Safety Data Sheet

1. Product and Company Identification

Product Identification : Zinc Selenide, ZnSe （without coating film）
General Use : Optical Material
Description : Inorganic Crystalline Material
Manufacturer : Sumitomo Electric Hardmetal Corp.
1-1-1, Koya-kita, Itami, Hyogo, 664-0016 Japan
Emergency Telephone : +81-72-771-0555

2. Hazard Summary

Danger from Fire

Zinc selenide is non flammable when it is in a solid state, thus there is no chance to be a cause of fire. Flash point, flammable limits and explosion limits have not been found.

Toxicity

Zinc selenide is stable under the general condition. But chemical reaction with acids may liberate hazardous gases. Thermal decomposition may liberate selenium products or toxic fumes.

GHS classification is carried out by the information of selenium and its grounds are written in Sec11.

The solid selenium has low acridity, but it is reported that selenium gas or fumes stimulates mucous membranes such as eyes, a nose, a throat, the skin, and acute or chronic intoxication may occur. But as to acute intoxication and acridity for eyes and skin, GHS classification is not applicable because of lack of data as shown in Sec11. Toxicological Information. Other selenium compounds such as selenium hydrogen, oxidation selenium, selenic acid, selenious acid have toxicity. In addition, inhaling fume of zinc oxide may cause chills, high heat several hours later.

Environmental Impact

There is no information available to be harmful regarding zinc selenide.

GHS Classification : Classified on Aug.8,2016）

Physical and Chemical Hazards: Not applicable

Health Hazards:

Specific target organ toxicity (simple exposure) Category1

(the central nervous system, respiratory organs, cardiovascular system, digestive organs)

Specific target organ toxicity (repeated exposure) Category1

(nervous system, respiratory organs, liver)

Environment Hazards: Not applicable

GHS Label Element :

Signal Word : Danger

Hazard Statement:

Disorder of the central nervous system, respiratory organs, cardiovascular system, digestive organs

Disorder of nervous system, respiratory organs, liver by prolonged or repeated exposure

Precautionary measuers:

Do not breathe dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Avoid release to the environment.

Response Precautionary Statement:

If skin contacted and injured (such as an incised wound), get medical attention.
IF eye contacted, flush eyes with plenty of water for at least 15minutes. Irritation persists, get medical attention.
If swallowed, rinse mouth with water induce vomiting and get medical attention immediately: Do not try to neutralize by acid or alkali

Storage: Store locked up.

Disposal:Contents/containers should be disposed in compliance with local,regulations

Other Hazards: None

3. Identity Information

Chemical Formula	Weight % of ingredients	CAS No.	Classification No. by PRTR Law	Enforcement Serial No. by Industrial Safety and Health Laws
ZnSe	100%	1315-09-9	Class 1-No.242	No. 9-333 Table

4. Emergency and First Aid Procedures

Skin contact

Wash the diseased part with soap and water. If irritation persists, get medical attention.

Eye contact

Flush eyes immediately with large amount of water or normal saline for at least 15 minutes .If irritation persists, get medical attention.

Inhalation

Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

Ingestion

Rinse mouth with water. Induce vomiting and get medical attention immediately.

5. Fire and Explosion Hazard Data

Flash Point: Not applicable
Explosive Limits: LEL(%) Not applicable UEL(%) Not applicable
Autoignition Temperature: Not applicable
Extinguish Media: Use carbon dioxide or dry chemicals.
Special Fire Fighting and Unusual Fire and Explosion Hazards

This product dose not burn. But decomposition may take place from overheating in air with toxic vapors. Exhaust adequately and wear air respirator and protective clothing where ZnSe is being decomposed.

For large fires, which cannot easily be extinguished with a portable fire extinguisher, escape from fires.

6. Spill and Leak procedures

Handle solid ZnSe with tweezers or gloves.
Sweep divided ZnSe.
Vacuum dusty ZnSe.
Place in closed containers for further handling and disposal. Do not flush to sewer.
Wear suitable breathing protection and chemical goggles.

