

SECTION 1: PRODUCT & COMPANY IDENTIFICATION

1.1 Product Identifiers

Product Name: NANOMYTE® BE-56E

Product Description: Lithium Manganese Nickel Cobalt Oxide (NMC811) electrode sheet

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

Identified Uses: Laboratory chemicals, research & development, 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

Not Classified. This product is defined as an "Article" under the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the REACH Regulation (EC) No. 1907/2006. In its manufactured and shipped form, it does not pose a physical hazard or health risk to humans or the environment.

2.2 Label Elements

None required.

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

This product contains Nickel and Cobalt compounds which are classified as carcinogens and sensitizers. In the manufactured form (coated sheet), these components are bound within a polymer matrix and are not bio-available. However, any process that destroys this matrix (e.g., shredding, grinding, or burning) may release hazardous dust or fumes. Persons already sensitized to Nickel or Cobalt should handle this product with caution.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Component Name	Synonyms	Formula	CAS #	Coating Wt %
Lithium Nickel Manganese Cobalt Oxide	NMC811	LiNi _{0.8} Mn _{0.1} Co _{0.1} O ₂	179802-95-0	90%
Raw Form Hazards: Skin sensitization (Cat. 1, H317); Respiratory sensitization (Cat 1, H334); Carcinogenicity (Cat 1, H350); STOT, repeated exposure (Cat 1, H372) Sheet Form Hazards: None (bound)				
Poly(vinylidene fluoride)	PVDF	(C ₂ H ₂ F ₂) _x	24937-79-9	5%
Hazards: Not classified				
Carbon Black	Carbon	C	1333-86-4	5%
Raw Form Hazards: Carcinogenicity (Cat. 2, H351) Sheet Form Hazards: None (bound)				
Aluminum Foil Sheet	Aluminium	Al	7429-90-5	(substrate)
Hazards: Not classified				

NOTE: This product is a solid, multi-layered article. Components are fully encapsulated within a dried polymer matrix. In this manufactured state, the ingredients are not respirable. The product does not meet the criteria for classification as a hazardous substance under GHS/OSHA/REACH. Hazards listed for individual components apply only to the release of dust or fumes through mechanical grinding, high-heat thermal decomposition, or chemical dissolution.

SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

NANOMYTE® BE-56E (NMC811 electrode sheet)

General Advice:

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

Inhalation (dust only):

Inhalation is not a likely route of exposure for the intact sheet. If dust is generated from cutting or grinding and inhalation occurs, move the person to fresh air. If breathing is difficult, seek medical attention.

Skin Contact:

Generally non-irritating. If irritation occurs from contact with coating, wash the affected area with soap and water.

Eye Contact:

Flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids. If dust particles are present, do not rub eyes, as the grit may cause corneal abrasion. Seek medical attention if irritation persists.

Ingestion:

Not a likely route of exposure for a solid sheet. If pieces are swallowed, do not induce vomiting unless directed by medical personnel. Seek medical advice.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

Acute: Dust may cause abrasive irritation to the eyes or mechanical irritation to the respiratory tract.

Delayed: Repeated inhalation of dust/fibers (if the sheet is pulverized) could lead to long-term lung issues.

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed

Treat symptomatically. No specific antidote is required.

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

Nickel Oxides, Lithium Oxides, Cobalt Oxides, Manganese Oxides, Carbon Oxides, Hydrogen Fluoride

5.3 Advice for Firefighters

Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

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 dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

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. If the "release" involves crushed or pulverized electrode material, use an N95 or P100 respirator to prevent inhalation of NMC dust. Keep in closed containers for disposal.

6.4 Reference to Other Sections

For personal protection, see section 8; 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. Avoid contact with eyes and skin. Handle in a dry and well-ventilated area. Avoid actions that abrade, sand, or grind the coated surface. Such actions can release respirable dust containing Nickel and Cobalt. Personnel with known allergies to Nickel or Cobalt should exercise extreme caution. Even though the material is bound, trace surface dust may be present. Wash hands thoroughly after handling electrode materials, even if gloves were worn. Do not eat, drink, or smoke in areas where electrodes are handled or processed. See Section 2.2 for precautions.

7.2 Conditions for Safe Storage (including any incompatibilities)

Store in a dry and well-ventilated place. Avoid moisture (humidity). Store sheets flat to prevent flaking or delamination of the coating from the foil substrate.

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

Components with workplace control parameters:

Component	OSHA PEL (TWA)	ACGIH TLV (TWA)	NIOSH REL (TWA)
Inorganic Nickel compounds	1 mg/m ³	0.1 mg/m ³ (inhalable)	0.015 mg/m ³
Inorganic Cobalt compounds	0.1 mg/m ³	0.02 mg/m ³ (inhalable)	0.05 mg/m ³
Manganese (Mn)	5 mg/m ³ (ceiling)	0.02 mg/m ³ (respirable)	1 mg/m ³
Carbon Black	3.5 mg/m ³	3 mg/m ³ (inhalable)	3.5 mg/m ³

8.2 Exposure Controls

Appropriate Engineering Controls

Handle in accordance with good industrial hygiene and safety practice. **Processing (Cutting/Slitting):** If generating dust, use a HEPA-filtered fume hood or local exhaust ventilation (LEV). Because the dust is conductive, ensure that the vacuum/exhaust system is rated for conductive dust to prevent motor fires.

Personal Protective Equipment

Respiratory Protection

Not required for normal handling of electrode sheets. If the sheets are damaged or dust is created outside of a fume hood, use an N95 or P100 respirator.

Eye / Face Protection

Safety glasses with side shields are recommended when cutting sheets or if dust is present.

