

Safety Data Sheet

Issue Date: 14-Sep-2016

Revision Date: 26-Sep-2016

Version 1

1. IDENTIFICATION

Product Identifier

Product Name LSM Ink

Other means of identification

SDS # NT-018

Synonyms LSM Paste; Lanthanum Strontium Manganite Ink.

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

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 Black liquid

Physical state Liquid

Classification

| | |
|-----------------------------------|------------|
| Serious eye damage/eye irritation | Category 2 |
| Skin sensitization | Category 1 |

Hazards Not Otherwise Classified (HNOC)

Causes mild skin irritation

Signal Word

Warning

Hazard statements

Causes serious eye irritation

May cause an allergic skin reaction



Precautionary Statements - Prevention

Wash face, hands and any exposed skin thoroughly after handling
 Avoid breathing dust/fume/gas/mist/vapors/spray
 Contaminated work clothing must not be allowed out of the workplace
 Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 If eye irritation persists: 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

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

LSMYSZ; Lanthanum Strontium Manganite-Yttria Stabilized Zirconia.

| Chemical Name | CAS No. | Weight-% |
|----------------------------------|------------|----------|
| Manganese Oxide | 1317-35-7 | 7-25 |
| Urea RPW formaldehyde, butylated | 68002-19-7 | 2-9 |
| n-Butyl Alcohol | 71-36-3 | 1-2 |
| pin-2(3)-ene | 80-56-8 | 0-1 |
| Dipentene | 138-86-3 | 0-1 |

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 | If exposed or concerned: Get medical advice/attention. |
| Eye Contact | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. |
| Skin Contact | IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Remove and wash contaminated clothing before reuse. |
| Inhalation | IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Seek medical attention for further treatment. |
| Ingestion | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If conscious give 2 glasses of water to dilute. Seek medical attention if symptoms develop. |

Most important symptoms and effects

| | |
|-----------------|--|
| Symptoms | Causes mild skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. |
|-----------------|--|

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**

Product is not flammable or combustible.

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**Environmental precautions**

Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. See Section 13: DISPOSAL CONSIDERATIONS.

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

Prevent further leakage or spillage if safe to do so. Soak up and contain spill with an absorbent material.

Methods for Clean-Up

Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling****Advice on Safe Handling**

Wash face, hands and any exposed skin thoroughly after handling. Avoid breathing dust/fume/gas/mist/vapors/spray. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing and eye/face protection. Handle in accordance with good industrial hygiene and safety practice.

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

Keep container tightly closed and store in a cool, dry and well-ventilated place.

Incompatible Materials

Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

| Chemical Name | ACGIH TLV | OSHA PEL | NIOSH IDLH |
|------------------------------|--|---|---|
| Manganese Oxide 1317-35-7 | TWA: 0.02 mg/m ³ Mn respirable particulate matter TWA: 0.1 mg/m ³ Mn inhalable particulate matter | (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 |
| n-Butyl Alcohol 71-36-3 | TWA: 20 ppm | TWA: 100 ppm TWA: 300 mg/m ³ (vacated) S* (vacated) Ceiling: 50 ppm (vacated) Ceiling: 150 mg/m ³ | IDLH: 1400 ppm Ceiling: 50 ppm Ceiling: 150 mg/m ³ |
| pin-2(3)-ene 80-56-8 | TWA: 20 ppm | - | - |

Appropriate engineering controls

Engineering Controls Apply technical measures to comply with the occupational exposure limits. Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Chemical splash goggles. Refer to 29 CFR 1910.133 for eye and face protection regulations.

Skin and Body Protection Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Refer to 29 CFR 1910.138 for appropriate skin and body protection.

Respiratory Protection If necessary, wear a MSHA/NIOSH-approved respirator. 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 | Liquid | Odor | Not determined |
| Appearance | Black liquid | Odor Threshold | Not determined |
| Color | Black | | |

| <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 | |
| Flammability Limits in Air | | |
| Upper Flammability Limits | Not determined | |
| Lower Flammability Limit | Not determined | |
| Vapor Pressure | Not determined | |
| Vapor Density | Not determined | |
| Relative Density | 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. See Sec. 7 Handling & Storage.

Incompatible Materials

Strong oxidizing agents.

Hazardous Decomposition Products

None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

| | |
|---------------------|---|
| Eye Contact | Causes serious eye irritation. |
| Skin Contact | Causes mild skin irritation. May cause an allergic skin reaction. |
| Inhalation | Do not inhale. |
| Ingestion | Do not ingest. |

Component Information

| Chemical Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|---|----------------------|-------------|-----------------|
| Lanthanum Oxide 1312-81-8 | > 8500 mg/kg (Rat) | - | - |
| Terpineol 98-55-5 | = 5170 mg/kg (Rat) | - | - |
| 1-Methyl-4-(1-methylethylidene)- cyclohexene | = 4390 mg/kg (Rat) | - | - |

| | | | |
|----------------------------|---|---|------------------------|
| 586-62-9 | | | |
| n-Butyl Alcohol 71-36-3 | = 790 mg/kg (Rat) = 700 mg/kg (Rat) | = 3402 mg/kg (Rabbit) = 3400 mg/kg (Rabbit) | > 8000 ppm (Rat) 4 h |
| pin-2(3)-ene 80-56-8 | = 3700 mg/kg (Rat) | > 5000 mg/kg (Rat) | - |
| Dipentene 138-86-3 | = 5300 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

Sensitization May cause an allergic skin reaction.