7. Handling and Storage

Storage

Keep dry and store in a clean environment.
Store separate from acids and alkalis.

Handling

If heated, or exposed to strong acids or alkalis, oxides may be liberated which are toxic. Avoid breathing dusts and fumes, if generated. Use adequate ventilation and protective e quipment.

8. Exposure Control/Personal Protection

Ventilation

Local Exhaust: Use for cutting, grinding, polishing and etching.
Special Exhaust: Vent into water or efficient bag house.
General Exhaust: Use good general ventilation.

Respiratory Protection

Use NIOSH/MSHA approved purifying respirator for lighter airborne concentrations.
Use a positive pressure, air supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or high concentration.

Eye protection

Safety glasses, goggles or face shield

Skin protection

Recommend protective clothing such as rubber gloves, apron and whole body suits for preventing dust.

Personal Hygienic

Avoid dust generation. Wash thoroughly after handling. Change and clean contaminated clothes.

9. Physical/Chemical Data

Melting point : 1520℃
Specific gravity (Water=1) : 5.27
Vapor pressure(Pa) : Not applicable
Solubility : Insoluble in water
Appearance and Odor : Reddish yellow transparent solid. No odor.

10. Stability and Reactivity

Stability

Stable under normal condition.

Materials to avoid

Contact with acids (HCl, H_2SO_4 etc) may liberate hydrogen selenide.

Hazardous Polymerization

Will not occur.

Thermal Decomposition products

Thermal decomposition may occur at high temperature due to a fire.
The decomposition products include zinc and selenium fumes, oxides of selenium, or zinc oxide.

11. Toxicological Information

Zinc selenide is stable compounds under the general condition and the toxicity is not confir med. In addition there is no knowledge of animal study results. This section shows the info rmation of selenium and the grounds of GHS classification.

Acute toxicity:

Oral

Not classifiable because of LD50(rat) 6700mg/kg (NITE initial risk evaluation book 2008, ATSDR 2003, ACGIH7th 2001, Japan Society for Occupational Health OLE documentation 2 000)

Dermal

Not classifiable because of lack of data.

Respiratory (gases)

Not classifiable **because it is solid in the definition of GHS**

Respiratory (Vapours)

Not classifiable because of lack of data.

Respiratory (Dust/Mist)

Not classifiable. LCL_0(rat) ≦33mg/m3(NITE initial risk evaluation book 2008) is reported. But LC50 cannot be specified which category correspond to only by this report.

Skin Corrosion/Irritation

Not classifiable because of lack of data.

Serious Eye Damage/Irritation

Not classifiable because of lack of data.

Respiratory or Skin Sensitization

Not classifiable because of lack of data.

Germ Cell Mutagenicity

Not classifiable because of lack of data.

Carcinogenicity

Not classifiable. Se classified in group3 by IARC 2005 and in D by EPA 2005.

Reproductive Toxicity

Not classifiable**.** In the reproduction toxicity oral test using rat with blended bait, though g eneral toxicity for the parents was not mentioned, drop of fecundity and the death of some children were reported. But the test was done 1936 in which the method was different from current one. And the number of rats is small(two male and four female).
(EHC 58(1986))

Specific target organ toxicity (simple exposure)

In the route of inhalation, respiratory tract irritation and by severe exposure, dyspnea, bro nchospasm, bronchitis, chemical pneumonia may occur. (ATSDR 2003, HSDB (Access on A ugust 2014), Japan Society for Occupational Health OLE documentation suggestion reason

book 2000, ACGIH 7th, 2001).

Primary injury part is a respiratory organ by acute aspiration exposure of fume or the dust. (ACGIH 7th 2001, ATSDR 2003)

Acute selenium poisoning is caused by ingestion and gastrointestinal injury, nervous system injury, respiratory failure, cardiac infarction, cardiovascular disease may occur. (NITE initial risk evaluation book 2008, PATTY 6th 2012, ATSDR 2003)

In the reports of animal experiments, the primary injury part is a respiratory organ by the acute inhalational exposure of the dust. (ATSDR 2003) By the inhalational exposure of the dust of 0.033mg/L, the rat had the severe injury in the respiratory system such as bleeding from lungs and pulmonary edema. In addition, interstitial pneumonia was recognized in survival animals.

