

# Safety Data Sheet

Issue Date: 03-Dec-2014

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Version 1

## 1. IDENTIFICATION

### Product Identifier

**Product Name** Ytria Stabilized Zirconia

### Other means of identification

**Synonyms** YSZ, Yttrium stabilized zirconium oxide, Zirconium(IV) oxide - yttria stabilized

### Recommended use of the chemical and restrictions on use

**Recommended Use** Laboratory chemicals and manufacture of substances.

### Details of the supplier of the safety data sheet

#### **Supplier Address**

Fuel Cell Store  
1902 Pinon Drive, Unit B  
College Station, Texas, USA 77845  
www.fuelcellstore.com

### Emergency Telephone Number

**Company Phone Number** Non-emergency calls/questions: 1-614-842-6606  
Fax: 1-614-842-6607

**Emergency Telephone (24 hr)** INFOTRAC 1-352-323-3500 (International)  
1-800-535-5053 (North America)

## 2. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** The product contains no substances which, at their given concentration, are considered to be hazardous to health.

**Appearance** White solid

**Physical State** Solid

**Odor** None

### Classification

This chemical does not meet the hazardous criteria set forth by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). However, this Safety Data Sheet (SDS) contains valuable information critical to the safe handling and proper use of this product. This SDS should be retained and available for employees and other users of this product.

### Unknown Acute Toxicity

100% of the mixture consists of ingredient(s) of unknown toxicity

**3. COMPOSITION/INFORMATION ON INGREDIENTS****Synonyms** YSZ.

| Chemical Name   | CAS No     | Weight-% |
|-----------------|------------|----------|
| Zirconium Oxide | 1314-23-4  | 78-94    |
| Yttrium Oxide   | 1314-36-9  | 4-20     |
| Hafnium Oxide   | 12055-23-1 | 1-2      |
| Aluminum Oxide  | 1344-28-1  | 0-3      |

\*\*If Chemical Name/CAS No is "proprietary" and/or Weight-% is listed as a range, the specific chemical identity and/or percentage of composition has been withheld as a trade secret.\*\*

**4. FIRST-AID MEASURES****First Aid Measures**

|                     |  |
|---------------------|--|
| <b>Eye Contact</b>  | Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician. |
| <b>Skin Contact</b> | Wash off immediately with plenty of water for at least 15 minutes.   |
| <b>Inhalation</b>   | Remove to fresh air.   |
| <b>Ingestion</b>    | Clean mouth with water and drink afterwards plenty of water.   |

**Most important symptoms and effects**

|                 |                 |
|-----------------|-----------------|
| <b>Symptoms</b> | Not determined. |
|-----------------|-----------------|

**Indication of any immediate medical attention and special treatment needed**

|                           |                        |
|---------------------------|------------------------|
| <b>Notes to Physician</b> | Treat symptomatically. |
|---------------------------|------------------------|

**5. FIRE-FIGHTING MEASURES****Suitable Extinguishing Media**

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Unsuitable Extinguishing Media** Not determined.

**Specific Hazards Arising from the Chemical**

Product is not flammable.

**Protective equipment and precautions for firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions, protective equipment and emergency procedures**

|                                  |   |
|----------------------------------|---|
| <b>Personal Precautions</b>      | Use personal protective equipment as required. Avoid creating dust.   |
| <b>Environmental Precautions</b> | Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. |

**Methods and material for containment and cleaning up**

**Methods for Containment** Prevent further leakage or spillage if safe to do so.

**Methods for Clean-Up** Keep in suitable, closed containers for disposal.

**7. HANDLING AND STORAGE****Precautions for safe handling**

**Advice on Safe Handling** Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Avoid generation of dust.

**Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Keep containers tightly closed in a dry, cool and well-ventilated place.

