SAFETY DATA SHEET

Date Printed: 03/29/2024
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SECTION 1. IDENTIFICATION

Product Identifier: Lead Selenide Quantum Dots

Product Code: PB-SE-01-QD

CAS Number: 12069-00-0

Relevant identified uses of the substance: Scientific research and development

Supplier details:

American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024
Tel: +1 310-208-0551
Fax: +1 310-208-0351
Emergency telephone number:
+1 800-424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture
GHS
Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Carcinogenicity (Category 1B), H350
Carcinogenicity (Category 1A), H350
Reproductive toxicity (Category 1A), H360
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 1), H400
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 1), H410
Chronic aquatic toxicity (Category 2), H411
GHS Label Elements:



Signal Word: Danger
Hazardous Statements
H225
Highly flammable liquid and vapor.
H304
May be fatal if swallowed and enters airways.
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.
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 (HNOC) or not covered by GHS--none

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name: Lead Selenide Nanocrystals
Chemical Formula: PbSe
Typical Solvents (CAS No):
Toluene (108-88-3), Hexanes (110-54-3), Chloroform (67-66-3), Dichloromethane (75-09-2), Methanol (67-56-1), Water
Substance Name
PbSe
CAS #12069-00-0
Toluene
108-88-3
Oleic Acid
112-80-1

SECTION 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
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

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SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing agents: Foam, CO2, dry chemical
Special Hazards:
1. Liquid and vapor 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 or decomposition leading to violent rupture of containers
Protective equipment:
Wear self-contained respirator if necessary. Wear protective gloves.

SECTION 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

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling:
1. Keep container tightly sealed. Store in refrigerator (2-8ºC) under dark conditions.
2. Wash thoroughly after handling
3. Use only in well ventilated area
4. Ground and bond containers when transferring
5. Use spark free tools and explosion proof equipment
Conditions for safe storage, including any incompatibilities
1. Keep container tightly sealed. Store in refrigerator (2-8ºC) under dark conditions.
2. Do not store with acids or oxidizers

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limit Lead Selenide:
TWA 0.2mg/mL air
Exposure for Toluene solvent
OSHA –Final PELs: 200ppm TWA
OSHA Ceiling: 300ppm
ACGIH: 50ppm, skin-potential for cutaneous absorption
NIOSH: 100ppm TWA: 375 mg/m3 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Liquid form–black, dissolved in a solvent
Color: Black
Odor: Odor dependent upon solvent used. Crystalline powder is odorless
Melting point/Melting range: No data available
Boiling point/Boiling range: Determined by solvent used
Sublimation temperature / start: No data available
Flash point: Dependent upon solvent used
Ignition temperature: Dependent upon solvent used
Decomposition temperature: Not determined
Danger of explosion: Dependent upon solvent used.
Explosion limits: Currently unknown for nanocrystals
Vapor pressure: Dependent upon solvent used
Density: 8.0g/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

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SECTION 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: Strong oxidizers
Hazardous decomposition products: Lead oxides, selenium oxides under fire conditions
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.

SECTION 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)
Additional Information:
Lead salts have been reported to cross the placenta and to induce embryo-and feto-mortality. They also have teratogenic effect in some animal species. No teratogenic effects have been reported with exposure to organometallic lead compounds. Adverse effects of lead on human reproduction, embryonic and fetal development, and postnatal (e.g., mental) development have been reported. Excessive exposure can affect blood, nervous, and digestive systems. The synthesis of hemoglobin is inhibited and results in anemia. If left untreated,
neuromuscular dysfunction, possible paralysis, and encephalopathy can result. Additional symptoms of overexposure include: joint and muscle pain, weakness of the extensor muscles (frequently the hand and wrist), headache, dizziness, abdominal pain, diarrhea, constipation, nausea, vomiting, blue line on the gums, insomnia, and metallic taste. High body levels produce increased cerebrospinal pressure, brain damage, and stupor leading to coma and often death., Acute selenium poisoning produces central nervous system effects, which include nervousness,
convulsions, and drowsiness. Other signs of intoxication can include skin eruptions, lassitude, gastrointestinal distress, teeth that are discolored or decayed, odorous ("garlic") breath, and partial loss of hair and nails. Chronic exposure by inhalation can produce symptoms that include pallor, coating of the tongue, anemia, irritation of the mucosa, lumbar pain, liver and spleen damage, as well as any of the other previously mentioned symptoms. Chronic contact with selenium compounds may cause garlic odor of breath and sweat, dermatitis, and moderate emotional
instability.

SECTION 12. ECOLOGICAL INFORMATION

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

SECTION 13. DISPOSAL CONSIDERATIONS

Consult local or national regulations for proper disposal.

SECTION 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/ICAO:
UN1294, Class or Division 3, Pack group II
Exceptions:
49 CFR 173.4
ID Number:
UN3283
Hazard class:
6
Packing Group:
III
Labeling Requirements:
Poison
Exceptions:
49 CFR 173.4

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:
Toluene
CAS-No. 108-88-3
Revision Date 2007-07-01
Lead Selenide
CAS-No.
12069-00-0

Revision Date
1993-04-24
Massachusetts Right to Know Components
Toluene
CAS-No. 108-88-3
Revision Date
2007-07-01
Lead Selenide
CAS-No. 12069-00-0
Revision Date
1993-04-24
Pennsylvania Right to Know Components
Toluene
CAS-No. 108-88-3
Revision Date
2007-07-01
Lead Selenide
CAS-No.
12069-00-0
Revision Date
1993-04-24
New Jersey Right to Know Components
Toluene
CAS-No. 108-88-3
Revision Date
2007-07-01
Lead Selenide
CAS-No.
12069-00-0
Revision Date
1993-04-24
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
Lead Selenide
CAS-No.
12069-00-0
Revision Date
1993-04-24
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
Lead Selenide
CAS-No.
12069-00-0
Revision Date

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. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2022 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.