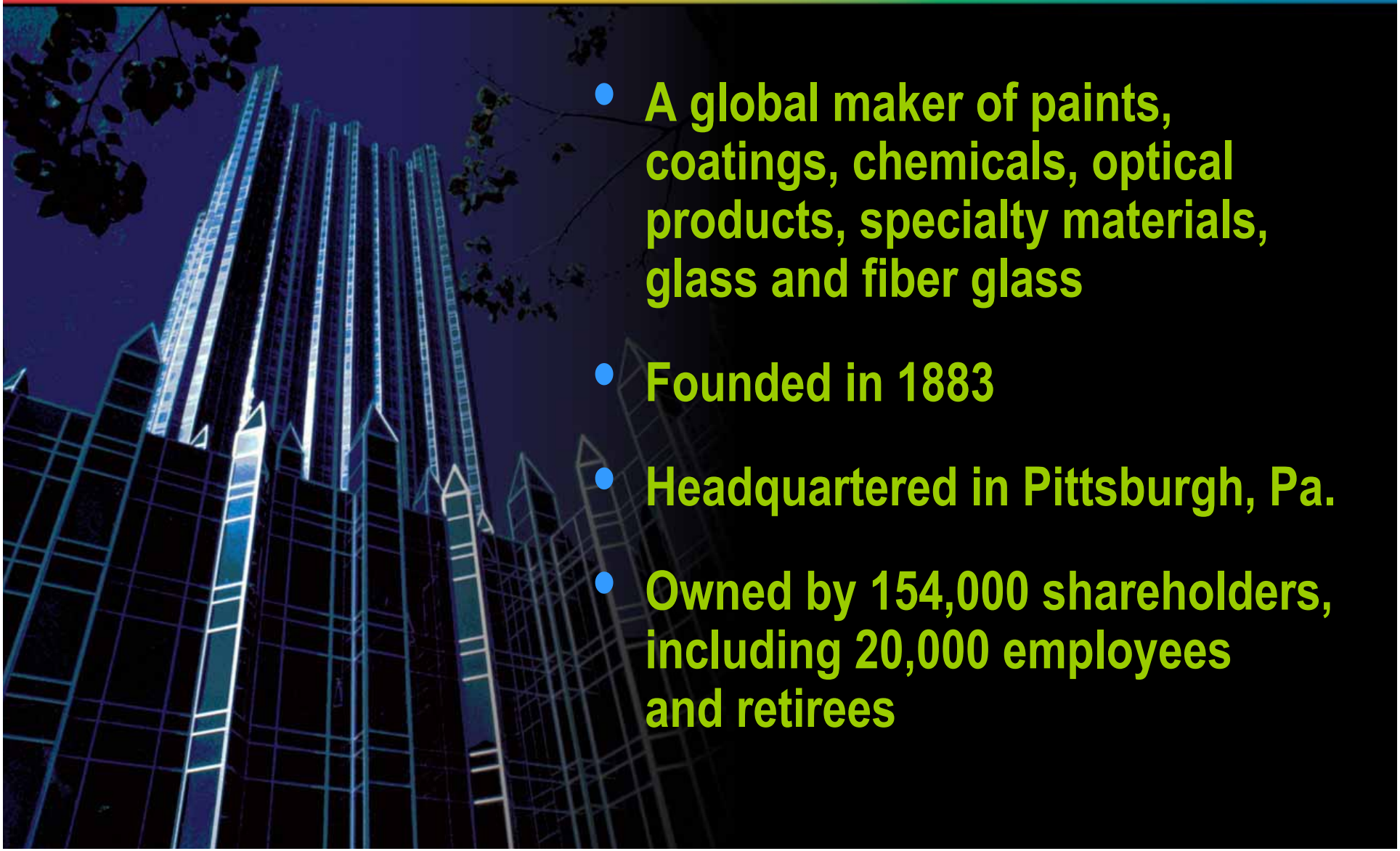
PPG Overview

Nano for Business May 22, 2008

Daniel Rardon, Ph.D.
Senior Scientist, Manager Advanced Technologies
PPG Industries, Inc.
Office of Science & Technology
drardon@ppg.com

