Diagnosing Industrial Environmental Diseases Associated with Exposure to Hazardous Materials vs. Advanced NanoMaterials

by Dr. Hildegarde Staninger™, RIET-1
Industrial Toxicologist/IH & Doctor of Integrative Medicine
Integrative Health Systems, LLC © March 6, 2010 Los Angeles, CA

In the 17th century, Ramazzini, the first great student of industrial disease, laid down a rule for the diagnosis of such illness. He bade the physicians of Italy, when they had a case of illness in a working man, to ask the patient not only about his symptoms but to go carefully into all the details of his occupation for, without this knowledge, a correct diagnosis could not be made. Ramazzini's advice is still needed more than ever, at least by every physician, health care provider, industrial hygienist, safety engineer, environmentalist, toxicologist and other related professional that has the ability to address the growing concern of exposure to toxic hazardous materials vs. the rising concern from being exposed to advanced nanomaterials.[1]

Mankind, through his scientific and engineering brilliance, has crossed into the world of integrating known hazardous materials with advanced nanotechnology into the new fields of nanomedicine, biotechnology, cloning (organs and designer babies/pets), DNA vaccines and gene therapy. All of these services are billable under standard Medicare benefit plans to be administered to the patient by physician, a health care specialty provider facility and/or hospital with a minimum of 80% payment. In many cases the medical procedure using nanomedicine may contain new and innovative intellectual properties that will be the pioneering technologies in the advancement of nanomedicine, thus making it 100% insurance paid.

Currently, there are 997 universities or colleges developing nano or biotechnology that will be for military, private industry, academia partnering groups and government. The patents and intellectual properties range from analytical tools, nanoimaging, nanomaterials and nanodevices; new therapeutics and medicine delivery systems; and clinical, regulatory, and toxicological issues. It can be said that the potential of nanotechnologies raises great hopes. The short-term potential benefits include therapies for cancer, antiviral, antifungal agents, arteriosclerosis, diabetes, and chronic lung diseases; while the long-term potential benefits include gene therapy and cell repair.[2]

Nanotechnologies can help physician's diagnosis at single-cell and molecule levels, and some can be integrated into present molecular diagnostic methods, such as biochips.[3] Nanoparticles, such as gold nanoparticles, silver nanoparticles, and quantum dots represent the most generalized use, but various other nanotechnological devices for manipulation at the nanoscale, such as nanobiosensors, are also useful for potential clinical applications. In conclusion, nanotechnologies will extend the limits of present molecular diagnostics and help in point-of-care diagnostics, integration of diagnostics with therapeutics, and development of personalized medicine and personalized gene therapy.[4] This new field is estimated to be a 4.7 trillion dollar business in less than five years.

Hazardous Materials vs. Advanced NanoMaterials

Hazardous Materials

A hazardous material is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through with other factors. Hazardous materials professionals are responsible for and are properly qualified to manage such materials. This includes managing and/or advising other managers on such items as may point in their life-cycle, from process planning and development of new products; through manufacture, distribution and use; to disposal, cleanup and remediation.[5]

Hazardous materials are defined and regulated in the United States primarily by laws and regulations administered by the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC). Each has its on definition of a "hazardous material."

OSHA's definition includes any substance or chemical which is a "health hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dust, gases, fumes, vapors, mists or smoke which may have any of the previous mentioned characteristics. (Full definitions may be found at 29 Code of Federal Regulations (CFR) 1910.1200 Hazard Communication Standard – "Employee Right to Know."

EPA incorporates the OSHA definition, and adds any item or chemical which can cause harm to people, plants, or animals, when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment. (40 CFR 355 contains a list of over 350 hazardous and extremely hazardous substances.)

DOT defines a hazardous material as any item or chemical which, when being transported or moved, is a risk to public safety or the environment, and is regulated as such under the: Hazardous Materials Regulations (49 CFR 100-0180); International Maritime Dangerous Goods Code; Dangerous Goods Regulations of the International Air Transport Association; Technical Instructions of the International Civil Aviation Organization; U.S. Air Force Joint Manual, Preparing Hazardous Materials for Military Air Shipments.

The Nuclear Regulatory Commission (NRC) regulates items or chemicals which are "special nuclear source" or by-products materials or radioactive substances. (See 10 CFR 20).[6]

Hazardous materials that are toxic agents have various classifications, which will be addressed in this paper, since they pertain specifically to their use in nanotechnology as it transcends the various disciplines of medicine and environmental monitoring.