**Incompatible Materials** None known based on information supplied.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Exposure Guidelines**

| Chemical Name                | ACGIH TLV  | OSHA PEL   | NIOSH IDLH  |
|------------------------------|--|--|---|
| Zirconium Oxide<br>1314-23-4 | STEL: 10 mg/m <sup>3</sup> Zr<br>TWA: 5 mg/m <sup>3</sup> Zr | TWA: 5 mg/m <sup>3</sup> Zr<br>(vacated) TWA: 5 mg/m <sup>3</sup> Zr<br>(vacated) STEL: 10 mg/m <sup>3</sup> Zr  | IDLH: 25 mg/m <sup>3</sup> Zr<br>TWA: 5 mg/m <sup>3</sup> except Zirconium<br>tetrachloride Zr<br>STEL: 10 mg/m <sup>3</sup> Zr |
| Yttrium Oxide<br>1314-36-9   | TWA: 1 mg/m <sup>3</sup> Y                                   | -  | IDLH: 500 mg/m <sup>3</sup> Y<br>TWA: 1 mg/m <sup>3</sup> Y   |
| Hafnium Oxide<br>12055-23-1  | TWA: 0.5 mg/m <sup>3</sup> Hf                                | -  | IDLH: 50 mg/m <sup>3</sup> Hf<br>TWA: 0.5 mg/m <sup>3</sup> Hf  |
| Aluminum Oxide<br>1344-28-1  | TWA: 1 mg/m <sup>3</sup> respirable fraction                 | TWA: 15 mg/m <sup>3</sup> total dust<br>TWA: 5 mg/m <sup>3</sup> respirable fraction<br>(vacated) TWA: 10 mg/m <sup>3</sup> total<br>dust<br>(vacated) TWA: 5 mg/m <sup>3</sup><br>respirable fraction | -   |

**Appropriate engineering controls**

**Engineering Controls** Apply technical measures to comply with the occupational exposure limits.

**Individual protection measures, such as personal protective equipment**

**Eye/Face Protection** Avoid contact with eyes.

**Skin and Body Protection** Wear suitable protective clothing.

**Respiratory Protection** Ensure adequate ventilation, especially in confined areas. In case of inadequate ventilation wear respiratory protection.

**General Hygiene Considerations** Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

|                       |             |                       |                |
|-----------------------|-------------|-----------------------|----------------|
| <b>Physical State</b> | Solid       | <b>Odor</b>           | None           |
| <b>Appearance</b>     | White solid | <b>Odor Threshold</b> | Not determined |
| <b>Color</b>          | White       |                       |                |

| <u>Property</u>              | <u>Values</u>         | <u>Remarks • Method</u> |
|------------------------------|-----------------------|-------------------------|
| pH                           | Not determined        |                         |
| Melting Point/Freezing Point | ~ 2500 °C / ~4530 °F  |                         |
| Boiling Point/Boiling Range  | ~ 3800 °C / ~6870     |                         |
| Flash Point                  | Not determined        |                         |
| Evaporation Rate             | Not determined        |                         |
| Flammability (Solid, Gas)    | Not flammable         |                         |
| Upper Flammability Limits    | Not determined        |                         |
| Lower Flammability Limit     | Not determined        |                         |
| Vapor Pressure               | Not determined        |                         |
| Vapor Density                | Not determined        |                         |
| Specific Gravity             | Not determined        |                         |
| Water Solubility             | Practically insoluble |                         |
| Solubility in other solvents | Not determined        |                         |
| Partition Coefficient        | Not determined        |                         |
| Auto-ignition Temperature    | Not determined        |                         |
| Decomposition Temperature    | Not determined        |                         |
| Kinematic Viscosity          | Not determined        |                         |
| Dynamic Viscosity            | Not determined        |                         |
| Explosive Properties         | Not determined        |                         |
| Oxidizing Properties         | Not determined        |                         |

**10. STABILITY AND REACTIVITY****Reactivity**

Not reactive under normal conditions.

**Chemical Stability**

Stable under recommended storage conditions.

**Possibility of Hazardous Reactions**

None under normal processing.

