

Safety Data Sheet

Issue Date: 11-Nov-2015

Revision Date: 13-Nov-2015

Version 1

1. IDENTIFICATION

Product Identifier

Product Name Single Electrode Cell - Anode Only

Other means of identification

SDS # NT-016

Synonyms SECA.

Recommended use of the chemical and restrictions on use

Recommended Use Solid Oxide Fuel Cells.

Details of the supplier of the safety data sheet

Supplier Address

Nexceris, LLC
404 Enterprise Dr.
Lewis Center, OH 43035
www.nexceris.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

Appearance According to product specification

Physical State Solid

Classification

Acute toxicity - Inhalation (Vapors)	Category 4
Skin sensitization	Category 1
Carcinogenicity	Category 1A
Specific target organ toxicity (repeated exposure)	Category 1

Hazards Not Otherwise Classified (HNOC)

May be harmful if swallowed

Signal Word

Danger

Hazard Statements

Harmful if inhaled
May cause an allergic skin reaction
May cause cancer
Causes damage to organs through prolonged or repeated exposure



Precautionary Statements - Prevention

Obtain special instructions before use
 Do not handle until all safety precautions have been read and understood
 Use personal protective equipment as required
 Use only outdoors or in a well-ventilated area
 Contaminated work clothing must not be allowed out of the workplace
 Wear protective gloves
 Do not breathe dust/fume/gas/mist/vapors/spray
 Wash face, hands and any exposed skin thoroughly after handling
 Do not eat, drink or smoke when using this product

Precautionary Statements - Response

If exposed or concerned: Get medical advice/attention
 IF ON SKIN: Wash with plenty of soap and water
 If skin irritation or rash occurs: Get medical advice/attention
 Wash contaminated clothing before reuse
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 Call a poison center or doctor/physician if you feel unwell

Precautionary Statements - Storage

Store locked up
 Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Other Hazards

Harmful to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms

SECA.

Chemical Name	CAS No	Weight-%
Zirconium Oxide	1314-23-4	65-85
Nickel Oxide	1313-99-1	1.8-18
Scandium Oxide	12060-08-1	0-9
Cerium Oxide	1306-38-3	0.3-9
Hafnium Oxide	12055-23-1	1.5-2
Aluminum Oxide	1344-28-1	0-1
Cobalt Oxide	1308-06-1	0.01-2
Yttrium Oxide	1314-36-9	0-13
Samarium Oxide	12060-58-1	0.1-0.4
Gadolinium (III) Oxide	12064-62-9	0.1-1

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**General Advice**

Provide this SDS to medical personnel for treatment.

Eye Contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin Contact	IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Inhalation	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Ingestion	Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects

Symptoms	Harmful if inhaled. May cause an allergic reaction. Causes damage to organs through prolonged or repeated exposure.
-----------------	---

Indication of any immediate medical attention and special treatment needed

Notes to Physician	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

Not determined.

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

Personal Precautions	Use personal protective equipment as required.
Environmental Precautions	See Section 12 for additional 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. Obtain special instructions before use. Do not handle until all safety precautions have been read and
--------------------------------	--

understood. Use personal protective equipment as required. Use only outdoors or in a well-ventilated area. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves. Do not breathe dust/fume/gas/mist/vapors/spray. Wash face, hands, and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

- Storage Conditions** Keep container tightly closed and store in a cool, dry and well-ventilated place. Store locked up.
- 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 1314-23-4	STEL: 10 mg/m ³ Zr TWA: 5 mg/m ³ Zr	TWA: 5 mg/m ³ Zr (vacated) TWA: 5 mg/m ³ Zr (vacated) STEL: 10 mg/m ³ Zr	IDLH: 25 mg/m ³ Zr TWA: 5 mg/m ³ except Zirconium tetrachloride Zr STEL: 10 mg/m ³ Zr
Nickel Oxide 1313-99-1	TWA: 0.2 mg/m ³ Ni inhalable fraction	TWA: 1 mg/m ³ Ni (vacated) TWA: 1 mg/m ³ Ni	IDLH: 10 mg/m ³ Ni TWA: 0.015 mg/m ³ except Nickel carbonyl Ni
Hafnium Oxide 12055-23-1	TWA: 0.5 mg/m ³ Hf	-	IDLH: 50 mg/m ³ Hf TWA: 0.5 mg/m ³ Hf
Aluminum Oxide 1344-28-1	TWA: 1 mg/m ³ respirable fraction	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 10 mg/m ³ total dust (vacated) TWA: 5 mg/m ³ respirable fraction	-
Cobalt Oxide 1308-06-1	TWA: 0.02 mg/m ³ Co	-	-
Yttrium Oxide 1314-36-9	TWA: 1 mg/m ³ Y	-	IDLH: 500 mg/m ³ Y TWA: 1 mg/m ³ Y