Toxic agents are classified in a variety of ways, depending on the interests and needs of the classifier. These agents may be discussed in terms of their target organ (liver, kidney, hematopoetic system, etc.), their use (pesticides, solvent, food additive, etc.), their source (animal and plant toxins), and their effects (cancer, mutation, liver injury, etc.) Toxic agents may also be classified in terms of their physical state (gas, dust, liquid), their labeling requirements (explosive, flammable, and oxidizer), their chemistry (aromatic amine, halogenated hydrocarbon, etc.), or their poisoning potential (extremely toxic, very toxic, slightly toxic, etc.). Classification of toxic agents on the basis of their biochemical mechanism of action (sulfhydryl inhibitor, methemoglobin producer) is usually more informative than classification by general terms such as irritants and corrosives, but the more general classifications such as air pollutants, occupation-related agents, and acute and chronic poisons can provide a useful focus on a specific problem. It is evident from the above that no single classification will be applicable for the entire spectrum of toxic agents and that combinations of classification systems or classification based on other factors may be needed to provide the best rating system for a special purpose. Nevertheless, classification systems that take into consideration both the chemical and biologic properties of the agent and the exposure characteristics are most likely to be useful for legislative or control purposes and for toxicology in general.[7]

The area of advanced nanomaterials is a whole new ball game in the field of hazardous materials, since they may be used for global environmental monitoring (GEMS) as "Smart Dust or Smart Crystal Motes" or as a therapeutic agent that is specifically designed not to stimulate the immune system. All are at a size below standard technology of detecting parts per billion (ppb), therefore, when you do not have a piece of equipment in a hospital lab capable of detecting an advanced nanomaterial in someone's body is it still in the body and toxic to the cell.[8]

Advanced NanoMaterials

The National Nanotechnolgy Initiative (NNI) defines nanotechnology as research and development at the atomic, molecular, or macromolecular levels in the sub-100-nm range (~0.1-100 nm) to create structures, devices, and systems that have novel functional properties. At this scale, scientists can manipulate atoms to create stronger, lighter, and more efficient materials (advanced nano-materials) with tailored properties. In addition to the numerous advantages provided by this scale of miniaturization (over their conventional "bulk" counterparts), quantum physics effects provide additional novel properties of nanomaterials.[9] Some examples of advanced nanomaterials are the following:

- **Nano Smart Materials** – buckyballs, single-walled nanotubes (SWNTs), nanoshells, quantum dots, and microcapsules.

  Optical – metals, semiconductors, carbon, and silica/silicon
  Mechanical – organic polymers, metals, ceramics, carbon
  Electrical – metals, carbon
  Magnetic – metals, ceramics
  Catalytic – ceramics, carbon
  Absorptive – organic polymers

  (Nanomaterials offer different advantages depending on their application.)

- **Nanocrystalline Materials** – have particles of around 1 to 100 nm with specific properties that are produced through the following processes:

  Sol-gel (colloidal) synthesis
  Inert gas condensation
  Mechanical alloying or high-energy ball milling
  Plasma synthesis
  Electrodeposition

- **Quantum Dots** are semiconducting nanoparticles that are able to trap electrons in small spaces.

  Biological markers
  Analysis tools
  Quantum computing
  Alloys

- **Nanocomposites** are materials and processes used in separate nanoscale particles in plastics, metals or plastic/ceramic resins. These materials are used to make ultra fine-grained structures with dimensions in the near nanoscale range, creating greater strength from much greater surface area.

- **Nanorings** occur when light is shown on a gold nanoring, a strong electromagnetic vibrating field (in the near infrared) is created inside and around the ring.

- **Nanoshells**, originally discovered by Rice University Professor Naomi Halas, combine chemistry (nanoshell fabrication), physics (optics), and engineering (fabrication fine-tuning). By changing proportional core and shell thicknesses, gold nanoshells can change color across visible and near-infrared light spectrums. They have a strong optical absorption.

- **Nano Self-Assembly** are nanomaterials that can self assemble in a specific dimension. When coupled with magnetic rings they may serve as memory elements in devices for long-term data storage and RAM (random-access memory).

- **Nanowires** are simply very tiny wires. They are composed of metals such as silver, gold, or iron, or semiconductors such as silicon, zinc oxide, and germanium. Nanoparticles are used to create these little nanowires, which can have a diameter as small as 3 nanometers.

