

Safety Data Sheet

NANOMYTE® SP-10E (LMNO)

SECTION 1: PRODUCT & COMPANY IDENTIFICATION

1.1 Product Identifiers

Product Name: Lithium Manganese Nickel Oxide
 Product Number: SP-10E
 CAS Number: 12031-75-3
 REACH Number: A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration, or the registration is envisaged for a later registration deadline.

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Cathode material for lithium-ion batteries

1.3 Details of the Supplier of the Safety Data Sheet

Company: NEI Corporation
 Address: 400 Apgar Drive, Unit E
 Somerset, NJ 08873 – USA
 Phone: +1 (732) 868-3141
 Fax: +1 (732) 868-3143
 Email: productinfo@neicorporation.com

1.4 Emergency Telephone Number

Manufacturer: +1 (732) 868-3142 (9am to 6pm EST / UTC -0500)
 U.S. Poison Control Center: +1-800-222-1222

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture

Emergency Overview

OSHA Hazards: Carcinogen, Target Organ Effect, Skin sensitizer
 Target Organs: Lungs, Nerves

GHS Classification

Skin sensitization: Category 1
 Carcinogenicity: Category 2

HMIS Classification


Health Hazard: 2 (moderate)
 Chronic Health Hazard: *
 Flammability Hazard: 0
 Physical Hazard: 0

NFPA Rating

Health Hazard: 2 (moderate)
 Flammability Hazard: 0
 Reactivity Hazard: 0

2.2 Label Elements

GHS Label Elements, including precautionary statements

Pictogram(s): 

Signal Word: Warning

Hazard Statement(s):
 H317 May cause an allergic skin reaction
 H351 Suspected of causing cancer

Precautionary Statement(s):
 P261 Avoid breathing dust / fume / gas / mist / vapors / spray
 P280 Wear protective gloves, protective clothing, & eye protection
 P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor / physician if you feel unwell.

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- P302 + P352 IF ON SKIN: Wash with plenty of soap and water
- P304 + P312 IF INHALED: Call a POISON CENTER or doctor / physician if you feel unwell.
- P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P261 Avoid breathing dust / fume / gas / mist / vapors / spray

2.3 Other Hazards (not otherwise classified)

None

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS
3.1 Substances

- Synonyms: Lithium Manganese Nickel Oxide, Spinel, LMNO
- Formula: $\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$
- Molecular Weight: 365.38 g/mol

COMPONENT	CAS #	CONCENTRATION
Lithium Manganese Nickel Oxide	12031-75-3	> 98%

SECTION 4: FIRST AID MEASURES
4.1 Description of First Aid Measures
General Advice:

Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

After Inhalation:

Remove to fresh air. If not breathing give artificial respiration. Seek medical attention.

After Skin Contact:

Wash with soap and copious amounts of water. Seek medical attention if irritation develops.

After Eye Contact:

Immediately flush eyes copiously with water for at least 15 minutes. Seek medical attention.

After Swallowing:

Never give anything by mouth to an unconscious person. Rinse mouth with water. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

No Data Available

SECTION 5: FIREFIGHTING MEASURES
5.1 Suitable Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.2 Hazardous Combustion Products

Hazardous decomposition products formed under fire conditions: Nickel / nickel oxides, Lithium oxides, Manganese / manganese oxides

Other: None

5.3 Advice for Firefighters

Wear self-contained breathing apparatus for firefighting if necessary

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6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, see section 8.

6.2 Environmental Precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and Materials for Containment and Cleaning Up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in closed containers for disposal.

6.4 Reference to Other Sections

For disposal see Section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for Safe Handling

Appropriate personal protective equipment should be used at all times. Provide good ventilation or extraction. Avoid contact with eyes and skin. Wash hands thoroughly after handling. For precautions, see section 2.2.

7.2 Conditions for Safe Storage (including any incompatibilities)

Keep container tightly closed in a dry and well-ventilated place. Avoid moisture. Store under inert gas.

7.3 Specific End Uses

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure Controls**Appropriate Engineering Controls**

Handle under properly operating chemical fume hood having an average face velocity of at least 100 feet per minute. Handle in accordance with good industrial hygiene and safety practice. Keep away from food and beverages. Remove all soiled and contaminated clothing immediately. Wash hands after use.

