

SECTION 1: PRODUCT & COMPANY IDENTIFICATION

1.1 Product Identifiers

Product Name: NANOMYTE® BE-100E

Product Description: 10% Silicon-Graphite 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 Numbers

Manufacturer: +1 (732) 868-3142 (9am to 6pm EST / UTC -0500)

U.S. Poison Control Center: +1-800-222-1222

ChemTel (North America): +1 (800) 255-3924 (during transportation only)

ChemTel (International): +1 (813) 248-0585 (during transportation only – collect calls accepted)

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

While the solid sheet is non-hazardous, the following potential risks are associated with downstream processing (e.g., shredding, grinding, milling, or burning):

- **Combustible Dust:** Mechanical processing of the sheet can release Silicon and Graphite particles. If accumulated in sufficient concentrations in air, these can form a combustible dust cloud.
- **Inhalation:** Grinding or cutting may release respirable Multi-Walled Carbon Nanotubes (MWCNTs) and Carbon Black. These are classified as Category 2B (Possible Carcinogens) in their loose powder form.
- **Conductivity:** Dust generated from this product is electrically conductive and may cause short circuits if it enters electrical equipment.
- **Binder Decomposition:** Thermal decomposition (burning) may release irritating vapors from the Poly(acrylic acid) and SBR binder system.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Component Name	Synonyms	Formula	CAS #	Weight %
Graphite (natural)	Carbon	C	7782-42-5	77.5%
Raw Form Hazards: Combustible Dust Sheet Form Hazards: None (bound)				
Silicon	n/a	Si	7440-21-3	10%
Raw Form Hazards: Flammable Solid (Cat 2) Sheet Form Hazards: None (bound)				
Multi-walled Carbon Nanotubes	MWCNT, MWNT	C	308068-56-6	4.5%
Raw Form Hazards: Carcinogenicity (Cat 2B), STOT RE (Cat 2) Sheet Form Hazards: None (bound)				
Styrene-butadiene copolymer	SBR	CH ₂ CH(C ₆ H ₅) _x	9003-55-8	3.5%
Raw Form Hazards: Not classified Sheet Form Hazards: None (Plastic)				

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cont.

Component Name	Synonyms	Formula	CAS #	Weight %
Poly(acrylic acid)	PAA	(C ₃ H ₄ O ₂) _n	9003-01-4	1.75%
Raw Form Hazards: Eye/Skin Irritant Sheet Form Hazards: None (Neutralized)				
Carboxymethyl Cellulose	CMC	(C ₈ H ₁₁ O ₇ Na) _n	9004-32-4	1.75%
Raw Form Hazards: Not classified Sheet Form Hazards: None				
Carbon Black	Conductive carbon	C	1333-86-4	1%
Raw Form Hazards: Carcinogenicity (Cat 2B) Sheet Form Hazards: None (bound)				
Copper Foil Sheet	Current collector	Cu	7440-50-8	(substrate)
Hazards: Not classified				

NOTE: This product is a solid, multi-layered article. Hazardous ingredients, including Silicon, MWCNTs, and Carbon Black, are fully encapsulated within a dried polymer matrix of PAA, CMC, and SBR. In this manufactured state, the ingredients are not respirable, nor do they exhibit flammable properties. 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

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. Due to the presence of MWCNTs, monitor for respiratory irritation.

Skin Contact:

Generally non-irritating. If irritation occurs from contact with the coating or binders (PAA/SBR), 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 (Silicon/Graphite) 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 (CO₂). Do not use high-pressure water jets directly on loose scrap or dust piles, as this may disperse conductive/combustible dust into the air, potentially causing a dust explosion.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products: In a fire, the polymer binders (PAA and SBR) may decompose, releasing irritating fumes, carbon monoxide (CO), carbon dioxide (CO₂), and low-molecular-weight hydrocarbons.

Specific Hazards: The electrode sheet itself is not highly flammable, but the organic binders and graphite can support combustion in an intense fire.

Conductivity Risk: Be aware that firefighting runoff may contain conductive graphite and MWCNT particles. Avoid allowing runoff to enter electrical rooms or sensitive electronic equipment areas.

