SAFETY DATA SHEETS

According to the UN GHS revision 10

1: Identification

1.1 GHS Product identifier

Product name	Hafnium

1.2 Other means of identification

Product number	7440-58-6
Other names	Hafnium

1.3 Recommended use of the chemical and restrictions on use

Identified uses	Industrial and scientific research use.
Uses advised against	no data available

1.4 Supplier's details

Company	Zhongshan Greenrock Technology Co., Ltd.
Address	No. 138, Jinsan Avenue, Sanjiao Town, Zhongshan City, Guangdong Province, China
Telephone	+86-2087066781

1.5 Emergency phone number

Emergency phone number	+86-2087066781
Service hours	Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

2: Hazard identification

2.1 Emergency Overview

Hazardous substances may spontaneously ignite in air or generate flammable gases in contact with water, posing a risk of fire and explosion. Strictly avoid contact with air, water, or moisture.

2.2 GHS Classification

Pyrophoric liquids : Category 1
Pyrophoric solids : Category 1

2.3 GHS label elements, including precautionary statements

Pictogram(s)	
Signal word	Danger
Hazard statement(s)	H250 Catches fire spontaneously if exposed to air
Precautionary statement(s)	
Prevention	P210 Keep away from heat, hot surface, sparks, open flames and other ignition sources. No smoking. P222 Do not allow contact with air. P231 Handle and store contents under inert gas/... P233 Keep container tightly closed. P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
Response	P302+P334 IF ON SKIN,Immerse in cool water or wrap in wet bandages. P302+P335+P334 Brush off loose particles from skin. Immerse in cool water [or wrap in wet bandages]. P370+P378 In case of fire,Use ... to extinguish.
Storage	no data available
Disposal	no data available

2.4 Physical and chemical

Pyrophoric substances can spontaneously heat up and combust in air. Hydrous substances, when exposed to water or moisture, release flammable gases (such as hydrogen and acetylene), which, reaching a certain concentration, can explode. Some reactions also release heat, increasing the risk of fire.

2.5 Health hazards

The combustion process releases toxic gases (such as carbon monoxide and phosphine) that can cause poisoning by inhalation. High temperatures can cause burns. Some of the released gases are toxic in themselves and may cause suffocation or poisoning.?

2.6 Environmental hazards

Combustion products may pollute the air and water. Released flammable gases will disperse quickly, but an explosion could damage the surrounding environment. Some substances are highly toxic to aquatic life.

2.7 Other hazards which do not result in classification

no data available

3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Hafnium	Hafnium	7440-58-6	231-166-4	99%

4: First-aid measures

4.1 General advice

Immediately move away from fire/heat sources. If the substance spontaneously combusts, use dry powder fire extinguisher to extinguish the fire (do not use water). Carry the substance SDS document, record the exposure situation, and seek medical attention as soon as possible. Materials that release gas when exposed to water (such as calcium phosphide) should be kept away from humid environments.

4.2 If inhaled

Move to a dry, ventilated place and keep the airway open. If you inhale flammable gases (such as hydrogen) or toxic gases (such as phosphine), immediately inhale oxygen. If you experience dizziness or nausea, seek medical attention immediately and monitor your blood oxygen saturation.

4.3 In case of skin contact

If you come into contact with self-igniting substances, immediately cover the fire with dry sand, remove the remaining particles with tweezers, and rinse with plenty of running water for 15 minutes; if there is a burn, cover it with sterile gauze and avoid applying ointment.

4.4 In case of eye contact

Immediately remove the foreign body with a dry cotton swab, then rinse with saline for 15 minutes; wear a light-proof eye mask after rinsing, avoid rubbing, and go to an ophthalmologist as soon as possible.

4.5 If swallowed

Do not induce vomiting. If the patient is conscious, give paraffin oil orally (to lubricate the intestines and reduce damage). Bring the substance SDS and seek medical attention immediately to monitor for gas embolism .

4.6 Most important symptoms and effects, both acute and delayed

Acute symptoms include skin burns, dizziness, nausea, and difficulty breathing. When the gas-releasing substance comes into contact with the skin, hydrogen bubbles (subcutaneous emphysema) may form. Long-term effects include inhalation of phosphine, which may cause pulmonary fibrosis.

