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SAFETY DATA SHEET

| Section 1- IDENTIFICATION | | |
|--|---|---|
| COMPOSITION DyF3 | | PRODUCT NAME Dysprosium Fluoride |
| SUPPLIER: Plasmaterials, Inc. 2268 Research Drive Livermore, CA 94550 Ph: 925-447-4030 | RECOMMENDED USE: Laboratory Chemicals Scientific Research | EMERGENCY TELEPHONE NUMBERS US: 001-800-424-9300 Europe: 001-703-527-3887 |

| Section 2- HAZARD(S) IDENTIFICATION | |
|---|--|
| Skin Corrosion/Irritation: Category 2 (H315) | Serious Eye Damage/Irritation: Category 2A (H319) |
| Physical Hazards: Not classified | Environmental Hazards: Not classified |
| OSHA Defined Hazards: Not classified | |
| Specific Target Organ Toxicity, Single Exposure: Category 3 (H335) | |
| LABEL ELEMENTS: | |
| Signal Word: Warning | |
| Hazard Symbol: | |
|  | |
| HAZARD STATEMENTS | |
| <ul style="list-style-type: none"> -H315: Causes skin irritation -H319: Causes serious eye irritation -H335: May cause respiratory irritation -H361: Suspected of damaging fertility or the unborn child -H362: May cause harm to breast-fed children -H373: May cause damage to organs through prolonged or repeated exposure | |
| PRECAUTIONARY STATEMENTS | |
| <ul style="list-style-type: none"> -P201: Obtain special instructions before use -P202: Do not handle until all safety precautions have been read and understood -P261: Avoid breathing dust, fume, gas, mist, vapors, spray -P263: Avoid contact during pregnancy/while nursing -P264: Wash face, hands and any exposed skin thoroughly after handling -P270: Do not eat, drink or smoke when using this product -P271: Use only outdoors or in a well-ventilated area -P280: Wear protective gloves, protective clothing, eye protection, face protection -P303+P352: IF ON SKIN: Wash with plenty of water -P304+P340: IF INHALED: Remove person 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. -P308+P313: IF EXPOSED OR CONCERNED: Get medical advice/attention -P312: Call a poison center/doctor if you feel unwell | |

- P321: Specific treatment (see this label)
- P322+P313: IF SKIN IRRITATION OCCURS: Get medical advice/attention
- P337+P313: IF EYE IRRITATION PERSISTS: Get medical advice/attention
- P362+P364: Take off contaminated clothing and wash before reuse
- P403+P233: Store in a well-ventilated place. Keep container tightly closed
- P405: Store locked up
- P501: Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC):

- Weak hydrogen fluoride-releaser

Section 3- COMPOSITION/INFORMATION ON INGREDIENTS

| COMPONENT | CAS-No | Molecular Weight |
|---------------------|------------|------------------|
| Dysprosium Fluoride | 13569-80-7 | 219.50 g/mol |

Section 4- FIRST AID MEASURES

Inhalation: Remove victim from exposure to fresh air and keep at rest in a position comfortable for breathing. Give oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Call a poison control center or doctor/physician if you feel unwell.

Skin Contact: Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye Contact: Immediately flush eyes with lukewarm water, lifting upper and lower lids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists, get medical advice/attention.

Ingestion: Rinse mouth with water. Never give anything by mouth to an unconscious person. Call a poison center or doctor/physician if you feel unwell.

Most Important Symptoms/Effects: The most important known symptoms and effects are described in the labeling (see section 2) and/or in section 11. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling and blurred vision. May cause respiratory irritation. Skin irritation: may cause redness and pain. Prolonged exposure may cause chronic effects.

General Advice: Hydrofluoric (HF) acid burns require immediate and specialized first aid and medical treatment. Symptoms may be delayed up to 24 hours depending on the concentration of HF. After decontamination with water, further damage can occur due to penetration/absorption of the fluoride ion. Treatment should be directed toward binding the fluoride ion as well as the effects of exposure. Skin exposures can be treated with a 2.5% calcium gluconate gel/paste repeated until burning ceases. More serious skin exposures may require subcutaneous calcium gluconate except for digital areas unless the physician is experienced in this technique, due to potential for tissue injury from increased pressure. Absorption can readily occur through the subungual areas and should be considered when undergoing decontamination. Prevention of absorption of the fluoride ion in cases of ingestion can be obtained by giving milk, chewable calcium carbonate tablets or Milk of Magnesia to conscious victims. Conditions such as hypocalcemia, hypomagnesemia and cardiac arrhythmias should be monitored for, since they can occur after exposure.

If exposed or concerned: get medical advice/attention. If you feel unwell, seek medical advice. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed. Wash contaminated clothing before reuse.

Section 5- FIREFIGHTING MEASURES

Suitable Extinguishing Media:

Water Fog, Alcohol-Resistant Foam, Dry Chemical Powder, Carbon Dioxide (CO₂)

Unsuitable Extinguishing Media:

No Data Available

Specific Hazards Arising from the Chemical:

Hydrogen Fluoride (HF), Metal Oxides, Gases hazards 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 water spray to cool unopened containers. Use standard firefighting procedures and consider the hazards of other involved materials.

Section 6- ACCIDENTAL RELEASE MEASURES**Personal Precautions:**

Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not touch or walk through spilled material. Avoid dust formation. Avoid breathing dust, vapors, mist or gas. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Local authorities should be advised if significant spillages cannot be contained. For personnel protection see Section 8.

