

SDS SHEET

Rev 07-21-2020

High Efficiency Cadmium Selenide / Zinc Sulfide Nanocrystals in Water with Amine Terminated Ligands

1. PRODUCT IDENTIFICATION

Chemical Name: Cadmium Selenide / Zinc Sulfide Nanocrystals in Water with Amine Terminated Ligands

Supplier: NNCrystal US Corporation 534 W Research Center Blvd., Ste 260 Fayetteville, AR 72701

Product Line: HECZWA

Phone: 479.595.0662

Recommended Use: Research and development use only

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

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

Acute toxicity, Oral (Category 4), H302

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Acute toxicity, Inhalation (Category 4), H332

Carcinogenicity (Category 1A), H350

Chronic aquatic toxicity (Category 2), H411

GHS Label Elements:



Signal Word: Danger

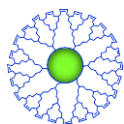
Hazardous Statements

H302 + H332	Harmful if swallowed or if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H350	May cause cancer.

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H373	May cause damage to organs (Gastro-intestinal system, Liver, Immune) through prolonged or repeated exposure.
H373	May cause damage to organs (Kidney, Bone) through prolonged or repeated exposure if swallowed.
H410	Very toxic to aquatic life with long lasting effects

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
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/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P405	Store locked up.
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: Cadmium Selenide / Zinc Sulfide Nanocrystals

Chemical Formula: CdSe/ZnS

<u>Substance Name</u>	<u>CAS #</u>
CdSe	1306-24-7
ZnS	1314-98-3
Water	7732-18-5
Amine Terminated Ligand	

4. FIRST AID MEASURES

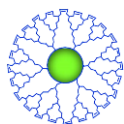
Eye:

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

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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

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

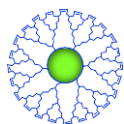
Precautions for safe handling:

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

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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 Cadmium Sulfide:

TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

General protective and hygienic measures: The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages, and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves

Eye protection: Safety glasses

Body protection: Protective work clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Liquid form – Crystalline powder, dissolved in a solvent

Color: Clear/Yellow – Red/Brown

Odor: Odor dependent upon solvent used. Crystalline powder is odorless

Melting point/Melting range: ~400°C to bulk melting point of CdSe crystals. The solvent is liquid and melting point depends on the chemical composition of the solvent.

Boiling point/Boiling range: Determined by solvent used

Sublimation temperature / start: approx. 1150 °C

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

Density: 5.81 g/cm³ (crystal at 20 °C) for the nanocrystal powder if isolated

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: Acids, Bases, Oxidants, Reductants, and Ligands to the nanocrystals should be used with caution.

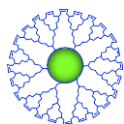
Hazardous decomposition products: Carbon monoxide, carbon dioxide, hydrocarbons

Thermal decomposition / conditions to be avoided: Not determined, but temperature increases will affect the solvent used.

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11. TOXICOLOGICAL INFORMATION

Skin: Irritant to skin and mucous membranes.

Eye: Irritating effect.

Sensitization: No sensitizing effects known.

Additional toxicological information: Danger through skin absorption.

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Target Organs: Lungs, Liver, Kidneys

EPA-B1: Probable human carcinogen, limited evidence of carcinogenicity from epidemiologic studies.

IARC-1: Carcinogenic to humans: sufficient evidence of carcinogenicity.

NTP-2: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals. Carcinogen as defined by OSHA.

ACGIH A2: Suspected human carcinogen: Agent is carcinogenic in experimental animals at dose levels, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. Available epidemiologic studies are conflicting or insufficient to confirm an increased risk of cancer in exposed humans.

WARNING: Many of the toxic effects of CdSe nanocrystals are still being researched and are currently unknown at this point. Use at own risk.

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 (Solvent Specific) –When dissolved in toluene

U.S. DOT 49 CFR 172.101

ID Number: UN2570

Hazard class: 6

Packing Group: III

Labeling Requirements: Poison

Canadian Transportation of Dangerous Goods: UN2570, Class 6.1

Land Transport ADR/RID: UN2570, Class 6.1, Class Code F1, Pack group III

Air Transport IATA/ICAO: UN2570, Class or Division 6.1, Pack group III

Exceptions: 49 CFR 173.4

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

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

Zinc Sulfide

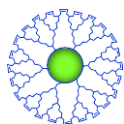
CAS-No. 1314-98-3

Revision Date 2007-01-07

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Massachusetts Right to Know Components

No components are subject to the Massachusetts Right to Know Act

Pennsylvania Right to Know Components

Cadmium Selenide	CAS-No. 1306-24-7	Revision Date 2007-01-07
Zinc Sulfide	CAS-No. 1314-98-3	Revision Date 2007-01-07

New Jersey Right to Know Components

Cadmium Selenide	CAS-No. 1306-24-7	Revision Date 2007-01-07
Zinc Sulfide	CAS-No. 1314-98-3	Revision Date 2007-01-07

California Prop. 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.

16. OTHER INFORMATION

HMIS Rating

Health hazard: 1
Chronic Health Hazard: *
Flammability: 0
Physical Hazard: 0

NFPA Rating

Health hazard: 1
Fire Hazard: 0
Reactivity Hazard: 0

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