NDSilver Particles

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: NDSilver – Silver Particles

OTHER / GENERIC NAMES: Argentium

MANUFACTURER:

NanoDynamics Inc.
901 Fuhrmann Blvd.
Buffalo, NY, U.S.A., 14203
Phone: 716-853-4900 (8 AM to 5 PM EST, Monday to Friday)

FOR MORE INFORMATION CALL: 716-853-4900
IN CASE OF EMERGENCY CALL: **For Chemical Emergency Spill Leak Fire Exposure or Accident Call CHEMTREC Day or Night (1-800- 424-9300)**

2. COMPOSITION / INFORMATION ON INGREDIENTS

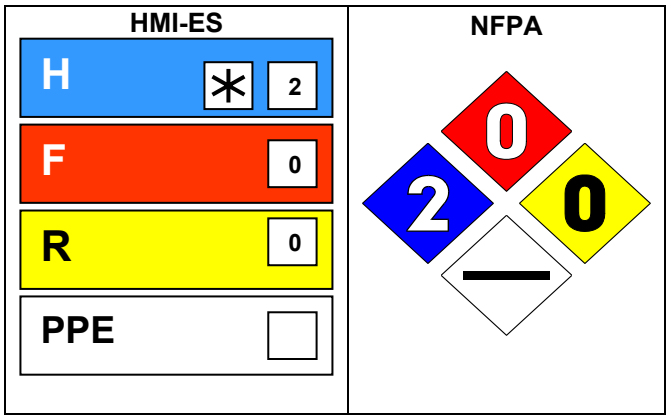
INGREDIENT NAME:	CAS NUMBER	WEIGHT %
Silver	7440-22-4	90-100%

This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Greyish-white powder, no odor.
Warning! Harmful if inhaled or swallowed. Causes respiratory tract irritation. Prolonged or repeated inhalation, ingestion or skin contact may cause a permanent discoloration of skin, eyes and mucous membranes, a condition called 'argyria'. May cause skin and eye irritation. May cause kidney damage. Keep away from strong acids and other incompatible material. Avoid and control operations which generate dust. Avoid exposure to air and moisture.



POTENTIAL HEALTH HAZARDS

ACUTE HEALTH HAZARDS:

SKIN: May cause irritation. Symptoms may include redness and pain. This product may be absorbed.

EYES: May cause irritation.

INHALATION: Harmful if inhaled. Inhalation of dusts or fumes may cause nose, throat and respiratory tract irritation and mild bronchitis.

INGESTION: Harmful if swallowed. May cause nausea, vomiting and pain.

CHRONIC AFFECTS: Chronic ingestion and inhalation may affect the kidneys. Prolonged or repeated inhalation, skin contact or ingestion may cause a permanent bluish discoloration of the skin, eye and mucous membranes, a condition called argyria.

PRE-EXISTING MEDICAL CONDITONS AGGRAVATED: May aggravate pre-existing skin, respiratory, digestive and kidney problems.

ROUTES OF CONTACT: Skin contact, skin absorption, eye contact, inhalation, ingestion.

TARGET ORGANS: Skin, eyes, respiratory system, digestive system and kidneys.

4. FIRST AID MEASURES

SKIN: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. Obtain medical attention if irritation persists. Launder clothing before reuse.

EYES: Immediately flush eyes with running water for a minimum of 15 minutes. Obtain medical attention if irritation persists.

INHALATION: Immediately remove person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, begin artificial respiration. Obtain medical attention.

INGESTION: If ingested, do not induce vomiting. Obtain medical attention immediately. Never give anything by mouth to an unconscious or convulsing person.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	Not available
AUTOIGNITION TEMPERATURE:	Not available
UPPER FLAME LIMIT (volume % in air):	Not available
LOWER FLAME LIMIT (volume % in air):	Not available
FLAME PROPAGATION RATE (solids):	Not available
OSHA FLAMMABILITY CLASS:	Non-Flammable.

FIRE HAZARDS/CONDITIONS OF FLAMMABILITY: Not considered flammable. When present as a finely divided dust cloud, the material may be ignited by sparks.

EXTINGUISHING MEDIA: Use media suitable to the surrounding fire, such as carbon dioxide and dry chemicals.

HAZARDOUS COMBUSTION PRODUCTS: Silver oxides.

SPECIAL FIRE FIGHTING PRECAUTIONS / INSTRUCTIONS: Do not enter fire area without proper protection. Fire-fighters should wear proper protective equipment and self-contained breathing apparatus with full face piece. Move containers from fire area if it can be done without risk. Water spray may be useful in cooling equipment exposed to heat and flame.