Environmental Precautions:

Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

Methods for Containment & Clean Up:

Stop the flow of material, if this is without risk. Sweep up and shovel spillage. Collect in suitable container for disposal according to local regulations. Never return spills to original containers for re-use. For waste disposal see Section 13.

Section 7- HANDLING AND STORAGE**Handling:**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid contact with eyes, skin and clothing. Avoid contact during pregnancy or while nursing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices. Use care in handling and storage. Further processing of solid materials 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.

Storage:

Store locked up. Store in original tightly closed container. Store in a cool, dry place out of direct sunlight. Store away from incompatible materials. Keep out of the reach of children.

Section 8- EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines:

Occupational Exposure Limits/Components with Workplace Control Parameters:

| Component | CAS-No. | Value | Control Parameters | Basis |
|---------------------|------------|--|-------------------------------------|---|
| Dysprosium Fluoride | 13569-80-7 | PEL | 2.5 mg/m ³ (as fluoride) | USA. Occupational Exposure Limits (OSHA) Table Z-1 Limits for Air Contaminants |
| | | TWA | 2.5 mg/m ³ | USA. Occupational Exposure Limits (OSHA) Table Z-2 Limits for Air Contaminants |
| | | TWA | 2.500000 mg/m ³ | USA. ACGIH Threshold Limit Values (TLV) |
| | Remarks | Bone Damage Fluorosis Substances for which there is a biological exposure index of indices Not classifiable as a human carcinogen Varies | | |
| | | PEL | 2.5 mg/m ³ | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

Biological Occupational Exposure Limits:

| Component | CAS-No. | Parameters | Value | Biological Specimen | Basis |
|---------------------|------------|--|-------------|---------------------|---|
| Dysprosium Fluoride | 13569-80-7 | Fluoride | 3.000mg/m | In Urine | ACGIH-Biological Exposure Indices (BEI) |
| | Remarks | Prior to shift (16 hours after exposure ceases) | | | |
| | | Fluoride | 10.0000mg/m | In Urine | ACGIH-Biological Exposure Indices (BEI) |
| | Remarks | End of shift (As soon as possible after exposure ceases) | | | |
| | | Fluoride | 2 mg/l | Urine | ACGIH-Biological Exposure Indices (BEI) |
| | Remarks | Prior to shift (16 hours after exposure ceases) | | | |
| | | Fluoride | 3 mg/l | Urine | ACGIH-Biological Exposure Indices (BEI) |
| | Remarks | End of shift (As soon as possible after exposure ceases) | | | |

Engineering Controls: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. 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. Provide eyewash station. Eye wash fountain and emergency showers are recommended.

Personal Protective Equipment:

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

Skin 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.

Body Protection: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific workplace. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory Protection: Respiratory protection is not required. 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).

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes and skin. 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: Solid
Color: No information available
Odor: No information available
Odor Threshold: No information available
pH: No information available
Melting Point/Range: No information available
Boiling Point/Range: No information available
Flash Point: No information available
Evaporation Rate: No information available
Flammability (solid,gas): No information available
Flammability or Explosive Limits:
 Upper: No data available
 Lower: No data available
Vapor Pressure: No information available
Vapor Density: No information available
Relative Density: No information available
Solubility: No information available
Partition coefficient; n-octanol/water: No information available
Auto Ignition Temperature: No information available
Decomposition Temperature: No information available
Viscosity: No information available
Explosive Properties: No information available
Oxidizing Properties: No information 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.

Conditions to Avoid: Contact with incompatible materials

Incompatible Materials: No information available

Hazardous Decomposition Products:

Hazardous decomposition products formed under fire conditions – Hydrogen Fluoride, Metal Oxide
Other decomposition products - No data available

Hazardous Polymerization: No information available

Hazardous Reactions: No information available

Section 11- TOXICOLOGICAL INFORMATION

Information on Toxicological Effects:

Acute Toxicity: May cause respiratory irritation

Inhalation: May cause irritation to the respiratory system. Prolonged inhalation may be harmful

Dermal: Causes skin irritation

Skin Corrosion/Irritation: Causes skin irritation.

Serious eye damage/irritation: Causes serious eye irritation

Ingestion: Due to lack of data the classification is not possible

Respiratory or Skin Sensitization: No information available

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

Germ Cell Mutagenicity: No information available

Reproductive Effects: May cause harm to breastfeed babies. Suspected of damaging fertility or

the unborn child.

Development Effects: No information available

Specific Target Organ Toxicity – single exposure: May cause respiratory tract irritation

Specific Target Organ Toxicity – repeated exposure: May cause damage to organs through prolonged or repeated exposure.

Aspiration Hazard: No information available

Chronic Effects: May cause damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful.

Additional Information: RTECS: Not available

-Fluoride ion can reduce serum calcium levels possibly causing fatal hypocalcemia

-Rare earth compounds may cause delayed blood clotting leading hemorrhages.

-Inhalation of rare earth metals may cause sensitivity to heat, itching, and increased awareness of odor and taste.

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

Section 12- ECOLOGICAL INFORMATION

Toxicity: Contains a substance which causes risk of hazardous effects to 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: 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/IMO: 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 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 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

US California Proposition 65: This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

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 New Jersey Right-to-Know Components:

| Component | CAS No. | Revision Date |
|---------------------|------------|---------------|
| Dysprosium Fluoride | 13569-80-7 | 2008-06-01 |

US Pennsylvania Right-to-Know Components:

| Component | CAS No. | Revision Date |
|---------------------|------------|---------------|
| Dysprosium Fluoride | 13569-80-7 | 2008-06-01 |

US Massachusetts Right-to-Know Components: No components are subject to the Massachusetts Right to Know Act

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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