



Issue Date 28-Sep-2022

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Version 1

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name Hafnium Hydroxide/Oxide

Other means of identification

Product Code SAC069

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended Use Chemical intermediate.

Uses advised against

Details of the supplier of the safety data sheet

Manufacturer Address

ATI, 116 15th Street, Suite 301, Box 1,
Pittsburgh, PA 15222 USA

Emergency telephone number

Emergency Telephone Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Inhalation (Dusts/Mists)	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3

Label elements

Emergency Overview

Warning

Hazard statements

Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
Harmful if inhaled



Appearance Powder

Physical state Solid

Odor Slight Ammonia or Sulfur

Precautionary Statements - Prevention

Avoid breathing dust/fume
 Wash hands thoroughly after handling
 Use only in well-ventilated areas
 Wear protective gloves/protective clothing/eye protection

Precautionary Statements - Response

IF ON SKIN: Wash with plenty of soap and water
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 If skin irritation occurs: Get medical advice/attention
 If eye irritation persists: Get medical advice/attention
 Take off contaminated clothing and wash before reuse

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable

Other Information

Contains low level of alpha emitting radioactive material.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Weight-%
Hafnium Oxide	12055-23-1	40 - 70
Hafnium Hydroxide	12027-05-3	30 - 60
Zirconium	7440-67-7	0 - 15
Ammonium Sulphate	7783-20-2	0 - 10
Uranium	7440-61-1	< 0.1

4. FIRST AID MEASURES

First aid measures

Eye contact In case of contact with eyes, rinse immediately. If eye irritation persists: Get medical advice/attention.

Skin Contact Wash off immediately with soap and plenty of water.

Inhalation IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Ingestion IF SWALLOWED. Call a POISON CENTER or doctor/physician if you feel unwell.

Most important symptoms and effects, both acute and delayed

Symptoms May cause skin, eye, or respiratory tract irritation.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Non-combustible.

Unsuitable extinguishing media Non-combustible.

Specific hazards arising from the chemical

Non-combustible.

Hazardous combustion products Not applicable.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Protective equipment and precautions for firefighters

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Use personal protective equipment as required.

For emergency responders Use personal protective equipment as required.

Environmental precautions

Environmental precautions Collect spillage to prevent release to the environment.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Sweep or shovel material into dry containers. Avoid creating uncontrolled dust.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep in properly labeled containers.

Incompatible materials Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL
Hafnium Oxide 12055-23-1	-	-
Hafnium Hydroxide 12027-05-3	-	-

Zirconium 7440-67-7	STEL: 10 mg/m ³ STEL: 10 mg/m ³ Zr TWA: 5 mg/m ³ TWA: 5 mg/m ³ Zr	TWA: 5 mg/m ³ Zr (vacated) STEL: 10 mg/m ³ (vacated) STEL: 10 mg/m ³ Zr
Ammonium Sulphate 7783-20-2	-	-
Uranium 7440-61-1	STEL: 0.6 mg/m ³ STEL: 0.6 mg/m ³ U TWA: 0.2 mg/m ³ natural TWA: 0.2 mg/m ³ U	(vacated) STEL: 0.6 mg/m ³

Appropriate engineering controls

Engineering Controls Avoid generation of uncontrolled particles.

Individual protection measures, such as personal protective equipment

- Eye/face protection** When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.
- Skin and body protection** Wear protective gloves.
- Respiratory protection** When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid	Odor	Slight Ammonia or Sulfur
Appearance	Powder	Odor threshold	-
Color	Tan or white		
Property	Values	Remarks • Method	
pH	-		
Melting point / freezing point	-		
Boiling point / boiling range	-		
Flash point	-		
Evaporation rate	-	Not applicable	
Flammability (solid, gas)	-	Not flammable	
Flammability Limit in Air	-	Not applicable	
Upper flammability limit:	-		
Lower flammability limit:	-		
Vapor pressure	-	Not applicable	
Vapor density	-	Not applicable	
Specific Gravity	-		
Water solubility	-	Insoluble	
Solubility in other solvents	-		
Partition coefficient	-	Not applicable	
Autoignition temperature	-	Not applicable	
Decomposition temperature	-	Not applicable	
Kinematic viscosity	-	Not applicable	
Dynamic viscosity	-	Not applicable	
Explosive properties	Not applicable		
Oxidizing properties	Not applicable		

