Allegheny Technologies
Specialty Materials That Make Our World

MATERIAL SAFETY DATA SHEET
WAH CHANG
PO BOX 460 - ALBANY, OREGON - 97321

SECTION 1. **Revised: 2/20/2006** **Product Number: 401**

PRODUCT: HAFNIUM METAL

SYNONYMS: Crystal Bar Hafnium or Iodide Bar

CHEMICAL FAMILY:

HMIS HAZARD RATING: **HEALTH = 0** **FIRE = 0** **REACTIVITY = 0**

HMIS RATING: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic

24 HOUR EMERGENCY ASSISTANCE
WAH CHANG
An Allegheny Technologies Company
541-926-4211
CHEMTREC
800-424-9300

SECTION 2. COMPOSITION, INGREDIENTS INFORMATION

CHEMICAL COMPONENTS	%	C.A.S. NO.	OSHA/ACGIH EXPOSURE LIMITS mg/m^3 or ppm*	
			PEL	TLV
Hafnium, Hf	97-99.8	7440-58-6	0.5	0.5
Zirconium, Zr	up to 4.5	7440-67-7	5	10 (STEL)

PNOR = Particles Not Otherwise Regulated

SECTION 3. HAZARDS IDENTIFICATION

ROUTES OF ENTRY

INHALATION:	No
INGESTION:	No
SKIN ABSORPTION:	No
SKIN/EYE CONTACT:	No

N. Ap. = Not Applicable
N. Av. = Not Available

SECTION 4. FIRST AID MEASURES

INHALATION:	N.Ap.
EYE CONTACT:	Normal procedure for inert foreign object
SKIN CONTACT:	Normal procedure for cuts from sharp metal
INGESTION:	N.Ap.

SECTION 5. FIRE FIGHTING MEASURES

IGNITION POINT:	Solid hafnium metal bars will not ignite. High surface area material such as 10 micron powder may autoignite at room temperature.
FLAMMABLE LIMITS:	N.Av.
EXTINGUISHING MEDIA:	Type D Fire Extinguisher. Dry table salt.
FIRE FIGHTING PROCEDURES:	Isolate burning material. Allow large fires to burn out completely, yet prevent the fire from spreading. Wear reflective heat resistant suit. Control small fires by smothering with dry salt or use of a Tpye D dry-powder fire extinguishing material.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Do not spray water on burning fines, chips, powder, or sponge, for a violent explostion may result. This hazard increases with finer particle size. If a fire starts in a mass of wet metal fines, such as a barrel of damp machining chips, an explosion may follow with a very high temperature flash. Therefore, do not attempt to extinguish the fire. The explosive characteristic of such material is caused by the hydrogen and steam generated by the burning mass.

SECTION 6. ACCIDENTAL RELEASE MEASURES

SPILL OR LEAK PROCEDURES: Sweep up spilled sponge, powder and fines. Keep hafnium away from any source of ignition and cleanup spills immediately. During cleanup avoid generation of hafnium dust.

SECTION 7. HANDLING AND STORAGE

PRECAUTIONS TO TAKE DURING HANDLING AND STORAGE:

Machining of hafnium may generate fine turnings, chips, or dust. Any material with a dimension less than 0.0625 inch (1/16 in.), or a cross sectoin less than 0.0078 inch square (1/16 x 1/8), if present in any quantity, are highly flammable and will sustain combustion. Keep away from any source of ignition. Surface grinding of the material will generate showers of sparks, which may cause a fire hazard of surrounding combustible material. Keep fine turnings completely dry, or very wet. If wet, keep water content more than 25% by weight. Severe explosions can result from ignition of hafnium powder or machining fines containing moisture in the concentration range of 5 to 10%.

SECTION 8. EXPOSURE CONTROL, PERSONAL PROTECTION

RESPIRATORY PROTECTION: Wear appropriate NIOSH approved respirator while performing grinding operations generating respirable dust.

PROTECTIVE CLOTHING: Use gloves to avoid cuts.

EYE PROTECTION: Wear goggles or face shield while surface grinding.