Growth • Leadership • Innovation

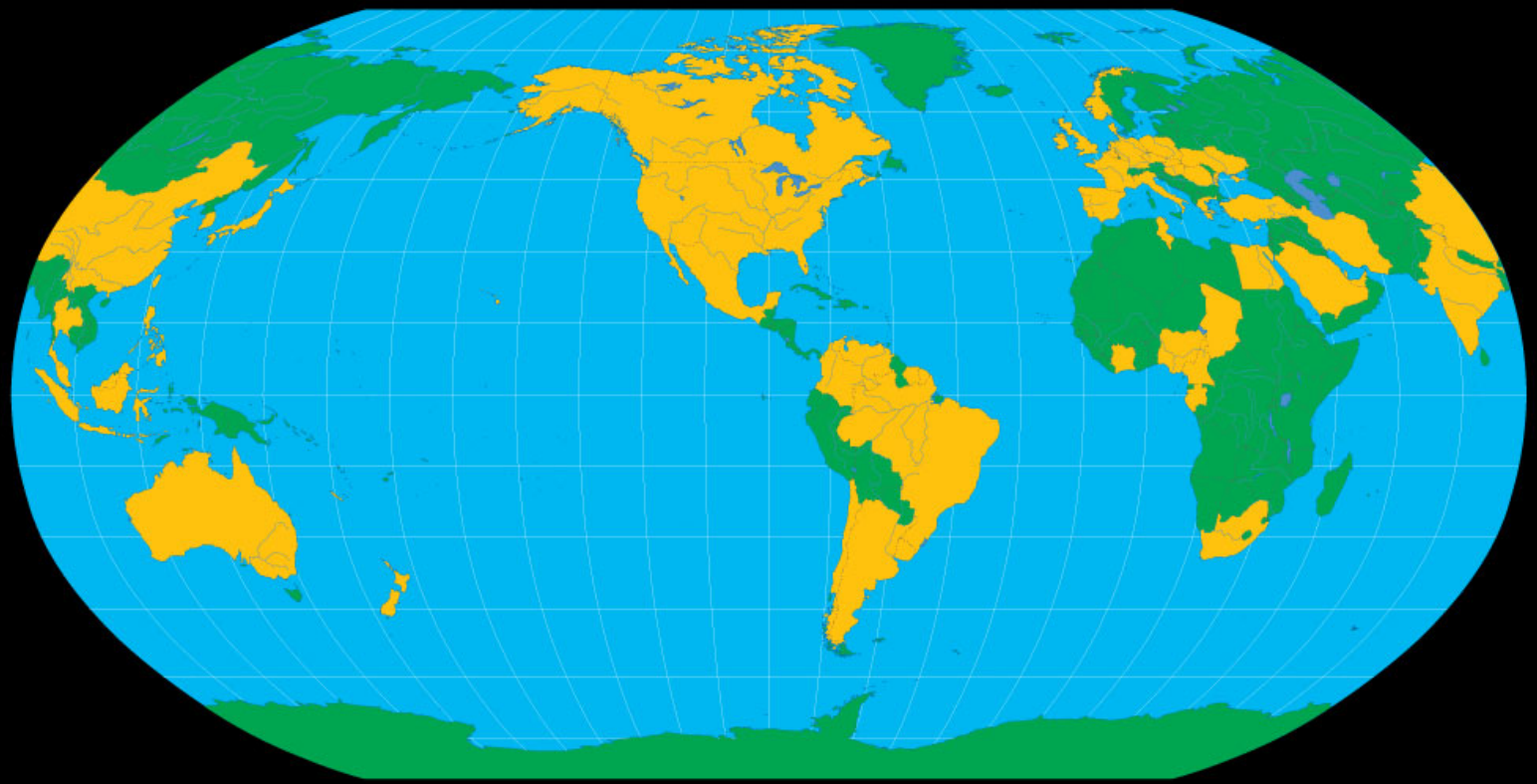
PPG Is...



