SAFETY DATA SHEET

Issue Date 28-May-2015 **Revision Date** 30-Jun-2022 **Version** 5

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

Product identifier
Product Name Crushed Niobium E.B. Furnace Slag

Other means of identification
Product Code SAC007
Synonyms Crushed Niobium Electron Beam Furnace Slag: Crushed Columbium E.B. Furnace Slag (Product #118)

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, 1000 Six PPG Place, Pittsburgh, PA
15222 USA
Emergency telephone number
Emergency Telephone Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label elements

Emergency Overview

Appearance Chunks with powder **Physical state** Solid **Odor** Odorless

Hazards not otherwise classified (HNOC)
Not applicable
Other Information
.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Crushed Niobium Electron Beam Furnace Slag: Crushed Columbium E.B. Furnace Slag (Product #118).

Chemical Name	CAS No.	Weight-%
Niobium (Columbium)	7440-03-1	5 - 65
Diiron trioxide	1309-37-1	0 - 23

Hafnium Dioxide	12055-23-1	0 - 18
Diniobium Pentaoxide	1313-96-8	5 - 15
Aluminum	7429-90-5	1 - 15
Aluminum Oxide	1344-28-1	1 - 13
Zirconium Dioxide	1314-23-4	1 - 10
Titanium Dioxide	13463-67-7	0 - 6
Barium Aluminate	12004-04-05	0 - 2
Ditantalum Pentaoxide	1314-61-0	0 - 1

4. FIRST AID MEASURES

First aid measures

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

Skin Contact None under normal use conditions.

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

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

Most important symptoms and effects, both acute and delayed

Symptoms None anticipated.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product.

Unsuitable extinguishing media Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.

Specific hazards arising from the chemical
Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

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 Very fine, high surface area material resulting from processing this product may ignite spontaneously at room temperature. WARNING: Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

Incompatible materials Dissolves in hydrofluoric acid.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical Name	ACGIH TLV	OSHA PEL
Niobium (Columbium) 7440-03-1	-	-
Diiron trioxide 1309-37-1	-	-
Hafnium Dioxide 12055-23-1	TWA: 0.5 mg/m³ Hf	-
Diniobium Pentaoxide 1313-96-8	-	-
Aluminum 7429-90-5	TWA: 1 mg/m³ respirable fraction	TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction
Aluminum Oxide 1344-28-1	TWA: 1 mg/m³ respirable fraction	TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction
Zirconium Dioxide 1314-23-4	STEL: 10 mg/m³ Zr TWA: 5 mg/m³ Zr	TWA: 5 mg/m³ Zr (vacated) STEL: 10 mg/m³ Zr
Titanium Dioxide 13463-67-7	TWA: 10 mg/m³	TWA: 15 mg/m³ total dust
Barium Aluminate 12004-04-05	-	-
Ditantalum Pentaoxide 1314-61-0	-	TWA: 5 mg/m³ dust

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 Fire/flame resistant/retardant clothing may be appropriate during hot work with the product.

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		
Appearance	Chunks with powder	**Odor**	Odorless
Color	Metallic gray or silver	**Odor threshold**	Not applicable

Property	**Values**	**Remarks • Method**
pH	-	Not applicable
Melting point / freezing point	1800 °C / 3270 °F	
Boiling point / boiling range	-	
Flash point	-	Not applicable
Evaporation rate	-	Not applicable
Flammability (solid, gas)	-	Not flammable
Flammability Limit in Air		
Upper flammability limit:	-	
Lower flammability limit:	-	
Vapor pressure	-	Not applicable
Vapor density	-	Not applicable
Specific Gravity	5-7	
Water solubility	-	
Solubility in other solvents	-	
Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	
Explosive properties	Not applicable	
Oxidizing properties	Not applicable	

Other Information

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	140-160 lb/ft^3

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
Dissolves in hydrofluoric acid.

Hazardous Decomposition Products
Not applicable.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation Product not classified.

Eye contact Product not classified.

Skin Contact Product not classified.

Ingestion Product not classified.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Niobium (Columbium) 7440-03-1	> 10,000 mg/kg bw	> 2000 mg/kg bw	-
Diiron trioxide 1309-37-1	> 5000 mg/kg bw	-	> 5 mg/L
Hafnium Dioxide 12055-23-1	>2000 mg/kg bw	-	>4.3 mg/L
Diniobium Pentaoxide 1313-96-8	> 8000 mg/kg bw	-	> 3.89 mg/L
Aluminum 7429-90-5	15,900 mg/kg bw	-	> 1 mg/L
Aluminum Oxide 1344-28-1	15,900 mg/kg bw	-	7.6 mg/L
Zirconium Dioxide 1314-23-4	>5000 mg/kg bw	-	>4.3 mg/L
Titanium Dioxide 13463-67-7	>5,000 mg/kg bw	-	> 6.82 mg/L
Barium Aluminate 12004-04-05	-	-	-
Ditantalum Pentaoxide 1314-61-0	> 8000 mg/kg bw	-	-

Information on toxicological effects

Symptoms None known.

