

SAFETY DATA SHEET

Date of Printing: 21-May-2024

Created:21-May-2024

Section 1.0

Identification of the substance / mixture and of the company

1.1 Product Identifier

Product Name : Ceria Stabilized Zirconia Micro Powder
HSN Code : 68042290
Physical state : Solid
Formula : $ZrO_2/ Ce-ZrO_2/ Ce_xZr_{1-x}O_2$
Synonyms : Ce-TZP
Cerium-stabilized zirconium dioxide
Cerium- stabilized zirconium oxide
Ceria stabilized zirconia

Chemical family : Inorganic Oxide

1.2 Recommended use of the substance/mixture and restrictions on use

Recommended use : Grinding media Non-Isolated Intermediate
For research and industrial use only

1.3 Details of the supplier of the safety data sheet

Stanford Advanced Materials
E-mail: sales@samaterials.com
Tel: (949) 407-8904

1.4 Emergency Telephone Number

Tel: (949) 407-8904

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Section 2.0

Hazard(s) identification

- 2.1 Classification of the substance or mixture** : Not classified (Reg. (EG)No.1272/2008)
2.2 Label elements : Not applicable (Reg. (EG)No.1272/2008)
2.3 Hazards not otherwise classified (HNOC) : No additional information available

Section 3.0

Composition / Information on Ingredients

- 3.1 Substance** : Not Applicable
- 3.2 Mixture**
Name : Sintered Ceria stabilized zirconia
CAS No. : Not available

Name of ingredient	Product Identifier (CAS No)	EINECS No	Wt %	GHS classification	REACH Reg.
Zirconium Oxide	1314-23-4	215-227-2	83	Not classified	01-2119486976-14
Cerium Oxide	1306-38-3	215-150-4	17	Not classified	01-2119488673-24

The product is obtained after undergoing thermal treatment of above mentioned raw materials and is inert. Its properties are not identical to those of its components.

Full text of hazard classes and H-statement : see section 16

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Section 4.0

Description of First Aid measures

4.1 Description of first aid measures

- General : Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; If not available show packaging or label.
- After inhaled : In case if dust is inhaled and there symptoms of cough or shortness of breath, move from exposure to a well ventilated place, and if breathing difficulty occurs then consult a physician.
- After skin contact : If irritation to skin occurs due to contact of dust then wash the affected area with fresh and clean water.
- After eye contact : If irritation occurs flush the eyes with fresh clean running tap water. Get medical attention if irritation continues
- After Ingestion : If substantial quantity of dust is swallowed, dilute with large amount of water, then consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Product dust generated through grinding, sanding or machining may cause irritation to the mucous membrane, eyes, skin and respiratory organs.

- Symptoms/injuries after inhalation : May cause irritation
- Symptoms/injuries after skin contact : May cause skin irritation
- Symptoms/injuries after eye contact : May cause eye irritation
- Symptoms/injuries after ingestion : No information available

4.3 Indication of any immediate medical attention and special treatment method

No additional information available

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Section 5.0

Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Product is not combustible and non-explosive.
Use a suitable extinguishing media for the surrounding fire
- Unsuitable extinguishing media : None known

5.2 Special hazards arising from the substrate or mixture

- Fire hazard : None known

5.3 Advice for firefighters

- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.
Avoid contact with skin and eyes. Do not breathe dust.

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Section 6.0

Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

- Protective equipment : Wear protective equipment as described in Section 8
- Emergency procedures : Evacuate unnecessary and unprotected personnel.
Avoid formation of product dust

6.1.2 For emergency responders

- Protective equipment : Do not attempt to take action without suitable protective equipment. Equip clean-up crew with proper protection. Use protective clothing, dust mask, and eye protection. For further information, refer to section 8: "Exposure controls/personal protection".

- 6.2 Environmental precautions : Prevent entry of product into sewers and public waters. Notify authorities if product enters sewers or public waters.
Avoid formation of product dust.

6.3 Methods and material for contamination and cleaning up

- For containment : Prevent migration and entry into sewers or streams
- Methods for cleaning up : Collect the pieces or dust by vacuum or mechanically for disposal and land filling as per local regulations. Avoid dust formation during cleaning.

6.4 Reference to other sections:

See Heading 8. Exposure controls and personal protection.

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Section 7.0

Handling and storage

7.1 Precautions for safe handling

Risk of slipping if the product is spilt on the floor. Use safety shoes while handling. Wear safety glasses for eye protection. Sweep up and recover into a container for reuse or disposal. If dust is generated, then wear personal protecting clothing including particle filter/dust mask and eye protection.

7.2 Hygiene Measures

Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.3 Conditions for safe storage, including any incompatibilities:

Storage conditions : Keep container tightly closed

Incompatible materials : Not known

Storage area : Material should be stored in well protected dry place, in its original packing.

7.4 Specific end uses

See section 1.2

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Section 8.0

Exposure controls and personal protection

8.1 Control parameters

Product dust generated through grinding, sanding or machining may cause irritation to the mucous membrane, eyes, skin and respiratory organs. The limits of dust concentration (mg/m^3) at the work-place have to be considered.

