

Safety Data Sheet

High Speed Bright Copper Electroplating Solution

Version date: 02/03/2017

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Section 1. Identification

Product Name: High Speed Bright Copper Electroplating Solution

Product Code: EP-EC1-65L-01-SEMI

Recommended use and restrictions on use: For laboratory and R&D use only

Manufacturer Name: NANO3D Systems LLC

Address: 1110 NE Circle Blvd., ATAMI/Bldg. 11
Corvallis, OR 97330

E-mail: info@nano3dsystems.com

Website: www.nano3dsystems.com

Emergency Number: CHEMTREC: 1-800-424-9300

Section 2. Hazard identification

Classification:

Corrosive to metals (Category 1),	H290
Acute toxicity, Oral (Category 4),	H302
Skin corrosion (Category 1A),	H314
Serious eye damage (Category 1),	H318
Acute Aquatic Toxicity (Category 1),	H400
Chronic Aquatic Toxicity (Category 1),	H410

Label elements and precautionary statements:

Signal word: Danger

Pictogram (s):



Hazard statements:

H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H410	Very toxic to aquatic life with long lasting effects.

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Precautionary statements:

P234	Keep only in original containers.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves, clothing, eye and face protection.
P301+P312+P330	If swallowed: Call a poison center or physician if you feel unwell.
P301+P330+P331	If swallowed: Rinse mouth. DO NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340+P310	If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a Poison Center/Doctor.
P305+P351+P338+P310	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or physician.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P391	Collect spillage.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of content and container to an approved waste disposal plant.

Hazards Not Otherwise Classified (HNOC): None

Section 3. Composition/information on ingredients

Component	CAS Number	EINECS Number	Classification	Wt %
Copper sulfate pentahydrate	7758-99-8	231-847-6	Acute Toc. 4; Skin Irrit.2; Eye Irrit. 2A; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H319, H410	< 35
Sulfuric acid	7664-93-9	231-639-5	Met.Corr 1; Skin Corr.1A; Eye Dam. 1; H290, H314	< 10
Water	7732-18-5	231-791-2		Balance

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Section 4. *First aid measures*

- Eye:** Immediately flush eyes with plenty of water. Hold eye open and rinse slowly and gently for at least 15-20 minutes. Contact physician for treatment advice.
- Skin:** Remove contaminated clothing and wash affected area thoroughly with soap and water. If irritation persists contact a physician.
- Inhalation:** Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.
- Ingestion:** Contact a poison control center or physician for treatment advice. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless told to do so by the poison control center or physician. If vomiting occurs spontaneously, avoid aspiration.

Section 5. *Fire-fighting measures*

Suitable extinguishing media: In all cases this material does not support combustion. Water, water fog, and/or carbon dioxide (CO₂) may be used to cool fire-exposed storage containers, structures and to protect personnel.

Fire fighting procedures: Do not flush down sewers or other drainage systems. Material is harmful to aquatic life. For fires in enclosed areas, wear self-contained breathing apparatus and full protective gear. Do not inhale combustion gases.

Unusual fire and explosion hazards: None. Material is denser than water and will mix completely into excess water when allowed to do so.

Combustion products: Extremely high temperatures may remove water by evaporation and lead to thermal decomposition releasing copper oxide and sulfur dioxide.

Section 6. *Accidental release measures*

Personal precautions, protective equipment and emergency procedures: Wear appropriate skin, eye and respiratory protection. Do not eat, drink or smoke while cleaning up. Ensure adequate ventilation.

Methods and materials for containment and cleaning up: Wear appropriate personal protective gear including eye, skin and respiratory protection. Keep unnecessary and/or untrained people away. Isolate spill area and avoid tracking through liquid. Dike and prevent runoff to drains or sewers. For small spills, cover with lime or soda ash and then scoop into polyethylene drums for later disposal. Large spill may be pumped directly into a storage container for later disposal. Do not wash residue to drain or sewer. Copper sulfate solution may deteriorate concrete. Refer to Section 15 for spill/release reporting information.

Environmental precautions: Prevent spills and rinsing from entering storm or sanitary sewers or other waterways and contact with soil.

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Section 7. *Handling and storage*

Handling: Avoid breathing dust or solution mist. Use in well-ventilated area. Sweep up crystals or powder, vacuum is preferred. Avoid contact with eyes. Eye wash stations should be available in work areas. Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing. Do not empty waste into sanitary drains.

Storage: Store in a cool, dry area. Use with adequate ventilation. Keep container tightly closed when not in use. Store only in the original container. Protect from physical damage. Empty containers may contain hazardous residue.

Section 8. *Exposure controls/personal protection*

Exposure limits:

Component	CAS No.	ACGIH (TLV)	OSHA (PEL)	NIOSH
Copper sulfate pentahydrate	7758-99-8	1(mg/m ³)	0.1(mg/m ³)	1(mg/m ³)
Sulfuric acid	7664-93-9	0.2 (mg/m ³)	1(mg/m ³)	1(mg/m ³)

Source: NIOSH = National Institute of Occupational Safety & Health
OSHA = Occupational Safety and Health Administration
TLV = Threshold Limit Value
ACGIH = American Conference of Industrial Hygienists

Engineering controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protective Equipment (PPE)

Eye protection: Chemical splash goggles or safety glasses with side shields.

Skin protection: Wear rubber or neoprene gloves. Wear rubber apron and long sleeves to prevent skin contact. Wash hand thoroughly with soap and water after handling and before eating or smoking.

