Chemical Information Call-in Candidate: Nano Cerium Oxide

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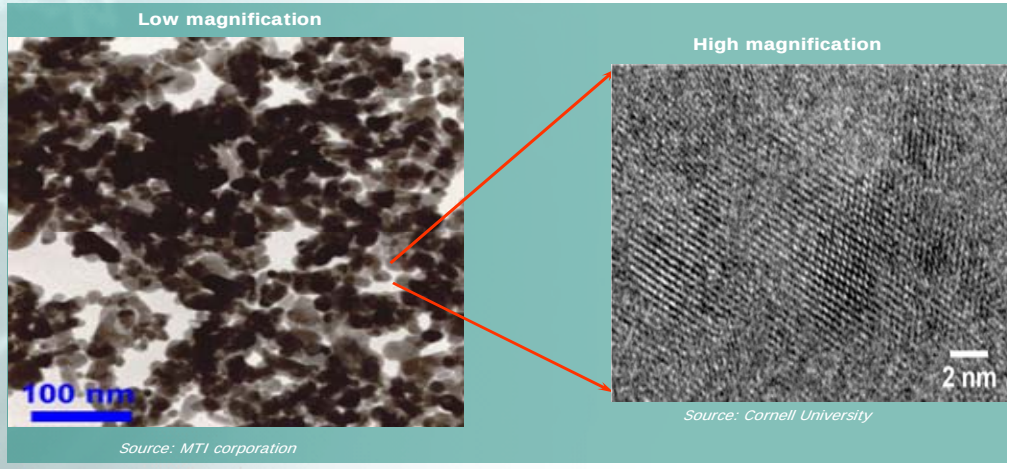
OVERVIEW: Nano Cerium Oxide

- **Why?**
  - Expanding Production and Applications
  - Health and Environmental Concerns
- **What Information Gaps?**
  - Properties, Stability
  - Toxicity, Fate in Environment
  - Analytical Methods
- **Who?**
  - Producers
  - Importers
  - Researchers



CeO_2 Applications

Major Industrial Applications

- Diesel fuel additive
- Chemical mechanical polishing for Si wafer
- Precision polishing for optics
- Anti-reflective coating
- UV filter: large band gap
- Nonvolatile memory

CeO_2 Production

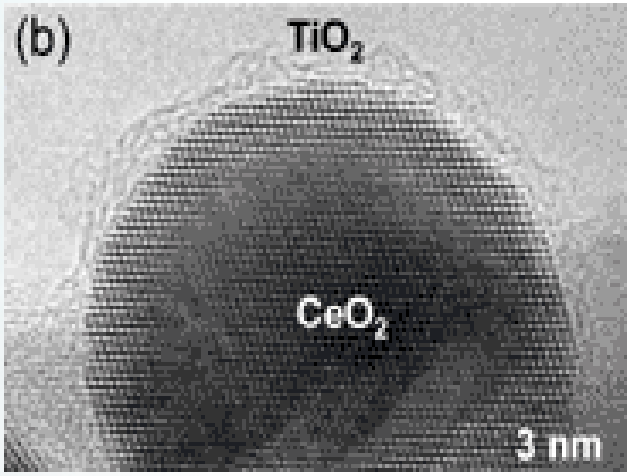
- **Annual Capacity:**
  - World-wide: 10,000 tons per year
  - California: ?

- **Major Producers:**
  - Saint-Gobain, Evonik, Meliorum Tech., Inframat Advanced materials, Antaria, HEFA Rare Earth Canada, Nanocerox, Nyacol, Energenics, MTI, etc.

Properties and Potential Concerns

- **Oxidative stress by Photocatalytic property**
  - Generate Reactive Oxygen Species (ROS)
  - Cytotoxic via oxidative stress
  - Chronic toxicity to aquatic life

- **Penetration into the cytoplasm**
- **Potential to be an skin irritant**
- **Modification**
  - CeO2-ZrO2
  - CeO2-TiO2



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CeO_2 Information Gaps

Information gaps:

- Analytical and other test methods
- Modification: core-shell structure
- Production capacity
- Toxicity and size dependence
- Stability, fate, and transport

Questions for Producers, Importers, Researchers, and Others

- **Analyzing the materials**

  1. What machines and methods do you use to analyze your materials?

  2. Do you know the properties of your materials? After modification?

- **Monitoring program**

  1. Do you have monitoring program in your work place? In air? In water?

- **Use and End of Life**

  1. Do you know reactions when your material is released into aquatic environment?

  2. Do you know reactions when your material is released into air?

- **Production**

  1. What is your actual production amount per year?

Please participate!

Browse our website, offer comments, prepare and submit your responses, meet with us, and call and write!

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