SAFETY DATA SHEET

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SECTION 1. IDENTIFICATION

Product Name: Zirconium Trifluoromethanesulfonate

Product Number: All applicable American Elements product codes, e.g. ZR-CFS-02 , ZR-CFS-025 , ZR-CFS-03 , ZR-CFS-035 , ZR-CFS-04 , ZR-CFS-05

CAS #: 89672-77-5

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

OSHA Haz Com: CFR 1910.1200: Skin Corrosion/Irritation [Category 2]
Eye Damage/Irritation [Category 2A]
Flammable Solids [Category 2]
Signal word: Warning!
Hazard Statement(s): Causes serious eye irritation
Causes skin irritation
Flammable solid



Pictogram(s) or Symbol(s):
Precautionary Statement(s):
[Prevention] Wash hands and face thoroughly after handling. Wear protective gloves. Wear eye and face protection.
Keep away from heat, sparks, open flames or other hot surfaces. - No smoking. Ground or bond container
and receiving equipment. Use explosion-proof electrical, ventilating, lighting, and equipment. Wear protective gloves, eye protection and face protection.
[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. In case of fire: Use dry chemical, CO2, sand, earth, water spray or regular foam to extinguish.
[Storage] None
[Disposal] None

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: Zirconocene Bis(trifluoromethanesulfonate) Tetrahydrofuran Adduct
Percent: >97.0%(T)
CAS Number: 89672-77-5
Molecular Weight: 591.65
Chemical Formula: C16H18F6O7S2Zr
Synonyms: Bis(cyclopentadienyl)zirconium Bis(trifluoromethanesulfonate) Tetrahydrofuran Adduct , Zirconocene
Bis(triflate) Tetrahydrofuran Adduct

SECTION 4. FIRST AID MEASURES

Inhalation: Call emergency medical service. 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. 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 with out medical advice. 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 , sand, earth, water spray or regular 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 Silicates Metallic oxides
Other specific hazards: 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. May re-ignite after fire is
extinguished. Runoff to sewer may create fire or explosion hazard. 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. Use sparkproof
tools and explosion-proof equipment. Remove all sources of ignition. 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. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in the immediate
area). 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). All equipment used when handling the product must be
grounded. 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:
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. Avoid mechanical shock and friction.
Avoid formation of dust and aerosols. Keep away from heat and sources of ignition. Use explosion-proof
equipment. Use only non-sparking hand tool when handling this product. Ground all equipment containing
material. Take measures to prevent build up of electrostatic charge. 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: Keep containers tightly closed in a cool, well-ventilated place. Keep away from sources of ignition. Store
and use away from heat, sparks, open flame, or any other ignition source. 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). Hygroscopic material, store in a tightly sealed container.
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: Pale yellow - Grayish yellow red
Odor: No data available
Odor threshold: No data available

Melting point/freezing point: No data available
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: 79°C (174°F)
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):

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Not Available.
Chemical Stability: Stable under recommended storage conditions. (See Section 7)
Possibility of Hazardous Reactions: No hazardous reactivity has been reported.
Conditions to avoid: Avoid excessive heat and light.
Incompatible materials: Acids, Alkali, Bases, Oxidizing agents
Hazardous Decomposition Products: No data available

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Toxicity:
No data available
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): No data available

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
Mobillity 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)
No data available

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)
UN number:
UN1325
Proper Shipping Name:
Flammable solids, organic, n.o.s.
Class or Division:
4.1 Flammable solid
Packing Group:
III
IATA
UN number:
UN1325
Proper Shipping Name:
Flammable solids, organic, n.o.s.
Class or Division:
4.1 Flammable solid
Packing Group:
III
IMDG
UN number:
UN1325
Proper Shipping Name:
Flammable solids, organic, n.o.s.
Class or Division:
4.1 Flammable solid
Packing Group:
III
EmS number: F-A, S-G

SECTION 15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):
This product is NOT on the EPA Toxic Substances Control Act (TSCA) inventory. The following notices are required by 40 CFR 720.36 (C) for those
products not on the inventory list:
(i) These products are supplied solely for use in research and development by or under the supervision of a technically qualified individual as defined in
40 CFR 720.0 et sec.
(ii) The health risks of these products have not been fully determined. Any information that is or becomes available will be supplied on a SDS sheet.
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: 3
Flammability: 2
Instability: 0
HMIS Classification:
Health: 3
Flammability: 2
Physical: 0
International Inventories
International Inventories
WHMIS hazard class: B4: Flammable Solid.
D2B: Materials causing other toxic effects. (Toxic)

SECTION 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.