ADDITIONAL PROTECTIVE MEASURES: Wear reflective heat resistant suit while burning fine scrap.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT @ 760 mm Hg:	4600°C
VAPOR DENSITY (AIR = 1):	N.Ap.
SPECIFIC GRAVITY (H_20 = 1):	13.30
Ph OF SOLUTIONS:	N.Ap.
FREEZING/MELTING POINT:	2227 +20°C
SOLUBILITY (WEIGHT % IN WATER):	Insoluble
BULK DENSITY:	830 lb/ft^3 (solid)
% VOLATILE BY VOLUME:	Nonvolatile
VAPOR PRESSURE:	0 @ 20°C
EVAPORATION RATE:	N.Ap.
HEAT OF SOLUTION:	N.Ap.
APPEARANCE AND ODOR:	Similar to stainless steel

SECTION 10. STABILITY AND REACTIVITY

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: See sections 5 & 7 for the Flammable Nature of Machining Fines.

INCOMPATIBILITY (Materials to Avoid): Hafnium metal is rapidly dissolved by hydrofluoric acid or hydrofluoric-nitric acid mixtures. Above 200°C, hafnium reacts exothermically with fluorine, chlorine, bromine, iodine, and with halocarbons, including carbon tetrachloride, carbon tetrafluoride and freons™.

HAZARDOUS DECOMPOSITION PRODUCTS: Hafnium metal does not decompose. The above reactions with incompatible materials will generate hazardous reaction products such as flammalbe hydrogen, toxic fumes of nitrogen oxides or corrosive hafnium halide vapors.

SECTION 11. TOXICOLOGICAL INFORMATION

TARGET ORGANS: None Known

TOXICITY DATA: Hafnium metal has no known toxicity. The metal is completely insoluble in water, saline solution, or body chemicals

CORROSIVE: No

CARCINOGEN: No

SENSITIZER: No

COMMENTS:

ACUTE EFFECTS FROM EXPOSURE: N.Av.

CHRONIC EFFECTS FROM EXPOSURE: N.Av.

REFERENCES: N.Ap.

SECTION 12. ECOLOGICAL PROTECTION

ENVIRONMENTAL HAZARDS: None. Hafnium is considered non-toxic.

SECTION 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Comply with Federal, State, and Local requirements for waste disposal. Fine, non-recyclable sponge, fines or dust may be considered a hazardous waste flammable solid.

SECTION 14. TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:
Not hazardous by D.O.T. regulations.

D.O.T PROPER SHIPPING NAME
N.Ap.

D.O.T. I.D. NUMBER
N.Ap.

PACKING GROUP
N.Ap.

HAZARD CLASS
N.Ap.

LABELS REQUIRED
N.Ap.

NORTH AMERICAN EMERGENCY RESPONSE GUIDE NUMBER
N.Ap.

SECTION 15. REGULATORY INFORMATION

Section 313 Supplier Notification: This product contains the following chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372): None

In addition to the ingredients listed in Section 2, this product contains the following chemicals considered by the State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as causing cancer or reproductive toxicity and for which warnings are now required: None

The Comprehensive Environmental Response, Compensation, and Liability Act of 1990, Sec102 (40 CFR 302) requires that any "release" into the "environment" of these hazardous substances contained in a product in excess of the "reportable quantity" in any 24-hour period must be immediately reported to the National Response Center (800-424-8802). Reporting is not required under certain circumstances such as a federally permitted release or the release of certain metal solid particles with a diameter larger than 100 micrometers: None

The Superfund Amendments and Reauthorization Act of 1986 (40 CFR 355) specifies certain emergency planning and notification requirements if these extremely hazardous substances are present in concentrations of greater than 1% at a facility in amounts greater than the threshold planning quantity: None

If this product is discarded as a waste, it would be identified with the following hazardous waste classification under the Resource Conservation and Recovery Act (40 CFR 261). The act specifies requirements for the management and disposal of hazardous wastes: If discarded this material could exhibit the characteristics of D001 Flammable solid. Site specific testing is required.

Components on Canadian "ingredient Disclosure List": All components listed on the Ingredient Disclosure List

TSCA (Toxic Substances Control Act): Components of this product listed on the TSCA Inventory are: All listed on TSCA Inventory

SECTION 16. OTHER INFORMATION

None

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