


Plasmaterials, Inc.  
 2268 Research Drive  
 Livermore, CA 94550  
 Ph: (925) 447-4030 Fx: (925) 447-4031  
 http://plasmaterials.com

## SAFETY DATA SHEET

Section 1- IDENTIFICATION		
COMPOSITION <b>ZrF4</b>		PRODUCT NAME <b>Zirconium Fluoride</b>
SUPPLIER: <b>Plasmaterials, Inc. 2268 Research Drive Livermore, CA 94550 Ph: 925-447-4030</b>	RECOMMENDED USE: <b>Laboratory Chemicals Scientific Research</b>	EMERGENCY TELEPHONE NUMBERS <b>US: 800-424-9300 International: 001-703-527-3887</b>

Section 2- HAZARD(S) IDENTIFICATION	
<b>Classification:</b> This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)	
<b>Physical Hazards:</b> Not classified	<b>Health Hazards:</b> Skin Corrosion/Irritation: Category 1 (H314)
<b>Health Hazards:</b> Serious Eye Damage/Eye Irritation: Category 1 (H318)	
<b>Environmental Hazards:</b> Not Classified	<b>OSHA Defined Hazards:</b> Not Classified
<b>LABEL ELEMENTS: Signal Word: Danger</b>	
	
<b>HAZARD STATEMENTS</b>	
-H314: Causes severe skin burns and eye damage -H318: Causes serious eye damage	
<b>PRECAUTIONARY STATEMENTS</b>	
-P264: Wash face, hands and any exposed skin thoroughly after handling -P280: Wear protective gloves/protective clothing/eye protection/face protection -P301+P330+P331: IF SWALLOWED: Rinse mouth. Do not induce vomiting -P303+P361+P353: IF ON SKIN (OR HAIR): Take off immediately all contaminated clothing. Rinse skin with water/shower. -P304+P340: IF INHALED: Remove victim to fresh air and keep comfortable for breathing -P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. -P310: Immediately call a poison center/doctor -P363: Wash contaminated clothing before reuse -P405: Store locked up -P501: Dispose of contents/container to an approved waste disposal plant	
<b>Hazards not otherwise classified (HNOC):</b> -None identified.	
<b>Supplemental Information:</b> -None	

### Section 3- COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS-No	Molecular Weight
Zirconium Fluoride	7783-64-4	167.21 g/mol

### Section 4- FIRST AID MEASURES

**GENERAL ADVICE:** Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Show this safety data sheet to the physician in attendance.

**INHALATION:** Remove victim from exposure to fresh air. Give oxygen if breathing is difficult. If not breathing, give artificial respiration. Consult a physician if symptoms develop or persist.

**SKIN CONTACT:** Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

**EYE CONTACT:** Flush eyes with plenty of water, lifting upper and lower lids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

**INGESTION:** Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content does not get into lungs.

**MOST IMPORTANT SYMPTOMS/EFFECTS:** The most important known symptoms and effects are described in the labeling (see section 2) and/or in section 11. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling and blurred vision. Permanent eye damage including blindness could result.

#### **INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT**

**NEEDED:** Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

### Section 5- FIREFIGHTING MEASURES

#### **Suitable Extinguishing Media:**

Water Fog, Foam, Dry Chemical Powder, Carbon Dioxide (CO<sub>2</sub>)

#### **Unsuitable Extinguishing Media:**

Do not use water jet as an extinguisher, as this will spread the fire.

#### **Specific Hazards Arising from the Chemical:**

Gases hazardous to health may be formed

#### **Protective Equipment & Precautions for Firefighters:**

As in any fire, Firefighters must wear full face, self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective clothing to prevent contact with skin and eyes.

#### **Specific Methods:**

Use standard firefighting procedures and consider the hazards of other involved materials.

#### **Fire Fighting Equipment/Instructions:**

Move containers from fire area if you can do so without risk.

#### **General Fire Hazards:**

No unusual fire or explosion hazards noted.

### Section 6- ACCIDENTAL RELEASE MEASURES

**Personal Precautions:** Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection see section 8.

**Environmental Precautions:** Avoid discharge into drains, water courses or onto the ground.

#### **Methods for Containment & Clean Up:**

-Large spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into

containers. Following product recovery, flush area with water.  
 -Small spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.  
 -Never return spills to original containers for re-use.  
 -For waste disposal, see Section 13.

