

NDLanthanum Strontium Manganate

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: NDLanthanum Strontium Manganate (LSM) Oxide

MANUFACTURER:
 NanoDynamics Inc.
 901 Fuhrmann Blvd.
 Buffalo, NY, U.S.A., 14203
 Phone: 716-853-4900 (8 AM to 5 PM EST,
 Monday to Friday)

FOR MORE INFORMATION CALL: (716) 853-4900

IN CASE OF EMERGENCY CALL: For Chemical Emergency Spill, Leak, Fire Exposure or Accident Call CHEMTREC Day or Night (1-800- 424-9300)

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME:</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
Manganese oxide	1317-35-7	35 - 37
Lanthanum oxide	1312-81-8	10 – 55
Strontium oxide	1314-11-0	8 – 53


This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Black/brown powder, no odor.

Danger! May react with water to produce heat and corrosive hydroxides. May cause eye and digestive tract burns. Causes severe skin irritation. Causes respiratory tract irritation. May cause adverse nervous system (Manganese poisoning), blood system and kidney effects. Keep away from moisture, strong acids and flammable or combustible materials. Avoid and control operations which generate dust.

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POTENTIAL HEALTH HAZARDS

TARGET ORGANS: Skin, eyes, respiratory system, digestive system, central nervous system, blood system, kidneys.

ROUTES OF ENTRY: Skin contact, eye contact, inhalation, ingestion.

ACUTE HEALTH HAZARDS:

SKIN: Product may react with moisture on the skin surface and result in severe irritation.

EYES: Direct contact causes severe irritation and/or caustic burns.

INHALATION: Harmful if inhaled. Inhalation of dusts or fumes may cause severe nose, throat and respiratory tract irritation. Inhalation of fumes may cause metal fume fever, a flu-like illness with symptoms including high temperature, metallic taste in mouth, nausea, general weakness and muscle aches. Additional symptoms similar to those listed for ingestion, may be experienced.

INGESTION: Harmful if swallowed. Causes severe irritation and/or corrosive damage to the mouth, throat and stomach. Symptoms may include abdominal pain, nausea, headache, chills, fever and hemoglobinuria (bloody urine). This product may also have an anti-coagulant affect on the blood, which will increase blood clotting time.

CHRONIC AFFECTS: Excessive inhalation or ingestion of manganese compounds can produce manganese poisoning. Chronic manganese exposures can lead to neurological problems such as apathy, drowsiness, weakness, spastic gait, paralysis, and other neurological problems resembling Parkinsonism. These symptoms can become progressive and permanent if not treated. Chronic ingestion and inhalation may affect the kidneys and the blood system. Prolonged or repeated inhalation could cause adverse respiratory effects and possibly chronic respiratory disease.

PRE-EXISTING MEDICAL CONDITONS AGGRAVATED: May aggravate pre-existing skin, respiratory and kidney problems.

4. FIRST AID MEASURES

SKIN: Immediately remove contaminated clothing and shoes. Wash skin thoroughly with mild soap and water, for at least 15 minutes. Obtain medical attention immediately. Launder contaminated clothing before reuse. Contaminated leather and shoes may need to be discarded.

EYES: Immediately flush eyes with gently flowing, running water for a minimum of 15 minutes. Obtain medical attention immediately.

INHALATION: Immediately remove person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, begin artificial respiration. Obtain medical attention immediately.

INGESTION: If ingested, do not induce vomiting. Obtain medical attention immediately. Never give anything by mouth to an unconscious or convulsing person.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: N/Av
AUTOIGNITION TEMPERATURE: N/Av
UPPER FLAME LIMIT (volume % in air): N/Av
LOWER FLAME LIMIT (volume % in air): N/Av
FLAME PROPAGATION RATE (solids): N/Av
OSHA FLAMMABILITY CLASS: Non-flammable

FIRE HAZARDS/CONDITIONS OF FLAMMABILITY: Not considered flammable. Product may react with water, producing heat and corrosive hydroxides. The heat that is produced may ignite nearby combustible materials. When present as a finely divided dust cloud, the material may be ignited by sparks.

