

Section 1: IDENTIFICATION

Product Name: Copper Metal

Synonyms: Cu-CATH-1; Copper Cathode, Copper Anode (Higher Purity Grade).

Product Use: Copper is used in the manufacture of bronzes, brass, other copper alloys, and electrical conductors and interconnects. Also used for electroplating of copper layers in the manufacture of microelectronic components.

Restrictions on Use: Not available.

Manufacturer/Supplier: Teck Advanced Materials Inc.
13670 Danielson Street
Suite H & I
Poway, CA 92064

Phone Number: 858-391-2935

Emergency Phone: 250-364-4214

Date of Preparation of SDS: May 15, 2024

Section 2: HAZARD(S) IDENTIFICATION

GHS INFORMATION

Classification: Not hazardous according to OSHA criteria (29 CFR 1910.1200).
Not hazardous according to WHMIS 2015 criteria.

LABEL ELEMENTS

Hazard None.

Pictogram(s):

Signal Word: None.

Hazard Statements: Not applicable.

Precautionary Statements

Prevention: Not applicable.

Response: Not applicable.

Storage: Not applicable.

Disposal: Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients with Unknown Toxicity: None.

Emergency Overview: Reddish metal that does not burn in bulk. Copper dust clouds will not explode readily, if at all, in air. Due to its high melting point, molten copper metal is unlikely to occur in most fire situations. This metal is relatively non-toxic and poses little immediate hazard to personnel or the environment in an emergency situation.

Potential Health Effects: Inhalation of dust may result in irritation of the nasal mucous membranes. Inhalation of copper oxide fumes may cause irritation of the upper respiratory tract and may result in a form of metal fume fever, characterized by flu-like symptoms such as chills, fever, nausea, and vomiting. Ingestion of copper metal may cause metallic taste and gastrointestinal irritation. Copper particles embedded in the eye may cause redness, pain and discoloration of ocular tissue. Direct skin contact may result in irritation in some workers. Discoloration of the skin has been observed from handling copper, but does not indicate an actual injury. Copper is not listed as a carcinogen by OSHA, the NTP, the ACGIH, IARC, or the EU (see Toxicological Information, Section 11).

Potential Environmental Effects: Copper is insoluble in water and, therefore, likely has low bioavailability. However, long-term exposure in aquatic and terrestrial environments or processing of the product can lead to the release of the constituent copper in more bioavailable forms. These bioavailable forms have the potential to yield toxic effects on aquatic organisms (see Ecological Information, Section 12).

This material is not considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

This material is not considered hazardous by the Hazardous Products Regulations.

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient(s)	Common name / Synonyms	CAS No.	% wt./wt.
Copper	Not available.	7440-50-8	99.9 - 100

Impurities / Stabilizing additives: None known.

Section 4: FIRST-AID MEASURES

Inhalation:	As supplied, the material does not pose an inhalation hazard. If dust or fume is inhaled: Call a poison center or doctor if you feel unwell. Acute and delayed symptoms and effects: Inhalation of dust may cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Inhalation of Copper fume can cause metal fume fever, a 24- to 48-hour flu-like illness characterized by chills, fever, aching muscles, dryness in the mouth and throat and headache.
Eye Contact:	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center or doctor if you feel unwell. Acute and delayed symptoms and effects: Copper particles embedded in the eye may cause redness, pain and discoloration of ocular tissue. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hot product may cause thermal burns.
Skin Contact:	If on skin: Wash with plenty of water. Call a poison center or doctor if you feel unwell. Acute and delayed symptoms and effects: Direct skin contact may result in irritation in some workers. Discoloration of the skin has been observed

from handling copper, but does not indicate an actual injury. Signs/symptoms may include localized redness, swelling, and itching. Hot product may cause thermal burns.

Ingestion: If swallowed: Call a poison center or doctor if you feel unwell. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration. Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Acute and delayed symptoms and effects: Ingestion of copper metal may cause metallic taste and gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea. Hot product may cause thermal burns.

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

Note to Physicians: Symptoms may not appear immediately.

Section 5: FIRE-FIGHTING MEASURES

FLAMMABILITY AND EXPLOSION INFORMATION

Not flammable or combustible by OSHA/WHMIS criteria.

Sensitivity to Mechanical Impact: This material is not sensitive to mechanical impact.

Sensitivity to Static Discharge: This material is not sensitive to static discharge.

MEANS OF EXTINCTION

Suitable Extinguishing Media: Use appropriate extinguishing media for surrounding fire. Move containers from fire area if you can do it without risk.

Unsuitable Extinguishing Media: Not available.

Products of Combustion: Oxides of copper.

Protection of Firefighters: Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may cause pollution. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedures: Keep unauthorized personnel away. Ventilate closed spaces before entering.

Personal Precautions: Do not touch or walk through spilled material. Use personal protection recommended in Section 8.

Environmental Precautions: Keep out of drains, sewers, ditches, and waterways.

Methods for Containment: Do not flush to sewer or allow to enter waterways.