**Conditions to Avoid**

Keep out of reach of children. Avoid generation of dust.

**Incompatible Materials**

None known based on information supplied.

**Hazardous Decomposition Products**

None known based on information supplied.

**11. TOXICOLOGICAL INFORMATION****Information on likely routes of exposure****Product Information**

**Eye Contact** Avoid contact with eyes.

**Skin Contact** Avoid contact with skin.

**Inhalation** Avoid inhalation of dust.

**Ingestion**

Do not ingest.

**Component Information**

| Chemical Name               | Oral LD50            | Dermal LD50 | Inhalation LC50 |
|-----------------------------|----------------------|-------------|-----------------|
| Aluminum Oxide<br>1344-28-1 | > 5000 mg/kg ( Rat ) | -           | -               |

**Information on physical, chemical and toxicological effects****Symptoms**

Please see section 4 of this SDS for symptoms.

**Delayed and immediate effects as well as chronic effects from short and long-term exposure****Carcinogenicity**

Based on the information provided, this product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

**Numerical measures of toxicity**

Not determined

**Unknown Acute Toxicity**

100% of the mixture consists of ingredient(s) of unknown toxicity.

**12. ECOLOGICAL INFORMATION****Ecotoxicity**

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

**Persistence/Degradability**

Not determined.

**Bioaccumulation**

Not determined.

**Mobility**

Not determined

**Other Adverse Effects**

Not determined

**13. DISPOSAL CONSIDERATIONS****Waste Treatment Methods****Disposal of Wastes**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

**Contaminated Packaging**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

**14. TRANSPORT INFORMATION**

|             |   |
|-------------|---|
| <b>Note</b> | Please see current shipping paper for most up to date shipping information, including exemptions and special circumstances. |
| <b>DOT</b>  | Not regulated   |
| <b>IATA</b> | Not regulated   |
| <b>IMDG</b> | Not regulated   |

## 15. REGULATORY INFORMATION

### International Inventories

| Chemical Name   | TSCA    | DSL | NDSL | EINECS  | ELINCS | ENCS    | IECSC | KECL    | PICCS | AICS |
|-----------------|---------|-----|------|---------|--------|---------|-------|---------|-------|------|
| Zirconium Oxide | Present | X   |      | Present |        | Present | X     | Present | X     | X    |
| Yttrium Oxide   | Present | X   |      | Present |        | Present | X     | Present | X     | X    |
| Hafnium Oxide   | Present | X   |      | Present |        | Present | X     | Present |       |      |
| Aluminum Oxide  | Present | X   |      | Present |        | Present | X     | Present | X     | X    |

#### Legend:

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

**ENCS** - Japan Existing and New Chemical Substances

**IECSC** - China Inventory of Existing Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

### US Federal Regulations

#### SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

| Chemical Name              | CAS No    | Weight-% | SARA 313 - Threshold Values % |
|----------------------------|-----------|----------|-------------------------------|
| Aluminum Oxide - 1344-28-1 | 1344-28-1 | 0-3      | 1.0                           |

### US State Regulations

#### California Proposition 65

This product does not contain any Proposition 65 chemicals.

### U.S. State Right-to-Know Regulations

| Chemical Name                | New Jersey | Massachusetts | Pennsylvania |
|------------------------------|------------|---------------|--------------|
| Zirconium Oxide<br>1314-23-4 |            | X             |              |
| Aluminum Oxide<br>1344-28-1  | X          | X             | X            |

**16. OTHER INFORMATION****NFPA****Health Hazards**

Not determined

**Flammability**

Not determined

**Instability**

Not determined

**Special Hazards**

Not determined

**HMIS****Health Hazards**

Not determined

**Flammability**

Not determined

**Physical Hazards**

Not determined

**Personal Protection**

Not determined

**Issue Date:** 03-Dec-2014  
**Revision Date:** 01-Oct-2015  
**Revision Note:** Company name change

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**