EXTINGUISHING MEDIA: Use carbon dioxide, foam and dry chemicals. Avoid the use of water.

HAZARDOUS COMBUSTION PRODUCTS: Metallic oxides and other irritating fumes and smoke.

SPECIAL FIRE FIGHTING PRECAUTIONS / INSTRUCTIONS: Do not enter fire area without proper protection. Firefighters should wear proper chemically protective equipment and self-contained breathing apparatus with full facepiece. Move containers from fire area if it can be done without risk. Water spray may ONLY be useful in cooling equipment exposed to heat and flame.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Keep all other personnel upwind and away from the spill/release. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

ENVIRONMENTAL PRECAUTIONS: Ensure spilled product does not enter drains, sewers, waterways or confined spaces.

SPILL RESPONSE/CLEANUP: Eliminate all sources of ignition. Ventilate area of release. Stop leak if you can do so without risk. Using HEPA vacuum, or other dustless methods, gather up spilled material and place in suitable container for later disposal (see Section 13). Avoid generating dust. Contaminated absorbent material may pose the same hazards as the spilled product. Notify the appropriate authorities as required.

PROHIBITED MATERIALS: None known.

SPECIAL SPILL RESPONSE PROCEDURES: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the National Response Center in the United States (phone: 1-800-424-8002).
 DOT/CERCLA Reportable Quantity (RQ): None Reported.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

SAFE HANDLING PROCEDURES: This material is a harmful solid. Wear suitable protective equipment for dusty conditions during handling. Use only in a well-ventilated area. Do not inhale dusts or fumes. Avoid contact with eyes, skin and clothing. Keep away from extreme heat, sparks and flame. Keep away from moisture and flammable or combustible materials. Avoid and control operations which create dust. Keep away from strong acids and other incompatibles. Keep container tightly closed when not in use. Assume empty containers contain residues, which are hazardous. Wash hands before eating, drinking, smoking or use of toilet facilities. Immediately remove soiled clothing and wash it thoroughly before reuse.

STORAGE REQUIREMENTS: Store in a cool, dry, well-ventilated area away from heat, flame and incompatible materials. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.

SPECIAL PACKAGING MATERIALS: Always keep in containers made of the same materials as the supply container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use adequate ventilation to maintain air contaminants below exposure limits. Local or exhaust ventilation recommended for prolonged exposures or if the TLV is not known.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Protective gloves impervious to the material should be worn during use. Advice should be sought from glove suppliers. Additional protective clothing, such as long sleeve shirts, rubber apron and safety shoes, may be required to prevent skin contact. An eyewash station and safety shower should be made available in the immediate working area.

EYE PROTECTION: Use chemical goggles to prevent dusts from entering the eyes. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Respiratory protection is required if the airborne concentration exceeds the TLV. Use NIOSH-approved respirators suitable for dusts. Advice should be sought from respiratory protection specialists.

ADDITIONAL RECOMMENDATIONS: Do not inhale dusts or fumes. Avoid contact with eyes, skin and clothing. Do not eat, drink or smoke when working. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Immediately remove soiled clothing and wash it thoroughly before reuse. Leather and contaminated shoes, may require disposal.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>
Manganese oxide	0.2 mg/m ³ (Manganese and inorganic compounds)	5 mg/m ³ (ceiling) (Manganese compounds)
Lanthanum oxide	N/Av	N/Av
Strontium oxide	N/Av	N/Av

¹ = Limit established by General Chemical Corporation

² = Workplace Environmental Exposure Level (AIHA)

³ = Biological Exposure Index (ACGIH)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Black/brown powder,
PHYSICAL STATE:	Powder
ODOR:	No odor.
SPECIFIC GRAVITY (water = 1.0):	N/Av
SOLUBILITY IN WATER (weight %):	Insoluble
pH:	N/Av
BOILING POINT:	N/Av
MELTING POINT:	N/Av
VAPOR PRESSURE:	N/Av
VAPOR DENSITY (air = 1.0):	N/Av
EVAPORATION RATE:	N/Av
% VOLATILES:	N/Av
FLASH POINT:	N/Av

10. STABILITY AND REACTIVITY

STABILITY AND REACTIVITY: Stable under the recommended storage and handling conditions prescribed. Product may react with water, producing heat and corrosive hydroxides. The heat that is produced may ignite nearby combustible materials.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid sources of heat and flame. Avoid moisture and contact with flammable or combustible material.