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** Refer to 29 CFR 1910.133 for eye and face protection regulations.
- Skin and Body Protection** Refer to 29 CFR 1910.138 for appropriate skin and body protection.
- Respiratory Protection** Refer to 29 CFR 1910.134 for respiratory protection requirements.
- 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

Physical State	Solid	Odor	Not determined
Appearance	According to product specification	Odor Threshold	Not determined
Color	Not determined		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	Not determined	
Melting Point/Freezing Point	Not determined	
Boiling Point/Boiling Range	Not determined	
Flash Point	Not determined	
Evaporation Rate	Not determined	
Flammability (Solid, Gas)	Not determined	
Upper Flammability Limits	Not determined	
Lower Flammability Limit	Not determined	
Vapor Pressure	Not determined	
Vapor Density	Not determined	
Specific Gravity	Not determined	
Water Solubility	Not determined	
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.

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	May cause an allergic skin reaction.
Inhalation	Harmful if inhaled.
Ingestion	May be harmful if swallowed.

Component Information

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Nickel Oxide 1313-99-1	> 5000 mg/kg (Rat)	-	-
Cerium Oxide	> 1000 mg/kg (Rat)	> 2000 mg/kg (Rat)	> 2.01 mg/L (Rat) 4 h

1306-38-3			
Aluminum Oxide 1344-28-1	> 5000 mg/kg (Rat)	-	-
Cobalt Oxide 1308-06-1	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rat)	> 4.83 mg/L (Rat) 4 h
Samarium Oxide 12060-58-1	> 5 g/kg (Rat)	-	-
Gadolinium (III) Oxide 12064-62-9	> 5 g/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 The table below indicates whether each agency has listed any ingredient as a carcinogen. However, the product as a whole has not been tested.

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel Oxide 1313-99-1	A1	Group 1	Known	X
Cobalt Oxide 1308-06-1	A3	Group 2B		X

Legend

- ACGIH (American Conference of Governmental Industrial Hygienists)**
- A1 - Known Human Carcinogen
- A3 - Animal Carcinogen
- IARC (International Agency for Research on Cancer)**
- Group 1 - Carcinogenic to Humans
- Group 2B - Possibly Carcinogenic to Humans
- NTP (National Toxicology Program)**
- Known - Known Carcinogen
- OSHA (Occupational Safety and Health Administration of the US Department of Labor)**
- X - Present

Numerical measures of toxicity

Not determined

12. ECOLOGICAL INFORMATION

Ecotoxicity

Harmful to aquatic life with long lasting effects.

Component Information

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Nickel Oxide 1313-99-1	127.3: 72 h Pseudokirchneriella subcapitata mg/L EC50	100: 96 h Brachydanio rerio mg/L LC50 static		100: 48 h Daphnia magna mg/L EC50
Cobalt Oxide 1308-06-1	88: 72 h Pseudokirchneriella subcapitata mg/L EC50	136: 96 h Brachydanio rerio mg/L LC50 static		136: 48 h Daphnia magna mg/L EC50

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.

California Hazardous Waste Status

Chemical Name	California Hazardous Waste Status
Cobalt Oxide 1308-06-1	Toxic

14. TRANSPORT INFORMATION

Note Please see current shipping paper for most up to date shipping information, including exemptions and special circumstances.

DOT Not regulated

IATA Not regulated

IMDG
Marine Pollutant This material may meet the definition of a marine pollutant

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
Nickel Oxide	Present	X		Present		Present	X	Present	X	X
Scandium Oxide	Present	X		Present			X	Present		X
Cerium 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
Cobalt Oxide	Present	X		Present		Present	X	Present		X
Yttrium Oxide	Present	X		Present		Present	X	Present	X	X
Samarium Oxide	Present	X		Present		Present	X	Present		X
Gadolinium (III) 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

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

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 %
Nickel Oxide - 1313-99-1	1313-99-1	10.8	0.1
Cobalt Oxide - 1308-06-1	1308-06-1	0.5	0.1

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Nickel Oxide		X		

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals.

Chemical Name	California Proposition 65
Nickel Oxide - 1313-99-1	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Nickel Oxide 1313-99-1	X	X	X
Aluminum Oxide 1344-28-1	X	X	X
Cobalt Oxide 1308-06-1	X		X

16. OTHER INFORMATION

<u>NFPA</u>	Health Hazards Not determined	Flammability Not determined	Instability Not determined	Special Hazards Not determined
<u>HMIS</u>	Health Hazards Not determined	Flammability Not determined	Physical Hazards Not determined	Personal Protection Not determined

Issue Date: 11-Nov-2015
 Revision Date: 13-Nov-2015
 Revision Note: New format

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