

[Bis\(cyclopentadienyl\)hafnium\(IV\)
Dichloride](#)

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Linear Formula	C ₁₀ H ₁₀ Cl ₂ Hf
Pubchem CID	21904050
MDL Number	MFCD00001438
EC No.	235-177-5
IUPAC Name	cyclopenta-1,3-diene; hafnium(4+); dichloride
SMILES	C1C=CC=[C-]1.C1C=CC=[C-]1.[Cl-].[Cl-].[Hf+4]
Inchl Identifier	InChI=1S/2C5H5.2ClH.Hf/c2*1-2-4-5-3-1;;;/h2*1-3H,4H2;2*1H;/q2*-1;;;+4/p-2
Inchl Key	IXKLRFLZVHXNCF-UHFFFAOYSA-L

Signal Word	Warning
Hazard Statements	H315-H319-H335
Hazard Codes	Xi
Risk Codes	36/37/38
Safety Statements	26-36
RTECS Number	MG4815000
Transport Information	N/A
WGK Germany	3

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SAFETY DATA SHEET

Date Accessed: 05/07/2024

Date Revised: 01/15/2022

SECTION 1. IDENTIFICATION

Product Identifiers: All applicable American Elements product codes for CAS #12116-66-4

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:
Domestic, North America +1 800-424-9300
International +1 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Skin
Corrosion/Irritation [Category 2]
Eye Damage/Irritation [Category 2A]
Specific Target Organ Toxicity (Single Exposure)
[Category 2]
Signal word: Warning!
Hazard Statement(s): Causes serious eye irritation
Causes skin irritation
May cause damage to organs: Liver



Pictogram(s) or Symbol(s):
Precautionary Statement(s):
[Prevention] Wash hands and face thoroughly after handling. Wear protective gloves. Wear eye and face protection. Do not breathe dusts or mists. Wash all exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product.
[Response] If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention. If exposed or concerned: Call a poison center or doctor.
[Storage] Store locked up.
[Disposal] Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: Hafnocene Dichloride
Percent: >98.0%(T)
CAS Number: 12116-66-4
Molecular Weight: 379.58

Chemical Formula: C₁₀H₁₀Cl₂Hf

Synonyms: Bis(cyclopentadienyl)hafnium Dichloride

SECTION 4. FIRST AID MEASURES

Inhalation: Call a poison center or doctor if you feel unwell. Effects of exposure (inhalation) to substance may be

delayed. Inhalation of vapors or contact with substance will result in contamination and potential harmful

effects. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if

breathing is difficult. Keep victim warm and quiet.

Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Skin contact: Call a poison center or doctor if you feel unwell. Effects of exposure (skin contact) to substance may be

delayed. Remove and wash contaminated clothing before re-use. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Eye contact: IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open.

Contact with

material may irritate or burn eyes. Call emergency medical service. Move victim to fresh air. Check for and

remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of

exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Ingestion: Do not induce vomiting without medical advice. Effects of exposure (ingestion) to substance may be

delayed. If swallowed, seek medical advice immediately and show the container or label. Do not use

mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket

mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will

not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to

protect themselves.

Symptoms/effects:

Acute: Redness.

Delayed: No data available

Immediate medical attention: If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂, water spray, or alcohol-resistant foam. Consult with local fire authorities before

attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: These products

include: Carbon oxides Halogenated compounds

Other specific hazards: WARNING: Highly toxic HCl gas is produced during combustion.

WARNING: Highly toxic HF gas is produced during combustion.

Special precautions for fire-fighters:

Use water spray or fog; do not use straight streams.