The general dust limit according to the TRGS 900, for dust which does not exhibit any mutagenic, carcinogenic, fibrogenic, allergising or toxic effect applies:

The OEL value for A dust (alveolar dust fraction) is $1.25 \text{ mg}/\text{m}^3$

The OEL value for E dust (inhalable dust fraction) is $10 \text{ mg}/\text{m}^3$

As the ingredients are present as a solid solution, the individual values for ZrO_2 (considering it as the major component) may be applicable for this material:

Zirconium Oxide (1314-23-4)*		
ACGIH	STEL (mg/m^3)	$10 \text{ mg}/\text{m}^3 \text{ Zr}$
	TWA (mg/m^3)	$5 \text{ mg}/\text{m}^3 \text{ Zr}$
OSHA	STEL (mg/m^3)	$10 \text{ mg}/\text{m}^3 \text{ Zr}$
	TWA (mg/m^3)	$5 \text{ mg}/\text{m}^3 \text{ Zr}$

8.2 Exposure controls

- Appropriate engineering controls : Provide local exhaust or general room ventilation. Suitable ventilation / dust extraction system must be used in the workplace or on the equipment.
- Personal protective equipment : Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- Hand protection : Neoprene or nitrile rubber gloves
- Eye protection : Safety glasses/goggles
- Skin and body protection : Wear suitable protective clothing. After work ensure that skin is cleaned and hand care products are used.
- Respiratory protection : In case of dust exposure respiratory protection equipment must be worn. FFP2/FFP3 dust masks with particle filters are recommended.

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Section 9.0

Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	Golden Brown
Surface Finish	:	Glossy, Satin Smooth
Condition	:	Solid
Odour	:	None
Melting point	:	>2000 °C
Freezing point	:	Not Applicable
Ignition point	:	Non Flammable
Density	:	6.2 ± 0.05 gm/cc
Hardness on Moh's Scale	:	9.0
Solubility in water	:	Non soluble
Porosity	:	Nil
Bead Sphericity 90%	:	≥0.95
PH	:	Not Applicable
Vapour Pressure	:	Not Applicable
Viscosity	:	Not Applicable
Vapour Density	:	Not Applicable
Partition Co-efficient	:	Not Applicable
Explosive Properties	:	Not Applicable
Oxidising Properties	:	Not Applicable

9.2 Other information

No additional information available

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Section 10.0

Stability and reactivity

10.1	Reactivity	:	Not known
10.2	Chemical stability	:	Stable
10.3	Possibility of hazardous reactions	:	Not known
10.4	Conditions to avoid	:	Not known
10.5	Incompatible materials	:	Not known
10.6	Hazardous decomposition products	:	Not known

Section 11.0

Toxicological information

11.1 Information on the toxicological effects

Acute toxicity	:	Not classified
Skin corrosion/irritation	:	Not classified
Serious eye damage/irritation	:	Not classified
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	No evidence of carcinogenic effect
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified
Symptoms/injuries after inhalation	:	Product dust generated through grinding, sanding or machining may cause irritation to the mucous membrane, eyes, skin and respiratory organs
Symptoms/injuries after skin contact	:	Product dust may cause skin irritation
Symptoms/injuries after eye contact	:	Product dust may cause eye irritation
Symptoms/injuries after ingestion	:	No information available

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Section 12.0

Ecological information

If used properly, no environmental problems are anticipated. Do not empty the product or collected dust into ground water or drains.

- | | | |
|--|---|---|
| 12.1 Toxicity | : | Not known |
| 12.2 Persistence & Degradability | : | Not known |
| 12.3 Bioaccumulative Potential | : | Not known |
| 12.4 Mobility in soil | : | |
| 12.5 Results of PBT and vPvB assessment | : | Product does not contain PBT or vPvB substances (see. REACH Annex XIII) |
| 12.6 Other Adverse Effect | : | |
| Effect on ozone layer | : | Not known |
| Effect on the global warming | : | No known effects from this product. |
| GWP mix comment | : | No known effects from this product. |

Section 13.0

Disposal considerations

13.1 Waste treatment methods

- | | | |
|---------------------------------|---|--|
| Sewage disposal recommendations | : | Do not dispose of waste into sewer |
| Waste disposal recommendations | : | Unless contaminated in service, this product is neutral to the environment. Landfill dispose in a safe manner in accordance with local/national regulations. |
| Ecology - waste materials | : | Avoid release to the environment |

Section 14.0

Transport information

No dangerous goods as defined by ADR/RID/ADN/GGVSEB, ICAO/IATA, IMDG, USDOT

- | | | |
|--|---|------------------------------|
| 14.1 UN number | : | Not regulated for transport. |
| 14.2 UN proper shipping name | : | Not applicable |
| 14.3 Transport hazard class(es) | : | Not applicable |
| 14.4 Packing | : | Not applicable |
| 14.5 Environmental Hazards | : | Not applicable |
| 14.6 Special Precautions for the user | : | See section 7 and 8 |
| 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code | : | Not applicable |

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Section 15.0

Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No classification or labelling applicable in accordance with Regulation (EC) No 1272/2008.

None of the chemicals in this product are considered highly hazardous by OSHA.

15.2 Chemical safety assessment

A chemical safety assessment of the product or its components is not available.

Section 16.0

Other information

16.1 Abbreviations and acronyms

REACH : Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals.

TWA : Time Weighted Average;

OEL : Occupational exposure limit;

ACGIH : American Conference of Governmental Industrial Hygienists;

OSHA : Occupational Safety and Health Administration;

CAS No. : Chemical Abstract Service Registration Number;

EINECS : European Inventory of Existing Commercial Chemical Substances

GHS : The Globally Harmonized System of Classification and labelling;

IATA : International Air Transport Association;

DOT : Department Of Transport;

IMDG : International Maritime Dangerous Goods;

RID : Regulations concerning the International Transport of Dangerous Goods by Rail;

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road;

ICAO : International Civil Aviation Organization

PBT : Persistent, bioaccumulative and toxic substances

vPvB : Very persistent and very bioaccumulative substances

Prepared by SAM.

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This SDS covers all grades of CSZ Powder. The information is based on the current state of our knowledge and relates to the product in its condition as applied. However, no guarantee, warranty or assurance is accepted either explicitly or implicitly for the accuracy, reliability and/or completeness of this information.

We expressly call on the person receiving this information to check on the suitability and completeness of this information for their particular application.