

## SECTION 1: PRODUCT & COMPANY IDENTIFICATION

### 1.1 Product Identifiers

Product Name: NANOMYTE® SP-10CE

Product Description: LATP-coated Lithium Manganese Nickel Oxide electrode sheet

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

Identified Uses: 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

#### GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)



Skin sensitization (Category 1) – [LMNO]

Carcinogenicity (Category 2) – [LMNO]

Carcinogenicity (Category 2B) – [Carbon Black]

### 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):

P202 Do not handle until all safety precautions have been read and understood.

P261 Avoid breathing dust / fume / gas / mist / vapors / spray

P264 Wash skin thoroughly after handling.

P280 Wear protective gloves, protective clothing, & eye protection

P302 + P352 IF ON SKIN: Wash with plenty of soap and water

P308 + P313 IF EXPOSED OR CONCERNED: Get medical advice / attention

P321 Specific treatment (see supplemental first aid instructions on this label).

P333 + P313 If skin irritation or rash occurs: Get medical advice / attention

P363 Wash contaminated clothing before reuse.

P501 Dispose of contents/ container to an approved waste disposal plant.

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust [Carbon Black]

## SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

### 3.1 Substances

COMPONENT NAME	SYNONYM	FORMULA	CAS #	CONCENTRATION
Lithium Manganese Nickel Oxide	Spinel, LMNO	$\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$	12031-75-3	75 – 94%
Lithium Aluminum Titanium Phosphate	LATP	$\text{Li}_{1.4}\text{Al}_{0.4}\text{Ti}_{1.6}(\text{PO}_4)_3$	120479-61-0	1 – 5%
Poly(vinylidene fluoride)	"PVDF"	$(\text{C}_2\text{H}_2\text{F}_2)_x$	249347-79-9	2.5 – 10%
Carbon Black	n/a	C	1333-86-4	2.5 – 10%

## SECTION 4: FIRST AID MEASURES

### 4.1 Description of First Aid Measures

**General Advice:**

Move out of exposed area. Seek medical attention if irritation occurs. Show this SDS to the doctor in attendance.

**After Inhalation:**

If breathed in, move person into fresh air. If not breathing, give artificial respiration and seek medical attention.

**After Skin Contact:**

Wash off with soap and plenty of water. Consult a physician.

**After Eye Contact:**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**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 Special Hazards Arising from the Substance or Mixture

Lithium oxides, Manganese oxides, Nickel oxides, Carbon oxides, Hydrogen fluoride, Oxides of phosphorus, Titanium oxides, Aluminum oxides

### 5.3 Advice for Firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

### 5.4 Other Information

No Data Available

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

### 6.2 Environmental Precautions

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 suitable, closed containers for disposal.

### 6.4 Reference to Other Sections

For safe handling, see Section 7; for personal protection, see Section 8; for disposal, see Section 13.

## SECTION 7: HANDLING AND STORAGE

### 7.1 Precautions for Safe Handling

Handle in a dry environment only. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Appropriate personal protective equipment should be used at all times (for additional precautions see Section 2.2).

### 7.2 Conditions for Safe Storage (including any incompatibilities)

Store sealed, in a dry and well-ventilated place. Avoid exposure to moisture / humidity. Avoid contamination with incompatible materials (see Section 10.5).

### 7.3 Specific End Uses

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

## SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1 Control Parameters

Components with workplace control parameters:

Component	CAS #	Value	Control Parameters	Basis
Carbon Black	1333-86-4	TWA	3.5000 mg/m <sup>3</sup>	OSHA Permissible Exposure Limit (PEL)
		TWA	3.5000 mg/m <sup>3</sup>	NIOSH Recommended Exposure Limit (REL)
		TWA	0.1000 mg PAHs/m <sup>3</sup>	NIOSH Recommended Exposure Limit (REL) (carbon black in the presence of PAHs)
<b>Remarks:</b>	Potential Occupational Carcinogen – Carbon black in presence of polycyclic aromatic hydrocarbons			
		TWA	3.5000 mg/m <sup>3</sup>	(ACGIH) Threshold Limit Value (TLV) (inhalable particulate matter)
<b>Remarks:</b>	Bronchitis - Confirmed animal carcinogen with unknown relevance to humans			

### 8.2 Exposure Controls

#### Appropriate Engineering Controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Keep away from food and beverages. Remove all soiled and contaminated clothing immediately.

#### Personal Protective Equipment

Eye / Face Protection:

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin 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.

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.

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).

#### Control of Environmental Exposure

Do not let product enter drains.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on Basic Physical and Chemical Properties (of components)

<u>Components:</u>	<u>LMNO</u>	<u>PVDF</u>	<u>Carbon Black</u>	<u>LATP</u>
Form:	Solid	Solid	Solid	Solid

<u>(cont.)</u>	<u>LMNO</u>	<u>PVDF</u>	<u>Carbon Black</u>	<u>LATP</u>
Color:	Brown / Black	White	Black	White
Odor:	Odorless	Odorless	Odorless	Odorless
pH (20 °C):	No data available	No data available	4 – 11 (50 g/l)	No data available
Melting point/range:	> 290 °C (> 554 °F)	165 °C (329 °F)	3,654 – 3,697 °C	No data available
Specific Gravity:	No data available	No data available	No data available	No data available
Relative Density:	No data available	1.740 g/cm <sup>3</sup>	1.887 g/cm <sup>3</sup>	No data available
Bulk Density:	No data available	No data available	0.02 - 55 g/l	No data available
Viscosity:	No data available	No data available	No data available	No data available
Boiling Point:	No data available	No data available	4,827 °C (8,721 °F)	No data available
Flashpoint:	No data available	No data available	Not applicable	No data available
Ignition Temperature:	No data available	No data available	> 500 °C	No data available
Auto-ignition Temperature:	No data available	No data available	> 315 °C (> 599 °F)	No data available
Lower Explosion Limit:	No data available	No data available	50 g/m <sup>3</sup>	No data available
Upper Explosion Limit:	No data available	No data available	No data available	No data available
Vapor Pressure (32 °C):	No data available	20 hPa (15 mmHg)	No data available	No data available
Vapor Density:	No data available	No data available	No data available	No data available
Water Solubility:	No data available	Negligible	Insoluble	No data available
Evaporation Rate:	No data available	No data available	No data available	No data available
Decomposition Temperature:	No data available	> 315 °C (> 599 °F)	No data available	No data available