4.7 Protection of first-aiders

Rescuers must wear fireproof and chemical protective clothing, anti-static gloves, and positive pressure air respirators; carry dry powder fire extinguishers when handling substances that release gas when exposed to water, and avoid contact with rain/sweat.

4.8 Notes to physician

Inform the physician of the substance type (spontaneous combustion/gassing upon contact with water) and route of exposure; monitor the patient's lungs (e.g., chest X-ray to check for pulmonary edema);

5: Fire-fighting measures

5.1 Unsuitable extinguishing media

Spontaneous combustion substances: Do not use water or foam (which may intensify spontaneous combustion or cause explosion); Substances that release flammable gases when in contact with water: Do not use any water-containing fire extinguishing agents (such as spray water or foam), which may produce flammable gases such as hydrogen and acetylene.

5.2 Specific hazards during fire fighting

Pyrophoric substances will spontaneously ignite when they come into contact with air, burn quickly, and can easily cause chain fires; substances that release gas when exposed to water react with water/humid air to release flammable gases, which can easily explode when the explosion limit is reached; some products are also toxic.

5.3 Hazardous combustion products

Carbon monoxide, carbon oxides; substances that release gas when in contact with water may release additional hydrogen (explosive), phosphine (highly toxic), hydrogen sulfide (highly toxic), etc.

5.4 Specific extinguishing methods

Cover small areas with dry powder/dry sand (to isolate the air), evacuate large areas, and allow the fire to burn (to avoid exacerbating the risk of improper fire extinguishing). For substances that release gas when exposed to water: cover the leak point with dry sand and soil, strictly prohibit contact with rain/humid environment, use dry powder to extinguish the fire (if it has already burned), and monitor the concentration of flammable gas at the same time.

5.5 Special protective equipment for fire-fighters

Wear fireproof and chemical protective clothing, anti-static gloves, and positive pressure air respirator; carry a flammable gas detector (to measure explosion limits); wear waterproof boots when working with materials that release gas when exposed to water to avoid skin contact with leaks.

6: Accidental release measures

6.1 Protective measures for workers

Wear fireproof protective clothing, chemical protective gloves (flame-resistant type), and a gas mask (with a flammable gas filter cartridge); if the substance releases gas when in contact with water, additional waterproof clothing and waterproof boots are required, and carry a dry powder fire extinguisher.

6.2 Environmental protection measure

Spontaneous combustion substances: prevent contact with air (to avoid spontaneous combustion), use dry powder to extinguish fire when burning (water is strictly prohibited); substances that release gas when exposed to water: set up waterproof cofferdams, strictly prohibit contact with rainwater/groundwater, and monitor gas concentration (to prevent explosion).

6.3 Containment methods for leaked chemicals

Spontaneous combustion substances: small amounts should be placed in sealed metal containers with nitrogen protection; large amounts should be covered with dry sand and transferred to inert gas storage facilities; substances that release gas when exposed to water: collect them in dry, corrosion-resistant containers and add desiccant (anhydrous calcium chloride).

6.4 Cleanup methods for chemical spills

Spontaneous combustion materials: Use spark-free tools to transfer in a dry environment to avoid oxygen enrichment; Materials that release gas when exposed to water: After being absorbed by dry sand and soil, transfer in a water-free environment. Handling in rainy days is strictly prohibited.

6.5 Measures to prevent the spread of leaks

Designate a 20-meter isolation zone and prohibit entry of water or wet items; set up waterproof trenches for materials that release gas when exposed to water; strengthen ventilation (explosion-proof fans) to prevent flammable gases from reaching explosion limits.

6.6 Container leakage treatment

Minor leaks: seal with dry sealant; serious leaks: evacuate immediately, prevent pyrophoric substances from self-igniting, keep substances that release gas when in contact with water away from water sources, and notify a professional team to handle the situation.

6.7 Special considerations

Spontaneous combustion substances must continuously monitor the temperature (to prevent self-heating); substances that release gas when in contact with water must not be rinsed with water; in case of skin contact, wipe with a dry cloth and then clean with a neutral detergent; containers must be dried and tested before being discarded.

7: Handling and storage

7.1 Safe storage conditions

Store in a dry, moisture-proof dedicated warehouse (relative humidity ? 40%), equipped with a dehumidifier (dehumidification capacity ? 2kg/h); the container for pyrophoric substances is a sealed metal can (such as tin-plated steel) with a built-in desiccant (anhydrous calcium chloride, dosage ? 5% of the container volume); the floor of the warehouse for substances that release gas when exposed to water should be raised by ? 30cm to prevent rainwater from flowing back.

