

United Nuclear

SCIENTIFIC EQUIPMENT & SUPPLIES

MSDS: Thorium Metal (Th-232)

SECTION 1: CHEMICAL PRODUCTS & COMPANY IDENTIFICATION

United Nuclear Scientific
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Klamath Falls, OR 97601

Phone Number: 541-205-6855

24 HR EMERGENCY Telephone Number

VelocityEHS (USA): 800-255-3924

Chemical Name: Thorium (metal)

Other Identifiers:

Use and Restriction: This material is prepared for use at analytic laboratories, which routinely handle thorium. United Nuclear expects that recipients of this material are in compliance with 29 CFR 1910.1200(h) which requires employers to provide employees with effective information and training on hazardous chemicals in their work area.

SECTION 2: HAZARDS IDENTIFICATION

Classifications/Hazards:

OSHA HAZARDS: Toxic by inhalation. Toxic by inges-

tion.

TARGET ORGANS: Kidney, liver, lungs, brain.

GHS Classification

Acute toxicity, Oral (Category

2)

Acute toxicity, Inhalation (Category 2)

Specific target organ toxicity – repeated exposure (Category

2) Acute aquatic toxicity (Category 2)

Chronic aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Hazard statement(s)

H300 + H330 May be fatal if dust inhaled

H373 May cause damage to organs through prolonged or repeated expo-

sure H411 Toxic to aquatic life with long lasting effects

H250 Finely divided material catches fire spontaneously if exposed to air.

Precautionary statement(s)

P220 Keep/Store away from clothing/combustible materials

P260 Do not breath dust/fume/gas/mist/vapours/spray.

P264 Wash hands thoroughly after handling

P273 Avoid release to environment
P284 Wear respiratory protection
P310 Immediately call Poison Center or doctor/physician

Other hazards

Radioactive
NFPA Rating
Health hazard: 3
Fire 0
Reactivity 3

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name: Thorium Metal (U) 100%.
CAS #: 7440-29-1
Chemical Family: Metal

SECTION 4: FIRST AID MEASURES

Indication of Immediate Medical Attention: In all routes of exposure, seek medical treatment immediately. Medical problems take priority over radiologic concerns. See treatment/first-aid measures below.

Necessary First Aid Measures:

INHALATION: Remove to fresh air. If breathing becomes difficult, call a physician.

INGESTION: If swallowed, wash out mouth with water provided person is conscious. Call a physician.

SKIN CONTACT: In case of contact, immediately wash skin with soap and copious amounts of water.

EYE CONTACT: In case of contact with eyes, flush with copious amounts of water for at least 20 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Most Important Symptoms/Effects, Acute and Delayed: Thorium is a nephrotoxin, damaging the kidneys. Thorium is a skin, eye, and mucous membrane irritant.

SECTION 5: FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical, carbon dioxide, water spray or regular foam.

Fire and Explosion Hazard: Dangerous fire hazard when exposed to heat or flame. Dangerous explosion hazard when exposed to heat or flame. Pyrophoric.

Hazardous combustion products: Thermal decomposition may release toxic and/or hazardous gases.

Special Protective Equipment and Precautions for Fire-Fighters: Move container from fire area if you can do it without risk. Wear self-contained breathing apparatus if necessary. Apply cooling water to sides of containers exposed to flames until well after fire is out. Do not move damaged containers; move undamaged containers out of fire zone. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Contact the local, State, or Department of Energy radiological response team. Use suitable agent for surrounding fire. Cool containers with flooding amounts of water, apply from as far a distance as possible. Avoid breathing dusts or vapors, keep upwind. Keep unnecessary people out of area until declared safe by radiological response team.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions and Protective Equipment: Avoid contact with eyes, skin and clothing. Avoid breathing dust. Wear respiratory protection, gloves, over garment and goggles. Evacuate personnel to safe areas.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling: Avoid contact with skin and eyes. wash hands thoroughly after handling.

Conditions for Safe Storage: Store in radioactive materials area. Keep container tightly closed. Store separately from incompatible materials. Observe all Federal, State and local regulations when storing this substance.

SECTION 8: EXPOSURE SONTROLS/PERSONAL PROTECTION

Exposure Limits:

Thorium, INSOLUBLE COMPOUNDS (As Th):

0.2 mg/m³ OSHA TWA; 0.6 mg/m³ OSHA STEL

0.2 mg/m³ ACGIH TWA; 0.6 mg/m³ ACGIH STEL

0.2 mg/m³ NIOSH Recommended TWA; 0.6 mg/m³ NIOSH Recommended

Occupational exposure to radioactive substances must adhere to standards established by the Occupational Safety and Health Administration., 29 CFR 1910.96, and/or the Nuclear Regulatory Commission, 10 CFR Part 20. IF purchased by DOE or DOE governed facilities subject to 10 CFR 835. Subject to foreign entity radiation protection regulations.

