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SAFETY DATA SHEET

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

Section 2- HAZARD(S) IDENTIFICATION	
Classification: This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)	
Substances and Mixtures, which in contact with water, Flammable Gases: Category 2 (H261)	
Flammable Solids: Category 2 (H228)	Pyrophoric Solids: Category 1 (H232)
LABEL ELEMENTS: Signal Word: Danger	
	
<u>HAZARD STATEMENTS</u>	
<ul style="list-style-type: none"> -H226: Flammable liquid and vapor. -H228: Flammable solid. -H232: May ignite spontaneously if exposed to air. -H261: In contact with water, releases flammable gases. 	
<u>PRECAUTIONARY STATEMENTS</u>	
<ul style="list-style-type: none"> -P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking -P223: Do not allow contact with water. -P231+P232: Handle under inert gas. Protect from moisture. -P233: Keep container tightly closed. -P240: Ground/bond container and receiving equipment -P241: Use explosion-proof electrical/ventilating/lighting equipment -P242: Use only non-sparking tools -P243: Take precautionary measures against static discharge -P280: Wear protective gloves/protective clothing/eye protection/face protection. -P302+P361+P353: If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. -P335+P334: Brush off loose particles from skin. Immerse in cool water, wrap in wet bandages. -P370+P378: In case of fire, use dry sand, dry chemical or alcohol-resistant foam to extinguish. -P402+P404: Store in a dry place. Store in a closed container. -P403+P235: Store in a well-ventilated place. Keep cool. -P501: Dispose of contents/container to an approved waste disposal plant. 	

Hazards not otherwise classified (HNOC):

-None identified.

Section 3- COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS-No	Molecular Weight
Zirconium	7440-67-7	91.22 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. Take off all contaminated clothing immediately. Wash contaminated clothing before reuse.

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: Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages. Take off all contaminated clothing immediately. Rinse skin with water/shower. Get medical attention if irritation develops or persists.

EYE CONTACT: Do not rub eyes. Immediately 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. Get medical attention if irritation develops or persists.

INGESTION: Rinse mouth with water. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

MOST IMPORTANT SYMPTOMS/EFFECTS: The most important known symptoms and effects are described in the labeling (see section 2) and/or in section 11. Direct contact with eyes may cause temporary irritation.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT

NEEDED: Provide general supportive measures and treat symptomatically. Thermal 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.

Section 5- FIREFIGHTING MEASURES**Suitable Extinguishing Media:**Dry Chemical Powder, Foam, Dry Sand, Carbon Dioxide (CO₂)**Unsuitable Extinguishing Media:**

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

Specific Hazards Arising from the Chemical:

Vapors may form explosive mixtures in air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, 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:

In case of fire and/or explosion, do not breath fumes. Move containers from fire area if you can do so without risk. Do not get water inside container.

General Fire Hazards:

Flammable liquid and vapor. In contact with water releases flammable gas.

Section 6- ACCIDENTAL RELEASE MEASURES

Personal Precautions: Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled

material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection see section 8.

Environmental Precautions: Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

Methods for Containment & Clean Up:

Do not get water on spilled substance or inside containers. Eliminate all ignition sources: no smoking, flares, sparks or flames in immediate area. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. The product is immiscible with water and will spread on the water surface. Stop the flow of material, if this is without risk. Large Spills: Dike the spilled material where this is possible. Cover with plastic sheet to prevent spreading. Use noncombustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Keep in suitable, closed containers for disposal. For waste disposal, see Section 13.

Section 7- HANDLING AND STORAGE

Handling: Keep away from any possible contact with water, because of violent reaction and possible flash fire. Handle under inert gas. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling product must be grounded. Use non-sparking tools and explosion-proof equipment. Avoid prolonged exposure. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Storage: Store in originally tightly closed container in a well-ventilated place. Store in a cool, dry place out of direct sunlight. Never allow product to get in contact with water during storage. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Keep in an area equipped with sprinklers. 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	7440-67-7	TWA	5 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
		STEL	10 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5 mg/m ³	USA NIOSH Pocket Guide to Chemical Hazards Materials
		STEL	10 mg/m ³	USA NIOSH Pocket Guide to Chemical Hazards Materials

Appropriate Engineering Controls: 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 suitable protective 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: Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EU EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

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.

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: 1,857°C (3,374.6°F)

Initial Boiling Point/Range: 3,577°C (6,470.6°F)

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): Insoluble

Partition coefficient; n-octanol/water: No data available

Auto Ignition Temperature: >200°C (392°F)

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: No data available

Stability: Stable under recommended storage conditions.

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Exposure to moisture. Contact with incompatible products. Avoid heat, sparks, open flames and other ignition sources.

Incompatible Materials: Strong oxidizing agents

Hazardous Decomposition Products: No data available

Section 11- TOXICOLOGICAL INFORMATION

Toxicological Effects:

Acute Toxicity: No information available

Inhalation: Prolonged inhalation may be harmful

Dermal: No information available

Ingestion: Expected to be a low ingestion hazard

Skin Corrosion/Irritation: Prolonged skin contact may cause temporary irritation

Serious eye damage/irritation: Direct contact with eyes may cause temporary irritation

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.

-ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential 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: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dispose of contaminated packaging as unused product. Dispose in accordance with all applicable regulations.

Section 14- TRANSPORT INFORMATION

DOT: Not regulated as dangerous goods

IATA: Not regulated as dangerous goods

IMDG: Not regulated as dangerous goods

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 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: No

Delayed Hazard: No

Fire Hazard: Yes

Pressure Hazard: No

Reactive Hazard: Yes

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

US California Proposition 65: This product does not contain any chemicals known to the State of California to cause cancer, birth defects or any other reproductive harm.

US New Jersey Right-to-Know Components:

Component	CAS No.	Revision Date
Zirconium	7440-67-7	1991-07-01

US Pennsylvania Right-to-Know Components:

Component	CAS No.	Revision Date
Zirconium	7440-67-7	1991-07-01

US Massachusetts Right-to-Know Components:

Component	CAS No.	Revision Date
Zirconium	7440-67-7	1991-07-01

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.

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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.

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