

SAFETY DATA SHEET

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SECTION 1. IDENTIFICATION

Product Name: Zirconium Bromide (ZrBr₄)

CAS #: 13777-25-8

Relevant identified uses of the substance: Scientific research and development

Supplier details:

Stanford Advanced Materials

E-mail: sales@samaterials.com

Tel: (949) 407-8904

Address: 23661 Birtcher Dr., Lake Forest, CA 92630 U.S.A.

SECTION 2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR

1910.1200)

Skin Corrosion/Irritation Category 1 B

Serious Eye Damage/Eye Irritation Category 1

Specific target organ toxicity (single exposure) Category 3

Target Organs - Respiratory system.

Label Elements

Signal Word

Danger

Hazard Statements

Causes severe skin burns and eye damage

May cause respiratory irritation

Precautionary Statements

Prevention

Do not breathe dust/fume/gas/mist/vapors/spray Wash face, hands and any exposed skin thoroughly after handling

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

Use only outdoors or in a well-ventilated area

Response

Immediately call a POISON CENTER or doctor/physician

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Ingestion

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

· Chemical characterization: Substances

· CAS No. Description

13777-25-8 Zirconium(IV) bromide, 98% (99+%-Zr)

· Identification number(s)

· EC number: 237-417-4

SECTION 4. FIRST AID MEASURES

· Description of first aid measures

· General information: Immediately remove any clothing soiled by the product.

· After inhalation: In case of unconsciousness place patient stably in side position for transportation.

· After skin contact: Immediately wash with water and soap and rinse thoroughly.

· After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.

· After swallowing: Drink copious amounts of water and provide fresh air. Immediately call a doctor.

· Information for doctor:

· Most important symptoms and effects, both acute and delayed No further relevant information available.

· Indication of any immediate medical attention and special treatment needed

No further relevant information available.

SECTION 5. FIREFIGHTING MEASURES

· Extinguishing media

· Suitable extinguishing agents:

CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam. · Special hazards arising from the substance or mixture

During heating or in case of fire poisonous gases are produced.

· Advice for firefighters

- Protective equipment: Mouth respiratory protective device.
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SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures

Mount respiratory protective device.

Wear protective equipment. Keep unprotected persons away.

- Environmental precautions: No special measures required.

- Methods and material for containment and cleaning up:

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

- 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

Thorough dedusting.

Ensure good ventilation/exhaustion at the workplace.

Open and handle receptacle with care.

- Information about protection against explosions and fires: Keep respiratory protective device available.

- 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: Not required.

- Further information about storage conditions:

Keep receptacle tightly sealed.

Store in cool, dry conditions in well sealed receptacles.

- Specific end use(s) No further relevant information available.
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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters
- Components with limit values that require monitoring at the workplace: Not required.
- Additional information: The lists that were valid during the creation were used as basis.

- Exposure controls

- Personal protective equipment:

- General protective and hygienic measures:

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work. Avoid contact with the eyes.

Avoid contact with the eyes and skin.

- Breathing equipment:

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

- Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

- Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of

quality and varies from manufacturer to manufacturer.

- Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

- Eye protection:

Tightly sealed goggles

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Information on basic physical and chemical properties

- General Information

- Appearance:

Form: Powder

Color: Whitish

- Odor: Pungent

- Odor threshold: Not determined.

- pH-value: Not applicable.

- Change in condition

Melting point/Melting range: 450 °C (842 °F) (15 atm)

Boiling point/Boiling range: no data °C

- Flash point: Not applicable.

- Flammability (solid, gaseous): Not determined.

- Ignition temperature:

Decomposition temperature: Not determined.

- Auto igniting: Not determined.

- Danger of explosion: Product does not present an explosion hazard.

- Explosion limits:

Lower: Not determined.

Upper: Not determined.

- Vapor pressure: no data hPa
- Density at 20 °C (68 °F): 4.201 g/cm³ (35.057 lbs/gal)
- Relative density Not determined.
- Vapor density Not applicable.
- Evaporation rate Not applicable.
- Solubility in / Miscibility with

Water: Insoluble.

- Partition coefficient (n-octanol/water): Not determined.
- Viscosity:Dynamic: Not applicable.

Kinematic: Not applicable.

· Solvent content:

Organic solvents: 0.0 %

VOC content: 0.0 g/l / 0.00 lb/gl

Solids content: 100.0 %

- Other information No further relevant information available.

SECTION 10. STABILITY AND REACTIVITY

- Reactivity No further relevant information available.
 - Chemical stability
 - Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
 - Possibility of hazardous reactions No dangerous reactions known.
 - Conditions to avoid No further relevant information available.
 - Incompatible materials: No further relevant information available.
 - Hazardous decomposition products: No dangerous decomposition products known.
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SECTION 11. TOXICOLOGICAL INFORMATION

- Information on toxicological effects
- Acute toxicity:
- Primary irritant effect:
 - on the skin: Strong caustic effect on skin and mucous membranes.
 - on the eye:

Strong caustic effect.

Strong irritant with the danger of severe eye injury.

- Sensitization: No sensitizing effects known.
- Additional toxicological information:

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

- Carcinogenic categories
- IARC (International Agency for Research on Cancer)

Substance is not listed.

- NTP (National Toxicology Program)

Substance is not listed.

- OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

SECTION 12. ECOLOGICAL INFORMATION

- Toxicity
- Aquatic toxicity: No further relevant information available.
- Persistence and degradability No further relevant information available.
- Behavior in environmental systems:
- Bioaccumulative potential No further relevant information available.
- Mobility in soil No further relevant information available.
- Additional ecological information:

- General notes: Must not reach bodies of water or drainage ditch undiluted or unneutralized.
- Results of PBT and vPvB assessment
- PBT: Not applicable.
 - vPvB: Not applicable.
 - Other adverse effects No further relevant information available.
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SECTION 13. DISPOSAL CONSIDERATIONS

- Waste treatment methods
- Recommendation:

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- Uncleaned packagings:
 - Recommendation: Disposal must be made according to official regulations.
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SECTION 14. TRANSPORT INFORMATION

DOT

UN-No UN3260

Proper Shipping Name Corrosive solid, acidic, inorganic, n.o.s.

Technical Name (Zirconium (IV) bromide)

Hazard Class 8

Packing Group III

TDG

UN-No UN3260

Proper Shipping Name Corrosive solid, acidic, inorganic, n.o.s.

Hazard Class 8

Packing Group III

IATA

UN-No UN3260

Proper Shipping Name Corrosive solid, acidic, inorganic, n.o.s.

Hazard Class 8

Packing Group III

IMDG/IMO

UN-No UN3260

Proper Shipping Name Corrosive solid, acidic, inorganic, n.o.s.

Hazard Class 8

Packing Group III

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SECTION 15. REGULATORY INFORMATION

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

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

· Carcinogenic categories

· EPA (Environmental Protection Agency)

Substance is not listed.

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.