7.2 Storage precautions

It is strictly forbidden to store it in the same warehouse with water or wet items (such as wet rags and oxygen cylinders); self-igniting substances must be stored separately and away from oxidizers (isolation distance ? 2 meters); check the humidity and temperature in the warehouse daily, and self-igniting substances must be equipped with a temperature alarm (alarm threshold ? 30?); use explosion-proof tools when handling to avoid sparks generated by friction.

7.3 VCI Storage Grade

Level 2 (medium-high): VCI rust inhibitor (such as barium petroleum sulfonate) is sprayed on the surface of metal containers to prevent corrosion in humid environments; VCI gas phase monitoring points are set up in the warehouse to ensure that the VCI concentration is ?0.05mg/m³ to prevent reactions caused by container leakage.

7.4 Recommended storage temperature

20-30?, strictly prohibited from exceeding 35?; self-igniting materials must be kept at a temperature ?30? to prevent self-heating; materials that release gas when in contact with water must be kept warm in winter (temperature ?10?) to prevent the container material from becoming brittle due to low temperature (if the

label has a recommended storage temperature, follow the label).

7.5 Handling

For precautions see Safety Data Sheet section 2
Advice on safe handling : Work under hood. Do not inhale substance/mixture.

8: Exposure controls/personal protection

8.1 Respiratory protection

When exposed to self-igniting substances or products that release gas when in contact with water, wear a filtering gas mask (APF?10); switch to a positive pressure air respirator when the concentration is high.

8.2 Recommended Filter type

For gases that release toxic gases when in contact with water, choose Type E+K composite filter cartridge (protects against acidic gases + ammonia); for dust-like self-igniting substances, choose Type P3 filter cotton to ensure a filtration efficiency of ?99.95%.

8.3 Eye/face protection

Wear impact-resistant goggles + protective mask. The mask must protect against heat radiation (when self-igniting substances are burning) and the lenses must be fog-proof to prevent sparks from splashing into the eyes.

8.4 Skin and body protection

Wear fireproof and chemical protective clothing with a flame-retardant outer layer (such as aramid material) and a chemical-resistant inner layer (nitrile coating); trouser legs should be tucked into chemical-resistant boots, and a fire blanket should be provided as a backup.

8.5 Hand protection

Wear fireproof and chemical-proof gloves with a flame-retardant outer layer and a chemical-proof inner layer. The glove length should be ? 25cm to avoid contact with self-igniting substances that may cause burns.

8.6 Hygiene measures

Wash your skin immediately after work, especially any areas that have come into contact with substances that release gas when in contact with water, and wipe it dry with a dry towel (to avoid secondary reactions caused by moisture); check your clothes for any residual self-igniting substances and only wash them after confirming they are safe.

9: Physical and chemical properties and safety characteristics

Physical state	wire
Colour	Gray crystals

Odour	no data available
Melting point/freezing point	2227oC(lit.)
Boiling point or initial boiling point and boiling range	4602°C(lit.)
Flammability	Explosive in powder form (either dry or with <25% water); finely divided powder can be ignited by static electricity or even SPONTANEOUSLY.Flammable. See Chemical dangers
Lower and upper explosion limit/flammability limit	no data available
Flash point	no data available
Auto-ignition temperature	20°C for dust cloud
Decomposition temperature	May explosively decompose on shock, friction, or concussion. /Hafnium powder/
pH	no data available
Kinematic viscosity	no data available
Solubility	Insoluble (NIOSH, 2016)
Partition coefficient n-octanol/water	no data available
Vapour pressure	0 mm Hg (approx) (NIOSH, 2016)
Density and/or relative density	13.3g/cm3(lit.)
Relative vapour density	no data available
Particle characteristics	no data available