Methods for Clean-Up: Sweep up and shovel into suitable containers for disposal.

Other Information: See Section 13 for disposal considerations.

Section 7: HANDLING AND STORAGE

Handling:

Copper cathodes suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Cathodes may contain cavities that collect moisture. Entrained moisture will expand explosively when immersed in a molten bath and potentially spatter molten metal out of the bath. Do not swallow. Wash hands thoroughly after handling. See Section 8 for information on Personal Protective Equipment.

Storage:

Store copper in a dry, covered area. Store away from incompatible materials. See Section 10 for information on Incompatible Materials. Keep out of the reach of children.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Component

Copper [CAS No. 7440-50-8]

ACGIH: 1 mg/m³ (TWA); (1990); For Copper, Dusts and mists, as Cu
0.2 mg/m³ (TWA); (1990); For Copper, Fume

OSHA: 0.1 mg/m³ Fume (as Cu) (TWA), 1 mg/m³ Dusts and mists (as Cu) (TWA);

TWA: Time-Weighted Average

Engineering Controls:

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT (PPE)



Eye/Face Protection:

Wear safety glasses. If product is hot, wear full face-shield. Indirect vented, dust-tight goggles are required if dust or fume is generated when handling this product. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3:20 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.

Hand Protection:

Wear protective gloves. If product is hot, thermally protective gloves are recommended. Consult manufacturer specifications for further information.

Skin and Body Protection:

Wear protective clothing. Clothing with full length sleeves and pants should be worn.

Respiratory Protection:

If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator

that meets the requirements of CSA Standard CAN/CSA-Z94.4-18, with particulate filter, or self-contained breathing apparatus must be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

General Hygiene Considerations: Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Reddish metal.
Colour:	Reddish.
Odour:	Odourless.
Odour Threshold:	Not available.
Physical State:	Solid.
pH:	Not available.
Melting Point / Freezing Point:	1083 °C (1981.4 °F)
Initial Boiling Point:	2595 °C (4703 °F)
Boiling Range:	2595 °C (4703 °F)
Flash Point:	Not available.
Evaporation Rate:	Not available.
Flammability (solid, gas):	See Section 5.
Lower Flammability Limit:	Not available.
Upper Flammability Limit:	Not available.
Vapor Pressure:	1 mmHg at 1083 °C (1981.4 °F)
Relative Vapor Density:	Not available.
Relative Density:	8.94 (Water = 1)
Solubilities:	Insoluble in water.
Partition Coefficient: n-Octanol/Water:	Not available.
Auto-ignition Temperature:	Not available.
Decomposition Temperature:	Not available.
Kinematic Viscosity:	Not available.
Percent Volatile, wt. %:	Not available.
VOC content, wt. %:	Not available.

Density: Not available.

Coefficient of Water/Oil Distribution: Not available.

Particle Characteristics: Not available.

Section 10: STABILITY AND REACTIVITY

Reactivity: Contact with incompatible materials.

Chemical Stability: Stable under normal storage conditions.

Possibility of Hazardous Reactions: Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxide or azide compounds. Copper in finely-divided powder or granular form reacts with strong oxidants like chlorates, bromates, iodates and ammonium nitrate causing a potential explosion hazard.

Conditions to Avoid: Contact with incompatible materials.

Incompatible Materials: Strong acids. Strong oxidizers. Halogens. Acetylene. Peroxides.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding, arc-air gouging or overheating a molten metal bath may generate metal fumes. These fumes will contain copper oxides, which, on inhalation in sufficient quantity, can produce metal fume fever.

Section 11: TOXICOLOGICAL INFORMATION

EFFECTS OF ACUTE EXPOSURE

Product Toxicity

Oral: Not available.

Dermal: Not available.

Inhalation: Not available.

Component Toxicity

Component	CAS No.	LD ₅₀ oral	LD ₅₀ dermal	LC ₅₀
Copper	7440-50-8	> 5000 mg/kg (mouse)	> 2000 mg/kg (mouse)	5.11 mg/L (rat); 4H

Likely Routes of Exposure: Eye contact. Skin contact. Inhalation. Ingestion.

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Liver. Kidneys.

Symptoms (including delayed and immediate effects)

Inhalation: Inhalation of dust may cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Inhalation of Copper fume can cause metal fume fever, a 24- to 48-hour flu-like illness characterized by chills, fever, aching muscles, dryness in the mouth and throat and headache.

- Eye:** Copper particles embedded in the eye may cause redness, pain and discoloration of ocular tissue. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hot product may cause thermal burns.
- Skin:** Direct skin contact may result in irritation in some workers. Discoloration of the skin has been observed from handling copper, but does not indicate an actual injury. Signs/symptoms may include localized redness, swelling, and itching. Hot product may cause thermal burns.
- Ingestion:** Ingestion of copper metal may cause metallic taste and gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea. Hot product may cause thermal burns.
- Skin Sensitization:** Repeated or prolonged contact with Copper dust may cause skin sensitization.
- Respiratory Sensitization:** Not available.
- Medical Conditions Aggravated By Exposure:** Wilson's Disease.