Dike fire-control water for later disposal; do not scatter the material. Containers may explode when heated. Move containers from fire area if you can do it without risk.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless

wearing appropriate protective clothing (Section 8).
Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation.
Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Personal protective equipment: Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).
Emergency procedures: Prevent dust cloud. Do not clean-up or dispose except under supervision of a specialist. In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.
Methods and materials for containment and cleaning up:
ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Ventilate the area. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material.
Environmental precautions:
Keep away from living quarters. Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling: Avoid inhalation of vapor or mist. Avoid contact with skin and eyes. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.
Conditions for safe storage: Store locked up. Keep containers tightly closed in a cool, well-ventilated place. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods. Store

under inert gas (e.g. Argon). Moisture sensitive.
Storage incompatibilities: Store away from oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits: No data available
Appropriate engineering controls:
Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.
Personal protective equipment
Respiratory protection: Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Wear protective gloves.
Eye protection: Safety glasses.
Skin and body protection: Lab coat.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Solid
Form: Crystal - Powder
Color: White - Slightly pale reddish yellow
Odor: No data available
Odor threshold: No data available
Melting point/freezing point: 233°C (451°F)
Boiling point/range: No data available
Decomposition temperature: No data available
Relative density: No data available
Kinematic Viscosity: No data available
Partition coefficient: No data available
n-octanol/water (log Pow)
Flash point: No data available
Flammability (solid, gas): No data available

pH: No data available
Vapor pressure: No data available
Vapor density: No data available
Dynamic Viscosity: No data available
Evaporation rate: No data available
(Butyl Acetate = 1)
Autoignition temperature: No data available
Flammability or explosive limits: No data available
Lower: No data available
Upper: No data available

Solubility(ies):
Water: Insoluble
Soluble: Hot toluene

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Not Available
Chemical Stability: Moisture sensitive.
Possibility of Hazardous Reactions: No hazardous reactivity has been reported.
Conditions to avoid: Exposure to moisture. Moisture sensitive.
Incompatible materials: Oxidizing agents
Hazardous Decomposition Products: No data available

SECTION 11. TOXICOLOGICAL INFORMATION

RTECS Number: MG4815000
Acute Toxicity:
ivn-mus LD50:100 mg/kg
Skin corrosion/irritation:
No data available
Serious eye damage/irritation:
No data available
Respiratory or skin sensitization:
No data available
Germ cell mutagenicity:
No data available
Carcinogenicity:
No data available
IARC: No data available NTP: No data available
OSHA: No data available
Reproductive toxicity:
No data available
Routes of Exposure: Inhalation, Eye contact, Ingestion, Skin contact.
Symptoms related to exposure:
Skin contact may result in inflammation; characterized by itching, scaling, reddening, or occasionally blistering. Skin contact may result in redness, pain or dry skin. Eye contact may result in redness or pain.
Potential Health Effects:
Skin and eye contact may result in irritation.
Target organ(s):
May cause damage to organs: Liver

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish: No data available

Crustacea: No data available

Algae: No data available

Persistence and degradability: No data available

Bioaccumulative potential (BCF): No data available

Mobility in soil: No data available

Partition coefficient:

n-octanol/water (log Pow)

No data available

Soil adsorption (Koc): No data available

Henry's Law:

constant (PaM³/mol)

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

Disposal of container: Dispose of as unused product.

Do not re-use empty containers.

Other considerations: Observe all federal, state and local regulations when disposing of the substance.

SECTION 14. TRANSPORT INFORMATION

DOT (US) Non-hazardous for transportation.

IATA Non-hazardous for transportation.

IMDG Non-hazardous for transportation.

SECTION 15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):

This product is ON the EPA Toxic Substances Control

Act (TSCA) inventory.
US Federal Regulations
CERCLA Hazardous substance and Reportable
Quantity:
SARA 313: Not Listed
SARA 302: Not Listed
State Regulations
State Right-to-Know
Massachusetts Not Listed
New Jersey Not Listed
Pennsylvania Not Listed
California Proposition 65: Not Listed
Other Information
NFPA Rating:
Health: 2
Flammability: 0
Instability: 0
HMIS Classification:
Health: 2
Flammability: 0
Physical: 0
International Inventories
WHMIS hazard class: D2B: Materials causing other
toxic effects. (Toxic)
EC-No: 235-177-5

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.