## Section 7- HANDLING AND STORAGE

**Handling:** Do not get in eyes, on skin or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

**Storage:** Store locked up. Store in original tightly closed container. Store away from incompatible materials.

## Section 8- EXPOSURE CONTROLS/PERSONAL PROTECTION

### Exposure Guidelines:

#### Occupational Exposure Limits/Components with Workplace Control Parameters:

Component	CAS-No.	Value	Control Parameters	Basis
Zirconium Fluoride	7783-64-4	STEL	10 mg/m <sup>3</sup>	USA. ACGIH Threshold Limit Values (TLV)
		STEL	10 mg/m <sup>3</sup>	USA. NIOSH Pocket Guide to Chemical Hazards Materials
		TWA	2.5 mg/m <sup>3</sup>	USA.OSHA Table Z-2 (29 CFR 1910.1000)
		STEL	10 mg/m <sup>3</sup>	USA. California Code of Regulations, Title 8, Section 5155, Airborne Contaminants

### Biological Limit Values:

Component	CAS-No.	Value	Determinant	Specimen
Zirconium Fluoride	7783-64-4	3 mg/l	Fluoride	Urine
		2 mg/l	Fluoride	Urine

**Appropriate Engineering Controls:** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

**Control Parameters:** Handle in accordance with good general industrial hygiene and safety practice. Wash hands before breaks and at the end of the workday.

### Personal Protective Equipment:

**Eye/Face Protection:** Safety glasses with side shields or goggles. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

**Skin and Body Protection:** Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Wear appropriate chemical resistant clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory Protection:** In case of insufficient ventilation, wear suitable respiratory equipment. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Thermal Hazards:** Wear appropriate thermal protective clothing when necessary.

**General Hygiene:** Always observe good personal hygiene measures such as washing after handling the material and before eating, drinking and/or smoking. Wash hands before breaks and at the end of the workday. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

## Section 9- PHYSICAL AND CHEMICAL PROPERTIES

**Physical State/Form:** Solid  
**Odor:** No data available  
**Odor Threshold:** No data available  
**pH:** No data available  
**Melting Point/Range:** No data available  
**Initial Boiling Point/Range:** No data available  
**Flash Point:** No data available  
**Evaporation Rate:** No data available  
**Flammability (solid, gas):** No data available  
**Flammability Limits:**  
    **Upper:** No data available  
    **Lower:** No data available  
**Explosive Limits:**  
    **Upper:** No data available  
    **Lower:** No data available  
**Vapor Pressure:** No data available  
**Vapor Density:** No data available  
**Relative Density:** No data available  
**Solubility (Water):** No data available  
**Partition coefficient; n-octanol/water:** No data available  
**Auto Ignition Temperature:** No data available  
**Decomposition Temperature:** No data available  
**Viscosity:** No data available  
**Explosive Properties:** No data available  
**Oxidizing Properties:** No data available

## Section 10- STABILITY AND REACTIVITY

**Reactive Hazard:** Stable and non-reactive under normal conditions of use, storage and transport.  
**Stability:** Stable under normal conditions  
**Conditions to Avoid:** Contact with incompatible materials  
**Incompatible Materials:** Strong oxidizing agents  
**Hazardous Decomposition Products:** No information available  
**Hazardous Polymerization:** No information available  
**Hazardous Reactions:** No information available

## Section 11- TOXICOLOGICAL INFORMATION

**Information on likely Routes of Exposure:**  
    **Inhalation:** May cause irritation to the respiratory system. Prolonged inhalation may be harmful  
    **Skin Contact:** Causes severe skin burns  
    **Eye Contact:** Causes serious eye damage  
    **Ingestion:** Causes digestive tract burns  
**Symptoms Related to the Physical, Chemical & Toxicological Characteristics:**  
    -Burning pain and severe corrosive skin damage  
    -Causes serious eye damage  
    -Symptoms may include stinging, tearing, redness, swelling and blurred vision.  
    -Permanent eye damage including blindness could result  
**Information on Toxicological Effects:**  
    **Acute Toxicity:** No information available  
    **Skin Corrosion/Irritation:** Causes severe skin burns and eye damage  
    **Serious eye damage/irritation:** Causes serious eye damage  
    **Respiratory or Skin Sensitization:** No information available

