



The Nano Flyer

Keeping the ESOH Acquisition Community Informed on Nanotechnology Developments

ASC Nano Working Group Community of Practice

Nanoscience and nanotechnology are revolutionizing products currently in the market place and present opportunities which will dramatically alter our current weapon systems. Materials at the nanoscale do not share the same chemical or physical properties as common bulk materials. One small example, includes gold nanoparticles below 80 nanometers, which exemplifies a change in color. Another attribute is associated with nanoscale carbon, which is generally not classified as a hazardous material, becomes hazardous at the nanoscale. The environmental, safety and health (ESOH), toxicology and risk management communities are concerned with the potential adverse ESOH effects of novel nanoscale materials.

Toxicity of nanoscale materials cause cell death depending on the size, shape, surface coating, and chemical composition. In response to these studies, workers who handle raw nanoparticles (NPs) should consider NPs hazardous materials until further toxicology data is released. Workers should protect themselves by wearing proper personal protective equipment such as half-mask respirators (100% HEPA rated filter), Tyvek coveralls, gloves, eyeglasses, shoe covers. Administrative controls such as access codes can be used to limit the number of personnel with access to nanoscale materials (<http://www.cdc.gov/niosh/topics/nanotech/>).

The DoD has placed nanomaterials on the Emerging Contaminate Watch List and released a memorandum on 13 May 2008 which states that ESOH professionals should inform science and technology managers, and acquisition program managers on the associated ESOH risks when handling engineered nanomaterials, and PMs should identify them as ESOH hazards. The National Nanotechnology Initiative (NNI) also issued a research strategy

on February 2008 focusing on nanomaterial environmental health, and safety issues (EHS) (http://www.nano.gov/NNI_EHS_Research_Strategy.pdf).

To address the potential risks associated with the use of nanomaterials, the United States Air Force has formed collaborative ties between the Aeronautical Systems Center (ASC/ENVV), the Air Force Research Laboratory (711 HPW/RHPB), and original equipment manufacturers at government-owned, contractor operated Air Force Plants (GOCOs). ASC/ENVV is currently gathering and exchanging information with those who are working with nanoscale materials. The first step in the ASC NanoProgrammatic Effort was establishing an informal working group between ASC/ENVV, AFRL, 711 HPW/RHPB and the GOCOs. This was done in concert with the HQ AFMC/SG office.

Next, ASC/ENVV is communicating with the acquisition community concerning the development of nanoscience by establishing the ASC Nano Working Group Community of Practice (CoP). This resource is currently located on the Air Force Center of Excellence for Knowledge Management (<https://afkm.wpafb.af.mil/ASPs/CoP/OpenCoP.asp?Filter=MC-AQ-00-95>). Alternatively, it can be accessed via the Air Force Portal (<https://wwwd.my.af.mil/afknprod/ASPs/CoP/OpenCoP.asp?Filter=MC-AQ-00-95>)

The CoP will be used to share pertinent information within our informal working group. Resources such as presentations from our USAF workshop, links to upcoming conferences and events, information on nanomaterial regulations and policies, employee safety information, and toxicological studies. We encourage you to join the ASC Nano CoP Working Group to gain and share information.

*Article written by Megan J. Hawk and Tim Sumpter,
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First Workshop on Biological Interaction of Engineered Nanomaterials

The United States Air Force conducted the First Workshop on Biological Interactions of Engineered Nanomaterials: Environmental, Safety and Health Issues of Military Concern. The workshop provided background information on nanoscience, nanotechnology systems & devices, and toxicology issues. Current information on regulations and ESOH related risks was presented. This event was held on 23-25 June 2008 at the Hope Hotel at Wright-Patterson AFB, OH. The organizers of the workshop were Dr. Saber Hussain, USAF 711 HPW/RHPB, Mr. William LaFountain, USAF ASC/ENVV and Mr. Donald Tarazano, SAIC, support contractor.

A total of 25 nationally recognized speakers from government agencies, industry, and academia shed light on the current issues facing us concerning the rapid development of nanoscience. Participants of the event included toxicologists, program managers, system engineers, bioenvironmental engineers, and students from the Air Force Institute of Technology and the University of Dayton. This event was sponsored by the Air Force Office of Scientific Research, USAF Aeronautical System Center, HQ Air Force Material Command Surgeon General (HQ AFMC/SG), and the Air Force Research Laboratory.

Nanoscience has been classified as the next technological revolution and provides a pathway to new physical responses and behaviors. Nanoscience is being used to produce nanoenergetic munitions, conformal body armor, local environment nanosensors, electro-optical sensors, directed energy weapons, photovoltaic power, and adaptive materials for antennas and satellite communication. The Air Force Research Laboratory formed the AFRL Nanoscience and Technology Strategic Technology Team to unite the scientific and technological community in order to transform nanoscience into Aerospace Dominance.

Other considerations currently being addressed by the Air Force are how discoveries in nanoscience will impact the life cycle of the weapon system from both a health and an environmental standpoint. The Air Force is dedicating time and resources to incorporate nanomaterials into future weapon systems without adverse health or environmental risks.

The Air Force is currently characterizing nanoparticles, observing the mechanistic interactions of nanoparticles with biological systems, and predicting human and environmental health effects attributed to the engineering of nanoparticles. Toxicology studies have found that nanoparticles can be toxic to the cell depending on its size, shape, or the type of nanoparticle being used in the study.

Dr. Saber Hussain and Mr. William LaFountain are currently planning for the 2009 USAF Nanotoxicology and ESOH Workshop. Parties interesting in continuing the information exchange can visit the ASC Nano Working Group CoP (see links in first article) or use the content at the end of this issue of the Nano Flyer.

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Upcoming Conferences:

19-20 November 2008
Interagency Environmental Nanotechnology Grantees Workshop, Sheraton Tampa Riverwalk
Tampa, FL
<http://www.scgcorp.com/nanotechnology08/index.htm>

6-9 April 2009
2009 Nanotechnology for Defense Conference
Burlingame, CA
<http://www.usasymposium.com/nano/>

Call for Articles and Information:

Submit articles or suggested topics for inclusion in future bimonthly editions to Megan Hawk at megan.hawk@wpafb.af.mil.

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