



SAFETY DATA SHEET

Issue Date 28-May-2015

Revision Date 22-Jan-2018

Version 4

Section 1: PRODUCT AND COMPANY IDENTIFICATION

A Product Name Hafnium Oxide
Synonyms Hafnium Oxide grades P, R, S and Spectro (Prod# 417, 404)
Product Code SAC005

B Recommended Use Alloy product manufacture
Uses advised against

C Supplier
Manufacturer
ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA

Emergency Telephone Chemtrec +1 703-741-5970

Section 2: HAZARDS IDENTIFICATION

A GHS - Classification

Not a hazardous substance or mixture according to the Globally Harmonized System (GHS)

B Label elements

Emergency Overview		
Appearance Powder	Physical state Solid	Odor Odorless

C Other Information

Hazards not otherwise classified (HNOC)
• Not applicable

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Hafnium Oxide grades P, R, S and Spectro (Prod# 417, 404).

Chemical Name	CAS No.	Weight-%
Hafnium Dioxide	12055-23-1	96-100
Zirconium Dioxide	1314-23-4	0-4

Section 4: FIRST AID MEASURES

A Eye contact In the case of particles coming in contact with eyes during processing, treat as with any foreign object

B Skin Contact None under normal use conditions

C Inhalation If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional

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

E Symptoms None anticipated.

F. Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically.

Section 5: FIRE FIGHTING MEASURES

- A Suitable extinguishing media** Non-combustible
- Unsuitable extinguishing media** Non-combustible
- B Specific hazards arising from the chemical** Non-combustible
- Hazardous combustion products** Not applicable.
- C Special protective equipment for fire-fighters** Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

- A Personal precautions** Use personal protective equipment as required.
- For emergency responders** Use personal protective equipment as required.
- B Environmental precautions** Collect spillage to prevent release to the environment
- C. 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

Section 7: HANDLING AND STORAGE

- A Advice on safe handling** Handle in accordance with good industrial hygiene and safety practice
- B Storage Conditions** Keep in properly labeled containers
- Incompatible materials** None known

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

A Control parameters

Chemical Name	Korea
Hafnium Dioxide	-
Zirconium Dioxide	STEL: 10 mg/m ³ TWA: 5 mg/m ³

B Engineering Controls Avoid generation of uncontrolled particles

C Personal Protective Equipment

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.

Eye/face protection

When airborne particles may be present, appropriate eye protection is recommended. For

<p>Skin and body protection</p> <p>General Hygiene Considerations</p>	<p>example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.</p> <p>Wear protective gloves.</p> <p>Handle in accordance with good industrial hygiene and safety practice.</p>
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Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

A Physical state	Solid		
Appearance	Powder	Color	white
B Odor	Odorless		
C Odor threshold	Not applicable		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
D pH	-	
E Melting point/freezing point	2760 °C / 5000 °F	
F Boiling point / boiling range	-	
G Flash point	-	Not applicable
H Evaporation rate	-	Not applicable
I Flammability (solid, gas)	-	Not flammable
J Flammability Limit in Air		
Upper flammability limit:	-	
Lower flammability limit:	-	
K Vapor pressure	-	Not applicable
L Solubility(ies)		
Water solubility	Insoluble	
Solubility in other solvents		
M Vapor density	-	Not applicable
N Specific Gravity	9.68	
O. Partition coefficient	-	Not applicable
P. Autoignition temperature	-	Not applicable
Q. Decomposition temperature	-	Not applicable
R Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
S. Molecular weight	-	

Other Information

Explosive properties	Not applicable
Oxidizing properties	Not applicable
Softening point	-
VOC Content (%)	Not applicable
Density	-
Bulk density	89-180 lb/ft3

Section 10: STABILITY AND REACTIVITY

A Stability	Stable under normal conditions
<u>Explosion data</u>	
Sensitivity to Mechanical Impact	None.
Sensitivity to Static Discharge	None.
B Possibility of Hazardous Reactions	None under normal processing
Hazardous polymerization	Hazardous polymerization does not occur
C Conditions to avoid	Dust formation and dust accumulation
D Incompatible materials	None known
E Hazardous Decomposition Products	Not applicable

products regulations

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

Section 14: TRANSPORT INFORMATION

A UN/ID No. Not regulated
B Proper shipping name Not regulated
C Hazard Class Not regulated
D Packing Group Not regulated
E Marine pollutant Not regulated

Section 15: REGULATORY INFORMATION

A Industrial Safety and Health Law

Chemical Name	ISHA - Harmful Substances Prohibited for Manufacturing, Importing, Transferring, or Supplying	Korea. Harmful Substances Requiring Permission	ISHA - Substances to be controlled - Organic Substances	ISHA - Substances to be controlled - Metals	ISHA - Substances to be controlled - Acids and bases
Hafnium Dioxide	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Zirconium Dioxide	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

B Toxic Chemicals Control Law Not applicable

Chemical Name	Toxic Chemical Classification Listing (TCCL) - Toxic Chemicals	Toxic Chemicals Control Law - Banned and/or restricted	Toxic Chemicals Control Law - Restrictions on use
Hafnium Dioxide	Not applicable	Not applicable	Not applicable
Zirconium Dioxide	Not applicable	Not applicable	Not applicable

C Dangerous Material Safety Control Not applicable

D Wastes Management Dispose of in accordance with federal, state and local regulations

E Other Regulations

Chemical Name	Toxic Release Inventory Chemicals - Group 1	Toxic Release Inventory Chemicals - Group 2
Hafnium Dioxide	Not applicable	Not applicable
Zirconium Dioxide	Not applicable	Not applicable

International Inventories

DSL/NDSL Complies
EINECS/ELINCS Complies
ENCS Complies
IECSC Complies
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

Section 16: OTHER INFORMATION**A Prepared By****B Issue Date** 28-May-2015**C Revision Date** 22-Jan-2018**Version** 4**Revision Note** Updated Section(s): 2, 5, 8, 9, 10, 15**D Other Information****Note:**

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End of Safety Data Sheet

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