EFFECTS OF CHRONIC EXPOSURE (from short and long-term exposure)

- Target Organs:** Skin. Eyes. Gastrointestinal tract. Respiratory system.
- Chronic Effects:** Prolonged or repeated contact may dry skin and cause irritation. Individuals with a rare disorder called "Wilson's Disease" (estimated prevalence 0.003% of the population) are predisposed to accumulate copper and should not be occupationally exposed.
- Carcinogenicity:** This product does not contain any carcinogens or potential carcinogens above reportable thresholds as listed by ACGIH, IARC, OSHA, or NTP.
- Mutagenicity:** Not available.
- Reproductive Effects:** Not available.
- Developmental Effects**
- Teratogenicity:** Not available.
- Embryotoxicity:** Not available.
- Toxicologically Synergistic Materials:** Not available.

Section 12: ECOLOGICAL INFORMATION

- Ecotoxicity:** Copper metal is relatively insoluble in water and, therefore, generally has low bioavailability. However, long-term exposure in aquatic and terrestrial environments or processing of the product can lead to the release of the constituent copper in more bioavailable forms. These more bioavailable forms have the potential to yield toxic effects under specific chemical conditions (e.g., low pH). The mobility of the copper compounds in soluble forms is also media-dependent. They can bind with inorganic and

organic ligands, reducing their mobility and bioavailability in both soil and water. Bioavailability is also regulated by other factors in the aquatic environment, such as hardness and dissolved organic carbon content.

Persistence / Degradability: Not available.

Bioaccumulation / Accumulation: Not available.

Mobility in Environment: Not available.

Other Adverse Effects: Not available.

Section 13: DISPOSAL CONSIDERATIONS

Disposal Instructions: Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

Section 14: TRANSPORT INFORMATION

U.S. Department of Transportation (DOT)

Proper Shipping Name: Not regulated.

Class: Not applicable.

UN Number: Not applicable.

Packing Group: Not applicable.

Placard(s): Not applicable.

Marine Pollutant: No.

Canada Transportation of Dangerous Goods (TDG)

Proper Shipping Name: Not regulated.

Class: Not applicable.

UN Number: Not applicable.

Packing Group: Not applicable.

Placard(s): Not applicable.

Marine Pollutant: No.

IATA Dangerous Goods Regulations Classification

Proper Shipping Name: Not regulated.

Class: Not applicable.

UN Number: Not applicable.

Packing Group: Not applicable.

Placard(s): Not applicable.

Marine Pollutant: No.

International Maritime Dangerous Goods Code (IMDG) Classification

Proper Shipping Name: Not regulated.
Class: Not applicable.
UN Number: Not applicable.
Packing Group: Not applicable.
Placard(s): Not applicable.
Marine Pollutant: No.

International Maritime Solid Bulk Cargoes (IMSBC) Code Classification

Proper Shipping Name: Not regulated.
Class: Not applicable.
UN Number: Not applicable.
Packing Group: Not applicable.
Placard(s): Not applicable.
Marine Pollutant: No.

IMO MARPOL V Classification: Not Harmful to the Marine Environment.

Section 15: REGULATORY INFORMATION

Chemical Inventories

US (TSCA)

The components of this product are in compliance with the chemical notification requirements of TSCA.

Canada (DSL)

The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

Federal Regulations

United States

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III

Component	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)
Copper	Not listed.	Not listed.	5000	313	Not listed.	Not listed.

State Regulations

Massachusetts

US Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Component

Copper

CAS No.

7440-50-8

RTK List

Listed.

New Jersey

US New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Component

Copper

CAS No.

7440-50-8

RTK List

Listed.

Pennsylvania

US Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Component

Copper

CAS No.

7440-50-8

RTK List

Listed.

California

California Prop 65: This product does not contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Section 16: OTHER INFORMATION

Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

C: Celsius, F: Fahrenheit

CAA: Clean Air Act

CAS: Chemical Abstracts Service

CSA: Canadian Standards Association

CEPA: Canadian Environmental Protection Act

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

DOT: Department of Transport

EHS: Extremely Hazardous Substances

EPCRA: Emergency Planning and Community Right-to-Know Act

IARC: International Agency for Research on Cancer

IMO: International Maritime Organization

LD50: Lethal Dose 50%

LC50: Lethal Concentration 50%

NIOSH: National Institute for Occupational Safety and Health

NTP: National Institute for Occupational Safety and Health

MSHA: Mine Safety and Health Administration

OSHA: Occupational Safety and Health Administration

RCRA: Resource Conservation and Recovery Act

RTK: Right to Know

RQ: Reportable Quantity

SARA: Resource Conservation and Recovery Act

TSCA: Toxic Substances Control Act

TPQ: Threshold Planning Quantities

WHMIS: Workplace Hazardous Materials Information System

wt.: Weight

Disclaimer:

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Teck Advanced Materials Inc. extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

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GHS SDS Prepared for: Teck Advanced Materials Inc.

Phone: 858-391-2935