Personal Protective Equipment**Respiratory Protection:**

Where risk assessment shows air-purifying respirators are appropriate, use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Eye / Face Protection:

Face shield and/or safety glasses should be worn. Use eye protection equipment that is tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Hand Protection:

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Skin and Body Protection:

Complete suit protecting against chemicals, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Control of Environmental Exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

Physical State:	Solid (electrode sheet)
Color:	Black
Odor:	Odorless
Odor Threshold:	No Data Available
pH:	No Data Available
Melting Point / Range:	> 290 °C (> 554 °F)
Boiling Point / Range:	No Data Available
Flash Point:	No Data Available
Evaporation Rate:	No Data Available
Flammability:	No Data Available
Upper Explosion Limit:	No Data Available
Lower Explosion Limit:	No Data Available
Vapor Pressure:	No Data Available
Vapor Density:	No Data Available
Relative Density:	No Data Available
Water Solubility:	Insoluble
Partition Coefficient:	No Data Available
Auto-ignition Temperature:	No Data Available
Decomposition Temperature:	No Data Available
Viscosity:	No Data Available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

No Data Available

10.2 Chemical Stability

Stable under recommended storage conditions

10.3 Possibility of Hazardous Reactions

No Data Available

10.4 Conditions to Avoid

No Data Available

10.5 Incompatible Materials

Oxidizing agents

10.6 Hazardous Decomposition Products

Under fire conditions: Nickel / nickel oxides, Lithium oxides, Manganese / manganese oxides

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Acute Toxicity

Oral LD50:	No Data Available
Inhalation LC50:	No Data Available
Dermal LD50:	No Data Available
Other Information:	No Data Available

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Skin corrosion/irritation

No Data Available

Serious eye damage/eye irritation

No Data Available

Respiratory or skin sensitization

No Data Available

Germ cell mutagenicity

No Data Available

Carcinogenicity

Limited evidence of carcinogenicity in human studies

IARC: No component of this product, present at levels greater than or equal to 0.1%, is identified as a probable, possible, or confirmed human carcinogen by IARC.

ACGIH: No component of this product, present at levels greater than or equal to 0.1%, is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product, present at levels greater than or equal to 0.1%, is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product, present at levels greater than or equal to 0.1%, is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No Data Available

Teratogenicity

No Data Available

Specific target organ toxicity - single exposure (Globally Harmonized System)

No Data Available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

No Data Available

Aspiration hazard

No Data Available

Potential Health Affects

Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.

Skin: May be harmful if swallowed.

Eyes: May be harmful if absorbed through skin. May cause skin irritation.

Ingestion: May cause eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Large doses of lithium ion have caused dizziness and prostration and can cause kidney damage if sodium intake is limited. Dehydration, weight loss, dermatological effects, and thyroid disturbances have been reported. Central nervous system effects that include slurred speech, blurred vision, sensory loss, ataxia, and convulsions may occur. Diarrhea, vomiting, and neuromuscular effects such as tremor, clonus, and hyperactive reflexes may occur as a result of repeated exposure to lithium ion. Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter, and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

Synergistic Effects

No Data Available

Additional Information

RTECS: Not available

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SECTION 12: ECOLOGICAL INFORMATION
12.1 Ecotoxicity

No Data Available

12.2 Persistence and Degradability

No Data Available

12.3 Bioaccumulative Potential

No Data Available

12.4 Mobility in Soil

No Data Available

12.5 PBT and vPvB Assessment

No Data Available

12.6 Other Adverse Effects

No Data Available

SECTION 13: DISPOSAL CONSIDERATIONS
13.1 Waste Treatment Methods – Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

13.2 Waste Treatment Methods – Contaminated Packaging

Dispose of as unused product, clean residue from packaging (do not allow in drains), & dispose of properly.

SECTION 14: TRANSPORT INFORMATION
14.1 Department of Transportation (DOT - US)

Not Dangerous Goods

14.2 International Maritime Dangerous Goods (IMDG)

Not Dangerous Goods

14.3 International Air Transport Association (IATA)

Not Dangerous Goods

14.4 Other

HST Code / Schedule B #: 2853.00.0065

SECTION 15: REGULATORY INFORMATION
15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture
OSHA HAZARDS

Carcinogen, Target Organ Effect, Skin sensitizer

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Component	CAS #
Lithium Manganese Nickel Oxide	12031-75-3

The following product components are cited on the lists below:

Component	CAS #	List Citations
Lithium Manganese Nickel Oxide	12031-75-3	NJ & PA Right to Know; CA Prop. 65

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A chemical safety assessment was not carried out for this product

SECTION 16: OTHER INFORMATION**16.1 Further Information**

NEI has attempted to provide current and accurate information to the best of its knowledge. NEI makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

Employers should use this information only as a supplement to other information gathered by them and should make independent judgment 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 Datasheet, or in combination with any other product or process, is the responsibility of the user.

- END OF MSDS -