Material Safety Data Sheet

acc. to OSHA and ANSI

1 Identification of substance:

- **Product details:**
- **Trade name:** Copper powder
- **Stock number:** 0295JY
- **Manufacturer/Supplier:**
  Nanostructured & Amorphous Materials, Inc.
  16840 Clay Road, Suite #113
  Houston, TX 77084, USA

2 Composition/Data on components:

- **Chemical characterization:**
  Description:
  (CAS#)
  Copper powder (CAS# 7440-50-8): 100%
- **Identification number(s):**
- **EINECS Number:** 231-159-6

3 Hazards identification

- **Hazard description:**
  Xn Harmful
  F Highly flammable
- **Information pertaining to particular dangers for man and environment**
  R 11 Highly flammable.
  R 62 Possible risk of impaired fertility
  R 63 Possible risk of harm to the unborn child
- **Classification system**
- **HMIS ratings (scale 0-4)**

(Hazardous Materials Identification System)
Health (acute effects) = 1
Flammability = 3
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 immediate medical advice.

5 Fire fighting measures

- **Suitable extinguishing agents**
  Special powder for metal fires. Do not use water.

- **For safety reasons unsuitable extinguishing agents** Water

- **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
  Keep away from ignition sources

- **Measures for environmental protection:**
  Do not allow material to be released to the environment without proper governmental permits.

- **Measures for cleaning/collecting:**
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents

Keep away from ignition sources.

- **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.
  Ensure good ventilation at the workplace.

- **Information about protection against explosions and fires:**
  Keep ignition sources away.
  Protect against electrostatic charges.
  Fumes can combine with air to form an explosive mixture.

- **Storage**

- **Requirements to be met by storerooms and receptacles:**
  Store in a cool location.

- **Information about storage in one common storage facility:**
  Do not store together with oxidizing and acidic materials.

- **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:

  Copper fume, dusts and mists (as Cu)

	mg/m3
ACGIH TLV	1 (dust, mist); 0.2 (fume)
Austria MAK	1
	0.1 (fume)
Belgium TWA	0.2 (fume); 1 (dust)
Denmark TWA	0.1
Finland TWA	0.2 (fume); 1 (dust)
France VME	0.2 (fume); 1 (dust)
	1; 2-STEL (dust)
Germany MAK	0.1 (fume); 1 (dust)
Hungary TWA	0.2; 0.4-STEL (dust)
Netherlands MAC-TGG	1 (dust)
Norway TWA	0.05
	0.1 (fume)
Poland TWA	0.1; 0.3-STEL (fume)
	1; 2-STEL (dust)
Russia	1-STEL (dust)
Sweden NGV	0.2 (resp. dust); 1 (total dust)
Switzerland MAK-W	0.1; 0.2-KZG-W (fume)
	1; 1-KZG-W
United Kingdom TWA	0.2 (fume)
	1; 2-STEL (dusts and mists as Cu)
	1; 3-STEL
USA PEL	0.1 (fume, dusts & mists)

- **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.
  Avoid contact with the eyes and skin.

- **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:** Black brown
- **Odor:** Odorless

	Value/Range	Unit	Method
Change in condition			
Melting point/Melting range:	1083	° C	
Boiling point/Boiling range:	2595	° C	
Sublimation temperature / start:	Not determined		
Flash point:	Not applicable		
Flammability (solid, gaseous)	Highly flammable.		
Ignition temperature:	Not determined		
Decomposition temperature:	Not determined		
Explosion limits:			
Lower:	Not determined		
Upper:	Not determined		
Vapor pressure:	Not determined		
Density: at 20 ° C	8.94	g/cm^3	
Solubility in / Miscibility with			
Water:	Insoluble		

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:**
  Oxidizing agents
  Acids

- **Dangerous reactions** Contact with acids releases flammable gases

- **Dangerous products of decomposition:** Toxic metal oxide fume

11 Toxicological information

- **Acute toxicity:**

- **Primary irritant effect:**

- **on the skin:** Irritant to skin and mucous membranes.

- **on the eye:** Irritating effect.

- **Sensitization:** No sensitizing effects known.

- **Other information (about experimental toxicology):**
  Tumorigenic effects have been observed on tests with laboratory animals.
  Reproductive effects have been observed on tests with laboratory animals.

- **Subacute to chronic toxicity:**
  Copper compounds may be irritating to the skin, eyes and respiratory tract. They may cause metal fume fever, hemolysis of the red blood cells and injury to the liver, lungs, kidneys and pancreas. Ingestion may also cause vomiting, gastric pain, dizziness, anemia, cramps, convulsions, shock, coma and death. Copper solutions may cause sensitization reactions.

- **Subacute to chronic toxicity:**
  The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
  Gastrointestinal - nausea or vomiting.
  Liver - hepatitis (hepatocellular necrosis), zonal
  Liver - other changes.
  Related to Chronic Data - death.
  Kidney, Ureter, Bladder - other changes.
  Cardiac - other changes.
  Tumorigenic - equivocal tumorigenic agent by RTECS criteria.

Lungs, Thorax, or Respiration - fibrosis, focal (pneumoconiosis).
Lung, Thorax, or Respiration - tumors.
Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive - Specific Developmental Abnormalities - Central Nervous System.
Reproductive - Specific Developmental Abnormalities - musculoskeletal system.
Reproductive - Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea)
Reproductive - Fertility - post-implantation mortality (e.g. dead/or resorbed implants per total number of implants).
Reproductive - Maternal Effects - uterus, cervix, vagina.
Reproductive - Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)

- **Additional toxicological information:**
  To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
  EPA-D: Not classifiable as to human carcinogenicity: inadequate human and animal evidence of carcinogenicity or no data are available.

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

- **DOT regulations:**
- **Hazard class:** 4.1
- **Identification number:** UN3089
- **Packing group:** II
- **Proper shipping name (technical name):** Metal powders, flammable, n.o.s. (copper)

- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** 4.1 Flammable solids
- **Item:** 13c
- **Danger code (Kemler):** 40
- **UN-Number:** 3089
- **Description of goods:** Metal powders, flammable, n.o.s. (copper)

- **Maritime transport IMDG:**
- **IMDG Class:** 4.1
- **UN Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s. (copper)

- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 4.1
- **UN/ID Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s.

(copper)

15 Regulations

- **Product related hazard informations:**

- **Hazard symbols:**
  Xn Harmful F Highly flammable

- **Risk phrases:**
  11 Highly flammable.
  62 Possible risk of impaired fertility
  63 Possible risk of harm to the unborn child

- **Safety phrases:**
  7 Keep container tightly closed.
  26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
  33 Take precautionary measures against static discharges.
  36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
  43 In case of fire, use metallic extinguishing powder. Never use water.
  60 This material and its container must be disposed of as hazardous waste.

- **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 copper and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

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.