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. Wear long sleeves to prevent conductive dust from settling on the skin. Wash and dry hands.

Recommendation: Nitrile rubber (minimum 4 mil thickness)

Recommendations are advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use. It should not be construed as offering an approval for any specific use scenario.

Skin and Body Protection

A standard lab coat is recommended. Contaminated clothing should be laundered separately.

Control of Environmental Exposure

Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

Physical State:	Solid coating on foil
Color:	Black
Odor:	Odorless
Odor Threshold:	No Data Available
pH:	No Data Available
Melting Point / Range:	No Data Available
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:	No Data Available
Partition Coefficient:	No Data Available
Auto-ignition Temperature:	No Data Available
Decomposition Temperature:	No Data Available
Viscosity:	No Data Available

9.2 Other Safety Information

No Data Available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under recommended storage and handling conditions.

10.2 Chemical Stability

Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of Hazardous Reactions

Thermal Decomposition: High-nickel NMC materials can release oxygen when heated to high temperatures (typically > 200 °C), which can accelerate the combustion of the PVDF binder or other nearby organic materials.

Contact with Acids: Exposure to strong acids may dissolve the NMC coating and react with the aluminum foil current collector, potentially generating flammable hydrogen gas.

10.4 Conditions to Avoid

Avoid excessive heat (> 150 – 200 °C), mechanical abrasion (generates respirable dust), moisture

10.5 Incompatible Materials

Strong acids, strong bases, strong oxidizing agents

10.6 Hazardous Decomposition Products

Under fire conditions or extreme thermal duress, the following may be released:

Hydrogen Fluoride (HF), Metal Oxides (such as Nickel, Manganese, and Cobalt oxides), Carbon Oxides

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Acute Toxicity

Not classified for the electrode sheet. If dust is generated, it may cause irritation to the upper respiratory tract.

Skin corrosion/irritation

May cause irritation

Serious eye damage/eye irritation

Dust may cause irritation

Respiratory or skin sensitization

Contains Nickel; may produce an allergic reaction (Nickel dermatitis) in sensitive individuals if the coating is handled directly and skin is broken. Inhalation of NMC dust may cause sensitization.

Germ cell mutagenicity

No data available for the mixture

Carcinogenicity

Nickel Compounds: Classified by IARC as Group 1 (Carcinogenic to humans) and by NTP as "Known to be a human carcinogen."

Carbon Black: Classified by IARC as Group 2B (Possibly carcinogenic to humans) via inhalation.

Note: *These risks are associated with the inhalation of respirable particles, which are not present in the finished sheet.*

Reproductive toxicity

Cobalt compounds are suspected of damaging fertility.

Teratogenicity

No Data Available

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

May cause respiratory irritation (as dust).

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

Long-term inhalation of Nickel/Cobalt dust may lead to lung damage (fibrosis).

Aspiration hazard

Not applicable

Additional Information

Routes of exposure: Inhalation (as dust), Skin Contact (direct contact), Eye Contact (as dust)

Under normal conditions of use & handling, physical hazards and health risks are not applicable due to physical form of the product. **Note:** Mechanical processing such as grinding, sanding, or laser cutting of the dry coating may generate respirable dust. In such cases, the hazards of the raw constituents may apply.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

The transition metal oxide components of Nickel, Cobalt, and Manganese are highly toxic to aquatic life with long-lasting effects. Nickel and Cobalt compounds are classified under GHS as Aquatic Chronic Category 1.

12.2 Persistence and Degradability

The materials contained in these electrode sheets are inorganic and do not biodegrade.

12.3 Bioaccumulative Potential

There is a high potential for the bioaccumulation of Nickel and Cobalt in aquatic organisms and plants.

12.4 Mobility in Soil

In their "as-manufactured" sheet form, these materials have very low mobility in soil.

12.5 Results of PBT and vPvB Assessment

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

12.6 Other Adverse Effects

Do not allow to enter drains or waterways.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods – Product

Do not discharge into drains or the environment. This material contains regulated metals (Nickel, Cobalt, Manganese). Waste should be disposed of in accordance with local, regional, and national regulations.

13.2 Waste Treatment Methods – Contaminated Packaging

If packaging is contaminated with NMC dust, treat it as hazardous waste.

SECTION 14: TRANSPORT INFORMATION

14.1 Department of Transportation (DOT - US)

Not classified as a dangerous good under transport regulations

14.2 International Maritime Dangerous Goods (IMDG)

Not classified as a dangerous good under transport regulations

14.3 International Air Transport Association (IATA)

Not classified as a dangerous good under transport regulations

14.4 Other

HS Classification #: 8507.90

Schedule B #: 8507.90.8000

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 product contains the following chemical categories subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR Part 372:

Nickel Compounds (Category N495): Present as > 51.5% of the total product weight

Manganese Compounds (Category N450): Present as > 6% of the total product weight

Cobalt Compounds (Category N096): Present as > 6% of the total product weight

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Right to Know Components

Lithium Nickel Manganese Cobalt Oxide (CAS #179802-95-0); Poly(vinylidene fluoride) (CAS #24937-79-9);

Carbon Black (CAS #1333-86-4)

California Proposition 65

This product can expose you to chemicals known to the State of California to cause cancer.

Carbon Black (CAS #1333-86-4)

Toxic Substances Control Act (TSCA) Chemical Substance Inventory

Carbon Black (CAS #1333-86-4); Poly(vinylidene fluoride) (CAS #24937-79-9)

Note: As a manufactured article, the finished sheet itself is generally exempt from TSCA reporting, but the chemical constituents are fully compliant.

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.

IMPORTANT

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.

– END OF SDS –