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

Acute toxicity Product not classified.
Skin corrosion/irritation Product not classified.
Serious eye damage/eye irritation Product not classified.
Sensitization Product not classified.
Germ cell mutagenicity Product not classified.
Carcinogenicity Product not classified.

Chemical Name	ACGIH	IARC	NTP	OSHA
Titanium Dioxide		Group 2B		X

13463-67-7				

Reproductive toxicity Product not classified.
STOT - single exposure Product not classified.
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
Niobium (Columbium) 7440-03-1	-	-	-	-
Diiron trioxide 1309-37-1	-	The 96 h LC50 of Diiron trioxide to Danio rerio was greater than or equal to 50,000 mg/L .	The 3 h EC50 of Diiron trioxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of Diiron trioxide to Daphnia magna was greater than or equal to 100 mg/L .
Hafnium Dioxide 12055-23-1	The 72 h EC50 of Hafnium dioxide in water to Pseudokirchneriella subcapitata was was greater than the solubility limit of 0.008 mg Hf/L	The 96 h LC50 of Hafnium dioxide in water to Danio rerio was greater than the solubility limit of 0.007 mg Hf/L	-	The 48 h EC50 of Hafnium dioxide to Daphnia magna was greater than the solubility limit of 0.007 mg Hf/L
Diniobium Pentaoxide 1313-96-8	The 72 h EC50 of Ditantalum pentaoxide to Desmodesmus subspicatus was greater than 1 mg/L	The 96 h LC50 of Ditantalum pentaoxide to Danio rerio was greater than or equal to 1 mg/L.	The 3 h EC50 of Ditantalum pentaoxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of Ditantalum pentaoxide to Daphnia magna was greater than or equal to 1 mg/L.
Aluminum 7429-90-5	The 96-h EC50 values for reduction of biomass of Pseudokirchneriella subcapitata in AAP-Medium at pH 6, 7, and 8 were estimated as 20.1, 5.4, and 150.6 µg/L, respectively, for dissolved Al.	The 96 h LC50 of aluminum to Oncorhynchus mykiss was 7.4 mg of Al/L at pH 6.5 and 14.6 mg of Al/L at pH 7.5	-	The 48-hr LC50 for Ceriodaphnia dubia exposed to Aluminium chloride increased from 0.72 to greater than 99.6 mg/L with water hardness increasing from 25 to 200 mg/L.
Aluminum Oxide 1344-28-1	The 96-h EC50 values for reduction of biomass of Pseudokirchneriella subcapitata in AAP-Medium at pH 6, 7, and 8 were estimated as 20.1, 5.4, and 150.6 µg/L, respectively, for dissolved Al.	The 96 h LC50 of Aluminum chloride to Oncorhynchus mykiss ranged from 7.4 mg of Al/L at pH 6.5 to 14.6 mg of Al/L at pH 7.5. The 96-hr LC50 for Pimephales promelas exposed to Aluminum chloride ranged from 1.16 to 44.8 mg/L with water hardness increasing from 25 to 200 mg/L.	-	The 48-hr EC50 for Ceriodaphnia dubia exposed to Aluminium chloride ranged from 1.9 to 2.6 mg/L with pH ranging from 7.42 to 8.13.
Zirconium Dioxide 1314-23-4	The 15 d NOEC of zirconium dichloride oxide to Chlorella vulgaris was greater than 200 mg/L	The 96 h LL50 of zirconium dioxide to Danio rerio was greater than 100 mg/L.	-	The 48 h EC50 of zirconium dioxide to Daphnia magna was greater than 100 mg/L
Titanium Dioxide 13463-67-7	The 72 h EC50 of titanium dioxide to Pseudokirchnerella subcapitata was 61 mg of TiO2/L.	The 96h LC50s values of titanium dioxide range from greater than 100 mg TiO2/L for Oncorhynchus mykiss to greater than 1000 mg TiO2/L for Pimephales promelas	The 3 h EC50 of titanium dioxide for activated sludge were greater than 1000 mg/L.	The 48 h LC50 of titanium dioxide to Daphnia magna was greater than 100 mg of TiO2/L.
Barium Aluminate 12004-04-05	-	-	-	-
Ditantalum Pentaoxide 1314-61-0	-	-	-	-

Persistence and degradability

Bioaccumulation

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	Complies
ENCS	Complies
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 contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Aluminum Oxide - 1344-28-1	1344-28-1	1 - 13	1.0 (fibrous forms only)

SARA 311/312 Hazard Categories

Acute health hazard	No
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
Titanium Dioxide - 13463-67-7	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Aluminum 7429-90-5	X	X	X
Aluminum Oxide 1344-28-1	X	X	X
Zirconium Dioxide 1314-23-4		X	
Titanium Dioxide 13463-67-7	X	X	X
Ditantalum Pentaoxide 1314-61-0	X		

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

NFPA	**Health hazards** 0	**Flammability** 0	**Instability** 0	**Physical and Chemical Properties** -
HMIS	**Health hazards** 1	**Flammability** 0	**Physical hazards** 0	**Personal protection** X

Chronic Hazard Star Legend ** = Chronic Health Hazard*

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Revision Note
SDS sections updated. 1, 3, 5, 7, 8, 9, 15.

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