

MATERIAL SAFETY DATA SHEET

Section I. Chemical Product and Company Identification

Product Name	Lanthanum Strontium Manganite Ink
Product Code	LSM20-I
CAS Number	Mixture
Supplier's Name	Fuel Cell Store
Address	1902 Pinon Drive, Unit B College Station, Texas, USA 77845
Information Telephone Number	614-842-6606
Date Prepared	May 9, 2011

Section II. Composition / Information on Ingredients

Component	CAS #	% (Optional)
Lanthanum oxide	1312-81-8	
Manganese oxide	1317-35-7	
Strontium oxide	1314-11-0	
Terpineol	8000-41-7	

Section III. Hazards Identification

- ◆ Hazard description: Irritant, harmful
- ◆ Information pertaining to particular dangers for man and environment
Irritating to eyes, respiratory system, and skin.
Harmful by inhalation, contact with skin, and ingestion.

Section IV. First Aid Measures

- ◆ **After inhalation**
Supply fresh air. If necessary, provide artificial respiration. Keep patient warm.
Seek immediate medical attention.
- ◆ **After skin contact**
Immediately wash with water and soap and rinse thoroughly. Remove contaminated clothing.
Seek immediate medical attention.
- ◆ **After eye contact**
Rinse opened eye for 15 minutes under running water. Then seek medical attention.
- ◆ **After ingestion**
Seek immediate medical attention.

Section V. Fire Fighting Measures

- ◆ **Suitable extinguishing agents**
Water fog, alcohol foam, dry chemical
- ◆ **Protective equipment:**
Use NIOSH approved self-contained breathing apparatus with full face piece operated in positive pressure mode, as evolved fumes are toxic and cause respiratory irritation. Wear fully protective impervious suit.

Section VI. Accidental Release Measures

- ◆ **Steps to be taken in case material is released or spilled:**
Clean spill with disposable paper towels and wash area with soap and water. Dispose of waste in accordance with all local, state, and federal regulations.
- ◆ **Protective equipment:**
Wear self-contained respirator. Wear fully protective impervious suit and rubber gloves.

Section VII. Handling and Storage

Handling

- ◆ **Information for safe handling:**
Keep container tightly sealed when not in use. Ensure good ventilation at the workplace.
- ◆ **Information about protection against explosions and fires:**
Keep away from open flame or sparks.

Storage

- ◆ **Requirements to be met by storerooms and receptacles:**
Store below flash point away from open flame or sparks.
- ◆ **Information about storage in one common storage facility:**
Do not store together with oxidizing, acidic, or caustic materials.
- ◆ **Further information about storage conditions:**
Store in cool, dry conditions in well sealed containers.

Section VIII. Exposure Controls and Personal Protection

- ◆ **Additional information about design of technical systems:**
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
- ◆ **Components with limit values that require monitoring at the workplace:**

Component	Limit Values (mg/m ³)	
	TWA	OSHA PEL
Manganese oxide as Mn	1	5-ceiling

- ◆ **Additional information:** No data
- ◆ **Personal protective equipment**
- ◆ **General protective and hygienic measures**
Standard precautionary measures for handling chemicals should be followed. Prevent eye contact with glasses or goggles, minimize skin contact, use with adequate ventilation to minimize inhalation of vapor. Do not smoke or eat in work areas. Wash hands thoroughly prior to smoking or eating.
- ◆ **Breathing equipment:**
Use suitable respirator when high concentrations are present.
- ◆ **Protection of hands:** Impervious gloves
- ◆ **Eye protection:** Safety glasses or goggles
- ◆ **Body protection:** Protective work clothing

Section IX. Physical and Chemical Properties

- ◆ **Form:** Paste
- ◆ **Color:** Black
- ◆ **Odor:** Mild
- ◆ **Melting point/Melting range:** Not determined
- ◆ **Boiling point/Boiling range:** 417°F
- ◆ **Sublimation temperature / start:** Not determined
- ◆ **Flash point:** 190°F
- ◆ **Flammability (solid, gaseous):** Not available
- ◆ **Ignition temperature:** Not available
- ◆ **Decomposition temperature:** Not determined
- ◆ **Danger of explosion:** Store below flash point away from open flame or sparks.
- ◆ **Explosion limits**
Lower: Not available
Upper: Not available
- ◆ **Vapor pressure:** <1 mm Hg (estimated for mixture, 20°C)
- ◆ **Density:** Not determined
- ◆ **Solubility in / Miscibility with water:** Negligible

Section X. Stability and Reactivity

- ◆ **Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.
- ◆ **Materials to be avoided:** Water/moisture, acids, oxidizing agents, caustics, carbon dioxide
- ◆ **Dangerous reactions:** No dangerous reactions known
- ◆ **Dangerous products of decomposition:** Combustion produces carbon monoxide, carbon dioxide, various hydrocarbons and metal oxides.

