

SAFETY DATA SHEET

Date Accessed: 25/08/2023

Date Revised: 03/02/2023

SECTION 1. IDENTIFICATION

Product Name: Scandia Stabilized Zirconium Oxide

CAS #: 151575-30-3

Relevant identified uses of the substance: Scientific research and development

Supplier details:

Stanford Advanced Materials

E-mail: sales@samaterials.com

Tel: (949) 407-8904

Address: 23661 Birtcher Dr., Lake Forest, CA 92630 U.S.A.

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

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

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Synonyms : Scandia-stabilized zirconia, Scandium zirconium oxide, ScSZ, Sc6SZ

Hazardous components

Component Classification Concentration

Zirconium dioxide

CAS-No.

EC-No.

1314-23-4

215-227-2

$\geq 90 - \leq 100\%$

Hafnium dioxide

CAS-No.

EC-No.

12055-23-1

235-013-2

$\geq 1 - < 5\%$

Aluminum oxide

CAS-No. 1344-28-1 $\geq 1 - < 5\%$

EC-No.

215-691-6

SECTION 4. 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

SECTION 5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6. 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 8.

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 13.

SECTION 7. 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.

Hygroscopic. Keep in a dry place.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component CAS-No. Value Control

parameters

Basis

Zirconium dioxide 1314-23-4 TWA 5.000000

mg/m³

USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 5.000000

mg/m3

USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 5.000000

mg/m3

USA. ACGIH Threshold Limit Values

(TLV)

Remarks Not classifiable as a human carcinogen

STEL 10.000000

mg/m3

USA. ACGIH Threshold Limit Values

(TLV)

Not classifiable as a human carcinogen

TWA 5.000000

mg/m3

USA. NIOSH Recommended

Exposure LimitsST 10.000000

mg/m3

USA. NIOSH Recommended

Exposure Limits

TWA 5 mg/m3 USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 5 mg/m3 USA. ACGIH Threshold Limit Values

(TLV)

Not classifiable as a human carcinogen

STEL 10 mg/m3 USA. ACGIH Threshold Limit Values

(TLV)

Not classifiable as a human carcinogen

TWA 5 mg/m³ USA. NIOSH Recommended

Exposure Limits

ST 10 mg/m³ USA. NIOSH Recommended

Exposure Limits

PEL 5 mg/m³ California permissible exposure
limits for chemical contaminants

(Title 8, Article 107)

STEL 10 mg/m³ California permissible exposure
limits for chemical contaminants

(Title 8, Article 107)

Hafnium dioxide 12055-23-1 TWA 0.500000
mg/m³

USA. ACGIH Threshold Limit Values

(TLV)

Upper Respiratory Tract irritation

Eye irritation

Liver damage

TWA 0.500000

mg/m³

USA. NIOSH Recommended

Exposure Limits

TWA 0.5 mg/m³ USA. ACGIH Threshold Limit Values

(TLV)

Upper Respiratory Tract irritation

Eye irritation

Liver damage

TWA 0.5 mg/m³ USA. NIOSH Recommended

Exposure Limits

alpha-Alumina is the main component of technical grade alumina.

Corundum is natural Al₂O₃. Emery is an impure crystalline variety of Al₂O₃.

See Appendix D - Substances with No Established RELs

Aluminum oxide 1344-28-1 TWA 15.000000

mg/m³

USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 5.000000

mg/m³

USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants TWA 15.000000

mg/m³

USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 5.000000

mg/m³

USA. Occupational Exposure Limits

(OSHA) - Table Z-1 Limits for Air

Contaminants

TWA 1.000000

mg/m³

USA. ACGIH Threshold Limit Values

(TLV)

Lower Respiratory Tract irritation

Pneumoconiosis

Neurotoxicity

Not classifiable as a human carcinogen

varies

TWA 1.000000

mg/m³

USA. ACGIH Threshold Limit Values

(TLV)

Lower Respiratory Tract irritation

Pneumoconiosis

Neurotoxicity

Not classifiable as a human carcinogen

varies

TWA 1 mg/m³ USA. ACGIH Threshold Limit Values

(TLV)

Lower Respiratory Tract irritation

Pneumoconiosis

Neurotoxicity

Not classifiable as a human carcinogen

varies

PEL 10 mg/m³ California permissible exposure

limits for chemical contaminants

(Title 8, Article 107)

PEL 5 mg/m³ California permissible exposure

limits for chemical contaminants

(Title 8, Article 107)

Appropriate engineering controls

General industrial hygiene practice.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such

as

NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique

(without

touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated

gloves

after

use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection Choose body protection in relation to its type, to the concentration and amount of dangerous

substances, and

to the specific work-place., The type of protective equipment must be selected according to the

concentration

and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use

type

N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved

under

appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

No special environmental precautions required.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

b) Odor No data available

c) Odor Threshold No data available

d) pH No data available

e) Melting point/freezing
point

No data available

f) Initial boiling point and
boiling range

No data available

g) Flash point No data available

h) Evaporation rate No data available

i) Flammability (solid, gas) No data available

j) Upper/lower

flammability or

explosive limits

No data available

k) Vapor pressure No data available

l) Vapor density No data available

m) Relative density No data available

n) Water solubility No data available

o) Partition coefficient: noctanol/
water

No data available

p) Auto-ignition

temperature

No data available

q) Decomposition

temperature

No data available

r) Viscosity No data available

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information

No data available

SECTION 10. 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

No data available

10.6 Hazardous decomposition products

Other decomposition products - No data available

Hazardous decomposition products formed under fire conditions. - Aluminum oxide, Zirconium oxides,

Scandium oxide,

Hafnium oxide

In the event of fire: see section 5

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

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 identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

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

RTECS: Not available

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

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative 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

12.6 Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

SECTION 15. 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:

Aluminum oxideCAS-No.

1344-28-1

Revision Date

1994-04-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

Zirconium dioxide

CAS-No.

1314-23-4

Revision Date

1993-04-24

Aluminum oxide 1344-28-1 1994-04-01

Pennsylvania Right To Know Components

Zirconium dioxide

CAS-No.

1314-23-4

Revision Date

1993-04-24

Scandium oxide 12060-08-1

Aluminum oxide 1344-28-1 1994-04-01

New Jersey Right To Know Components

Zirconium dioxide

CAS-No.

1314-23-4

Revision Date

1993-04-24

Scandium oxide 12060-08-1

Hafnium dioxide 12055-23-1

Aluminum oxide 1344-28-1 1994-04-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). 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.