Anti-Corrosion Nanotechnology Solutions for Logistics (ACNS-L)

2009 U.S. Army Corrosion Summit

4 Feb 09; Clearwater, FL

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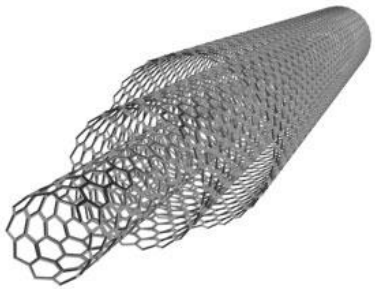
Outline

- Project Overview
- Objectives
- Strategy
- Community Engagement

Source: TC Lin - poagao.com



Source: Akasaka

ACNS-L Project Overview

- **U.S. Army Logistics Innovation Agency (LIA)**
  - Project Lead: Ed Scicluna (Futures Group)
  - Started Aug 08

Goal is to develop…

- A *structured approach to nanotechnology solutions* that will assist *Army future forces to overcome corrosion problems*, and

- A *framework and strategy* for the *application of nano-engineered coatings and/or materials* specifically designed to mitigate corrosion.

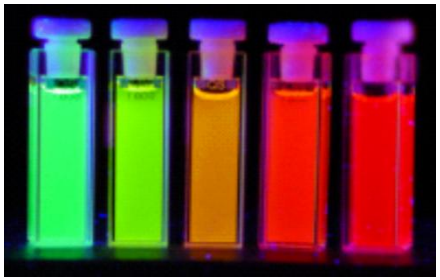
Nanotechnology

"Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers, where unique phenomena enable novel applications"

- **By 2014, impact about 15% of total global output**
  - *$2.6T manufactured goods will incorporate nanotech*
  - *Army leverage economies of scale*

- **Aspects of Nanotechnology**
  - Manipulation of matter at the nanoscale
  - Interdisciplinary
  - Unique and enhanced properties

Quantum Dots



Source: Koninklijke Philips Electronics N.V.

ACNS-L Objectives

1. **Increase** U.S. Army awareness about the potential of nanotechnology for corrosive resistant materials.

2. **Identify** current government, academic, industry research and development efforts.

3. **Facilitate** enhanced communication and collaboration through organized information exchange within the Army.

4. **Assess** U.S. Army corrosion mitigation practices and technologies.

ACNS-L Strategy

- **Phase 1 – Foundational Assessments (2009)**
  - Nanotechnology Corrosion R&D Assessment
  - Army Corrosion Assessment
- **Phase 2 – Strategy & Logistics (2010)**
  - Technical/Business Case Analysis/ROI Analysis
  - ACNS-L Roadmap
- **Phase 3 – Testing & Implementation (2011)**
  - T&E of Nanotechnology Corrosion Solutions
  - Subtopic Analysis

Goal → Tangible benefits to Army corrosion mitigation

Nanotech Corrosion R&D Assessment Report

- **Identify** key organizations and research groups involved in nanotechnology corrosion mitigation
- **Summarize** conventional corrosion mitigation techniques and products
- **Assess** state of nanotech corrosion mitigation R&D
- **Detail** existing and emerging nanotechnology-enabled commercial products for corrosion mitigation
- **Report** on major areas of nanotech corrosion mitigation

Army Corrosion Mitigation Assessment Report

- **Identify** current Army-funded nanotech corrosion RDT&E activities
- **Summarize** current Army corrosion mitigation practices
- **Assess** Army corrosion mitigation practices and technology across vehicles, facilities, varying conditions/environments
- **Provide** tradeoff analyses of nanotech products and technologies
- **Recommend** possible U.S. Army applications

Platforms of Interest

- **Initial List**
  - Age of Platform
  - Commonality with other Services
  - Widespread Use
  - Harsh Operating Environments

- **Wheeled Vehicles**
  - Heavy Expanded Mobility Tactical Truck (HEMTT)
  - High-Mobility Multipurpose Wheeled Vehicle (HMMWV)
  - M900 Series of 5 Ton Trucks
  - Family of Medium Tactical Vehicles
  - M1070 Heavy Equipment Transporter
  - Tactical Wheeled Vehicle
  - Logistics Materials Handling Equipment

- **Tracked Vehicles**
  - M1A2 Abrams
  - Engineering Vehicles
- **Aviation**
  - UH-60 Black Hawk
  - CH-47 Chinook
- **Small Arms**
  - MK-19 Grenade MG
  - M2 Browning MG
- **Other**
  - Generator & Powers Sets
  - Support and Ground Handling Equipment
  - Army Watercraft

Candidates for Phase 2 Detailed Analysis

Project Tasks

- **Engage** Army corrosion stakeholders continuously
  → Improve relevance of analysis, Align with requirements
- **Capitalize** on existing investments
  → Prevent redundant efforts
- **Expand** nanotech corrosion mitigation knowledge base
  → Extend/update level of detail, Fill gaps
- **Provide** foundational assessments
  → Stepping stone to realizing Army applications

Army & DoD Stakeholders

- Incorporate CPC activities into analysis reports
- Align future phases with requirements / needs
- **Topics of Interest:**
  - Top 10 corrosion issues?
  - Current CPC practices and technologies?
  - Nanotech corrosion products or R&D?

Available During Conference

Industry & Academia

- **Incorporate R&D and products into analyses**
- **Evaluate for roadmap and Army applications**
- **Topics of Interest:**
  - Commercial maturity?
  - Benefits of nano?
  - Comparison to conventional technologies?
  - Proposed applications?

Source: Industrial Nanotech, Inc.

Available During Conference

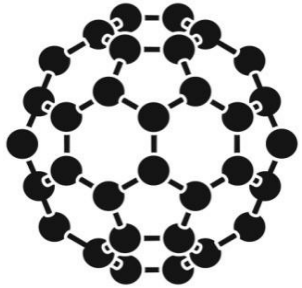
Collaboration & Information Resources

- **CorrDefense** (www.corrdefense.org)
  - *"Nanotechnology Corrosion Solutions"* WG
  - Information on nanotechnology research and products for corrosion mitigation

- **NanoLog e-Portal** (www.nanolog.org)
  - General site for nanotechnology and DoD logistics

Conclusion

Anti-Corrosion Nanotechnology Solutions – Logistics (ACNS-L)



Source: ManTech e-IC

- **USA LIA Project**
- **Leveraging nanotech to fight Army corrosion**
  - Nanotech Corrosion R&D Assessment
  - Army Corrosion Mitigation Assessment
- **Actively engaging stakeholders and the R&D community**

Source: Darren Hester (Flickr)


THANK YOU
ANTICIPATE
INNOVATE
ADAPT
ALWAYS READY