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SAFETY DATA SHEET

Section 1- IDENTIFICATION		
COMPOSITION ZrB2		PRODUCT NAME Zirconium Boride
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)	
Physical Hazards: Pyrophoric Solids: Category 1	Health Hazards: Not Classified
Physical Hazards: Substances and mixtures which in contact with water, emit flammable gases: Category 1	
Environmental Hazards: Not Classified	OSHA Defined Hazards: Not Classified
LABEL ELEMENTS: Signal Word: Danger	
	
HAZARD STATEMENTS	
-H250: Catches fire spontaneously if exposed to air. -H260: In contact with water, releases flammable gases which may ignite spontaneously	
PRECAUTIONARY STATEMENTS	
-P210: Keep away from heat/sparks/open flames/hot surfaces – No Smoking -P222: Do not allow contact with air -P223: Do not allow contact with water -P231: Handle under inert gas -P232: Protect from moisture -P264: Wash face, hands and any exposed skin thoroughly after handling -P270: Do not eat, drink or smoke when using this product -P280: Wear protective gloves/protective clothing/eye protection/face protection -P335 + P334: Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages. -P370 + P378: In case of fire: Use appropriate media to extinguish -P402 + P404: Store in a dry place. Store in a closed container -P422: Store contents under appropriate liquid or inert gas. -P501: Dispose of contents/container to an approved waste disposal plant	
Hazards not otherwise classified (HNOC):	
-None identified.	

Supplemental Information:

- 100% of the mixture consists of component(s) of unknown acute oral toxicity
- 100% of the mixture consists of component(s) of unknown acute dermal toxicity
- 100% of the mixture consists of component(s) of unknown of acute hazards to the aquatic environment
- 100% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment

Section 3- COMPOSITION/INFORMATION ON INGREDIANTS

COMPONENT	CAS-No	Molecular Weight
Zirconium Boride	12045-64-6	112.85 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: Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages. Consult a physician if irritation develops and persists.

EYE CONTACT: Do not rub eyes. 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 and 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: No information available

Section 5- FIREFIGHTING MEASURES**Suitable Extinguishing Media:**

Dry Chemical Powder, Soda Ash, Lime or Dry Sand

Unsuitable Extinguishing Media:

Water

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:

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

General Fire Hazards:

Catches fire spontaneously if exposed to air. In contact with water, releases flammable gases which may ignite spontaneously. 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. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Use only non-sparking tools. 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:

Do not get water on spilled substance or inside containers. Neutralize with lime or soda ash. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk.

Following product recovery, flush area with water.

-For waste disposal, see Section 13.

Section 7- HANDLING AND STORAGE

Handling: Do not allow contact with air. Open container carefully and only in a dry, oxygen-free or inert atmosphere. Keep away from any possible contact with water, because of violent reaction and possible flash fire. Handle under inert gas. Keep away from heat/sparks/open flames/hot surfaces – No Smoking. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Storage: Never allow product to get in contact with water during storage. Keep away from heat, sparks and open flame. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a dry place. 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 Boride	12045-64-6	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
		PEL	5 mg/m ³	USA.OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
		PEL	5 mg/m ³	USA. California Code of Regulations, Title 8, Section 5155, Airborne Contaminants
		STEL	10 mg/m ³	USA. California Code of Regulations, Title 8, Section 5155, Airborne Contaminants

Biological Limit Values: No biological exposure limits noted for the substance

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.

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 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: 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: In contact with water, releases flammable gas
Stability: Stable under normal conditions
Conditions to Avoid: Avoid heat, sparks, open flames and other ignition sources. Exposure to moisture. Exposure to air. Contact with incompatible materials
Incompatible Materials: Air
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: Prolonged inhalation may be harmful
 Skin Contact: No data available
 Eye Contact: No data available
 Ingestion: No data available
Symptoms Related to the Physical, Chemical & Toxicological Characteristics:
 -Direct contact with eyes may cause temporary irritation
Information on Toxicological Effects:
 Acute Toxicity: No information available
 Skin Corrosion/Irritation: No data available
 Serious eye damage/irritation: No data available
 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. Dispose of contents/container in accordance with local/regional/national/international 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. All components are on the US EPA TSCA Inventory List.

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: No

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

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): Not regulated

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.

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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