Plasmaterials, Inc.
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SAFETY DATA SHEET

Section 1- IDENTIFICATION

COMPOSITION	PRODUCT NAME
Ba	**Barium**

SUPPLIER:	RECOMMENDED USE:	EMERGENCY TELEPHONE NUMBERS
Plasmaterials, Inc. **2268 Research Drive** **Livermore, CA 94550** **Ph: 925-447-4030**	**Laboratory Chemicals** **Scientific Research**	**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: Substances and mixtures, which in contact with water, emit flammable gases: Category 2 (H261)

HEALTH HAZARDS: Specific Target Organ Toxicity, Single Exposure-Respiratory tract irritation: Category 3 (H335)

LABEL ELEMENTS: Signal Word: Danger

HAZARD STATEMENTS

-H261: In contact with water releases flammable gases.
-H315: Causes skin irritation
-H319: Causes serious eye irritation
-H335: May cause respiratory irritation

PRECAUTIONARY STATEMENTS

-P223: Do not allow contact with water
-P231+P232: Handle under inert gas. Protect from moisture.
-P264: Wash skin thoroughly after handling.
-P280: Wear protective gloves/protective clothing/eye protection/face protection.
-P302+P335+P334+P352: IF ON SKIN, Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages. Wash with plenty of soap and water.
-P305+P351+P338: IF IN EYES, Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
-P362+P364: Take off contaminated clothing. Wash clothing before reuse.
-P370+P378: In case of fire, use dry sand, dry chemical or alcohol-resistant foam to extinguish.
-P402+P404: Store in s dry place. Store in a closed container.
-P501: Dispose of contents/container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC):
-None identified.

Section 3- COMPOSITION/INFORMATION ON INGREDIANTS

COMPONENT	CAS-No	Molecular Weight
Barium	**7440-39-3**	**137.33 g/mol**

Section 4- FIRST AID MEASURES

GENERAL ADVICE: Consult a physician if you feel unwell. 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. Call a poison center/physician if you feel unwell.

SKIN CONTACT: Brush off loose particles. Wash off with soap and plenty of water while removing all contaminated clothes and shoes. Seek medical attention if irritation develops or 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 or persists.

INGESTION: Rinse mouth with water. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur. If ingestion of a large amount occurs, call a poison control center immediately.

MOST IMPORTANT SYMPTOMS/EFFECTS: The most important known symptoms and effects are described in the labeling (see section 2) and/or in section 11.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED: No data available

Section 5- FIREFIGHTING MEASURES

Suitable Extinguishing Media:	**Unsuitable Extinguishing Media:**
Dry powder, dry sand, sodium chloride powder, graphite powder or Met-L-X powder	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.

Fire Fighting Instructions:
Move containers from fire area if you can do so without risk.

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

General Fire Hazards:
No data available

Section 6- ACCIDENTAL RELEASE MEASURES

Personal Precautions: Evacuate personnel to safe areas. Wear appropriate protective equipment and clothing during clean-up. Avoid dust formation. Avoid breathing vapors, mist or gas. For personal protection see section 8.

Environmental Precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for Containment & Clean Up:
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. For waste disposal, see Section 13. Do not flush with water. Keep in suitable, closed containers for disposal.

Section 7- HANDLING AND STORAGE

Handling: Further processing of solid material may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition. No smoking. Avoid prolonged exposure. Wear appropriate personal protection equipment. Observe good industrial hygiene practices. Wash hands thoroughly after handling.

Storage: Keep container tightly closed in a dry and well-ventilated place. Never allow product to get in contact with water during storage. Store under inert gas.

Section 8- EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines:

Components with Workplace Control Parameters:

Component	CAS-No.	Value	Control Parameters	Basis
Barium	7440-39-3	TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye, skin and Gastrointestinal irritation Muscular stimulation Not classifiable as a human carcinogen		
		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) Table Z-1 Limits for Air Contaminants
		TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye, skin and Gastrointestinal irritation Muscular stimulation Not classifiable as a human carcinogen		
		TWA	0.500000 mg/m3	USA.NIOSH Recommended Exposure Limits
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) Table Z-1 Limits for Air Contaminants
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye, skin and Gastrointestinal irritation Muscular stimulation Not classifiable as a human carcinogen		
		TWA	0.5 mg/m3	USA.NIOSH Recommended Exposure Limits
		PEL	0.5 mg/m3	California Permissible Exposure Limits for Chemical Contaminants (Title 8, Article 107)

Personal Protective Equipment:

Eye/Face Protection: Safety glasses with side shields. Use equipment for eye protection tested and approved under appropriate 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.