For the rabbit and guinea pig, light interstitial pneumonia, congestion of lungs and pulmonary emphysema by the inhalational exposure of the dust. (ATSDR 2003, HSDB (Access on August 2014)) These influence on lungs was seen in the range of category 1 of the guidance.

For human this material may cause the injury for the central nervous system, respiratory organs, cardiovascular system and the influence on gastrointestinal tract. And animal experiments show injury on respiratory organs is seen in a density range equivalent to category1. Therefore, in the Specific target organ toxicity (simple exposure) division, this material classified in category 1 (the central nervous system, respiratory organs, cardiovascular system, gastrointestinal tract).

Specific target organ toxicity (repeated exposure)

In the selenium smelt plant, 35 of 62 workers who had been exposured in the atmosphere of 0.007-0.05 mg/m3 selenium density showed some symptom, More than half of workers suffered from the a headache, sleeplessness, inappetence, injury on nervous system injury such as nausea, a digestive organ injury, and 9 workers suffered from the conjunctivitis and bronchitis. (NITE initial risk evaluation book 2008, ACGIH 7th 2001, EHC 58 1986)

In addition, there are reports that facial edema was seen in the engineer who was exposured by the fume of metal selenium vapour and liver hypertrophy was seen in the craft who treated metal selenium and selenious acid sodium. And by the long term exposure in mixed aerosol of metal selenium and selenium dioxide caused nasal inflammation, nose bleed, the pain of end parts of four limbs (NITE initial risk evaluation book 2008)

The animal experiments about repeated exposure are extremely limited. By the aspirational exposure in the atmosphere of 33mg/m3, 8 times every other day for 4 hours per one time, congestion of the liver, fatty degeneration were seen in a guinea pig, and the congestion of the lungs, interstitial pneumonia in a guinea pig.(ATSDR (2003)

These information are considered to support the toxicity knowledge against human Therefore, in the Specific target organ toxicity (simple exposure) division, this material classified in category 1 (nervous system, respiratory organs, liver).

Aspiration Hazard

Not classifiable**.**

Others(Producion of poisonous gas by reaction with water etc)

None

12. Ecological information:

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

13. Waste Disposal Method

Scrap, waste and rejections should be disposed in compliance with local, state and federal laws and regulations (contact local or state environmental agency for specific rules).

14. Transport Information

ZnSe material should be wrapped in lens tissue or optical tissue and placed in individual boxes to avoid possible breakage.
Not a hazardous material for transportation.

Hazard class : 6.1
Identification number : UN3283
Packing group : III

15. Regulatory Information (Japanese Applicable Law)

PRTR Law

[Selen and selenide are Class 1-designated chemical substances.
Preparation of SDS is obligatory.: Ministry of Economy, Trade & Industry, Ministry of Environment.]

Occupational Safety & Health Administration Law.

[Preparation of MSDS is obligatory.: Ministry of Health, Labor & Welfare]

Law on the Evaluation of Chemical Substances and Regulation of their Manufactures, etc.

Reference Number in Gazetted List in Japan : 573

Poisonous and Deleterious Substances Control Law.

Note: ZnSe with coating film is not applicable Poisonous and Deleterious Substances Control Law.

16. Other Information

Notes on the following descriptions

The details in this SDS have been based on our best investigation and evidences. The information may be revised according to new evidences, test etc., however, the accuracy and safety of the information are not a guaranteed value.
All chemical agents may contain unknown harmful substances: therefore, the companies and operators, using this MSDS, are requested to take appropriate actions according to their own conditions on their own responsibility.

* Homepage of Ministry of Economy, Trade & Industry : http://www.meti.go.jp/
* Homepage of Ministry of Environment : http://www.env.go.jp/
* Homepage of Ministry of Health, Labor & Welfare : http://www.mhlw.go.jp/
* Supplier of ICSC Cards : http://www.nihs.go.jp/ICSC/