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

The substance may spontaneously ignite on contact with air and at higher temperatures with nitrogen, phosphorous and sulphur. /Hafnium powder, wet or dry/Dust explosion possible if in powder or granular form, mixed with air.Metals, such as HAFNIUM METAL(reactivity similar to zirconium), are reducing agents and tend to react with oxidizing agents. Their reactivity is strongly influenced by their state of subdivision: in bulk they often resist chemical combination; in powdered form they may react very rapidly. Thus, as a bulk metal it is somewhat unreactive, but finely divided material may be pyrophoric. The metal reacts exothermically with compounds having active hydrogen atoms (such as acids and water) to form flammable hydrogen gas and caustic products. The reactions are less vigorous than the similar reactions of alkali metals, but the released heat can still ignite the released hydrogen. Materials in this group may react with azo/diazo compounds to form explosive products. These metals and the products of their corrosion by air and water can catalyze polymerization reactions in several classes of organic compounds; these polymerizations sometimes proceed rapidly or even explosively. Some metals in this group form explosive products with halogenated hydrocarbons.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Although /hafnium/ is relatively inert, when powdered it becomes very reactive. The dry powder may react explosively at elevated temperatures with nitrogen, phosphorus, oxygen, sulfur and other non-metals. The halogens react similarly, and in contact with hot concentrated nitric acid and other oxidants it may explode (often after a delay with nitric acid). The powder is pyrophoric and readily ignitable by friction, heat or static sparks, and if dry burns fiercely. Presence of water (5-10%) slightly reduces the ease of ignition, but combustion of the damp powder proceeds explosively (the oxygen content of water, 89%, being much higher than that of air).

10.6 Hazardous decomposition products

May explosively decompose on shock, friction, or concussion. /Hafnium powder/

11: Toxicological information

11.1 Acute toxicity

Oral: no data available
Inhalation: no data available
Dermal: no data available

11.2 Skin corrosion/irritation

no data available

11.3 Serious eye damage/irritation

no data available

11.4 Respiratory or skin sensitization

no data available

11.5 Germ cell mutagenicity

no data available

11.6 Carcinogenicity

no data available

11.7 Reproductive toxicity

no data available

11.8 STOT-single exposure

no data available

11.9 STOT-repeated exposure

no data available

11.10 Aspiration hazard

no data available

12: Ecological information

12.1 Toxicity

Toxicity to fish: no data available
Toxicity to daphnia and other aquatic invertebrates: no data available
Toxicity to algae: no data available
Toxicity to microorganisms: 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 Other adverse effects

no data available

13: Disposal considerations

13.1 Disposal methods for waste chemicals

Spontaneously combustible materials must be thoroughly incinerated in a professional incinerator (temperature ? 800°C) under inert gas protection. Materials that release gas when exposed to water must be disposed of in a dry environment, using chemical absorption methods (such as absorbing phosphine with copper sulfate solution) or high-temperature decomposition. Before disposal, ensure that the material is in a stable state and add a stabilizer if necessary.

13.2 Precautions

Disposal of materials that release gas when in contact with water is strictly prohibited in humid environments. Disposal sites must be kept away from fire and heat sources. The self-heating temperature of self-igniting materials must be tested before disposal to ensure safety during the disposal process. Operators must wear fire and chemical protection equipment. Gases generated during disposal must be collected and treated to prevent the spread of toxic gases.

14: Transport information

14.1 UN Number

ADR/RID: Not dangerous goods. IMDG: Not dangerous goods. IATA: Not dangerous goods.

14.2 UN Proper Shipping Name

ADR/RID: unknown IMDG: unknown IATA: unknown

14.3 Transport hazard class(es)

ADR/RID: Not dangerous goods. IMDG: Not dangerous goods. IATA: Not dangerous goods.

14.4 Packing group, if applicable

ADR/RID: Not dangerous goods. IMDG: Not dangerous goods. IATA: Not dangerous goods.

14.5 Environmental hazards

ADR/RID: no IMDG: no IATA: no

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Hafnium	Hafnium	7440-58-6	231-166-4

New Zealand Inventory of Chemicals (NZIoC)	Not Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Listed.
Vietnam National Chemical Inventory	Listed.
Australian Inventory of Industrial Chemicals (AIIC)	Not Listed.
Catalogue of Strictly Restricted Toxic Chemicals in China	Not Listed.
China Catalog of Hazardous chemicals 2015	Listed.
European INventory of Existing Commercial chemical Substances	Not Listed.
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans	Not Listed.
TSCA Inventory of Chemical Substances	Listed.

16: Other information

Information on revision

SDS Creation Date	July 1, 2025
SDS Revision Date	July 1, 2025

Abbreviations and acronyms in SDS

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

SDS References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Any questions regarding this Safety Data Sheet, Please send your inquiry to sales@MolBest.com

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