## 9.2 Other Information

None

## SECTION 10: STABILITY AND REACTIVITY

### 10.1 Reactivity

No Data Available

### 10.2 Chemical Stability

Stable under recommended storage conditions (see Section 7.2)

### 10.3 Possibility of Hazardous Reactions

No Data Available

### 10.4 Conditions to Avoid

Do not heat over 290 °C, avoid exposure to humidity & moisture

### 10.5 Incompatible Materials

Strong oxidizing agents, chlorates, nitrates, strong acids

### 10.6 Hazardous Decomposition Products

Other Decomposition Products: No Data Available (in the event of fire: see Section 5)

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological Effects (of components)

<u>Acute Toxicity</u>	<u>LATP-LMNO</u>	<u>PVDF</u>	<u>Carbon Black</u>
Oral LD50:	No Data Available	> 6,000 mg/kg (Rat)	> 8,000 mg/kg (Rat)
Inhalation LC50:	No Data Available	No Data Available	No Data Available
Dermal LD50:	No Data Available	No Data Available	> 3,000 mg/kg (Rabbit)
Other Information:	No Data Available	No Data Available	No Data Available

**Skin corrosion/irritation**

	<u>LATP-LMNO</u>	<u>PVDF</u>	<u>Carbon Black</u>
	No Data Available	No Data Available	Skin - Rabbit No skin irritation

**Serious eye damage/eye irritation**

	No Data Available	No Data Available	Eyes - Rabbit No eye irritation
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**Respiratory or skin sensitization**

	No Data Available	No Data Available	Guinea pig Did not cause sensitization
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**Germ cell mutagenicity**

	No Data Available	No Data Available	Ames test – <i>S. typhimurium</i> Result: negative
	No Data Available	No Data Available	Hamster – ovary Result: negative
	No Data Available	No Data Available	DNA repair – Rat (female) Result: negative

**Carcinogenicity**

- IARC:** Group 2: LMNO shows limited evidence of a carcinogenic effect.  
Group 2B: Carbon black is possibly carcinogenic to humans.
- 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

**Additional Information**

RTECS: Not available

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.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**SECTION 12: ECOLOGICAL INFORMATION**

**12.1 Toxicity**

<b>Components:</b>	<u>LATP-LMNO</u>	<u>PVDF</u>	<u>Carbon Black</u>
Toxicity to Fish:	No Data Available	No Data Available	LC50 - Danio rerio (zebra fish) > 1,000 mg/l - 96 h

<p>(cont.)</p> <p>Toxicity to daphnia and other aquatic invertebrates:</p> <p>Toxicity to algae:</p>	<p><b>LATP-LMNO</b></p> <p>No Data Available</p> <p>No Data Available</p>	<p><b>PVDF</b></p> <p>No Data Available</p> <p>No Data Available</p>	<p><b>Carbon Black</b></p> <p>EC50 - Daphnia magna (Water flea) &gt; 5,600 mg/l - 24 h</p> <p>EC50 - Desmodesmus subspicatus (green algae) 10,000 mg/l - 72 h</p>
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**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 Results of PBT and vPvB Assessment**

PBT/vPvB assessment not available as chemical safety assessment not conducted

**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 properly as you would with unused product.

**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**

**SARA 302 Components**

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

**SARA 313 Components**

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**

<u>Components</u>	<u>CAS #</u>	<u>Hazard</u>
Lithium Manganese Nickel Oxide	12031-75-3	Acute Health Hazard, Chronic Health Hazard
Carbon Black	1333-86-4	Chronic Health Hazard

The following product components are cited on the lists below:

<u>Component</u>	<u>CAS #</u>	<u>List Citations</u>
Lithium Manganese Nickel Oxide	12031-75-3	NJ, PA Right to Know

(cont.)	<b><u>Component</u></b>	<b><u>CAS #</u></b>	<b><u>List Citations</u></b>
	Lithium Aluminum Titanium Phosphate	120479-61-0	NJ, PA Right to Know
	Poly(vinylidene fluoride)	249347-79-9	NJ, PA Right to Know
	Carbon Black	1333-86-4	MA, NJ, PA, MN, LA, CA Right to Know

**CALIFORNIA PROPOSITION 65**

WARNING! This product contains a chemical known to the State of California to cause cancer.

<b><u>Component</u></b>	<b><u>CAS #</u></b>
Carbon Black	1333-86-4

**15.2 Chemical Safety Assessment**

A chemical safety assessment was not carried out for this product.

**SECTION 16: OTHER INFORMATION**

**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.

**HMIS Classification**

Health Hazard:	2
Flammability Hazard:	0
Physical Hazard:	0

**NFPA Rating**

Health Hazard:	2
Flammability Hazard:	0
Reactivity Hazard:	0

**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 Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Preparation Information**

Version #1.0                                      Prepared by: K. Martin