

**Safety Data Sheet (SDS)**

Printing date 7/15/2020

Version 1

Reviewed on 7/5/2020

**1. Chemical and Company Identification**

Product Name: Cadmium Selenide Zinc Sulfide Quantum Dots - Alkyl

Product Use: Laboratory chemical – R&D use only

Manufacturer/Supplier: CytoDiagnosics Inc., 919 Fraser Drive, Unit 11, Burlington, Ontario, Canada, L7L 4X8

Phone: (866) 344-3954

Web: <https://www.cytodiagnosics.com>

Information and Support: customer\_service@cytodiagnosics.com

**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
- Flammable liquids (Category 2), H225
- Skin irritation (Category 2), H315
- Eye irritation (Category 2A), H319
- Acute toxicity, Inhalation (Category 4), H332
- Carcinogenicity (Category 1A), H350
- Reproductive toxicity (Category 2), H361
- Specific target organ toxicity – single exposure (Category 3), Central nervous system, H336
- Specific target organ toxicity – repeated exposure (Category 2), H373
- Aspiration hazard (Category 1), H304
- Acute aquatic toxicity (Category 2), H401
- Chronic aquatic toxicity (Category 2), H411

**GHS Label Elements and Precautionary Statements:**



**Signal Word:** Danger

**Hazardous Statements**

- |             |   |
|-------------|---|
| H225        | Highly flammable liquid and vapor.            |
| H302 + H332 | Harmful if swallowed or if inhaled            |
| H304        | May be fatal if swallowed and enters airways. |

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H315	Causes skin irritation.	H318 Causes serious eye damage.
H350	May cause cancer.	
H361	Suspected of damaging fertility or the unborn child.	
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.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
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
P271	Use only outdoors or in a well-ventilated area.
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.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
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.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

***Hazards not otherwise classified:***

None

**3. Composition/Information on Ingredients**

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**This product contains:** Cadmium Selenide/Zinc Sulfide Quantum Dots**Chemical Formula:** CdSe/ZnS**Components:****Component 1:** CdSe, CAS# 1306-24-7**Component 2:** ZnS, CAS# 1314-98-3**Component 3:** Toluene, CAS# 108-88-3**Component 4:** Oleic Acid, CAS# 112-80-1**4. First Aid Measures*****In case of skin contact:*** In case of contact with skin, immediately remove contaminated clothing and wash extensively with soap and water and seek medical advice if symptoms occur.***In case of ingestion:*** If swallowed and person is conscious wash mouth with water, seek medical advice immediately.***In case of eye contact:*** In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.***If case of inhalation:*** In case of accident by inhalation, remove to fresh air. If breathing becomes difficult seek medical advice. If not breathing, give artificial respiration.***Most important symptoms and effects, both acute and delayed***

The most important known symptoms and effects are described in the labeling (see section 2) and/or in section 11.

***Immediate medical attention and special treatment needed:***

No data available

**5. Fire Fighting Measures*****Suitable extinguishing media:***

Use alcohol-resistant foam, dry chemical or carbon dioxide.

***Specific hazards arising from the substance or mixture:***

1. Liquid and vapors are highly flammable
2. Severe fire hazard when exposed to heat, flame and/or oxidizers
3. Vapor may travel a considerable distance to source of ignition
4. Heating may cause expansion and decomposition leading to violent rupture of containers

***Special protective equipment and precautions for fire-fighters:***

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Wear self-contained breathing apparatus if necessary. Wear protective gloves.

**6. Accidental Release Measures*****Personal precautions, protective equipment and emergency procedures:***

Use personal protective equipment. Avoid aerosols or dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

***Methods and materials for containment and cleaning up:***

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 container marked flammable

Do not allow product to enter drains or the environment. For disposal see section 13.

**7. Handling and Storage*****Precautions for safe handling:***

1. Keep container tightly closed in a dry and well-ventilated place. Containers, which are opened, must be carefully resealed and kept upright to prevent leakage.
2. Avoid formation of aerosols
3. Provide adequate exhaust ventilation at places aerosols may form.
4. Use spark free tools and explosion proof equipment
5. Wash thoroughly after handling

***Conditions for safe storage:***

1. Keep container tightly closed in a dry and well-ventilated place. Containers, which are opened, must be carefully resealed and kept upright to prevent leakage.
2. Recommended storage temperature 2-8°C under dark conditions
3. Do not store with acids or oxidizers

**8. Exposure Controls/Personal Protection****Exposure Limits Cadmium Sulfide:**

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

**Exposure for Toluene solvent**

OSHA – Final PELs: 200ppm TWA

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OSHA Ceiling: 300ppm  
 ACGIH: 50ppm, skin-potential for cutaneous absorption  
 NIOSH: 100ppm TWA; 375 mg/m<sup>3</sup> TWA; 550ppm IDLH

**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 – check gloves using UV light after use to determine level of contamination.

**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/cm<sup>3</sup> (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:** Vapor is explosive when exposed to heat or flame

**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 tetroxide; 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.

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**In the event of fire:** see section 5**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.**Reproductive toxicity:** Damage to fetus possible Suspected human reproductive toxicant. Reproductive toxicity - Rat - Inhalation Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Experiments have shown reproductive toxicity effects in male and female laboratory animals.**Developmental Toxicity:** Rat - Oral Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus)**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 into the environment without proper governmental permits.

**13. Disposal Considerations****Disposal:** Consult a licensed waste disposal specialist for proper destruction. Observe all local, state and federal regulations.**14. Transport Information****U.S. DOT 49 CFR 172.101****ID Number:** UN1294**Hazard class:** 3**Packing Group:** II**Labeling Requirements:** Flammable Liquid**Canadian Transportation of Dangerous Goods:** UN1294, Class 3**Land Transport ADR/RID:** UN1294, Class 3, Class Code F1, Pack group II**Air Transport IATA/CAO:** UN1294, Class or Division 3, Pack group II

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**Exceptions:** 49 CFR 173.4

**ID Number:** UN2570

**Hazard class:** 6

**Packing Group:** III

**Labeling Requirements:** Poison

**Exceptions:** 49 CFR 173.4

**15. Regulatory Information**

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations and the safety data sheet contains all of the information required by those 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:

Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
Zinc Sulfide	CAS-No. 1314-98-3	Revision Date 2007-01-07

**Massachusetts Right to Know Components**

Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
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**Pennsylvania Right to Know Components**

Cadmium Selenide	CAS-No.1306-24-7	Revision Date 2007-01-07
Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
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
Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
Zinc Sulfide	CAS-No. 1314-98-3	Revision Date 2007-01-07

**California Prop. 65 Components**

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

Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
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**WARNING:** This product contains a chemical known to the State of California to cause birth defects or other reproductive harm:

Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
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**16. Other Information**

**HMIS Rating**

Health Hazard: 2

Chronic Health Hazard: \*

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Flammability: 3  
Physical Hazard: 0

**NFPA Rating**

Health Hazard: 2  
Fire Hazard: 3  
Reactivity Hazard: 0

This product is for laboratory research purposes, not for diagnostic or therapeutic use in humans or animals.

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship. Users should make independent decisions regarding completeness of the information based on all sources available. Cytodiagnostics Inc. shall not be held liable for any damage resulting from handling or contact with the above product.

**END OF SDS**