Section 1: Product and Company Identification

1.1 Product Identifiers
Product Name: Copper plated graphite powder
Product Number: ELNP-GCU-25A

1.2 Relevant identified uses of the substance or mixture
Identified Uses: Laboratory chemicals, Manufacture of substances and alloys

1.3 Details of the supplier
Company: Nano3D Systems LLC
1110 NE Circle Blvd., ATAMI/Bldg. 11
Corvallis, OR 97330

Telephone: + 1 541 – 713– 2037
Email: info@nano3dsystems.com
www.nano3dsystems.com

1.4 Emergency Telephone Number
Emergency Phone #: CHEMTREC: 1-800-424-9300

Section 2: Hazard Identification

2.1 Classification of the substance or mixture
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable solids (Category 1), H228
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger
Hazard statement(s)
H228 Flammable solid.
H400 Very toxic to aquatic life.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

Section 3: Composition/ Information on ingredients

3.1 Substance/ Mixture : Cu plated graphite

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphite</td>
<td>(CAS No) 7782-42-5</td>
<td>Trade Secret</td>
<td>Not a hazardous substance or mixture</td>
</tr>
<tr>
<td>Copper</td>
<td>(CAS No) 7440-50-8</td>
<td>Trade Secret</td>
<td>Flam. Sol. 1; Aquatic Acute 1; Aquatic Chronic 3; H228, H400, H412</td>
</tr>
</tbody>
</table>

Section 4: First AID Measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.
If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
Notes to Physician : No data available

Section 5: Fire-Fighting Measures

5.1 Extinguishing Media
Suitable extinguishing media : Use Water, Alcohol-resistant foam, or carbon dioxide

5.2 Special hazards arising from the substance or mixture
Carbon Oxides, and other gases may be formed that are hazardous to health.

5.3 Advice for fire fighters
Wear self-contained breathing apparatus for fire fighting if necessary.

5.4 Further Information
Use standard fire fighting procedures and consider the hazards of other involved materials. Use water spray to cool unopened containers.

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wetbrushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.
Section 7: Handling and Storage

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Keep in a dry place.
Storage class (TRGS 510): Flammable solid hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

Section 8: Exposure Control/Personal Protection

8.1 Control Parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>TWA</td>
<td>15.000000Million particles per cubic foot</td>
<td>USA, Occupational Exposure Limits (OSHA) - Table Z-3 Mineral Dusts</td>
</tr>
</tbody>
</table>

Remarks: Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques. 

Also see specific listing for Graphite (synthetic).

TWA 2,500000 mg/m³ USA, NIOSH Recommended Exposure Limits

TWA 15.000000 mg/m³ USA, Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

TWA 5.000000 mg/m³ USA, Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

TWA 2.000000 mg/m³ USA, ACGIH Threshold Limit Values (TLV)

Pneumoconiosis

TWA 2.5 mg/m³ USA, NIOSH Recommended Exposure Limits

Also see specific listing for Graphite (synthetic).

See table Z-3

TWA 15 Million particles per cubic foot USA, Occupational Exposure Limits (OSHA) - Table Z-3 Mineral Dusts

Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques. 

Also see specific listing for Graphite (synthetic).
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<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>TWA</td>
<td>1.000000 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Irritation</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Gastrointestinal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>metal fume fever</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>1.000000</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>1.000000</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>0.200000</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
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</tr>
<tr>
<td>Remarks</td>
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<td></td>
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<td></td>
<td>metal fume fever</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
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<td>0.100000</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
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<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
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</table>
### Table: Exposure Limits

<table>
<thead>
<tr>
<th></th>
<th>TWA</th>
<th>USA. ACGIH Threshold Limit Values (TLV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritation</td>
<td>Gastrointestinal metal fume fever</td>
<td>TWA 1 mg/m3</td>
</tr>
<tr>
<td>Irritation</td>
<td>Gastrointestinal metal fume fever</td>
<td>TWA 0.2 mg/m3</td>
</tr>
<tr>
<td></td>
<td>TWA 1 mg/m3</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td>TWA 1 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td>TWA 0.1 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td>PEL 0.1 mg/m3</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

