability Task Group
- New (Jan. 2009) – Consumer and Societal Dimensions of Nanotechnologies Task Group

WG3 – Health, Safety and Environment - 9 Project Groups

- **PG5 – Identifying a small set of characterization elements that are important for toxicologists. Will improve data quality.**
- PG7 – Preparing a technical report describing guidance on product stewardship practices.
- PG9 – Preparing a technical report describing the development of Material Safety Data Sheets for nanomaterials

NNI Agencies in ISO/ANSI/ASTM - Selected



- NIST – All ISO/ANSI Working Groups & ASTM
- NIOSH – WG3
- FDA – WG3
- EPA – WG3
- NCI – WG3
- NIH - WG3

OECD Activities



- The Working Party on Manufactured Nanomaterials (WPMN) has established 8 Projects.
- SG1&2 – Development of an EHS Database & EHS Research Strategies – Database now available.
- SG3 – Safety Testing of a Representative Set of 14 Manufactured Nanomaterials - Research Program underway with preparation of dossiers compiling existing data and documenting the generation of new data. Phase 1 anticipated to be completed 2011-2012. Materials partially overlap with NIST's & EPA's lists.

SG4 – Manufactured Nanomaterials and Test Guidelines-
Existing OECD Test Guidelines evaluated for possible use with NM. Now working on identifying sample preparation methods for assessments of NM in environmental media.

SG5 – Co-operation on Voluntary Schemes and Regulatory Programs

SG6 – Co-operation on Risk Assessments and Exposure Measurements:

Risk Assessment workshop just completed in Washington, DC.

SG7 – The Role of Alternative Methods in Nano Toxicology:
Trying to reduce the use of animals in toxicity evaluations.

SG8 – Exposure Measurement and Exposure Mitigation:
Identifying exposure routes and protective measures.

NNI Agencies in OECD - Selected



- EPA - WPMN
- FDA – WPMN, WPN
- NIOSH - WPMN
- State - WPN
- NIST – WPN, (WPMN?)
- CPSC – WPMN
- NIH – WPN, WPMN

Recommendations



- Continue NNI agency involvement in ISO, OECD, ASTM and related activities - NT
- Consider increase in NNI agency EHS related programs consistent with their missions – NT, MT
- Improve explanations relating non-EHS research results to EHS needs. Improve explanation of “EHS” research to EHS. - NT
- Increase quality of extramural research through requirements for material characterization and method validation – NT, MT, LT
- Ensure ease of sharing of information within and between NNI agencies (NEHI, NSET). Don't repeat work done by others or create unnecessary work - NT
- Reach out to industry. Raise comfort level - NT

Priority Environmental Research Needs



- Consistent terminology – e.g. What is a nanomaterial? What is meant by “size”?- NT
- Emphasize the importance of characterization – NT, MT
- Improve understanding of NM characteristics that have EHS impacts. Size, Aspect Ratio, Composition, Surface, etc. - NT, MT
- Methods for Detection and Identification of NM in biological and environmental media – MT, LT
- Distinguishing eng'd/mnf'd NM from background NM - LT
- Validated procedures & Reference Materials – NT, MT, LT
- Predictive models - LT



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