

Material Safety Data Sheet

Section 1 – Product Description

Product name: Copper oxide, 90-99%

Recommended Use: Use as pigment of glass and ceramic, polishing paste of glass, or catalyst etc.

Synonyms: Copper (II) Oxide, Black Copper Oxide, Cupric Oxide

CAS Number: 1317-38-0

Company Identification:


Nanostructured & Amorphous Materials, Inc.

16840 Clay Road, Suite #113

Houston, TX 77084, USA

Section 2 - Hazards Identification

Classification of the substance or mixture

Symbol	Signal word	Hazard statement
	Warning	Harmful if swallowed

Label elements

GHS label elements

The substance is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms GHS07

Hazard-determining components of labeling: Activated copper oxide

Indication of Particular Risks

R22: Harmful if swallowed

R36: Irritating to the eyes

Indication of Safety Precautions

S22: Do not breathe dust

S36: Wear suitable protective clothing

Section 3 – Composition/Information on Ingredients

Chemical Name: Copper oxide (synonyms: Cupric Oxide)

CAS#: 1317-38-0

Purity: 90-99%

Single Substance or Mixture: Single substance

Section 4 –First Aid Measures

First Aid: Eyes

In case of contact with eyes, rinse immediately with plenty of water for at least 20 minutes. Seek immediate medical attention.

First Aid: Skin

Remove all contaminated clothing. For skin contact, wash thoroughly with soap and water for at least 20 minutes. Seek immediate medical attention if irritation develops or persists.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Have victim rinse mouth thoroughly with water, if conscious. Never give anything by mouth to a victim who is unconscious or having convulsions. Contact a physician or poison control center immediately.

First Aid: Inhalation

Remove source of contamination or move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve.

Section 5 – Firefighting Procedures**General Fire Hazards**

Copper Oxide is not combustible and does not contribute to the intensity of a fire. Exposure to moist air at > 212 deg F may result in spontaneous combustion. Concentrated solutions of Copper Oxide may be flammable. When involved in a fire, this material may decompose and produce irritating vapors, acrid smoke and toxic gases. Copper Oxide decomposes at 1026 deg C.

Extinguishing Media: Use fire fighting measures that suit the surrounding fire.

Hazardous Combustion Products: Copper fumes.

Fire Fighting Equipment/Instructions: Firefighters should wear full protective clothing including self-contained breathing apparatus. If possible control runoff from fire control or dilution water to prevent environmental contamination.

Section 6 – Spill or Leak Procedures

Person-related safety precautions: Wear protective equipment. Keep unprotected persons away.

Measures for environmental protection: Do not allow material to be released to the environment without proper governmental permits. Prevent flow out to river, etc. so as not to badly affect.

Containment Procedures

Stop the flow of material, if this is can be done without risk. Contain the discharged material. If sweeping of a contaminated area is necessary use a dust suppressant agent, which does not react with product.

Clean-Up Procedures

Small releases can be cleaned-up in gloves, goggles and suitable body protection. In case of a large spill (in which excessive dusts can be generated), clear the affected area, protect people, and respond with trained personnel. Prevent spill rinsate from contamination of storm drains, sewers, soil or groundwater. Place all spill residues in an appropriate container and seal.

Thoroughly wash the area after a spill or leak clean-up.

Evacuation Procedures

Evacuate the area promptly and keep upwind of the spilled material. Isolate the spill area to prevent people from entering. Keep materials, which can burn away from spilled material. In case of large spills, follow all facility emergency response procedures.

Special Procedures

Remove soiled clothing and launder before reuse. Avoid all skin contact with the spilled material. Have emergency equipment readily available.

Section 7 – Handling and Storage**Handling Procedures**

Do not breathe dust. Avoid all contact with skin and eyes. Wash thoroughly after handling. Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace. Prevent formation of dust.

Storage:

Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals(see Section 10, Stability and Reactivity). Storage areas should be made of fire-resistant

materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers). Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Do not cut, grind, weld, or drill near this container. Never store food, feed, or drinking water in containers that held this product. Keep this material away from food, drink and animal feed. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Do not store this material in open or unlabeled containers. Limit quantity of material stored. Store in suitable containers that are corrosion-resistant.

Section 8 – Protection Information

Components with workplace control parameters

Components	CAS No.	Vaule	Control parameters	Basis
Cu	7440-50-8	TWA	1 mg/m ³ (dusts & mists)	ACGIH
			0.2 mg/m ³ (fume)	
			1 mg/m ³ (dusts & mists)	OSHA/NIOSH
			0.1 mg/m ³ (fume)	
Remarks	Use mechanical ventilation such as dilution and local exhaust. Use a corrosion-resistant ventilation system and exhaust directly to the outside. Supply ample air replacement. Provide dust collectors with explosion vents.			

