

SAFETY DATA SHEET

Date Printed: 05/13/2024

Date Revised: 01/15/2022

SECTION 1. IDENTIFICATION

Product Identifier: (4N) 99.99% Hafnium Nanoparticles / Nanopowder

Product Code: HF-M-04-NP

CAS Number: 7440-58-6

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 in accordance with 29 CFR 1910 (OSHA HCS)

GHS02 Flame

Self-heat. 1 H251 Self-heating: may catch fire.

Hazards not otherwise classified No data available.

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS02

Signal word: Danger

Hazard statements

H251 Self-heating: may catch fire.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P235+P410 Keep cool. Protect from sunlight.

P420 Store away from other materials.

P407 Maintain air gap between stacks/pallets.

WHMIS classification

B6 - Reactive flammable material
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH

FIRE

REACTIVITY

1

4

2

Health (acute effects) = 1

Flammability = 4

Physical Hazard = 2

Other hazards

Results of PBT and vPvB assessment:

PBT: N/A.

vPvB: N/A.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

CAS No. / Substance Name:

7440-58-6 Hafnium powder

Identification number(s):

EC number: 231-166-4

Additional information:

Hafnium is routinely found with a low level of zirconium since separation of the two elements is difficult.

SECTION 4. FIRST AID MEASURES

Description of first aid measures

If inhaled:

Supply fresh air. If not breathing, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

In case of skin contact:

Immediately wash with soap and water; rinse thoroughly.

Seek immediate medical advice.

In case of eye contact: Rinse opened eye for several minutes under running water. Consult a physician.

If swallowed: Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed: No information available.

Indication of any immediate medical attention and special treatment needed: No information available.

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media

Suitable extinguishing media Special powder for metal fires. Do not use water.

For safety reasons unsuitable extinguishing media Water

Special hazards arising from the substance or mixture
Spontaneously flammable in air.
If this product is involved in a fire, the following can be released:
Metal oxide fume
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources
Environmental precautions: Do not allow material to be released to the environment without official permits.
Methods and material for containment and cleanup:
Keep away from ignition sources.
Ensure adequate ventilation.
Prevention of secondary hazards: Keep away from ignition sources.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7. HANDLING AND STORAGE

Handling
Precautions for safe handling
Handle under dry protective gas.
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure adequate ventilation.
Information about protection against explosions and fires:
Protect against electrostatic charges.
Substance/product is self ignitable.
Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Store away from air.
Further information about storage conditions:
Store under dry inert gas.
This product is air sensitive.
Keep container tightly sealed.
Store in cool, dry conditions in well-sealed containers.
Specific end use(s) No information available.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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.

Control parameters

Components with limit values that require monitoring at the workplace:

Hafnium, metal and compounds as Hf

mg/m³

ACGIH TLV 0.5

Austria MAK 0.5

Belgium TWA 0.5

Denmark TWA 0.5

Finland TWA 0.5

France VME 0.5

Germany MAK 0.5

Korea TLV 0.5

Netherlands MAC-TGG 0.5

Norway TWA 0.5

Poland TWA 0.5

Switzerland MAK-W 0.5

United Kingdom TWA 0.5; 1.5-STEL

USA PEL 0.5

Zirconium and compounds, as Zr

mg/m³

ACGIH TLV 10; 10-STEL, Not classifiable as human carcinogen

Australia TWA 5; 10-STEL

Austria MAK 5

Denmark TWA 5

Finland TWA 5

Korea TLV 5

Hungary 5-STEL

Poland TWA 5; 10-STEL

Russia 6-STEL

OSHA PEL 5

Additional information: No data

Exposure controls

Personal protective equipment

Follow typical general protective and industrial hygiene measures for handling chemicals.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves

Inspect gloves prior to use.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Penetration time of glove material (in minutes) No data available.

Eye protection:

Safety glasses

Full face protection

Body protection: Protective work clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance:

Form: Powder

Color: Silver-gray

Odor: Odorless

Odor threshold: No data available.

pH: N/A.

Melting point/range: 2222 °C (4032 °F)

Boiling point/range: 5400 °C (9752 °F)

Sublimation temperature / start: No data available.

Flammability (solid, gas): No data available.

Ignition temperature: No data available.

Decomposition temperature: No data available.

Auto igniting: Spontaneously flammable in air.

Danger of explosion: No data available.

Explosion limits:

Lower: No data available.

Upper: No data available.

Vapor pressure: N/A.

Density at 20 °C (68 °F): 13.09 g/cm³ (109.236 lbs/gal)

Relative density: No data available.

Vapor density: N/A.

Evaporation rate: N/A.

Solubility in Water (H₂O): Insoluble

Partition coefficient (n-octanol/water): No data available.

Viscosity:

Dynamic: N/A.

Kinematic: N/A.

Other information: No information available.

SECTION 10. STABILITY AND REACTIVITY

Reactivity Catches fire spontaneously if exposed to air.

Chemical stability Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions Spontaneously flammable in air.

Conditions to avoid No information available.

Incompatible materials:

Air

Oxidizing agents

Hazardous decomposition products: Metal oxide fume

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity: N/A

LD/LC50 values that are relevant for classification: No data
Skin irritation or corrosion: May cause irritation
Eye irritation or corrosion: May cause irritation
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: N/A
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: N/A
Specific target organ system toxicity - repeated exposure: N/A
Specific target organ system toxicity - single exposure: N/A
Aspiration hazard: N/A
Subacute to chronic toxicity:
Hafnium and hafnium compounds may be irritating to the skin and eyes. There are reports of liver damage from hafnium exposure.
Inhalation of zirconium and zirconium compounds may cause pulmonary granulomas.
Subacute to chronic toxicity: N/A
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: No information available.
Persistence and degradability: No information available.
Bioaccumulative potential: No information available.
Mobility in soil: No information available.
Additional ecological information:
General notes:
Do not allow material to be released to the environment without official permits.
Avoid transfer into the environment.
Results of PBT and vPvB assessment:
PBT: N/A.
vPvB: N/A.
Other adverse effects: No information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation: Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

SECTION 14. TRANSPORT INFORMATION

UN-Number
DOT, IMDG, IATA: UN2545
UN proper shipping name
DOT: Hafnium powder, dry
IMDG, IATA: HAFNIUM POWDER, DRY
Transport hazard class(es)

DOT

Class 4.2 Substances liable to spontaneous combustion.

Label 4.2

Class 4.2 (S4) Substances liable to spontaneous combustion

Label 4.2

IMDG, IATA

Class 4.2 Substances liable to spontaneous combustion.

Label 4.2

Packing group

DOT, IMDG, IATA: II

Environmental hazards: N/A.

Special precautions for user: Warning: Substances liable to spontaneous combustion

Segregation groups: Powdered metals

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: N/A.

Transport/Additional information:

DOT

Marine Pollutant (DOT): No

UN "Model Regulation": UN2545, Hafnium powder, dry, 4.2, II

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

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.