Material Safety Data Sheet

acc. to OSHA and ANSI

1 Identification of substance:

- **Product details:**
- **Product name: Silver powder**
- **Stock number:** 0474DFF1
- **Manufacturer/Supplier:**
  Nanostructured & Amorphous Materials, Inc.
  16840 Clay Road, Suite #113
  Houston, TX 77084, USA

2 Composition/Data on components:

- **Chemical characterization:**
  Description: (CAS#)
  Silver (CAS# 7440-22-4), 100%
- **Identification number(s):**
- **EINECS Number:** 231-131-3

3 Hazards identification

- **Hazard description:** · Not applicable
- **Information pertaining to particular dangers for man and environment**
  Not applicable
- **Classification system**
- **HMIS ratings (scale 0-4)**

  (Hazardous Materials Identification System)
  Health (acute effects) = 1
  Flammability = 1
  Reactivity = 1

4 First aid measures

- **After inhalation**
  Supply fresh air. If required, provide artificial respiration. Keep patient warm.
  Seek immediate medical advice.
- **After skin contact**
  Immediately wash with water and soap and rinse thoroughly.
  Seek immediate medical advice.
- **After eye contact**
  Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing** Seek medical treatment.

5 Fire fighting measures

- **Suitable extinguishing agents**
  Fire-extinguishing powder
  Dry sand
- **Protective equipment:**
  Wear self-contained respirator.
  Wear fully protective impervious suit.

6 Accidental release measures

- **Person-related safety precautions:**
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation
- **Measures for environmental protection:**
  Do not allow material to be released to the environment without proper governmental permits.
- **Measures for cleaning/collecting:** Pick up mechanically.
- **Additional information:**
  See Section 7 for information on safe handling
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

- **Handling**
- **Information for safe handling:**
  Keep container tightly sealed.
  Store in cool, dry place in tightly closed containers.

No special precautions are necessary if used correctly.

- **Information about protection against explosions and fires:**
No special measures required.

- **Storage**
- **Requirements to be met by storerooms and receptacles:**
No special requirements.
- **Information about storage in one common storage facility:**
Do not store together with acids.
Do not store together with alkalies (caustic solutions).
- **Further information about storage conditions:**
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Silver metal

	mg/m^3
ACGIH TLV	0.1
Austria MAK	0.01
Belgium TWA	0.1
Denmark TWA	0.01
Finland TWA	0.1
France VME	0.1
Germany MAK	0.01
Japan OEL	0.01
Korea TWA	0.1
Netherlands MAC-TGG	0.01
Norway TWA	0.01
Russia TWA	1-STEL
Sweden NGV	0.1
Switzerland MAK-W	0.01
United Kingdom TWA	0.1
USA PEL TWA	0.01

- **Additional information:** No data

- **Personal protective equipment**
- **General protective and hygienic measures**
The usual precautionary measures for handling chemicals should be

followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.

- **Breathing equipment:**
  Use suitable respirator when high concentrations are present.
- **Protection of hands:** Impervious gloves
- **Eye protection:** Safety glasses
- **Body protection:** Protective work clothing.

9 Physical and chemical properties:

- **General Information**

- **Form:** Powder
- **Color:** Gray
- **Odor:** Odorless

	Value/Range	Unit	Method
Change in condition			
Melting point/Melting range:	960.8	° C	
Boiling point/Boiling range:	2210	° C	
Sublimation temperature / start:	Not determined		
Flash point:	Not applicable		
Flammability (solid, gaseous)	Fine powder: highly flammable		
Ignition temperature:	Not determined		
Decomposition temperature:	Not determined		

- **Danger of explosion:**
  Product does not present an explosion hazard.

- **Explosion limits:**
- **Lower:** Not determined
- **Upper:** Not determined

- **Vapor pressure:** Not determined

- **Density:** at 20 ° C 10.491 g/cm³

- **Solubility in / Miscibility with**
- **Water:** Insoluble
  Not determined

- **10 Stability and reactivity**

  - **Thermal decomposition / conditions to be avoided:**
    Decomposition will not occur if used and stored according to specifications.
  - **Materials to be avoided:**
    Acids
    Bases
  - **Dangerous reactions**
    Silver may react with acetylene or ammonia to form shock sensitive compounds.
  - **Dangerous products of decomposition:** Metal oxide fume

- **11 Toxicological information**

  - **Acute toxicity:**
  - **Primary irritant effect:**
  - **on the skin:** Powder: irritant effect
  - **on the eye:** Powder: irritant effect
  - **Sensitization:** No sensitizing effects known.
  - **Other information (about experimental toxicology):**
    Tumorigenic effects have been observed on tests with laboratory animals.
  - **Subacute to chronic toxicity:**
    Absorption of silver compounds by ingestion, inhalation or through broken skin can cause argyria, a permanent bluish-grey discoloration of the skin, conjuctiva and mucous membranes.
  - **Additional toxicological information:**
    To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
    The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

- **12 Ecological information:**

  - **General notes:**
    Do not allow material to be released to the environment without proper governmental permits.

- **13 Disposal considerations**

- **Product:**
- **Recommendation**
  Consult state, local or national regulations to ensure proper disposal.

- **Uncleaned packagings:**
- **Recommendation:**
  Disposal must be made according to official regulations.

- **14 Transport information**

  Not a hazardous material for transportation.

- **DOT regulations:**
- **Hazard class:** None

- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** None

- **Maritime transport IMDG:**
- **IMDG Class:** None

- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** None

- **Transport/Additional information:**
  Not dangerous according to the above specifications.

- **15 Regulations**

- **Product related hazard informations:**
  Observe the general safety regulations when handling chemicals

- **National regulations**
  All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

- **Information about limitation of use:**
  For use only by technically qualified individuals.
  This product contains silver and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

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- **16 Other information:**

  Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.