Other Information

Softening point -

Molecular weight	-
VOC Content (%)	Not applicable
Density	9.68
Bulk density	-

10. STABILITY AND REACTIVITY

Reactivity

Not applicable

Chemical stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid

Dust formation and dust accumulation.

Incompatible materials

Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

Hazardous Decomposition Products

Not applicable.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation	May be harmful if inhaled. May cause respiratory irritation.
Eye contact	Causes serious eye irritation.
Skin Contact	Causes skin irritation.
Ingestion	Product not classified.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hafnium Oxide 12055-23-1	-	-	-
Hafnium Hydroxide 12027-05-3	-	-	-
Zirconium 7440-67-7	> 5000 mg/kg bw	-	>4.3 mg/L
Ammonium Sulphate 7783-20-2	4250 mg/kg bw	>2000 mg/kg bw	> 2 mg/L
Uranium 7440-61-1	-	-	-

Information on toxicological effects

Symptoms May cause skin, eye, or respiratory tract irritation.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Acute toxicity Harmful if inhaled.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.
Sensitization	Product not classified.
Germ cell mutagenicity	Product not classified.
Carcinogenicity	Product not classified.

Chemical Name	ACGIH	IARC	NTP	OSHA
Uranium 7440-61-1	A1	Group 1		X

Reproductive toxicity	Product not classified.
STOT - single exposure	May cause respiratory irritation.
STOT - repeated exposure	Product not classified.
Aspiration hazard	Product not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity

This product as shipped is not classified for aquatic toxicity.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Hafnium Oxide 12055-23-1	-	-	-	-
Hafnium Hydroxide 12027-05-3	-	-	-	-
Zirconium 7440-67-7	The 14 d NOEC of zirconium dichloride oxide to <i>Chlorella vulgaris</i> was greater than 102.5 mg of Zr/L.	The 96 h LL50 of zirconium to <i>Danio rerio</i> was greater than 74.03 mg/L.	-	The 48 h EC50 of zirconium dioxide to <i>Daphnia magna</i> was greater than 74.03 mg of Zr/L.
Ammonium Sulphate 7783-20-2	The 18 d EC50 of Ammonium sulphate to <i>Chlorella vulgaris</i> was 2700 mg/L.	The 96 h LC50 of Ammonium sulphate to <i>Danio rerio</i> was 480 mg/L.	The 30 min EC50 of Ammonium chloride for activated sludge was 1618 mg/L.	The 48-hr EC50 for <i>Daphnia magna</i> exposed to Ammonium sulphate was 169 mg/L.
Uranium 7440-61-1	-	-	-	-

Other adverse effects

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging Disposal should be in accordance with applicable regional, national and local laws and regulations.

This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. TRANSPORT INFORMATION

DOT Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Not Listed
ENCS	Not Listed
IECSC	Not Listed
KECL	Complies
PICCS	Not Listed
AICS	Not Listed

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations**California Proposition 65**

This product contains the Proposition 65 chemicals listed below. Proposition 65 warning label available at ATImetals.com.

Chemical Name	California Proposition 65
Uranium - 7440-61-1	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Zirconium 7440-67-7	X	X	X
Uranium 7440-61-1	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

<u>NFPA</u>	Health hazards 1	Flammability 0	Instability 0	Physical and Chemical Properties -
<u>HMIS</u>	Health hazards 2	Flammability 0	Physical hazards 0	Personal protection X

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Revision Note

New Safety Data Sheet

Note:

The information provided in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Additional information available from: Safety data sheets and labels available at ATImaterials.com