Section 9 – Physical Data

Appearance: Black powder
 Odor: Odorless
 Physical State: Solid
 pH: Not available
 Vapor Pressure: Not applicable
 Vapor Density: Not applicable
 Boiling Point: Not applicable
 Melting Point: 1326 deg C (2418 deg F @ 760 mm Hg)
 Solubility (H₂O): < 0.1%
 Specific Gravity: 6.4 (H₂O = 1)
 Freezing Point: Not available
 Softening Point: Not available
 Bulk Density: Not available
 Molecular Weight: 79.55
 Chemical Formula: CuO

Section 10 – Reactivity Data

Chemical stability: stable in solid form at standard temperature.
Conditions to avoid: Avoid high temperatures and incompatible materials.
Incompatibility: Forms explosive acetylides with acetylene in caustic solutions. Exposure to moist air at > 212 deg F may result in spontaneous combustion. Explodes when heated with powdered aluminum; anilinium perchlorate, hydrogen, magnesium, or phthalic anhydride. Boron reacts

violently with cupric oxide after warming, melting glass tubing. Titanium reacts violently with cupric oxide when heated. Hydrazine reacts vigorously with cupric oxide. Cesium acetylene carbide explodes on contact with cupric oxide at 350 deg C. The reduction of heated cupric oxide by admixed magnesium is accompanied by incandescence and an explosion. Cupric oxide is reduced when heated with sodium. The reaction proceeds with vivid incandescence. Cupric oxide is reduced to metallic copper when heated with potassium at temp below its melting point. This reaction proceeds with vivid incandescence.

Other incompatibilities include: dirubidium acetylides, hydrogen, hydrogen sulfide, metals, phospham, phthalic anhydride, acetylene, and zirconium. An attempted thermite reaction with aluminum powder and copper(II) oxide caused a violent explosion. Mixtures of phthalic anhydride and anhydrous Cupric Oxide have exploded violently on heating. Interaction with hydroxylamine or hydrazine is vigorous. A pelleted mixture containing barium acetate, copper(II) oxide and yttrium oxide, was heated in a furnace, and a small explosion occurred during the early stages, 'from formation of pyrolysis products'. Copper oxide and manganese dioxide react at 359 deg C incandescently. Solutions of sodium hypobromite are decomposed by powerful catalytic action of cupric ions, even as impurities.

Hazardous Decomposition: Copper fumes.

Hazardous Polymerization: Will not occur.

Section 11 – Toxicity Data

Acute toxicity

LD50 (Oral-Rat) 470 mg/kg; LD50 (Intraperitoneal-Mouse) 273 mg/kg; LD50 (Intratracheal-Rat) 250 mg/kg

Component Analysis - TDLo/LDLo Copper Oxide (CAS # 1317-38-0): LDLo (Intratracheal-Rat) 278 mg/kg; TDLo (Intraperitoneal-Mouse) 45.4 mg/kg; Behavioral: excitement; Sense Organs and Special Senses (Eye): conjunctive irritation; Lungs, Thorax, or Respiration: cough

May be harmful or fatal if swallowed. Product is an eye and skin irritant and may cause skin discoloration. Product is a respiratory tract irritant, and inhalation may cause nose irritation, sore throat, coughing, and chest tightness and possibly, ulceration and perforation of the nasal septum. Except for occasional acute incidents of copper poisoning, few effects are noted in normal human populations. Effects of single exposure following suicidal or accidental oral exposure have been reported as metallic taste, epigastric pain, headache, nausea, dizziness, vomiting and diarrhea, tachycardia, respiratory difficulty, hemolytic anemia, hematuria, massive gastrointestinal bleeding, liver and kidney failure, and death. Metal fume fever from inhalation of high concentrations in the air in occupational settings have been reported.

Epidemiology: No information available.

Neurotoxicity: Has not been identified.

Mutagenicity: No information available.

Teratogenicity: There are no reports of teratogenicity in humans. Animal studies indicate that a deficiency or excess of copper in the body can cause significant harm to developing embryos. The net absorption of copper is limited and toxic levels are unlikely from industrial exposure. Other

Toxicological Information: Individuals with Wilson's disease are unable to metabolize copper.

Thus, persons with pre-existing Wilson's disease may be more susceptible to the effects of overexposure to this product. Persons with pre-existing skin disorders, impaired liver, kidney or pulmonary function may also be more susceptible to the effects of this product.

Section 12 – Ecological Data

Toxicity

Harmful to aquatic life in very low concentrations. Copper Oxide is toxic to fish and marine organisms when applied to streams, rivers, ponds or lakes.

Environmental Fate

Persistence: In soil, acidic conditions promote solubility of copper compounds and increase the concentration of ionic copper and so change the microorganism and other animal populations, depending on their various tolerance levels for copper. In the aquatic environment, some copper compounds may be metabolized, however, there is not any evidence that biotransformation processes have a significant bearing on the aquatic fate of these compounds. In water, as in soil, copper compounds will also bind to carbonates, clays, humic materials and hydrous oxides of iron and manganese. In the atmosphere, copper compounds (as aerosols) are estimated to have a residence time of 2-10 days in an unpolluted atmosphere and 0.1 to less than 4 days in polluted, urban areas. Bioaccumulation: Copper compounds are accumulated by plants and animals, but do not appear to biomagnify from plants to animals.

Section 13 – Disposal Information

General Product Information

As shipped, this product is not considered a hazardous waste.

Disposal Instructions

All wastes must be handled in accordance with local, state and federal regulations.

This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

Contaminated packaging: Disposal must be made according to official regulations.

Section 14 – Transport Information

NOTE: The shipping classification information in this section (Section 14) is meant as a guide of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information

Shipping Name: Non-regulated.

Hazard Class: Not Applicable

UN/NA #: Not Applicable

Packing Group: Not Applicable

Required Label(s): None

Additional Info.: None

Section 15 –Regulations

US Federal Regulations

General Product Information: As a "Copper Compound", Copper Oxide (CAS # 1317-38-0) is listed as a Priority and Toxic Pollutant under the Clean Water Act.

Component Analysis: This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Section 16 – Additional Information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment 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.