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## SAFETY DATA SHEET

### Section 1- IDENTIFICATION

COMPOSITION <b>ZrO2</b>		PRODUCT NAME <b>Zirconium Oxide</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: 001-800-424-9300 Europe: 001-703-527-3887</b>

### Section 2- HAZARD(S) IDENTIFICATION

<b>Physical Hazards:</b> Not Classified	<b>Health Hazards:</b> Not Classified
<b>Environmental Hazards:</b> Not Classified	<b>OSHA Defined Hazards:</b> Not Classified
<b>LABEL ELEMENTS:</b>	
<b>Hazard Symbol:</b> None	<b>Signal Word:</b> None
<p style="text-align: center;"><b>HAZARD STATEMENTS</b></p> <p>-The substance does not meet the criteria for classification</p> <p style="text-align: center;"><b>PRECAUTIONARY STATEMENTS</b></p> <p>-P264: Wash face, hands, and any exposed skin thoroughly after handling          -P270: Do not eat, drink, or smoke when using this product          - P420: Store away from incompatible materials          -P501: Dispose of contents/container in accordance with local/regional/national/international regulations</p> <p><b>Hazards not otherwise classified (HNOC):</b>          -None identified.</p>	

### Section 3- COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS-No	Molecular Weight
<b>Zirconium Oxide</b>	<b>1314-23-4</b>	<b>123.22 g/mol</b>

### Section 4- FIRST AID MEASURES

<p><b>GENERAL ADVICE:</b> Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.</p> <p><b>Inhalation:</b> 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.</p> <p><b>Skin Contact:</b> Wash off with soap and water. Consult a physician if irritation develops and/or persists.</p> <p><b>Eye Contact:</b> 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/or persists.</p> <p><b>Ingestion:</b> Rinse mouth with water. Never give anything by mouth to an unconscious person. Get medical advice/attention if you feel unwell. Get medical attention if symptoms occur.</p> <p><b>Most Important Symptoms/Effects:</b> Direct contact with eyes may cause temporary irritation.</p> <p><b>Indication of any Immediate Medical Attention and Special Treatment Needed:</b> Treat symptomatically</p>
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## Section 5- FIREFIGHTING MEASURES

### Suitable Extinguishing Media:

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

### Unsuitable Extinguishing Media:

None known

### Specific Hazards Arising from the Chemical:

Gases hazardous to health may be formed

### General Fire Hazards:

No unusual fire or explosion hazards noted

### 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. Use water spray to cool unopened containers.

## Section 6- ACCIDENTAL RELEASE MEASURES

**Personal Precautions:** Keep unnecessary personnel away. Wear appropriate personnel protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid breathing vapors, mist, or gas. For personnel protection see Section 8.

**Environmental Precautions:** No special environmental precautions required.

**Methods for Containment & Clean Up:** Stop the flow of material if this is without risk. Prevent entry into waterways, sewer, basements, or confined areas. Keep in suitable, closed containers for disposal. Never return spills to original containers for re-use. Following product recovery, flush area with water. For waste disposal see Section 13.

## Section 7- HANDLING AND STORAGE

**Handling:** Use care in handling and storage. Avoid prolonged exposure. Observe good industrial hygiene practices.

**Storage:** 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 Oxide	1314-23-4	TWA	5 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		STEL	10 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		TWA	5 mg/m <sup>3</sup>	USA. ACGIH Threshold Limit Values (TLV)
		STEL	10 mg/m <sup>3</sup>	USA. ACGIH Threshold Limit Values (TLV)
		TWA	15 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) Table Z-1 Limits for Air Contaminants
		PEL	5 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) Table Z-1 Limits for Air Contaminants
		PEL	5 mg/m <sup>3</sup>	California Permissible Exposure Limits for Chemical Contaminants (Title 8, Article 107)
		STEL	10 mg/m <sup>3</sup>	California Permissible Exposure Limits for Chemical Contaminants (Title 8, Article 107)
		PEL	5 mg/m <sup>3</sup>	California Code of Regulations, Title 8, Section 5155. Airborne Contaminants
		STEL	10 mg/m <sup>3</sup>	California Code of Regulations, Title 8, Section 5155. Airborne Contaminants