- A global maker of paints, coatings, chemicals, optical products, specialty materials, glass and fiber glass
- Founded in 1883
- Headquartered in Pittsburgh, Pa.
- Owned by 154,000 shareholders, including 20,000 employees and retirees

PPG's Global Operations

- More than 41,000 employees
- More than 150 manufacturing sites and equity affiliates
- In more than 60 countries

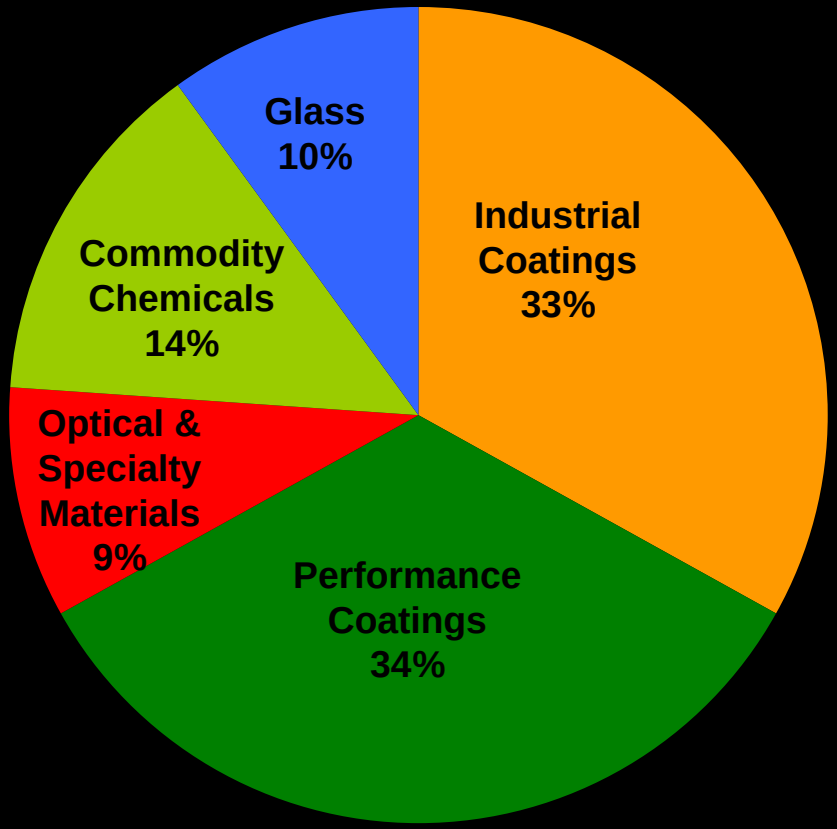


PPG Is...

