

SAFETY DATA SHEET

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SECTION 1. IDENTIFICATION

Product Name: Cadmium Zinc Telluride

CAS #: 303114-50-3

Relevant identified uses of the substance: Scientific research and development

Supplier details:

Stanford Advanced Materials

E-mail: sales@samaterials.com

Tel: (949) 407-8904

Address: 23661 Birtcher Dr., Lake Forest, CA 92630 U.S.A.

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

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

Acute toxicity, Oral (Category 4), H302

Acute toxicity, Inhalation (Category 3), H331

Acute toxicity, Dermal (Category 4), H312

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H302 + H312 Harmful if swallowed or in contact with skin

H331 Toxic if inhaled.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)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.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P311 Call a POISON CENTER or doctor/ physician.

P322 Specific measures (see supplemental first aid instructions on this label).

P330 Rinse mouth.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage.

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

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

3.2 Mixtures

Synonyms : CZT

Formula : Cd_{0.9}Zn_{0.1}Te

Molecular weight : 235.31 g/mol

Hazardous components

Component

Cadmium telluride

CAS-No. 1306-25-8

EC-No. 215-149-9

Index-No. 048-001-00-5

Classification

Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H302 + H312 + H332, H410

Concentration

$\geq 90 - \leq 100\%$

Component

Zinc telluride

CAS-No. 1315-11-3

EC-No. 215-260-2

Classification

Acute Tox. 2; H330

Concentration

$\geq 20 - < 30\%$

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. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

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

No data available

SECTION 5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

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

5.2 Special hazards arising from the substance or mixture

Cadmium/cadmium oxides, Zinc/zinc oxides, Tellurium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing Vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

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 Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. 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.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component CAS-No.

Cadmium telluride 1306-25-8

Value Control parameters Basis

TWA 0.100000 mg/m³ USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 0.010000 mg/m³ USA. ACGIH Threshold Limit Values (TLV)

Remarks

Kidney damage

Substances for which there is a Biological Exposure Index or Indices (see BEI® section)

Suspected human carcinogen varies

TWA 0.002000 mg/m³ USA. ACGIH Threshold Limit Values

(TLV)

Kidney damage

Substances for which there is a Biological Exposure Index or Indices (see BEI® section)

Suspected human carcinogen varies

TWA 0.100000 mg/m³ USA. ACGIH Threshold Limit Values (TLV)

Halitosis

PEL 0.005000 mg/m³ OSHA Specifically Regulated Chemicals/Carcinogens

1910.1027

This standard applies to all occupational exposures to cadmium and cadmium compounds, in all forms, and in all industries covered by the Occupational Safety and Health Act, except the construction- related industries, which are covered under 29 CFR 1926.63.

OSHA specifically regulated carcinogen

Potential Occupational Carcinogen

See Appendix A

Potential Occupational Carcinogen

See Appendix A

TWA 0.100000 mg/m³ USA. NIOSH Recommended Exposure Limits

PEL 0.005000 mg/m³ OSHA Specifically Regulated Chemicals/Carcinogens 1910.1027

This standard applies to all occupational exposures to cadmium and cadmium compounds, in all forms, and in all industries covered by the Occupational Safety and Health Act, except the construction- related industries, which are covered under 29 CFR 1926.63.

OSHA specifically regulated carcinogen

Potential Occupational Carcinogen

See Appendix A

TWA 0.100000 mg/m³ USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 0.100000 mg/m³ USA. ACGIH Threshold Limit Values (TLV)

Halitosis

TWA 0.100000 mg/m³ USA. NIOSH Recommended Exposure Limits

TWA 0.1 mg/m³ USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 0.1 mg/m³ USA. ACGIH Threshold Limit Values (TLV)

Halitosis

TWA 0.1 mg/m³ USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component CAS-No.

Cadmium telluride 1306-25-8

Parameters Value Biological specimen Basis

cadmium 5.0000 µg/l In blood ACGIH - Biological Exposure Indices (BEI)

Remarks

Not critical

cadmium 0.0050 mg/g Urine ACGIH - Biological Exposure Indices (BEI)

Not critical

cadmium 5 µg/l In blood ACGIH - Biological Exposure Indices (BEI)

Not critical

cadmium 5µg/g creatinine Urine ACGIH - Biological Exposure Indices (BEI)

Not critical

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling

the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses 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.

Body Protection

Complete suit protecting against chemicals, 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 particlerespirator type N99 (US) or type P2 (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

a) Appearance: Form: solid

b) Odor: No data available

c) Odor Threshold: No data available

d) pH: No data available

e) Melting point/freezing point: Melting point/range: 1,100 - 1,500 °C (2,012 - 2,732 °F)

f) Initial boiling point and boiling range: No data available

g) Flash point: No data available

h) Evaporation rate: No data available

i) Flammability (solid, gas): No data available

j) Upper/lower flammability or explosive limits: No data available

- k) Vapor pressure: No data available
- l) Vapor density: No data available
- m) Relative density: No data available
- n) Water solubility: No data available
- o) Partition coefficient: n-octanol/water: No data available
- p) Auto-ignition temperature: No data available
- q) Decomposition temperature: No data available
- r) Viscosity: No data available
- s) Explosive properties: No data available
- t) Oxidizing properties: 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

No data available

10.5 Incompatible materials

Strong oxidizing agents, Strong acids

10.6 Hazardous decomposition products
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

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Cadmium telluride)

NTP: Known to be human carcinogen The reference note has been added by TD based on the background information of the NTP. (Cadmium telluride)

OSHA: OSHA specifically regulated carcinogen (Cadmium telluride)

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Acute inhalation exposure to cadmium fumes may cause "metal fume fever" with flu-like symptoms of weakness, fever, headache, chills, nausea, vomiting, dizziness, sweating, muscular pain, cough and

difficulty breathing. Acute

pulmonary edema may develop within 24 hours and reaches a maximum by three days. The first chronic effect of exposure to cadmium is generally kidney damage, manifested by excretion of excessive protein in the urine, followed by anemia, teeth discoloration and loss of smell. Cadmium also is believed to cause pulmonary emphysema and bone disease., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

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 with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

DOT (US)

UN number: 2570 Class: 6.1 Packing group: III

Proper shipping name: Cadmium compounds (Cadmium telluride, Zinc telluride) Reportable Quantity (RQ):

Poison Inhalation Hazard: NoIMDG

UN number: 2570 Class: 6.1 Packing group: III EMS-No: F-A, S-A Proper shipping name: CADMIUM COMPOUND (Cadmium telluride, Zinc telluride)

Marine pollutant:yes

IATA

UN number: 2570 Class: 6.1 Packing group: III

Proper shipping name: Cadmium compound (Cadmium telluride, Zinc telluride)

SECTION 15. REGULATORY INFORMATION

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:

Cadmium telluride

CAS-No.

1306-25-8

Revision Date

2007-07-01

Zinc telluride 1315-11-3 2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Cadmium telluride

CAS-No.

1306-25-8

Revision Date

2007-07-01

Zinc telluride 1315-11-3 2007-07-01

New Jersey Right To Know Components

Cadmium telluride

CAS-No.

1306-25-8

Revision Date

2007-07-01Zinc telluride 1315-11-3 2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the

State of California to cause cancer. Cadmium telluride

CAS-No.

1306-25-8

Revision Date

2007-09-28

SECTION 16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is

believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.