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

12. ECOLOGICAL INFORMATION

Ecotoxicity

Harmful to aquatic life with long lasting effects.

Component Information

| Chemical Name | Algae/aquatic plants | Fish | Crustacea |
|----------------------------|---|--|---|
| n-Butyl Alcohol 71-36-3 | 500: 72 h Desmodemus subspicatus mg/L EC50 500: 96 h Desmodemus subspicatus mg/L EC50 | 100000 - 500000: 96 h Lepomis macrochirus µg/L LC50 static 1730 - 1910: 96 h Pimephales promelas mg/L LC50 static 1740: 96 h Pimephales promelas mg/L LC50 flow-through 1910000: 96 h Pimephales promelas µg/L LC50 static | 1897 - 2072: 48 h Daphnia magna mg/L EC50 Static 1983: 48 h Daphnia magna mg/L EC50 |
| pin-2(3)-ene 80-56-8 | | 0.28: 96 h Pimephales promelas mg/L LC50 static | 41: 48 h Daphnia magna mg/L LC50 |

Persistence/Degradability

Not determined.

Bioaccumulation

Not determined.

Mobility

| Chemical Name | Partition Coefficient |
|----------------------------|-----------------------|
| n-Butyl Alcohol 71-36-3 | 0.785 |
| pin-2(3)-ene 80-56-8 | 4.1 |

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.

US EPA Waste Number

| Chemical Name | RCRA | RCRA - Basis for Listing | RCRA - D Series Wastes | RCRA - U Series Wastes |
|----------------------------|------|-----------------------------------|------------------------|------------------------|
| n-Butyl Alcohol 71-36-3 | | Included in waste stream: F039 | | U031 |

California Hazardous Waste Status

| Chemical Name | California Hazardous Waste Status |
|----------------------------|-----------------------------------|
| n-Butyl Alcohol 71-36-3 | 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** Not regulated

15. REGULATORY INFORMATION

International Inventories

| Chemical Name | TSCA | DSL/NDSL | EINECS/E LINCS | ENCS | IECSC | KECL | PICCS | AICS |
|---|------|----------|----------------|---------|-------|---------|-------|------|
| Lanthanum Oxide | X | X | X | Present | X | Present | X | X |
| Manganese Oxide | X | X | X | Present | X | Present | X | X |
| Terpineol | X | X | X | Present | X | Present | X | X |
| 1-Methyl-4-(1-methylethylidene)-cyclohexene | X | X | X | Present | X | Present | X | X |
| Urea RPW formaldehyde, butylated | X | X | | Present | X | Present | X | X |
| Strontium Oxide | X | X | X | Present | X | Present | | X |
| n-Butyl Alcohol | X | X | X | Present | X | Present | X | X |
| pin-2(3)-ene | X | X | X | Present | X | Present | X | X |
| Dipentene | X | X | X | 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

| Chemical Name | Hazardous Substances RQs | CERCLA/SARA RQ | Reportable Quantity (RQ) |
|---------------|--------------------------|----------------|--------------------------|
|---------------|--------------------------|----------------|--------------------------|

| | | | |
|----------------------------|---------|--|--|
| n-Butyl Alcohol 71-36-3 | 5000 lb | | RQ 5000 lb final RQ RQ 2270 kg final RQ |
|----------------------------|---------|--|--|

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 % |
|-----------------------------|-----------|----------|-------------------------------|
| Manganese Oxide - 1317-35-7 | 1317-35-7 | 7-25 | 1.0 |
| n-Butyl Alcohol - 71-36-3 | 71-36-3 | 1-2 | 1.0 |

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

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 |
|---|------------|---------------|--------------|
| Manganese Oxide 1317-35-7 | X | X | X |
| 1-Methyl-4-(1-methylethylidene)- cyclohexene 586-62-9 | X | | |
| n-Butyl Alcohol 71-36-3 | X | X | X |
| pin-2(3)-ene 80-56-8 | X | X | X |
| Dipentene 138-86-3 | X | | |

16. OTHER INFORMATION

NFPA

Health Hazards

Flammability

Instability

Special Hazards

Not determined

Not determined

Not determined

Not determined

HMIS

Health Hazards

Flammability

Physical hazards

Personal Protection

Not determined

Not determined

Not determined

Not determined

Issue Date:

14-Sep-2016

Revision Date:

26-Sep-2016

Revision Note:

Updated SDS for LSM Ink

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