Flame retardant 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 N100 (US) or type P3 (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).

Control of Environmental Exposure: Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Section 9- PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
- **Physical State:** Solid
- **Color:** Grey

Odor: No data available
Odor Threshold: No data available
pH: No data available
Melting Point/Range: 725°C (1,337°F)
Initial Boiling Point/Range: 1,640°C (2,984°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: 3.6 g/mL at 25°C (77°F)
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 recommended storage conditions.

Possibility of Hazardous Reactions: Reacts violently with water.

Conditions to Avoid: Exposure to moisture. Contact with incompatible products.

Incompatible Materials: Oxidizing agents, water, acids, oxygen, chlorinated solvents, carbon dioxide (CO2), halogens, halogenated hydrocarbon, alcohols, sulfur compounds, hydrogen sulfide gas

Hazardous Decomposition Products:
Hazardous decomposition products formed under fire conditions - Barium Oxide
Other decomposition products - No data available

Section 11- TOXICOLOGICAL INFORMATION

Toxicological Effects:

Acute Toxicity: No information available
Inhalation: May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Dermal: No information available
Skin Corrosion/Irritation: No information available
Serious eye damage/irritation: Direct contact with eyes may cause temporary irritation
Respiratory or Skin Sensitization: No information available
Carcinogenicity: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP or EPA classification.
-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.
Mutagenic Effects: No information available
Reproductive Effects: No information available
Development Effects: No information available
STOT – single exposure: May cause respiratory irritation
STOT – repeated exposure: No information available
Aspiration Hazard: No information available
Additional Information: (RTECS: CQ8370000): Stomach/intestinal disorders, nausea, vomiting, drowsiness, dizziness, gastrointestinal disturbance, weakness, tremors, seizures.
To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

Section 12- ECOLOGICAL INFORMATION

Toxicity to Fish:
-mortality NOEC – Cyprinodon variegatus (sheepshead minnow) – 500 mg/l – 96.0 h
-LC50 – Cyprinodon variegatus (sheepshead minnow) – 500 mg/l – 96.0 h
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. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

Section 14- TRANSPORT INFORMATION

DOT:
UN-No: 1400
Proper Shipping Name: Barium
Hazard Class: 4.3
Packing Group: II
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IATA:
UN-No: 1400
Proper Shipping Name: Barium
Hazard Class: 4.3
Packing Group: II

IMDG/IMO:
UN-No: 1400
Proper Shipping Name: Barium
Hazard Class: 4.3
Packing Group: II
EMS-No: F-G, S-O

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): The following components are subject to reporting levels established by SARA Title III, Section 313:

Component	CAS No.	Revision Date
Barium	7440-39-3	2007-07-01

SARA 311/312 Hazardous Chemical: Reactivity Hazard
CERCLA Hazardous Substance List (40 CFR 302.4): Barium (CAS 7440-39-3)
HMIS (USA):
Health Hazard: 0
Chronic Health Hazard:
Flammability: 3
Physical Hazard: 1
National Fire Protection Association (USA):
Health Hazard: 0
Fire Hazard: 3
Reactivity Hazard: 1
Special Hazard.I: W
US California Proposition 65: This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.
US California Candidate Chemicals List Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3 subd. (a)): Barium (CAS 7440-39-3)

US Massachusetts RTK – Substance List:

Component	CAS No.	Revision Date
Barium	7440-39-3	2007-07-01

US New Jersey Right-to-Know Act:

Component	CAS No.	Revision Date
Barium	7440-39-3	2007-07-01

US Pennsylvania RTK – Hazardous Substances:

Component	CAS No.	Revision Date
Barium	7440-39-3	2007-07-01

US Rhode Island RTK – Hazardous Substances:

Component	CAS No.	Revision Date
Barium	7440-39-3	2007-07-01

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.

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.

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