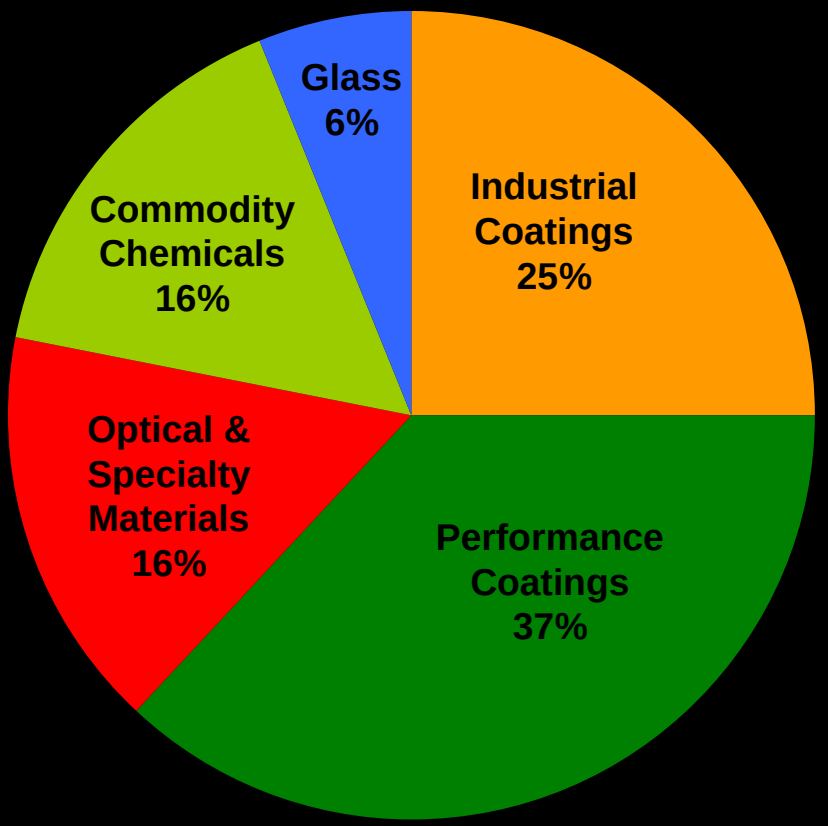
- **Composed of 13 strategic business units in six business segments:**
  - ►**Industrial Coatings**
  - ►**Performance Coatings**
  - ►**Architectural Coatings (EMEA)**
  - ►**Optical & Specialty Materials**
  - ►**Commodity Chemicals**
  - ►**Glass**

Global Sales & Income 2007

Sales ($11.2 billion)



Segment Income ($1.5 billion)



Nanotechnology Competencies

- Thin Film Coating
  - ► In-line magnetron sputtering vacuum deposition (MSVD)
  - ► Large-scale chemical vapor deposition (CVD)
  - ► Multilayer design, modeling, and manufacture of coated transparencies
- Nanocomposite Materials
  - ► Coatings with improved performance, functionality, and activity
  - ► Transparent and non-transparent structural composites and armor
  - ► Nanofiber composites and electro-mechanical spinning
- Color and Security
- Nanoparticle Manufacture (Corporate Technology Initiative)
  - ► Vapor-phase processes for oxide and non-oxide ceramic nanomaterials
  - ► Design, economic feasibility, scale-up, and supply

Nanotechnology in Glass Products

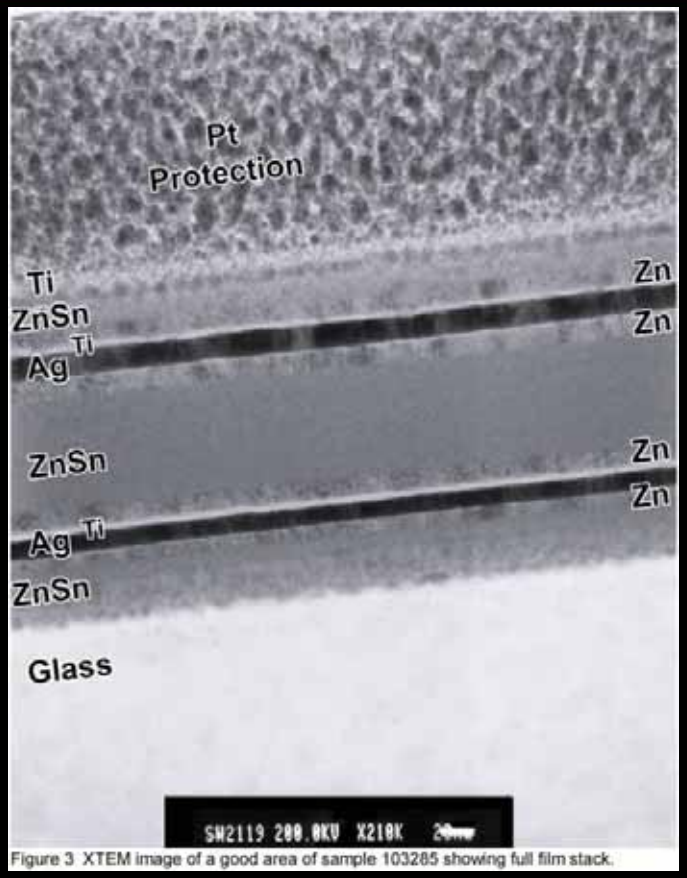


Figure 3 XTEM image of a good area of sample 103285 showing full film stack.