It is very important to realize that these advanced nanomaterials are made up of the same chemicals that OSHA, EPA, DOT and NRC have termed hazardous materials. They may be 0.000,000,001 in size, but they are small enough to attach to a cell membrane or go through it and deliver a specific gene to repair a cell or target organ system. In 2006, a specific nanomaterial was identified, which was taken from an individual diagnosed with the disease Morgellons. The material was analyzed by MIT, Woods Hole Lab, and Lambda Labs. It was identified to be a two-part polymer (acrylonitrile and methylmethacrylate) with a silicon head, this material was later discovered to be coated with an antimicrobic agent known as silane with siloxanes.[10] These materials are in the chemical families known to be carcinogenic chemicals. (See Table 1-1 and Table 2-2).

A ten minute exposure to acrylonitrile through inhalation will have a 20 year latency period to produce cancer in the individual.[11] In the majority of cases of individuals exposed to hazardous materials they cannot be treated with pharmaceuticals composed of petroleum and other synthetic chemicals. Exposure to advanced nanomaterials, due to their size, ability to go into the cell membrane, nuclear membrane permeability and their reactive state with incompatible chemicals will be viewed to be more of a hazardous risk to health, safety and the environment than conventional hazardous materials. (See Table 3-3).

Nano particulates composed of metals and/or ceramics will remain in the body and systemically accumulate in specific organ systems upon exposure to electromagnetic frequencies in both the extremely low, tetra hertz and mega hertz frequency ranges. When hydrogels or silicone based nano composite materials are present and they are mixed with chlorine, ammonia, or heavy metals (silver and mercury) they can create a harder polymerization of the polymeric compounds that will trap the pollutant within the cellular matrix/tissue.

Some of the nanomaterials have been used in nano modified food starch, which contains 50 % plant starch and 50% waterborne polyurethane (styrene). This material is not only being used in our daily over-the-counter-foods, but as a dispersing agent for pesticdes such as the biological pesticides being used on the brown moth.

Since the use of these materials in the air for weather modification, mass aerial inoculations, mycotoxin insecticides and GEMS (Global Environmental MEMS Sensors) there has been a steady increase in respiratory diseases in large cities as compared to previous studies. GEMS may be coupled with biological sensors or monitoring devices, (which may anchor in nasal passages) that are made of nano composite and nanotubes or nanowires.[11] Figure 1-1 shows a nano composite material that as taken from the right nasal bulb area of an individual who was exposed to heavy Aerial Chemical Spraying and EMF in Los Angeles, CA during the Summer of 2009. Figure 2-2 shows a Sencil™ from the same individual. The Sencil™ device was on top of the nanocomposite material in Figure 1-1.

It is important to note that these materials were from inhalation of air during a heavy Aerial Chemical Spraying day, thus advanced nanomaterials are being utilized in various technologies that are causing our US population to be exposed and at-risk to the hazardous effects from exposure to advanced nanomaterials, such as styrene which is a known carcinogen.

There are many toxicological concerns from exposure to advanced nanomaterials, especially from known carcinogens like chrysotile asbestos, in which 1 fiber will cause meseotheleoma in an individual. Currently, nanomedicine is using iron-doped chrysotile asbestos nano-size particulates to color contrast tumors in an individual. These particles are so small that they can go through the cell membrane and cause the initiating factors of cancer from asbestos exposure. An interesting factor with asbestos and the disease meseothelioma is that it has a 100 % disease rate when an individual has been exposed to Simian virus (SM) 40. SM-40 was a contaminant in polio vaccine as the liquid and sugar cube (Mahoney and Sabin), but not in the actual vaccine that was inoculated with a shot (Salk).[12]

We are in the ERA of NANO… And its platinum age is when asbestos becomes a medicine. The health care provider does not even have a material safety data sheet on the nanomaterial in the product or medicine because the developing industry says it is too small to do any damage and definitely below the < 1 percent acceptable additive level. NOW is the time for Mankind to wake up and look around as one sees the selective species of trees dying, no clouds in the sky just trails of chemicals, as the one who controls the weather controls the world. It is time for all physicians, health care providers and other related professionals to be like Ramazzini and ask their patients about their environment, occupational exposures and how Chicken Little[12] would describe the nanomaterials falling from the sky into the water we drink, the plants and animals we eat and the lands our children will not inherit, because it will be to polluted.

REFERENCES

1. Finkel, Asher J. Hamilton and Hardy's Industrial Toxicology, 4th Edition. John Wright * PSG Inc., Boston, MA © 1983 pg. 13 & 14.

