

# Nanotechnology and Nanoscale Materials

American Chemistry Council Activities





# ACC and Nanotechnology

- Support Global Coordination of Regulatory, Research, and Standard-Setting Activities
- Assess Existing Regulatory Frameworks For Application to the Characterization and Properties of Nanomaterials
- Apply Product Stewardship Principles of the Global Chemicals Management Policy and Responsible Care® to Nanotechnology Related Activities
- Support the Increased Funding of Methods to Assess Impacts of Nanotechnology on Environment, Health, and Safety and for Research Programs to Apply Those Methods



# ACC Nanotechnology Panel: Focus for ACC

- Producers, Users, Researchers of Manufactured Nanomaterials- Founded in 2005
- Representing Wide Range of Company Sizes and Types of Nanomaterials- In Commerce and Research and Development Phases
- Based on the Business of Chemistry and Responsible Care®
- Early, Continuing Supporter of Voluntary Stewardship Programs
- 17 Companies Presently- More Expected



# ACC Nanotechnology Panel

- Policy Development and Advocacy- National (Congress, EPA, NIOSH/OSHA, NIEHS, FDA, PCAST), International (OECD/BIAC, Canada, UK-Defra, EU)
- Technical Analysis and Publication- Definition Considerations, Research and Testing Matrices, ANSI/ISO, Material Characterization Base Set
- Product Stewardship- Surveys, Wilson Center (Communications), NMSP, Product Inventories
- Communications- Press Statements, Website Publications

# “Nano before Nano was cool!”

Particle size between 4 and 20 millimicron

- Manufacturer of a Variety of High Surface Area Materials:
  - Silica, alumina, titania, zirconia, ceria, and “hydrophobic” grades
  - Used in rheology, reinforcement, abrasion
- The term “nano” is at the Nexus of Regular Chemistry, Regulatory Chemistry and Rhetorical Chemistry
  - First entry in Oxford English Dictionary for “Nano” is 1947 after commercialization of AEROSIL®



“Farbe & Lacke” April 1949

# Nanotechnology- The Order



## The First Nanotechnologists

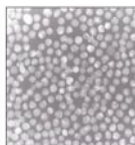
Ancient stained-glass makers knew that by putting varying, tiny amounts of gold and silver in the glass, they could produce the red and yellow found in stained-glass windows. Similarly, today's scientists and engineers have found that it takes only small amounts of a nanoparticle, precisely placed, to change a material's physical properties.

### Gold particles in glass

Size: 25 nm  
Shape: sphere  
Color reflected:

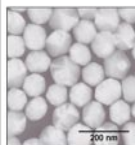


100 nanometers =  
0.0001 millimeter

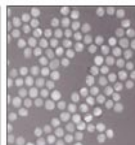
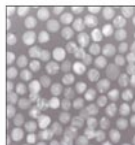


### Silver particles in glass

Size: 100 nm  
Shape: sphere  
Color reflected:



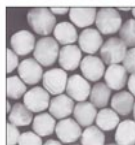
Size: 50 nm  
Shape: sphere  
Color reflected:



Size: 40 nm  
Shape: sphere  
Color reflected:



Size: 100 nm  
Shape: sphere  
Color reflected:



Size: 100 nm  
Shape: prism  
Color reflected:



Source: Dr. Chad A. Mirkin, Institute of Nanotechnology, Northwestern University

\*Approximate





# Current Major Issues

- Perspective Versus Reality
  - Scope of Nanomaterials in Commerce
  - Codes of Ethics for Nanomaterials Development
  - Definitions
- Policies
  - National Nanotechnology Initiative Reauthorization- EHS Research
  - EPA Nanomaterials Stewardship Program
  - NGO and Global Perspectives



# Product Stewardship for Manufactured Nanomaterials

- Handled as Hazardous Materials
- Part of ACC Responsible Care Program
- Worker and Workplace Protection Is In-Place
- Global Harmonization of Management Approaches
- Adequate and Improving Material Characterization and Measurements



# Global Harmonization

- OECD Working Party on Manufactured Nanomaterials (BIAC)
- OECD Working Party on Nanotechnology (BIAC)
- ANSI/ISO



# Cefic LRI calls in preparation

- Tiered approach to testing and assessment of nanomaterial safety to human health (budget €1.5m)
  - Test the suitability of OECD guidelines for selected nanomaterials for human health endpoints ( $\text{SiO}_2$ , ZnO)
  - Define a tiered testing strategy for inhalation and dermal exposure, comprised of short- and long-term studies, needed for a comprehensive human health hazard assessment
  - Consideration of animal welfare (3R principles): inclusion of *in vitro* methods
- Environmental fate of nanomaterials (preliminary budget €500k)
  - In development
- Process
  - Calls to be published in 2008
  - Results to be published in peer-reviewed journals
- Industry contribution to OECD Sponsorship Programme



# Why Is ACC Supporting the EPA NMSP?

- Quicker Data Collection on Nanoscale Materials to Assist EPA in Building Its Knowledge of Nanoscale Materials and Risk Management Practices
- Contribute Data and Information to the OECD Research Program (Working Party on Manufactured Nanomaterials)
- Continue Support of Voluntary Programs
- A Mandatory Reporting Option Could be More Demanding and Time Consuming



# EHS Research on Manufactured Nanomaterials

- Support Development of EHS Roadmap- BEST (NAS)
- Support NNI Reauthorization & “Coordinator” for Effective Implementation
- Need Appropriate Metrics



# ACC Contact Information

- **Bill Gulledge**  
Chemical Products & Technology Division  
American Chemistry Council  
1300 Wilson Boulevard  
Arlington, Virginia 22209  
(703) 741-5613  
[william\\_gulledge@americanchemistry.com](mailto:william_gulledge@americanchemistry.com)