5.3 Advice for Firefighters

Firefighters should wear self-contained breathing apparatus (SCBA) and full protective bunkering gear. Cool with water spray even after the fire is out to prevent re-ignition of the tightly packed material.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing dust, vapors, mist, or gas. Ensure adequate ventilation. Remove all sources of ignition. 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

Sweep up and shovel. Contain spillage and collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (Section 13). 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

Appropriate personal protective equipment should be used at all times. Avoid contact with eyes and skin. Handle in a well-ventilated area. Avoid creasing and folding, or actions that abrade, sand, or grind the coated surface, as this can cause the brittle Silicon-Graphite coating to delaminate or flake off, creating unnecessary dust. Do not eat or drink in the area where sheets are handled. Wash hands after handling to ensure no conductive carbon particles remain on the skin.

7.2 Conditions for Safe Storage (including any incompatibilities)

Silicon and PAA binders are hygroscopic. Store sheets flat and in a dry and well-ventilated place, away from heat — ideally a desiccator or a dry box. Exposure to humidity can cause the PAA binder to swell or the silicon to surface-oxidize, degrading electrochemical performance.

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 #	OSHA PEL (TWA)	ACGIH TLV (TWA)	NIOSH REL
Graphite	7782-42-5	15 mg/m ³ (Total)	2 mg/m ³ (Respirable)	2.5 mg/m ³ (Respirable)
Silicon	7440-21-3	15 mg/m ³ (Total)	10 mg/m ³ (Total)	10 mg/m ³ (Total)
MWCNT	308068-56-6	15 mg/m ³ (as PNOR*)	Not Established	1 µg/m ³ (Proposed)
Carbon Black	1333-86-4	3.5 mg/m ³	3 mg/m ³ (Inhalable)	3.5 mg/m ³

*PNOR: Particulates Not Otherwise Regulated (Nuisance Dust)

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 to protect against flying foil slivers or coating flakes.

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.

Recommendations: **Nitrile gloves** (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 flame-resistant (FR) or antistatic lab coat is recommended. Contaminated clothing should be laundered separately.

Control of Environmental Exposure

Prevent further leakage or spillage if safe to do so. 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**

Form:	Solid (cast film)
Color:	Black
Odor:	Odorless
pH:	No data available
Melting point/range:	No data available
Specific Gravity:	No data available
Relative Density:	No data available
Viscosity (20 °C):	No data available
Boiling Point:	No data available
Flashpoint:	No data available
Ignition Temperature:	No data available
Auto-ignition Temperature:	No data available
Lower Explosion Limit:	No data available
Upper Explosion Limit:	No data available
Vapor Pressure:	No data available
Vapor Density:	No data available
Water Solubility:	No data available
Evaporation Rate:	No data available

9.2 Other Information

Non-flammable in manufactured form.

SECTION 10: STABILITY AND REACTIVITY**10.1 Reactivity**

No Data Available

10.2 Chemical Stability

Stable under normal ambient temperatures and pressures. However, Silicon and Poly(acrylic acid) binder are sensitive to long-term moisture exposure.

10.3 Possibility of Hazardous Reactions

Moisture/Humidity: Silicon particles may react slowly with moisture over time, potentially releasing trace amounts of hydrogen gas (H₂). This is typically only a concern if stored in bulk in airtight, non-vented containers for very long periods. **Dust Explosion:** In the manufactured sheet form, there is no risk. However, if the sheet is pulverized into fine dust, the combination of Graphite and Silicon can form a combustible dust mixture that may ignite in the presence of a strong ignition source.

10.4 Conditions to Avoid

Moisture, high humidity, extreme temperatures, heat, flames, and sparks. Avoid crushing, grinding, or sanding, which releases conductive/combustible dust.

10.5 Incompatible Materials

Strong Oxidizers, Strong Acids/Bases, Hydrofluoric Acid (HF)

10.6 Hazardous Decomposition Products

Under fire conditions or extreme thermal stress, the following may be released: Carbon Monoxide (CO) and Carbon Dioxide (CO₂), acid smoke and irritating organic vapors, metal oxide fumes

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Acute Toxicity

Oral: Not Classified (ingestion is not a likely route of exposure).

Dermal: Not Classified (the binder prevents absorption through the skin).