Respiratory protection: Wear appropriate, approved respiratory protection when ventilation is inadequate to meet exposure limits.

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Section 9. *Physical and chemical properties*

Physical state:	Liquid
Color:	Dark blue
Odor:	Slightly sharp
Odor threshold:	Not available
pH:	<2.5
Melting/freezing point:	On cooling below 15°C the solution becomes saturated and crystals of copper sulfate pentahydrate can appear.
Initial boiling point:	>100 °C (>212 °F)
Flash point:	> 110 °C (>230 °F)
Evaporation rate:	Not available
Flammability (solid, gas):	Not applicable
Upper/lower explosion limits:	Non-explosive
Vapor pressure:	As water
Vapor density:	As water
Specific gravity (H₂O=1):	1.05 – 1.17
Solubility:	Completely soluble in water at 20 °C
Partition coefficient octanol/water:	Not determined
Auto-ignition temperature:	Not applicable
Decomposition temperature:	Not available
Viscosity:	Similar to water

Section 10. *Stability and reactivity*

Reactivity: Stable, non-reactive when stored and used according to recommendations.

Chemical stability: No decomposition if used according to specifications.

Possibility of hazardous reactions: None are known.

Conditions to avoid: None reported.

Incompatible materials: None reported.

Hazardous Decomposition Products: When heated to decomposition cupric oxide and sulfur dioxide may form.

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Section 11.	<i>Toxicological information</i>
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Route of Exposure and Symptoms

Eye contact:	Causes severe eye damage.
Skin contact:	Causes severe skin burns.
Inhalation:	Can cause irritation in the upper respiratory tract and in excessive quantities can cause ulceration and perforation of the nasal septum.
Ingestion:	Causes severe burns to mouth, throat and gastrointestinal tract. Copper may build up in the liver and kidneys.

Acute and Chronic Effects from Short- and Long-term Exposure:

See Routes of Exposure and Symptoms above.

Acute Oral Toxicity:	LD50: 2140 mg/kg (rat, sulfuric acid) LD50: 300 mg/kg (rat, copper sulfate pentahydrate)
Acute Dermal Toxicity:	No applicable information available.
Acute Inhalation Toxicity:	LC50: 510 mg/m ³ , 2 hours (rat, sulfuric acid)
Acute Eye Irritation:	1.38 mg, severe (rabbit, sulfuric acid)
Dermal Irritation:	No applicable information available.

Carcinogen Listings:

IARC: No

NTP: No

OSHA: No

Reproductive Effects: No applicable information available.

Target Organ Effects: No applicable information available.

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Section 12. *Ecological Information*

Aquatic Toxicity: LC50: 42 mg/l, 96 hours (Mosquito fish, sulfuric acid)
EC50: 0.024 mg/l (Daphnia magna, copper sulfate)

Persistence and degradability: There are no data reported for this material; however, it would not be expected to be biodegradable.

Bio-accumulative potential: There is no evidence to suggest bioaccumulation will occur.

Mobility in soil: Accidental spillage may lead to penetration in the soil and groundwater. Improper handling and disposal of this material may cause environmental damage.

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released into water, this material is not expected to biodegrade. When released into water, this material is not expected to evaporate significantly. This material is expected to significantly bioaccumulate.

Section 13. *Disposal considerations*

Waste must be disposed of in accordance with federal, state/provincial and local environmental control regulations. Improper disposal is a violation of law. Do not reuse empty container. If allowed by federal, state/provincial and local authorities, dispose of container in a sanitary landfill or by incineration

Section 14. *Transport information*

Classification for shipment by road or rail, sea (IMDG) and air (IATA/ICAO):

UN proper shipping name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(Sulfuric Acid and Copper Sulfate Mixture)

UN number: UN3264

Hazard class: 8

Packing group: II

Marine Pollutant: Yes (Copper sulfate)

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Section 15. Regulatory information

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS Number	Revision Date
Sulfuric acid	7664-93-9	2007-07-01

SARA 313: This product contains the following SARA 313 Toxic Release Chemicals.

	CAS Number	Revision Date
Copper sulfate pentahydrate	7758-99-8	1993-04-24
Sulfuric acid	7764-93-9	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right to Know Components

	CAS Number	Revision Date
Copper sulfate pentahydrate	7758-99-8	1993-04-24
Sulfuric acid	7764-93-9	2007-07-01

Pennsylvania Right to Know Components

	CAS Number	Revision Date
Water	7732-18-5	
Copper sulfate pentahydrate	7758-99-8	1993-04-24
Sulfuric acid	7764-93-9	2007-07-01

New Jersey Right to Know Components

	CAS Number	Revision Date
Water	7732-18-5	
Copper sulfate pentahydrate	7758-99-8	1993-04-24
Sulfuric acid	7764-93-9	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS Number	Revision Date
Sulfuric acid	7764-93-9	2007-07-01

Section 16. Other information

HMIS Ratings:

Health: 3 Flammability: 0 Reactivity: 0 Personal Protection: C

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Full text if H-Statements referred to under sections 2 and 3.

Cute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Eye Dam.	Serious eye damage
Eye Irrit.	Eye irritation
Met. Corr.	Corrosive to metals
Skin Corr.	Skin corrosion
Skin Irrit.	Skin irritation
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life with long lasting effects.

SDS Preparation date: February 3, 2017 **Supersedes previous version:** New SDS

This SDS contains revisions in the following section(s): Not applicable. New SDS.

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End of Safety Data Sheet