Section XI. Toxicological Information

- ◆ **Acute toxicity:** Unknown
- ◆ **Primary irritant effect**
 - Skin contact:** Irritant to skin and mucous membranes, may be corrosive
 - Eye contact:** Irritating effect, may be corrosive
- ◆ **Sensitization:** No sensitizing effects known.
- ◆ **Subacute to chronic toxicity:**

Lanthanons can cause delayed blood clotting leading to hemorrhages. Exposure may also lead to sensitivity to heat, itching, increased awareness of odor and taste, and liver damage.

Chronic exposure to manganese may cause impairment to the central nervous system. Symptoms include sluggishness, sleepiness, muscle weakness, loss of facial muscle control, edema, emotional disturbances, spastic gait and falling. Chronic manganese poisoning may develop after as little as three months of heavy exposure but usually cases develop after one to three years of exposure. Strontium has a low order of toxicity. High doses have caused changes in blood clotting factors, adrenal function and liver function.

Corrosive materials (such as SrO) are acutely destructive to the respiratory tract, eyes, skin and digestive tract. Eye contact may result in permanent damage and complete vision loss. Inhalation may result in respiratory effects such as inflammation, edema, and chemical pneumonitis. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Ingestion may cause damage to the mouth, throat and esophagus. May cause skin burns or irritation depending on the severity of the exposure.
- ◆ **Additional toxicological information:**

Danger through skin absorption.

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

Section XII. Environmental Information

- ◆ **General notes:**

Do not allow material to be released to the environment without proper governmental permits.

Section XIII. Disposal Information

- ◆ **Product:**
 - Recommendation**

Consult local, state, and federal regulations for proper disposal.
- ◆ **Uncleaned packagings:**
 - Recommendation**

Disposal must be made according to local, state, and federal regulations.

Section XIV. Transportation Information

- ◆ Not a hazardous material for transportation.
 - ◆ **DOT regulations:**
Hazard class: None
 - ◆ **Land transport ADR/RID (cross-border)**
ADR/RID class: None
 - ◆ **Maritime transport IMDG:**
IMDG Class: None
 - ◆ **Air transport ICAO-TI and IATA-DGR:**
ICAO/IATA Class: None
 - ◆ **Transport/Additional information:**
Not dangerous according to the above specifications.
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Section XV. Regulatory Information

- ◆ **Product related hazard information:**
 - ◆ **Hazard symbols:** Irritant, Harmful
 - ◆ **Risk phrases:**
Irritating to eyes, respiratory system and skin.
Harmful by inhalation, in contact with skin and if swallowed.
 - ◆ **Safety phrases:**
In case of contact with eyes, rinse immediately with plenty of water and seek medical attention. Wear suitable protective clothing.
 - ◆ **National regulations**
Components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory.
 - ◆ **Information about limitation of use:**
For use only by technically qualified individuals.
This product contains manganese and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.
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Section XVI. Other Information

This MSDS has been revised in the following section(s):
Section VIII. Exposure Controls and Personal Protection

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

MSDS Prepared by:

Fuel Cell Store
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College Station, Texas, USA 77845

Vendee and third persons assume the risk of injury proximately caused by the material if reasonable safety procedures are not followed as provided for in the data sheet, and vendor shall not be liable for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed.

All persons using this product, all persons working in an area where this product is used, and all persons handling this product should be familiar with the contents of this data sheet. This information should be effectively communicated to employees and others who might come in contact with the product.

While the information accumulated and set forth herein is believed to be accurate as of the date hereof, Nexceris, LLC makes no warrant with respect thereto and disclaims all liability from reliance thereon. Recipients are advised to confirm in advance that the information is current, applicable, and suitable for their particular circumstances.