**Carcinogenicity:** This product is not considered to be a carcinogen by IARC, ACGIH, NTP or OSHA.

**-IARC:** No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen.

**-NTP:** No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen.

**-OSHA:** No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen.

**Germ Cell Mutagenic Effects:** No information available

**Reproductive Effects:** No information available

**Development Effects:** No information available

**Specific Target Organ Toxicity – single exposure:** No information available

**Specific Target Organ Toxicity – repeated exposure:** No information available

**Aspiration Hazard:** No information available

**Chronic Effects:** Prolonged inhalation may be harmful

**Additional Information:**

**-To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.**

## Section 12- ECOLOGICAL INFORMATION

**Toxicity:** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

**Persistence and Degradability:** No information available

**Bioaccumulation/Accumulation:** No information available

**Mobility in Soil:** No information available

**Results of PBT and vPvB assessment:** PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

**Other Adverse Effects:** No information available

## Section 13- DISPOSAL CONSIDERATIONS

**Waste Disposal Methods:** Collect and reclaim or dispose in sealed containers to a licensed disposal company. Dispose of contaminated packaging as unused product. Empty containers or liners may retain some product residues. Dispose of contents/container in accordance with local/regional/national/international regulations.

## Section 14- TRANSPORT INFORMATION

**DOT:**

**UN-No:** 2923

**Proper Shipping Name:** Corrosive solids, toxic, n.o.s.

**Hazard Class:** 8

**Subsidiary Risk:** 6.1 (PGI, II)

**Label(s):** 8, 6.1

**Packing Group:** II

**Special Provisions:** IB8, IP2, IP4, T3, TP33

**Packaging Exceptions:** 154

**Packaging Non Bulk:** 212

**Packaging Bulk:** 240

**Special Precautions for User:** Read safety instructions, SDS and emergency procedures before handling

**IATA:**

**UN-No:** 2923

**Proper Shipping Name:** Corrosive solids, toxic, n.o.s.

**Hazard Class:** 8

<p><b>Subsidiary Risk:</b> 6.1 (PGI, II)  <b>Label(s):</b> 8, 6.1  <b>Packing Group:</b> II  <b>Environmental Hazards:</b> No  <b>Special Precautions for User:</b> Read safety instructions, SDS and emergency procedures before handling</p>
<p><b>IMDG:</b>  <b>UN-No:</b> 2923  <b>Proper Shipping Name:</b> Corrosive solids, toxic, n.o.s.  <b>Hazard Class:</b> 8  <b>Subsidiary Risk:</b> 6.1 (PGI, II)  <b>Label(s):</b> 8, 6.1  <b>Packing Group:</b> II  <b>EMS-No:</b> Not available  <b>Marine Pollutant:</b> No  <b>Special Precautions for User:</b> Read safety instructions, SDS and emergency procedures before handling</p>

## Section 15- REGULATORY INFORMATION

**US Federal Regulations:** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt.D):** Not regulated

**U.S. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):** Not Listed

**SARA 302:** No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

**SARA 304 Emergency Releases Notification:** Not regulated

**SARA 313 (TRI Reporting):** This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313

**SARA 311/312 Hazardous Chemical:** Yes

**SARA Hazard Categories:**

- Immediate Hazard:** Yes
- Delayed Hazard:** No
- Fire Hazard:** No
- Pressure Hazard:** No
- Reactive Hazard:** No

**CERCLA Hazardous Substance List (40 CFR 302.4):** Not Listed

**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List:** Not regulated

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):** Not regulated

**Safe Drinking Water Act (SDWA):** 4.0 mg/l

## Section 16- OTHER INFORMATION

The above information is accurate to the best of our knowledge. However, since data, safety standards and government regulations are subject to change, the conditions of handling and use, or misuse are beyond our control, Plasmaterials, Inc. makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Users should satisfy themselves that they have all current data relevant to their particular use.

The information in this SDS was obtained from sources, which we believe are reliable. However, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

REVISION: 03-27-18