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

Product identifier
Product Name
Niobium Thermite Slag

Other means of identification
Product Code
SAC025
Synonyms
Columbium Thermite Slag (Product #112)

Recommended use of the chemical and restrictions on use
Recommended Use
Niobium Compounds.
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 considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Hazard Statement</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmful if swallowed</td>
<td>Category 4</td>
</tr>
<tr>
<td>Causes severe skin burns and eye damage</td>
<td></td>
</tr>
<tr>
<td>Causes serious eye damage</td>
<td>Category 1 Sub-category B</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
</tbody>
</table>

Label elements

Emergency Overview

Danger

Hazard statements
Harmful if swallowed
Causes severe skin burns and eye damage
Causes serious eye damage

Appearance
Various blends of powders and chunks

Physical state
Solid

Odor
Odorless

Precautionary Statements - Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing, Rinse skin with water/shower
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms
Columbium Thermite Slag (Product #112).

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>1344-28-1</td>
<td>75-85</td>
</tr>
<tr>
<td>Barium Oxide</td>
<td>1304-28-5</td>
<td>15-25</td>
</tr>
<tr>
<td>Diniobium Pentaioxide</td>
<td>1313-96-8</td>
<td>0-3</td>
</tr>
<tr>
<td>Niobium (Columbium)</td>
<td>7440-03-1</td>
<td>0-3</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

First aid measures

Eye contact
Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin Contact
Remove dry material from skin with a dry cloth, then flush with plenty of water.

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

Ingestion
Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Call a physician or poison control center immediately.

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
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**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) respirator and full protective 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** See section 12 for additional ecological information.

### 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** None known.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide 1344-28-1</td>
<td>TWA: 1 mg/m³ respirable fraction</td>
<td>TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction</td>
</tr>
<tr>
<td>Barium Oxide 1304-28-5</td>
<td>TWA: 0.5 mg/m³ Ba</td>
<td>TWA: 0.5 mg/m³ Ba</td>
</tr>
<tr>
<td>Diniobium Pentaoxide 1313-96-8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niobium (Columbium) 7440-03-1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**
Engineering Controls

Avoid generation of uncontrolled particles.

Individual protection measures, such as personal protective equipment

Eye/face protection
If a risk of eye injury or irritation is present, appropriate eye protection is recommended; for example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shields the eyes.

Skin and body protection
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Various blends of powders and chunks</td>
<td>Odor Odorless</td>
</tr>
<tr>
<td>Color</td>
<td>gray</td>
<td>Odor threshold Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>&gt;7</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>1900 °C / 3450 °F</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>-</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor density</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>4</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Water solubility</td>
<td>0.5-1</td>
<td>Soluble in water</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Softening point</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Molecular weight</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>VOC Content (%)</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Bulk density</td>
<td>150-190 lb/ft³</td>
<td></td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity
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
None known.

Hazardous Decomposition Products
Not applicable.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation
Product not classified.

Eye contact
Corrosive to the eyes and may cause severe damage including blindness.

Skin Contact
Contact causes severe skin irritation and possible burns.

Ingestion
Harmful if swallowed.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide 1344-28-1</td>
<td>15,900 mg/kg bw</td>
<td>-</td>
<td>7.6 mg/L</td>
</tr>
<tr>
<td>Barium Oxide 1304-28-5</td>
<td>146 mg/kg bw</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Niobium (Columbium) 7440-03-1</td>
<td>&gt; 10,000 mg/kg bw</td>
<td>&gt; 2000 mg/kg bw</td>
<td>-</td>
</tr>
<tr>
<td>Diniobium Pentaoxide 1313-96-8</td>
<td>&gt; 8000 mg/kg bw</td>
<td>-</td>
<td>&gt; 3.89 mg/L</td>
</tr>
</tbody>
</table>

Information on toxicological effects

Symptoms
None known.

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

Acute toxicity
Harmful if swallowed.

Skin corrosion/irritation
Causes severe burns.

Serious eye damage/eye irritation
Risk of serious damage to eyes.

Sensitization
Product not classified.

Germ cell mutagenicity
Product not classified.

Carcinogenicity
Product not classified.

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.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Toxicity to microorganisms</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide 1344-28-1</td>
<td>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.</td>
<td>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.</td>
<td>-</td>
<td>The 48-hr EC50 for Ceriodaphnia dubia exposed to Aluminum chloride ranged from 1.9 to 2.6 mg/L with pH ranging from 7.42 to 8.13.</td>
</tr>
<tr>
<td>Barium Oxide 1304-28-5</td>
<td>The 96 h IC50 of Barium to Lemna minor was 102 mg/L.</td>
<td>The 28-day LC50 of Barium to Oncorhynchus mykiss was 42.7 mg/L.</td>
<td>The 3 h EC50 of Barium Oxide for activated sludge was greater than 1000 mg/L.</td>
<td>The 48-hr EC50 for Daphnia magna exposed to Barium was 14.5 mg/L.</td>
</tr>
<tr>
<td>Dintalum Pentaoxide 1313-96-8</td>
<td>The 72 h EC50 of Dintalum pentaoxide to Desmodesmus subspicatus was greater than 1 mg/L.</td>
<td>The 96 h LC50 of Dintalum pentaoxide to Danio rerio was greater than or equal to 1 mg/L.</td>
<td>The 3 h EC50 of Dintalum pentaoxide for activated sludge was greater than 10,000 mg/L.</td>
<td>The 48 h EC50 of Dintalum pentaoxide to Daphnia magna was greater than or equal to 1 mg/L.</td>
</tr>
<tr>
<td>Niobium (Columbium) 7440-03-1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>TSCA</th>
<th>DSL/NDSL</th>
<th>EINECS/ELINCS</th>
<th>ENCS</th>
<th>IECSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complies</td>
<td>Complies</td>
<td>Complies</td>
<td>Complies</td>
<td>Complies</td>
</tr>
</tbody>
</table>
KECL  Complies
PICCS  Complies
AICS  Complies

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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide - 1344-28-1</td>
<td>1344-28-1</td>
<td>75-85</td>
<td>1.0</td>
</tr>
<tr>
<td>Barium Oxide - 1304-28-5</td>
<td>1304-28-5</td>
<td>15-25</td>
<td>1.0</td>
</tr>
</tbody>
</table>

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 does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide 1344-28-1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Barium Oxide 1304-28-5</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

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

16. OTHER INFORMATION
Chronic Hazard Star Legend

* = Chronic Health Hazard

Issue Date
12-Jun-2015

Revision Date
18-Dec-2015

Revision Note
Updated Section 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 ATImetals.com