- Design & modeling of multilayer interference thin film coatings
- Large-scale chemical vapor deposition (CVD)
- In-line magnetron sputtering vacuum deposition (MSVD)
- Transparent coated product manufacturing compatibility
  - ► Solar thermal HLR and low-emissivity functions
  - ► Coat flat and bend automotive glazing
- Development of conducting, high transmittance coatings for heated transparencies, window antennae, and electrochromic window units

ENERGY STAR

IdeaScapes
Glass • Coatings • Paint

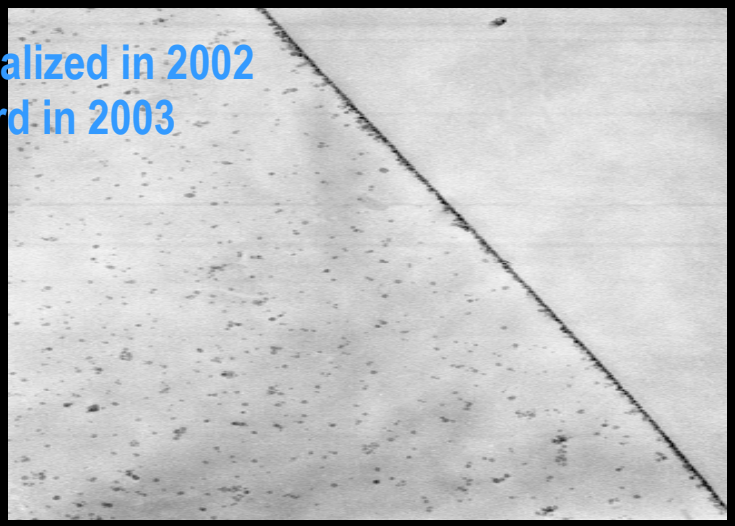
Nanotechnology in Coating Products

CeramiClear

- First automotive clearcoat to use nanoparticle technology
- State of the art mar, scratch, and acid-etch resistance
- Outstanding gloss retention after weathering and washing
- Compatible with existing circulation and application systems

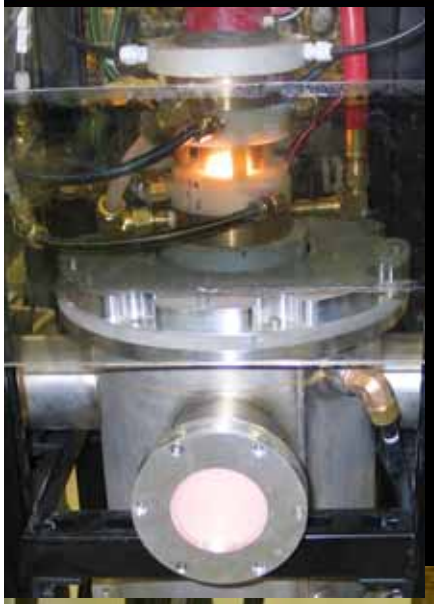
- Commercialized in 2002
- Pace Award in 2003

