

Safety Data Sheet

Issue Date: 02-Nov-2015

Revision Date: 13-Nov-2015

Version 1

1. IDENTIFICATION

Product Identifier

Product Name NextCell

Other means of identification

SDS # NT-014

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

| Chemical Name | CAS No | Weight-% |
|------------------------|------------|----------|
| Zirconium Oxide | 1314-23-4 | 60-90 |
| Nickel Oxide | 1313-99-1 | 1-20 |
| Scandium Oxide | 12060-08-1 | 0-10 |
| Lanthanum Oxide | 1312-81-8 | 0.5-15 |
| Cerium Oxide | 1306-38-3 | 0.1-12 |
| Manganese Oxide | 1317-35-7 | 0-10 |
| Hafnium Oxide | 12055-23-1 | 1-3 |
| Strontium Oxide | 1314-11-0 | 0.1-5 |
| Aluminum Oxide | 1344-28-1 | 0-1 |
| Gadolinium (III) Oxide | 12064-62-9 | 0.1-2 |
| Cobalt Oxide | 1308-06-1 | 0.01-2 |
| Yttrium Oxide | 1314-36-9 | 0-15 |
| Samarium Oxide | 12060-58-1 | 0.1-1 |
| Iron Oxide | 1332-37-2 | 0-10 |

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 | Toxic if inhaled. May cause an allergic skin reaction. Causes damage to organs through prolonged or repeated exposure. May be harmful if swallowed. |
|-----------------|---|

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 |
| Manganese Oxide 1317-35-7 | TWA: 0.02 mg/m ³ Mn TWA: 0.1 mg/m ³ Mn | (vacated) TWA: 1 mg/m ³ Mn (vacated) Ceiling: 5 mg/m ³ Ceiling: 5 mg/m ³ Mn | IDLH: 500 mg/m ³ Mn TWA: 1 mg/m ³ Mn STEL: 3 mg/m ³ Mn |
| 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 | | |

| | | |
|-----------------|---------------|-------------------------|
| Property | Values | Remarks • Method |
|-----------------|---------------|-------------------------|

| | |
|-------------------------------------|----------------|
| 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) | - | - |
| Lanthanum Oxide 1312-81-8 | > 8500 mg/kg (Rat) | - | - |
| Cerium Oxide 1306-38-3 | > 1000 mg/kg (Rat) | > 2000 mg/kg (Rat) | > 2.01 mg/L (Rat) 4 h |
| Aluminum Oxide 1344-28-1 | > 5000 mg/kg (Rat) | - | - |
| Gadolinium (III) Oxide 12064-62-9 | > 5 g/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) | - | - |

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

STOT - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

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 |
| Lanthanum Oxide | Present | X | | Present | | Present | X | Present | X | X |
| Cerium Oxide | Present | X | | Present | | Present | X | Present | X | X |
| Manganese Oxide | Present | X | | Present | | Present | X | Present | X | X |
| Hafnium Oxide | Present | X | | Present | | Present | X | Present | | |
| Strontium Oxide | Present | X | | Present | | Present | X | Present | | X |
| Aluminum Oxide | Present | X | | Present | | Present | X | Present | X | X |
| Gadolinium (III) 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 |

| | | | | | | | | | | |
|------------|---------|---|--|---------|--|---------|---|---------|---|---|
| Iron 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 | 9.4 | 0.1 |
| Manganese Oxide - 1317-35-7 | 1317-35-7 | 3.6 | 1.0 |
| Aluminum Oxide - 1344-28-1 | 1344-28-1 | 0-1 | 1.0 |
| Cobalt Oxide - 1308-06-1 | 1308-06-1 | 0.4 | 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 |
| Manganese Oxide 1317-35-7 | 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 | Flammability | Instability | Special Hazards |
| | Not determined | Not determined | Not determined | Not determined |
| <u>HMIS</u> | Health Hazards | Flammability | Physical Hazards | Personal Protection |
| | Not determined | Not determined | Not determined | Not determined |

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 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