EXPLOSIVE DATA: Sensitivity to mechanical impact / static discharge: Not expected to be highly sensitive.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Keep all other personnel upwind and away from the spill/release. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

ENVIRONMENTAL PRECAUTIONS: Ensure spilled product and flush solutions do not enter drains, sewers, waterways or confined spaces.

SPILL RESPONSE/CLEANUP: Eliminate all sources of ignition. Ventilate area of release. Stop leak if you can do so without risk. Using HEPA vacuum, wet vacuum, or other dustless methods, gather up spilled material and place in suitable container for later disposal (see Section 13). Avoid generating dust. Contaminated absorbent material may pose the same hazards as the spilled product. Notify the appropriate authorities as required.

PROHIBITED MATERIALS: None known.

SPECIAL SPILL RESPONSE PROCEDURES: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the National Response Center in the United States (phone: 1-800-424-8002).

DOT/CERCLA Reportable Quantity (RQ): Silver (RQ 1000 lbs.)

7. HANDLING AND STORAGE

SAFE HANDLING PROCEDURES: This material is a harmful solid. Wear suitable protective equipment for dusty conditions during handling. Use only in a well-ventilated area. Avoid breathing dusts or fumes. Avoid contact with eyes, skin and clothing. Keep away from extreme heat, sparks and flame. Avoid and control operations which create dust. Keep away from strong acids and other incompatibles. Avoid exposure to air. Keep container tightly closed when not in use. Assume empty containers contain residues, which are hazardous. Wash hands before eating, drinking, smoking or use of toilet facilities. Immediately remove soiled clothing and wash it thoroughly before reuse.

STORAGE REQUIREMENTS: Store in a cool, dry, well-ventilated area away from heat, flame and incompatible materials. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.

SPECIAL PACKAGING MATERIALS: Always keep in containers made of the same materials as the supply container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use adequate ventilation to maintain air contaminants below exposure limits. Local or exhaust ventilation recommended for prolonged exposures or if the TLV is not known.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Protective gloves impervious to the material should be worn during use. Advice should be sought from glove suppliers. Additional protective clothing, such as long sleeve shirts and/or coveralls, are recommended. An eyewash station and safety shower should be made available in the immediate working area.

EYE PROTECTION: Use chemical goggles to prevent dusts from entering the eyes. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Respiratory protection is required if the airborne concentration exceeds the TLV. Use NIOSH-approved respirators suitable for dusts. Advice should be sought from respiratory protection specialists.

GENERAL HYGIENE CONSIDERATIONS: Avoid inhalation of dusts or fumes. Avoid contact with eyes, skin and clothing. Do not eat, drink or smoke when working. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Immediately remove soiled clothing and wash it thoroughly before reuse.

EXPOSURE GUIDLINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL
Silver	0.1 mg/m^3 (metal) 0.01 mg/m^3 (soluble compounds, as Ag)	0.01 mg/m^3 (metal and soluble compounds)

[1] = Limit established by General Chemical Corporation
[2] = Workplace Environmental Exposure Level (AIHA)
[3] = Biological Exposure Index (ACGIH)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Greyish-white powder,
PHYSICAL STATE:	Solid
MOLECULAR WEIGHT:	107.9
CHEMICAL FORMULA:	Ag
ODOR:	No Odor
SPECIFIC GRAVITY (water = 1.0):	10.5

SOLUBILITIY IN WATER (weight %):	Insoluble
pH:	N/Ap
BOILING POINT:	4014°F (2212g°C)
MELTING POINT:	1762°F (961°C)
VAPOR PRESSURE:	0
VAPOR DENSITY (air = 1.0):	N/Ap
EVAPORATION RATE:	N/Ap
% VOLATILES:	0
FLASH POINT:	N/A

10. STABILITY AND REACTIVITY

STABILITY AND REACTIVITY: Stable under the recommended storage and handling conditions prescribed. May turn black on exposure to ozone.

MATERIALS TO AVOID (INCOMPATIBILES): Acetylene, ammonia, peroxides, strong acids, carboxylic acids, chlorine trifluoride, oxalic and tartaric acids.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid sources of heat and flame. Exposure to air. Avoid contact with incompatibles.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA: There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

	LC_{50}(4hr)	LD_{50} (mg/kg)	
Ingredients	**inh, rat**	**oral, rat**	**dermal, rabbit**
Silver	N/Av	>5000	N/Av

CARCINOGENICITY: None of the ingredients listed are classified by IARC, ACGIH, NTP or OSHA as carcinogenic.

