

Safety Data Sheet

I. Product Identification

Manufacturer/Supplier:

QS Advanced Materials Inc

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Product Name: Hafnium Oxide (HfO₂) Sputtering Targets

Formula of major composition: HfO₂

CAS Number: 12055-23-1

II. Hazardous Identification

Classification of the substance or mixture

Not a hazardous substance or mixture.

GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

Hazards not otherwise classified (HNOC) or not covered by GHS - none

III. Composition/information on ingredients

Specific Gravity: No data.

Solubility in H₂O: Insoluble

Appearance and Odor: White solid, no order

IV. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

V. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Flammability: N/A

Autoignition Temperature: N/A

Flammable Limits: **Upper:** NA
Lower: NA

Extinguishing Media: Use suitable extinguishing media for surrounding material and type of fire.

Special Firefighting Procedures: Fire fighters must wear full face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. Fumes from fire are hazardous. Isolate runoff to prevent environmental pollution.

Unusual Fire & Explosion Hazards: NA

VI. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapors, mist or gas. For personal protection see section VIII.

6.2 Environmental precautions

No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section XIII.

VII. Handling and storage

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage class (TRGS 510): 13: Non-Combustible Solids

7.3 Specific end use(s)

Apart from the uses as laboratory chemicals no other specific uses are stipulated

VIII. Exposure controls/personal protection

Respiratory Protection:

NIOSH approved respirator.

Ventilation:

Use local exhaust to limit personal exposure to levels which do not exceed the TLV. General exhaust is recommended.

Protective Gloves:

Rubber gloves

Eye Protection:

Safety glasses

Appropriate engineering controls: General industrial hygiene practice.

IX. Physical and chemical properties

- a) **Appearance** White solid, no order
- b) **Odor** odorless
- c) **Odor Threshold** No data available
- d) **pH** Solid, no data available
- e) **Melting point** N.A.
- f) **Initial boiling point** N.A.
- g) **Flash point** Not applicable
- h) **Evaporation rate** No data available
- i) **Flammability (solid, gas)** The product is not flammable.
- j) **Upper/lower flammability or explosive limits** No data available

- k) **Vapour pressure** No data available
l) **Vapour density** No data available
m) **Water solubility** Insoluble

X. Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

No decomposition in regular fire conditions.

XI. Toxicological information

11.1 Information on toxicological effects Acute

toxicity

LD50 Oral - Rat - male and female - > 10,000 mg/kg

(OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 4 h - > 2.3 mg/l

(OECD Test Guideline 403)

Dermal: No data

available No data

available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 24

h (OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

(OECD Test Guideline

405)

Respiratory or skin sensitization

Draize Test - Guinea pig

Result: Does not cause skin sensitization.

- Mouse

Result: Does not cause respiratory sensitization.

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Cough, chest pain, Difficulty in breathing, Gastrointestinal disturbance

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

XII: Ecological information

12.1 Toxicity

No data available

12.2 Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bio accumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

XIII: Disposal considerations

13.1 Waste treatment methods Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

XIV: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

XV: Regulatory information

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Hafnium Oxide CAS-No. 12055-23-1 Revision Date 1994-04-01

SARA 311/312 Hazards

Chronic Health Hazard

XVI: Other information

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. **QSAM** shall not be held liable for any damage resulting from handling or from contact with the above product

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