PACE AWARD

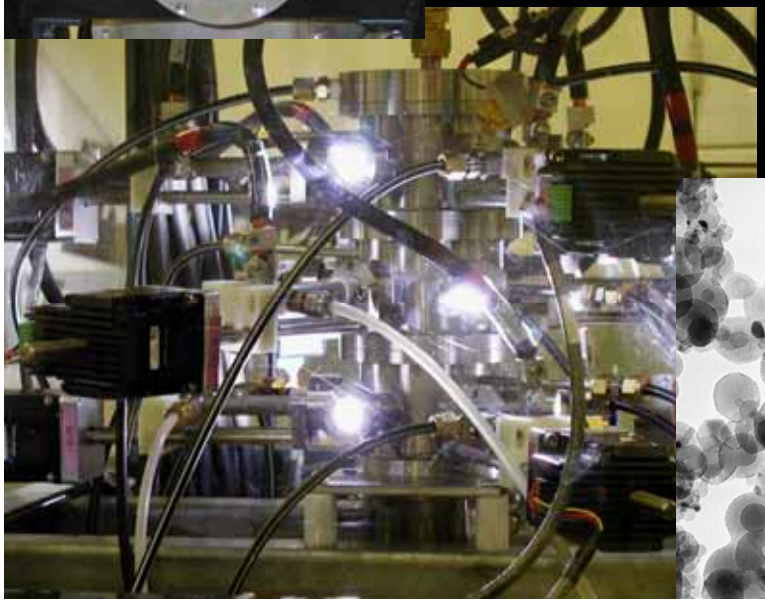


CORROSION

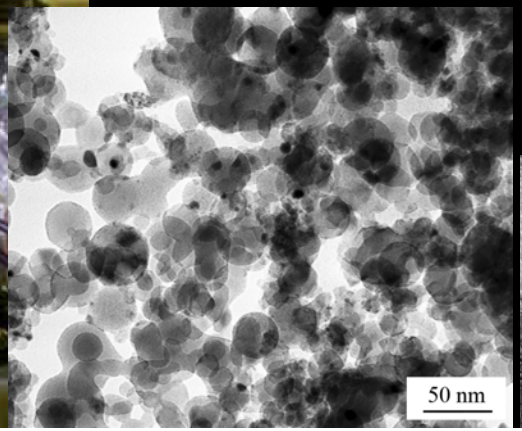
Nanoparticle Design & Scale Up

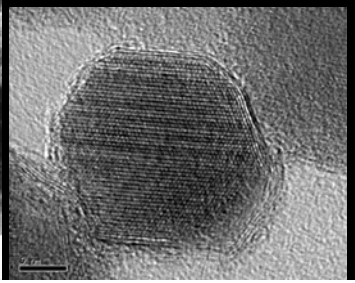


- Modular hybrid plasma systems for low cost nanoparticle production – a CRADA project with Idaho National Laboratory
- Nanoparticle development for energetic materials and protective systems – a public/private partnership with the US Army Armament Research, Development, & Engineering Center (ARDEC)



- Versatile process
- Unique compositions
- Cost effective materials
- Environmentally friendly





PPG Longmont

- PPG completed acquisition of assets and intellectual property of NanoProducts Corp in February 2008
- 15,000 square foot facility in Longmont, CO
  - ► Plasma and combustion pilot / production capability
- Large IP portfolio
  - ► Nanomaterial manufacturing methods and processes
  - ► Particle composition, morphology, and surface treatment
  - ► Multiple end-use applications and devices
- Materials experience
  - ► Powders (oxides, metals, non-oxides)
  - ► Dispersions

Nanomaterial Stewardship

- ACC Nanotechnology Panel
  - ► EPA cooperation: voluntary testing programs, etc.
  - ► International collaboration: EU programs
  - ► Industry coalition and communication
  - ► Collaboration with government and non-government organizations (NGOs)
- Nanoparticle Benchmarking Occupational HSE (NOSH) Project
  - ► Industry led consortium to help address current needs
    - Formation and stability of nanoparticle aerosols
    - Measurement tool for airborne nanoparticles
    - Efficacy of PPE and filtration media
- Internal nanomaterial environmental, health & safety programs
  - ► Corporate guidelines for handling, labeling, etc.
  - ► Toxicity testing
  - ► Participation in EPA NMSP

Growth • Leadership • Innovation

www.ppg.com