2. Wianitkit, Viroj. Advanced Nanomedicine and Nanobiotechnology. Nova Science Publishers, Inc., New York © 2008 pg. 8

3. Wianitkit, Viroj. IBID. pg. 9

5. Sacarello, Hildegarde. The Comprehensive Handbook of Hazardous Materials: Regulations, Handling, Monitoring and Safety. Lewis Publishers/CRC Press, Inc. Boca Raton, FL © 1994

6. Staninger, Hildegarde. IEIA Criteria Document 01-1113-2009. Nano Modified Food Starch. IHS Press, Los Angeles, CA © November 13, 2009. (Note: The National Registry of Environmental Professionals will re-print/publish this document in their July 2010 issue of the Journal of Sustainability and Science.)

7. Amdur, Mary O., Doull, John, and Curtis D. Klaassen. Cassarett and Doull's Toxicology: The Basic Science of Poisons. Pergamon Press. New York © 1991 pg. 13 & 14.

8. Staninger, Hildegarde. *"Smart Dust: Defending the Land, Air, and SEA and Its Global Environmental Impact through Depopulation Wars."* Presented at the 2010 Health Freedom War Council!™ Natural Solutions Foundation/Health Freedom USA Webinar © January 2 & 3, 2010 http://healthfreedomusa.org/?p=4327.

9. Wei, Chiming. Nanomedicine: Medical Clinics of North America. September 2007, Volume 91, Number 5. theclinics.com Saunders. Philadelphia. © 2007 pg. 806

10. Staninger, Hildegarde. Project: Fiber, Morgellons and Meteorite (Project: FMM). Project FMM - Fibers, Meteorite, Morgellons http://www.rense.com/morgphase/phase2_1.htm) (Morgellons # 7) http://rense.gsradio.net:8080/rense/special/rensemorgellons7.mp3 (www.staningerreport.com)© 2006 (The report has been submitted to be published by IEIA and the National Registry of Enviornmental Professionals, Glenview, IL © 2010 as an IEIA Criteria Document)

11. Tanker Enemy. You Tube: Smart Dust is in Our Environment Now © 2009.

12. Colodizin, Benjamin. Chicken Little 101: The History of Aerial Spraying from 1949 to Present Day. Presented at the 2010 Health Freedom War Council!™ Natural Solutions Foundation/Health Freedom USA Webinar © January 2 & 3, 2010 http://healthfreedomusa.org/?p=4327.

Table 1-1: CLASSIFICATION OF CARCINOGENIC CHEMICALS.

Category and Class	Example
A. DNA – reactive (genotoxic) carcinogens	
1. Activation – independent organic	Alkylating agents
2. Activation – independent inorganic	Nickel, cadmium*
3. Activaiton – dependent	Polycyclic aromatic hydrocarbon, arylamine, nitrosamine
B. Epigenetic carcinogens	
1. Promoter	Organochlorine pesticides, saccharin
2. Hormone – modifying	Estrogen, amitrole
3. Peroxisome proliferators	Clofibrate, diethylhexylphthalate
4. Cytotoxic	Nitrolotriacetic acid
5. Immunosuppressor	Cyclosporin A, azathioprine
6. Solid state	Plastics, asbestos
C. Unclassified	
1. Miscellaneous	Ethanol, dioxane

* Some metals have yielded evidence of reaction with DNA, others may operate through epigenetic mechanisms such as alteration of fidelity of DNA polymerases.

Table 2-2: CHARACTERISTICS OF MAJOR AIR POLLUTANTS.

Pollutant	Characteristics	Health Effect	Other Effects
Sulfur dioxide	Corrosive	Associated with coughs, colds, asthma, bronchitis. Can aggravate heart Disorders	Can cause acid rain
Nitrogen oxide	Highly reactive	Fatal at high concentrations	Can form ozone, a principal Constituent of Smog.
Ozone	Pungent smelling	Irritates mucous Membrane	Principal constituent of Smog
Carbon Monoxide	Colorless	Fatal at high levels, can cause headaches, dizziness Nausea, breathing difficulties	Impairs judge-ment and perception
Particulates	Dust, soot, smoke	Aggravates respiratory disease	Aesthetic concerns
Lead	Mainly from auto emissions	Affects blood forming, nervous and kidney Systems	Young children are at high risk
Hydrocarbons	Mainly from Auto emissions	No significant effects at low levels	Reacts with nitrogen oxides to form oxidants

