Copper Indium Sulfide / Zinc Sulfide Nanocrystals in Water

1. PRODUCT IDENTIFICATION

Chemical Name: Copper Indium Sulfide / Zinc Sulfide Nanocrystals  
Supplier: NNCrystal US Corporation 534 W Research Center Blvd., Ste 254 Fayetteville, AR 72701  
Product Line: CISW  
Phone: 479.595.0662  
Recommended Use: Research and development use only

2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302  
Acute toxicity, Inhalation (Category 4), H332  
Acute toxicity, Dermal (Category 4), H312  
Skin irritation (Category 2), H315  
Eye irritation (Category 2A), H319  
Specific target organ toxicity -single exposure (Category 3), Respiratory system, H335

GHS Label Elements:

Signal Word: Warning

Hazardous Statements

H302 + H312 + H332 Harmful if swallowed, in contact with skin or if inhaled  
H315 Causes skin irritation.  
H319 Causes serious eye irritation.  
H335 May cause respiratory irritation.

Precautionary Statements

P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.  
P264 Wash skin thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P271 Use only outdoors or in a well - ventilated area.  
P280 Wear eye protection/ face protection.
P280  Wear protective gloves/ protective clothing.
P301 + P312 + P330  IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352  IF ON SKIN: Wash with plenty of soap and water.
P302 + P352 + P312  IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P312  IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313  If skin irritation occurs: Get medical advice/ attention.
P337 + P313  If eye irritation persists: Get medical advice/ attention.
P362  Take off contaminated clothing and wash before reuse.
P403 + P233  Store in a well - ventilated place. Keep container tightly closed.
P501  Dispose of contents/ container to an approved waste disposal plant.

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

3. COMPOSITION/INFORMATION ON INGREDIENT (EACH VIAL)

Chemical Name: Copper Indium sulfide/Zinc sulfide
Chemical Formula: CuInS/ZnS

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
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</thead>
<tbody>
<tr>
<td>CuS</td>
<td>19138-68-2</td>
</tr>
<tr>
<td>In₂S₃</td>
<td>12030-24-9</td>
</tr>
<tr>
<td>ZnS</td>
<td>1314-98-3</td>
</tr>
<tr>
<td>3-mercaptopropionic acid</td>
<td>107-96-0</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
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</tbody>
</table>

4. FIRST AID MEASURES

Eye:
1. Flush immediately with warm water for at least 20 minutes
2. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids
3. If pain persists or recurs seek medical attention
4. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel

Skin:
1. Removing contaminated clothing, shoes and leathery wearings
2. Washing affected area thoroughly with soap and water for at least 20 minutes
3. Call a physician if irritation develops or persists

Ingestion:
1. If spontaneous vomiting appears imminent or occurs, hold patient’s head down, lower than their hips to help avoid possible aspiration of vomits
2. If victim is conscious and alert, give 2-4 cupfuls of milk/water to dilute the substance in the stomach
3. Never give anything by mouth to an unconscious person
4. Don’t induce vomiting unless directed to by a medical person
5. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible, prior to initiating first aid procedures
6. Seek medical attention

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Page 2 of 5
Inhalation
1. Remove from further exposure and flush thoroughly with air
2. Lay patient down. Keep warm and rested
3. Prosthesis such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures
4. If respiratory irritation seek immediate medical assistance and call a physician

5. FIRE FIGHTING MEASURES

Suitable extinguishing agents: Foam, CO₂, dry chemical
Product is not flammable.

Protective equipment: Wear self-contained respirator if necessary. Wear protective gloves.

6. ACCIDENTAL RELEASE MEASURES

Person-related safety precautions: Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation
Measures for environmental protection: Do not allow material to be released to the environment without proper governmental permits.
Measures for cleaning/collecting:
1. Remove all ignition sources
2. Clean up all spills immediately
3. Avoid breathing vapors and contact with skin and eyes
4. Control personal contact by using protective equipment
5. Contain and absorb small quantities with vermiculite or other absorbent material
6. Wipe up
7. Collect residues in a flammable waste container

7. HANDLING AND STORAGE

Precautions for safe handling:
1. Keep container tightly sealed. Store in refrigerator (2-8°C) under dark conditions.
2. Wash thoroughly after handling

Conditions for safe storage, including any incompatibilities
1. Keep container tightly sealed. Store in refrigerator (2-8°C) under dark conditions.
2. Do not store with acids or oxidizers

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits Indium Sulfide Component:

Indium (III) sulfide 12030-24-9
TWA 0.100000 mg/m³ USA. ACGIH Threshold Limit Values (TLV)

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Liquid form - Crystalline powder, dissolved in a solvent
Color: Green to dark red
Odor: Odor dependent upon solvent used. Crystalline powder is odorless
Melting point/Melting range: The solvent is liquid and depends on the chemical composition of the solvent.
Boiling point/Boiling range: Determined by solvent used
Sublimation temperature / start: Not determined
Flash point: Dependent upon solvent used
Ignition temperature: Dependent upon solvent used
Decomposition temperature: Not determined
Danger of explosion: Dependent upon solvent used. Crystalline powder does not present an explosion hazard.
Explosion limits: Currently unknown for nanocrystals
Vapor pressure: Dependent upon solvent used
Solubility in / Miscibility with Polar Solvents: Soluble when hydrophilic ligands are present
Solubility in / Miscibility with Non-Polar Solvents: Soluble when hydrophobic ligands are present

10. STABILITY AND REACTIVITY

Reactivity: Stable under normal conditions and pressures
Stability: Stable at room temperature in closed containers under normal storage and handling conditions
Incompatible materials: Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, and coatings
Hazardous decomposition products: Carbon monoxide, carbon dioxide, hydrocarbons
Thermal decomposition / conditions to be avoided: Not determined, but temperature increases will affect the solvent used.

Be aware of the necessary warnings for the specific solvent used.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data available
Skin corrosion/irritation: No data available
Serious eye damage/eye irritation: No data available
Respiratory or skin sensitization: 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 Inhalation: May cause respiratory irritation.
Specific target organ toxicity - repeated exposure: No data available
Aspiration hazard: No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
12. ECOLOGICAL INFORMATION

Do not allow material to be released to the environment without proper governmental permits.

13. DISPOSAL CONSIDERATIONS

Consult local or national regulations for proper disposal.

14. TRANSPORT INFORMATION

**DOT Classification**: Not a DOT controlled material (United States).

**Identification**: Not applicable.

**Special Provisions for Transport**: Not applicable

15. REGULATIONS

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

**SARA 313 Components**

<table>
<thead>
<tr>
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<th>Revision Date</th>
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<td>1314-98-3</td>
<td>2007-01-07</td>
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**Pennsylvania Right To Know Components**

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**California Prop. 65 Components**

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

16. OTHER INFORMATION

**HMIS Rating**

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<tr>
<td>Chronic Health Hazard</td>
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<td>Flammability</td>
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**NFPA Rating**

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