MATERIALS TO AVOID (INCOMPATIBLES): Strong acids, water, bases, reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Lanthanum hydroxide, Strontium hydroxides.

11. TOXICOLOGICAL INFORMATION

Toxicological data: There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

<u>Ingredients</u>	<u>LC₅₀ (4hr)</u>	<u>LD₅₀ (mg/kg)</u>	
	<u>inh. rat</u>	<u>oral, rat</u>	<u>dermal, rabbit</u>
Manganese oxide	N/Av	N/Av	N/Av
Lanthanum oxide	N/Av	>8500	N/Av
Strontium oxide	N/Av	N/Av	N/Av

Carcinogenicity: None of the ingredients of this product are classified as carcinogenic by IARC, NTP or OSHA.

Reproductive effects, Teratogenicity, Mutagenicity: None known.

Sensitization to material: None known.

Synergistic materials: Not available.

Other important hazards: None known.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: The ecological characteristics of this product have not been fully investigated. The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment.

CHEMICAL FATE INFORMATION: There is no data available on the product itself.

13. DISPOSAL CONSIDERATIONS

HANDLING FOR DISPOSAL: Handle according to recommendations listed in Section 7.

METHODS FOR DISPOSAL: Dispose in accordance with all applicable federal, state and local regulations. Contact your local, state or federal environmental agency for specific rules.

RCRA: If this product, as supplied, becomes a waste, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US 49 CFR INFORMATION: Not regulated for shipments by ground within the continental United States.

IATA / ICAO INFORMATION: Not regulated for international shipments by air.

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

US INFORMATION:

TSCA INFORMTION: All ingredients are listed on the TSCA inventory.

EPA / CERCLA (40 CFR 302.4) INFORMATION: None known

SARA TITLE III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372: This product is not subject to the TSCA notification requirements, since it does not contain any Toxic Chemical constituents.

CALIFORNIA PROPOSITION 65: To the best of our knowledge, this product does not contain any chemicals known to the State of California to cause cancer or reproductive harm.

NEW JERSEY LABELING REQUIREMENTS: This product contains the following substances required to be disclosed on product labeling:

<u>Chemical Name</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>New Jersey Hazardous Substance</u>
Manganese oxide	1317-35-7	35 - 37	No
Lanthanum oxide	1312-81-8	10 – 55	No
Strontium oxide	1314-11-0	8 – 53	No

International Information:

Canadian CEPA information: All ingredients listed are present on the DSL.

Canadian WHMIS Classification: **Class D2B** – Materials Causing Other Toxic Effects, Toxic Material.

16. OTHER INFORMATION

Legend:

ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CEPA: Canadian Environmental Protection Act
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
DOT: Department of Transportation
DSL: Domestic Substances List
EPA: Environmental Protection Agency
EST: Eastern Standard Time
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
N/Ap: not applicable
NIOSH: National Institute of Occupational Safety and Health
NTP: National Toxicology Program
N/Av: Not available
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
RCRA: Resource Conservation and Recovery Act
TLV: Threshold Limit Values
SARA: Superfund Amendments & Reauthorization Act
TSCA: Toxic Substance Control Act
WHMIS: Workplace Hazardous Materials Information System

References:

1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2005.
2. International Agency for Research on Cancer Monographs, searched 2005.
3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, searched 2005 (Chempendium, HSDB and RTECs).
4. US EPA Title III List of Lists – January 27, 2005 version
5. California Proposition 65 List – August 19, 2005 version.

CURRENT ISSUE DATE: 9/8/05

PREVIOUS ISSUE DATE: N/A

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

N/A

OTHER INFORMATION:

N/A