VENTILATION: At a minimum, provide local exhaust or process enclosure ventilation.

One method of controlling external radiation exposure is to provide adequate shielding. The absorbing material used and the thickness required to attenuate the radiation to acceptable levels depends on the type of radiation, its energy, the flux and the dimensions of the source.

ALPHA PARTICLES: For the energy range of alpha particles usually encountered, a fraction of a millimeter of any ordinary material or a few inches of air is sufficient for absorbency. Rubber, cardboard or any such material will suffice.

BETA PARTICLES: Beta particles are more penetrating than alpha, and require more shielding. Materials composed mostly of elements of low atomic number such as acrylic, aluminum and thick rubber are most appropriate for the absorption of beta particles. With high-energy beta radiation from large sources, Bremsstrahlung (X-ray production) contribution may become significant and it may be necessary to provide additional shielding of high atomic weight material, such as lead, to attenuate the Bremsstrahlung radiation. In the quantities shipped, Certified Reference Materials will not emit significant amounts of beta particles.

GAMMA RAYS: The most suitable materials shielding gamma radiation are lead and iron. Thorium is not considered a significant gamma emitter.

EYE PROTECTION: Employee must wear appropriate eye protection that will not allow the introduction of particles into the eyes. Contact lenses should not be worn.

Clothing, glove and eye protection equipment will provide protection against alpha particles.

CLOTHING: Disposable over-garments, including head coverings and foot covering, should be worn by any employee engaged in handling any radioactive substance. These garments are also recommended even if the employee is working with a "glovebox" containment system.

GLOVES: Employee must wear appropriate protective gloves to prevent contact with this substance. Used gloves may be contaminated and should be disposed of as radioactive waste.

RESPIRATOR: The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH pocket guide to chemical hazards; NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION: grayish white, dense, silvery, radioactive solid that is strongly electropositive. It is ductile and malleable and finely divided material ignites spontaneously in air.

Molecular weight: 232.04

Molecular formula: Th

Boiling point: 4787 C

Melting point: 1755 C

Specific Gravity: 11.71

Water Solubility: Insoluble

Solvent Solubility: Slightly Soluble in Acid

Partition Coefficient: Data Not Available

Auto-Ignition Temperature: Data Not Available

Decomposition Temperature: Data Not Available

Viscosity: Data Not Available

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability: Clean Thorium turnings or chips oxidize readily in air

Incompatible Materials: See below

CHLORINE: Violent Reaction

FLUORINE: Violent Reaction

NITRIC ACID: Reacts explosively or with the formation of an explosive surface coating or residue

NITROGEN OXIDE: Ignites

DINITROGEN TETROXIDE: Explodes or forms an explosive surface coating or residue

SELENIUM: Reacts violently

SULFUR: Reacts violently

WATER: Reaction Hazard

AMMONIA: Reacts violently

BROMIUM TRIFLUORIDE: Violent Reaction

TRICHLORO ETHYLENE: Violent Reaction

NITRYL FLUORIDE: Violent Reaction or glowing or white incandescence

CARBON DIOXIDE: At 750°C Interaction is so rapid that ignition will occur with the finely divided metal, and at 800°C the massive metal will ignite.

CARBON TETRACHLORIDE: Use of a carbon tetrachloride fire extinguisher on a Thorium fire may cause an explosion.

SECTION 11: TRANSPORTATION INFORMATION

The U.S. Department of Transportation (D.O.T.) Code of Federal Regulations (49 CFR Parts 100-185), the International Air Transportation Association (IATA), International Civil Aviation Organization (ICAO) and International Maritime Organization (IMDG) are all factored into the classification and transport of material.

UN/ID Number: To be determined on a case by case basis.

Classification of substances with multiple hazards must be determined in accordance with the criteria presented in the above mentioned regulations. Due to the various quantities/combinations of materials being shipped at one time, the information above must be determined based on the characteristics of the specific shipment.

SECTION 12: REGULATORY INFORMATION

ACUTE HAZARD: Y

CHRONIC HAZARD: Y

FIRE HAZARD: Y REACTIVITY

HAZARD: Y

SUDDEN RELEASE HAZARD: Y

SECTION 16 OTHER INFORMATION

This material is prepared for use as a standard or in interlaboratory comparison programs at analytical laboratories, which routinely handle Thorium. United Nuclear Scientific assumes that recipients of this material have developed internal safety procedures, which guard against accidental exposure to radioactive and toxic materials.

The information and recommendations set forth herein are presented in good faith and believed to be correct as of the revision date. However, recipients of this material should use this information only as a supplement to other information gathered by them, and should make independent judgement of the suitability and accuracy of this information. This statement is not intended to provide comprehensive instruction in developing an appropriate safety program and does not include all regulatory guidelines. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

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