### 8.2 Exposure Controls

#### Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

#### Personal protective equipment Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

#### Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

- **Full contact**
  - Material: Nitrile rubber
  - Minimum layer thickness: 0.11 mm
  - Break through time: 480 min
  - Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)
Splash contact  
Material: Nitrile rubber  
Minimum layer thickness: 0.11 mm  
Break through time: 480 min  
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**  
Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**  
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**  
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

---

**Section 9: Physical and Chemical Properties**

**9.1 Information on basic physical and chemical properties**

1) Appearance  
a. Form: Flakes  
b. Color: Grey/Black  
2) Odor  
a. Odorless  
3) Odor threshold  
a. No data available  
4) pH  
a. No data available  
5) Melting Point
a. No data available
6) Boiling Point
   a. No data available
7) Flash Point
   a. No data available
8) Evaporation rate
   a. No data available
9) Flammability
   a. No data available
10) Upper/Lower Flammability
    a. No data available
11) Vapor Pressure
    a. No data available
12) Vapor Density
    a. No data available
13) Relative Density
    a. 1.9 g/cm³
14) Water Solubility
    a. Slightly soluble
15) Partition Coefficient
    a. No data available
16) Auto-ignition
    a. No data available
17) Decomposition temperature
    a. No data available
18) Viscosity
    a. No data available
19) Explosive properties
    a. No data available
20) Oxidizing properties
    a. No data available

9.2 Other Safety Information
No data available

Section 10: Stability and Reactivity

10.1 Reactivity
No data available

10.2 Chemical Stability
Stable under recommended storage conditions

10.3 Possibility of hazardous reactions
No data available
10.4 Conditions to avoid
Minimize dust generation and accumulation; heat, flames and sparks

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Acid chlorides, Halogens

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Copper oxides
Other decomposition products - No data available
In the event of fire: see section 5

Section 11: Toxicological Information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
LD50 Intraperitoneal - Mouse - 3.5 mg/kg

Skin corrosion/irritation
May irritate skin.

Serious eye damage/eye irritation May irritate eyes.

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.
Specific target organ toxicity - repeated exposure
No data available

Additional Information
RTECS: GL5325000

Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis. Damage to the lungs, Vomiting, Diarrhoea, Abdominal pain, Blood disorders

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

Section 12: Ecological Information

12.1 Toxicity
Toxicity to fish mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 0.022 mg/l - 96 h
Toxicity to daphnia and mortality NOEC - Daphnia (water flea) - 0.004 mg/l - 24 h other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 0.04 - 0.05 mg/l - 48 h

12.2 Persistence and degradability
Biodegradability Result: - Readily biodegradable

12.3 Bioaccumulative potential
Bioaccumulation Cyprinus carpio (Carp) - 40 d
- 200 mg/l
Bioconcentration factor (BCF): 108

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life. Avoid release to the environment.
Section 13: Disposal Considerations

13.1 Disposal Methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

Section 14: Transport Information

DOT (US)
UN number: 3089  Class: 4.1  Packing group: II
Proper shipping name: Metal powders, flammable, n.o.s. Reportable Quantity (RQ): 5000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3089  Class: 4.1  Packing group: II
Proper shipping name: METAL POWDER, FLAMMABLE, N.O.S. (Copper)
Marine pollutant: yes

IATA
UN number: 3089  Class: 4.1  Packing group: II
Proper shipping name: Metal powder, flammable, n.o.s. EMS-No: F-G, S-G

Section 15: Regulatory Information

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
Graphite          CAS No. 7782-42-5
Copper           CAS No. 7440-57-5
Pennsylvania Right to Know Components
Graphite  CAS No. 7782-42-5
Copper   CAS No. 7440-57-5

New Jersey Right To Know Components
Graphite  CAS No. 7782-42-5
Copper   CAS No. 7440-57-5

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

Section 16: Other Information

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

Aquatic Acute  Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity
Flam. Sol.     Flammable solids
H228          Flammable solid.
H400          Very toxic to aquatic life.
H412          Harmful to aquatic life with long lasting effects.

HMIS Rating
Health hazard:  0
Chronic Health Hazard:  *
Flammability:  3
Physical Hazard  3

NFPA Rating
Health hazard:  0
Fire Hazard:  3
Reactivity Hazard:  3

SDS Preparation date:  June 27, 2016  Supersedes previous version:  New SDS

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

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Nano3D Systems LLC be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Nano3D Systems LLC has been advised of the possibility of such damages.

End of Safety Data Sheet