Inhalation: Not Classified for the sheet. However, if dust is generated, the following apply:

Silicon: LD50 (Rat): 3160 mg/kg; **Graphite:** LC50 (Inhalation, Rat): > 2 mg/L

Skin corrosion/irritation

Non-irritating, but dust may cause mechanical irritation (abrasion) to the skin.

Serious eye damage/eye irritation

Non-irritating, but dust particles may cause mechanical irritation and redness. Do not rub eyes if exposed to dust.

Respiratory or skin sensitization

Not expected to cause sensitization in the finished form.

Germ cell mutagenicity

No Data Available

Carcinogenicity

The following classifications apply only to respirable, unbound particles. In this product, these materials are bound in a polymer matrix and do not pose a cancer risk unless the sheet is pulverized into a breathable dust.

IARC: Group 2B: Possibly carcinogenic to humans based on sufficient experimental evidence on animals and inadequate evidence from epidemiological studies.

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

Reproductive toxicity

No Data Available

Teratogenicity

No Data Available

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

Dust may cause respiratory tract irritation if inhaled.

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

Prolonged or repeated inhalation of graphite & silicon dust may lead to benign pneumoconiosis (lung shadowing).

Aspiration hazard

Not an aspiration hazard (solid form)

Additional Information

In its manufactured form as a coated sheet, the components are encapsulated within a solid polymer matrix. Therefore, exposure to the individual hazardous components is not expected under normal conditions of use.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

No data is available, however it is not expected to be toxic to aquatic life in the manufactured sheet form. The components are locked in a water-insoluble polymer matrix.

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

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

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)

Non-hazardous coated metal foil (battery electrode sheet). Not restricted for transport.

14.2 International Maritime Dangerous Goods (IMDG)

Non-hazardous coated metal foil (battery electrode sheet). Not restricted for transport.

14.3 International Air Transport Association (IATA)

Non-hazardous coated metal foil (battery electrode sheet). Not restricted for transport.

14.4 Additional Transport Information

HS Code #: 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 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

Chronic Health Hazard (only if dust is generated)

Right to Know Components

Graphite (CAS #7782-42-5); Silicon (CAS #7440-21-3); Multi-walled Carbon Nanotubes (CAS #308068-56-6); Styrene-butadiene copolymer (CAS #9003-55-8); Poly Acrylic Acid (CAS #9003-01-4); Carboxymethyl Cellulose (CAS #9004-32-4); Carbon Black (CAS #1333-86-4); Copper (CAS #7440-50-8)

CALIFORNIA PROPOSITION 65

This product contains a chemical known to the State of California to cause cancer. However, this warning is only required for materials in a respirable (airborne, unbound) form. The materials in this electrode sheet are bound within a solid matrix.

Toxic Substances Control Act (TSCA) Chemical Substance Inventory

Graphite (CAS #7782-42-5); Silicon (CAS #7440-21-3); Multi-walled Carbon Nanotubes (CAS #308068-56-6); Styrene-butadiene copolymer (CAS #9003-55-8); Poly Acrylic Acid (CAS #9003-01-4); Carboxymethyl Cellulose (CAS #9004-32-4); Carbon Black (CAS #1333-86-4); Copper (CAS #7440-50-8)

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out for this product by the supplier. This product is an "Article" and is manufactured in quantities below the threshold requiring a formal Chemical Safety Report (CSR) under REACH Regulation (EC) No 1907/2006.

15.3 International Regulations

Canada (DSL/NDSL): All components are listed on the Domestic Substances List.

European Union (REACH): This product is an Article as defined in Article 3(3). It contains no Substances of Very High Concern (SVHC) above the 0.1% threshold (unless your MWCNTs have specific impurities).

RoHS (Restriction of Hazardous Substances): This electrode sheet is compliant with RoHS as it does not contain Lead, Mercury, Cadmium, or Hexavalent Chromium.

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.

Further Information

NEI has provided this information in good faith and believes it to be accurate as of the date of publication. NEI makes no representations or warranties, express or implied, as to the accuracy or completeness of this data. Users assume all risk and liability for any loss, damage, or injury arising from the use of or reliance on this information. It is the user's responsibility to determine the suitability of this Article for their specific process and to ensure compliance with all applicable safety and health regulations.

– END OF SDS –