<b>Biological Limit Values:</b> No biological exposure limits noted for this substance
<b>Engineering Measures:</b> 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.
<b>Appropriate Engineering Controls:</b> Handle in accordance with good industrial hygiene and safety practice. 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.
<b>Control Parameters:</b> Follow standard monitoring procedures
<b>Personal Protective Equipment:</b>
<b>Eye/Face Protection:</b> Wear 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).
<b>Skin and Body Protection:</b> Handle with appropriate chemical resistant 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 clothing equipment must be selected according to the concentration and amount of the dangerous substance and to the specific workplace.
<b>Respiratory Protection:</b> In case of insufficient ventilation, wear suitable respiratory equipment. Where protection from nuisance levels of dusts is 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).
<b>Thermal Hazards:</b> Wear appropriate thermal protective clothing when necessary.
<b>Hygiene Measures:</b> Handle in accordance with good industrial hygiene and safety practice. When using do not smoke. Keep away from food and drink. Wash thoroughly after handling and before eating, drinking and/or smoking. 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

<b>Physical State:</b> Solid
<b>Odor:</b> No information available
<b>Odor Threshold:</b> No information available
<b>pH:</b> No information available
<b>Melting Point/Range:</b> 2,715°C (4,919°F)
<b>Boiling Point/Range:</b> 4,300°C (7,772°F)
<b>Flash Point:</b> No information available
<b>Evaporation Rate:</b> No information available
<b>Flammability (solid,gas):</b> No information available
<b>Flammability or Explosive Limits:</b>
<b>Upper:</b> No data available
<b>Lower:</b> No data available
<b>Vapor Pressure:</b> No information available
<b>Vapor Density:</b> No information available
<b>Relative Density:</b> 5.89 g/cm <sup>3</sup>
<b>Solubility:</b> No information available
<b>Partition coefficient; n-octanol/water:</b> No information available
<b>Auto Ignition Temperature:</b> No information available
<b>Decomposition Temperature:</b> No information available
<b>Viscosity:</b> No information available
<b>Explosive Properties:</b> No information available
<b>Oxidizing Properties:</b> No information available

## Section 10- STABILITY AND REACTIVITY

<b>Reactive Hazard:</b> Stable and non-reactive under normal conditions of use, storage, and transport
<b>Stability:</b> Stable under normal conditions

<b>Conditions to Avoid:</b> Contact with incompatible materials
<b>Incompatible Materials:</b> Strong oxidizing agents, Strong acids
<b>Hazardous Decomposition Products:</b> No information available -Hazardous Decomposition products formed under fire conditions: Zirconium Oxides
<b>Hazardous Polymerization:</b> No information available
<b>Hazardous Reactions:</b> No information available

## Section 11- TOXICOLOGICAL INFORMATION

### Information on likely Routes of Exposure:

**Inhalation:** Prolonged inhalation may be harmful

**Skin Contact:** No information available

**Eye Contact:** No information available

**Ingestion:** No information available

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Direct contact with eyes may cause temporary irritation.

### Information on Toxicological Effects:

**Acute Toxicity:** No information available

**Skin Corrosion/Irritation:** No information available.

**Serious eye damage/irritation:** No information available.

**Respiratory or Skin Sensitization:** No information available

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

**Germ Cell Mutagenicity:** No information available

**Reproductive Toxicity:** No information available

**Development Toxicity:** 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

**-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 & 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/IMO:** Not regulated as dangerous goods

## Section 15- REGULATORY INFORMATION

**US Federal Regulations:** This product is not known to be 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 1910.1001-1052):** Not regulated

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

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

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

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

**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

**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.

**Massachusetts Right To Know Components:** Zirconium Oxide (CAS No. 1314-23-4)

**New Jersey Right To Know Components:** Zirconium Oxide (CAS No. 1314-23-4)

**Pennsylvania Right To Know Components:** Zirconium Oxide (CAS No. 1314-23-4)

## 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: 07-14-20