Table 3-3: Incompatible Chemicals

The following is a partial list of chemicals that are incompatible with each other. Reactions can take place which may liberate poisonous or flammable gases, cause explosions by contact or by their reaction products, or may ignite spontaneously. An occasional review of this list will be a reminder of these hazards and may suggest other incompatibles that may be encountered in a rubber or plastics laboratory. Substances in the right hand column should be stored and handled so they cannot possibly accidentally contact corresponding substances in the left hand column. (Taken from the text The Comprehensive Handbook of Hazardous Materials: Regulations, Monitoring, Handling and Safety by Hildegarde Sacarello. Lewis/CRC Press, Inc., Boca Raton, FL. © 1994 pg.83-85.)

Alkaline and alkaline earth	Carbon dioxide, carbon tetrachloride, and other Metals, such as sodium and chlorinated hydrocarbons (also prohibit water, potassium, cesium, lithium, foam, and dry chemical on fire involving these magnesium, calcium, and aluminum metals)
Acetic acid	Chromic acid, nitric acid, hydroxyl-containing compounds, ethylene glycol, perchloric acid, peroxides, and permagnates
Acetone	Concentrated nitric and sulfuric acid mixtures
Acetylene	Chlorine, bromine, copper, silver, fluorine, and mercury
Ammonia (anhyd.)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, and hydrogen fluoride
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrates, sulfur, finely divided organics, or combustibles.
Aniline	Nitric acid, hydrogen peroxide
Bromine	Ammonia, acetylene, butadiene, butane and other petroleum gases, hydrogen, sodium carbide, turpentine, benzene, and finely divided metals
Calcium carbide	Water (see also acetylene)
Carbon, activated	Calcium hypochlorite
Copper	Acetylene, hydrogen peroxide
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organics, or combustibles

Chromic acid	Acetic acid, naphthalene, camphor, glycerine, turpentine, alcohol, and other flammable liquids

Table 3-3: Incompatible Chemicals (continued)

Chlorine	Ammonia, acetylene, butadiene, butane, and other petroleum gases, hydrogen, sodium carbine, turpentine, benzene, and finely divided metals
Chlorine dioxide	Ammonia, methane, phosphine, and hydrogen sulfide
Cumene hydroperoxide	Acids (organic or mineral)
Fluorine	Isolate from everything
Hydrocyanic acid	Nitric acid, alkalis
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, any flammable liquid, combustible materials, aniline, nitromethane
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hydrocarbons (benzene, butane, propane, gasoline, turpentine, etc.)	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Iodine	Acetylene, ammonia (anhyd. or aqueous), hydrogen
Mercury	Acetylene, ammonia (anhyd. or aqueous), hydrogen
Nitric acid (conc.)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, and nitritable substances
Oxygen	Oils, grease, hydrogen, flammable liquids, solids, or gases
Oxalic acid	Silver, mercury
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood
Phosphorus (white)	Air, oxygen
Potassium chlorate	Acids (see also chlorates)
Potassium perchlorates	Acids (see also perchlorates)
Potassium permanganage	Glycerine, ethylene glycol, benzaldehyde, sulfuric

	acid
Silver	Acetylene, oxalic acid, tartaric acid, fulminic acid, ammonium compounds