REPRODUCTIVE EFFECTS, TERATOGENICITY, MUTAGENICITY: None known.

SENSITIZATION TO MATERIAL: None known.

SYNERGISTIC MATERIALS: Not available.

OTHER IMPORTANT HAZARDS: None known.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: The ecological characteristics of this product have not been fully investigated. The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment.

CHEMICAL FATE INFORMATION: There is no data available on the product itself.

13. DISPOSAL CONSIDERATIONS

RCRA: If this product, as supplied, becomes a waste, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

Is the unused product a RCRA hazardous waste if discarded? ☐ **Yes** ☒ **No** **If yes, the RCRA ID number is:** N/Ap

HANDLING FOR DISPOSAL: Handle according to recommendations listed in Section 7.

METHODS OF DISPOSAL: Dispose in accordance with all applicable federal, state and local regulations. Contact your local, state or federal environmental agency for specific rules.

The information offered in section13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US 49 CFR INFORMATION: Not regulated for shipments by ground within the continental United States.

IATA / ICAO INFORMATION: Not regulated for shipments by air, internationally.

15. REGULATORY INFORMATION

US Information:

TSCA information: All ingredients are listed on the TSCA inventory.

EPA / CERCLA (40 CFR 302.4) information: This product contains the following chemicals with established reportable quantities and which are designated as hazardous under CERCLA (40 CFR 302.4):

Chemical Name	CAS #	% (weight)	CERCLA Reportable Quantities (RQ's)
Silver	7440-22-4	90 - 100	1000 lbs.
Sodium	7440-23-5	<0.1	10 lbs.
Copper	7440-50-8	<0.1	5000 lbs.
Zinc	7440-66-6	<0.1	1000 lbs.
Nickel	7440-02-0	<0.1	100 lbs.
Lead	7439-92-1	<0.0001	10 lbs.

SARA TITLE III: *Sec. 313, Toxic Chemicals Notification, 40 CFR 372*: This product may be subject to the TSCA notification requirements, since it contains Silver, a Toxic Chemical constituent. This product also contains the following Toxic Chemical constituents at trace levels (below de minimus concentrations): Copper (CAS # 7440-50-8), Zinc (CAS # 7440-66-6), Nickel (CAS # 7440-02-0), Lead (CAS # 7439-92-1).

CALIFORNIA PROPOSITION 65: This product contains trace levels of Nickel (CAS # 7440-02-0) and Lead (CAS # 7439-92-1). Nickel and Lead are known to the State of California to cause cancer. Lead is known to the State of California to cause developmental harm.

NEW JERSEY LABELING REQUIREMENTS: This product contains the following substances required to be disclosed on product labeling:

Chemical Name	CAS #	% (weight)	New Jersey Hazardous Substance
Silver	7440-22-4	90 - 100	Yes

International Information:

CANADIAN CEPA INFORMATION: All ingredients listed are present on the DSL.

CANADIAN WHMIS CLASSIFICATION: Not controlled.
Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center[(800) 424-8802] and to you Local Emergency Planning Committee.

16. OTHER INFORMATION

HMI-ES Rating:
0 - Insignificant 1 - Slight 2 - Moderate 3 - High 4 – Extreme
* - Chronic Hazard

Health: *2 **Flammability:** 0 **Reactivity:** 0

Legend: **ACGIH:** American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CEPA: Canadian Environmental Protection Act
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
DOT: Department of Transportation
DSL: Domestic Substances List
EPA: Environmental Protection Agency
EST: Eastern Standard Time
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
N/Ap: not applicable
NIOSH: National Institute of Occupational Safety and Health
NTP: National Toxicology Program
N/Av: Not available
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
RCRA: Resource Conservation and Recovery Act
TLV: Threshold Limit Values
SARA: Superfund Amendments & Reauthorization Act
TSCA: Toxic Substance Control Act
WHMIS: Workplace Hazardous Materials Information System

References:
1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2004.
2. International Agency for Research on Cancer Monographs, searched 2005.
3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, searched 2005 (Chempendium, HSDB and RTECs).
4. US EPA Title III List of Lists – January 27, 2005 version.
5. California Proposition 65 List – March 4, 2005 version.

CURRENT ISSUE DATE: 11/9/05

PREVIOUS ISSUE DATE: 5/26/05

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:
Title changed from NDSilver Powder 80 nm nominal to NDSilver Particles.

OTHER INFORMATION: N/A