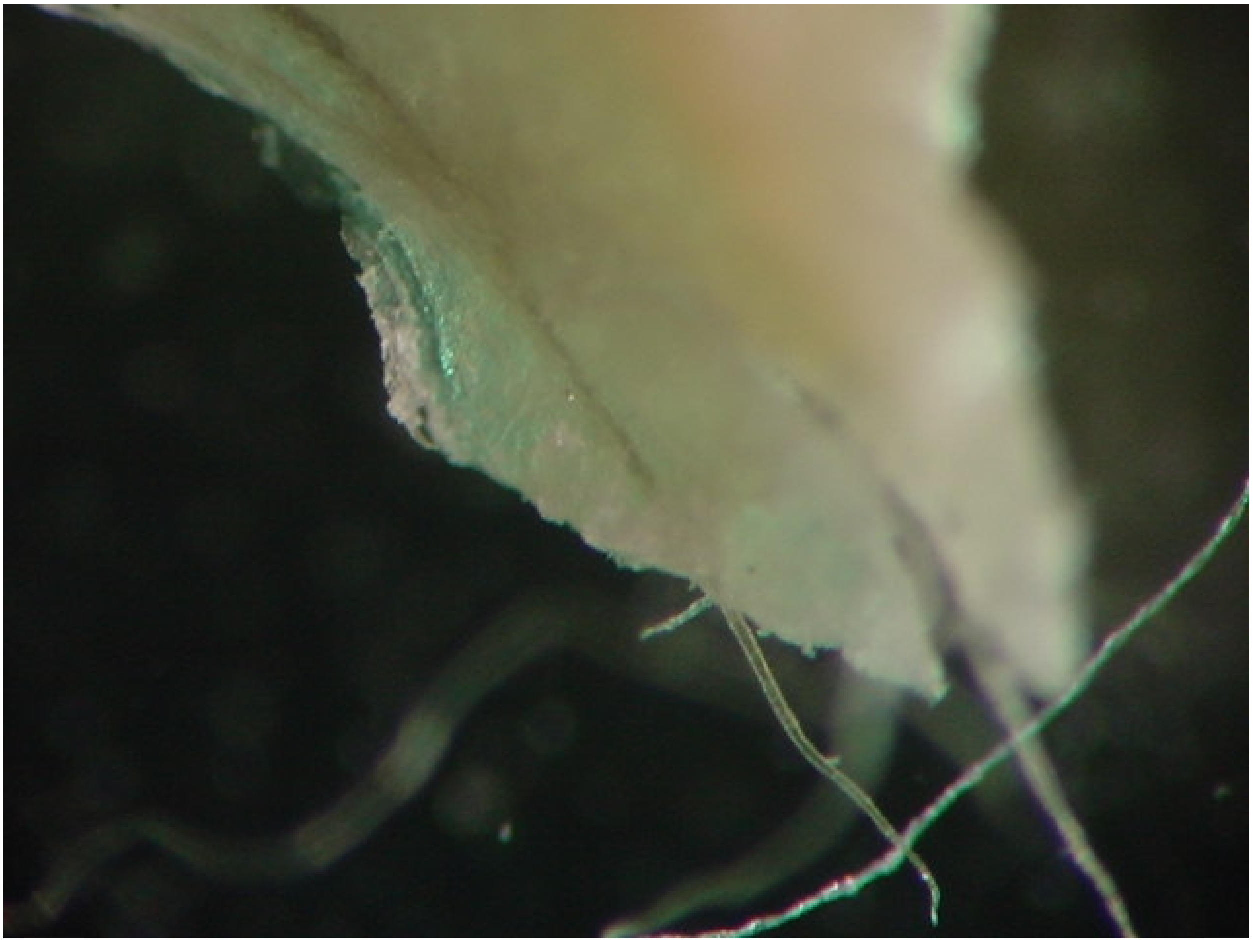
Table 3-3: Incompatible Chemicals (continued)

Sodium	See alkaline metals (above)
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Any oxidizable substance, such as ethanol, methanol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerine, ethylene glycol, ethyl acetate, methyl acetate, and furfural
Sulfuric acid	Chlorates, perchlorates, permanganates
Toluene diisocyanate and other isocyanates	Avoid contact with strong alkalis, such as caustic soda, to prevent uncontrollable polymer-izations
Trichloroethylene	Reacts with strong alkalis to form gases that ignite spontaneously
Zirconium	Prohibit water, carbon tetrachloride, foam, and dry chemical on zirconium fires

Figure 1-1: Photomicrograph of nanocomposite material with nano-silica tube tongues. The nanotongues from a side view appear to be in the shape of a dragon's head. Argonne National Labs conducted vaccine H1N1 studies with dragon protein and found it to make the shape of a dragon's head. When a nanomaterial makes a continuous same shape it is known as a Molecular Brand. Photomicrograph taken by Applied Consumer Services, Inc. Hialeah Gardens, FL for Integrative Health Systems, LLC. H. Staninger © 2010

Picture 1


Picture 2


Picture 3

Figures 2-2: Photomicrograph of Sencil™ as diagramed by the Alfred E. Mann Institute, University of Southern California, Los Angeles, CA as compared to the removal of Sencil™ from the nasal bulb (right) of a female who was exposed to heavy Aerial Chemical Spraying, Summer 2009. The Sencil™ from the nasal bulb was originally on top of the nanocomposite material in Figure 1-1. Photomicrograph taken by Applied Consumer Services, Inc., Hialeah Gardens, FL for Integrative Health Systems, LLC. H. Staninger © 2009