

Safety Data Sheet

NANOMYTE® SSE-10D (LSPS Dispersion)

SECTION 1: PRODUCT & COMPANY IDENTIFICATION

1.1 Product Identifiers

Product Name: Lithium Tin Phosphorus Sulfide (LSPS) Dispersion
Product Number: SSE-10D
CAS Number: A CAS number has not been assigned to this material.
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

Identified Uses: Dispersion of solid electrolyte material for Li-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

Note: The information in this SDS is related to the formulation ingredients of the material and may not reflect all the hazards of the product.

OSHA Hazards: Water Reactive, Toxic by ingestion, Corrosive, Teratogen, Target Organ Effect, Toxic by inhalation, Carcinogenicity, Flammable

Target Organs: Lungs, Nerves, Skin, Eyes, respiratory system, central nervous system

GHS Classification

Skin corrosion (Category 1B) – H314

Serious eye damage (Category 1) – H314

Carcinogenicity (Category 2) – H351

Acute aquatic toxicity (Category 1) – H400

Specific target organ toxicity – single exposure (Category 3), Respiratory system, Central nervous system, H335, H336

Specific target organ toxicity – repeated exposure, Oral (Category 2), Liver, Blood, H373

Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central nervous system, H373

Flammable solids (Category 1) – H228

Substances, which in contact with water, emit flammable gases (Category 1) – H260

Acute toxicity, Oral (Category 3) – H301

Acute toxicity, Inhalation (Category 4) – H332

HMIS Classification

Health Hazard: 3
Chronic Health Hazard: *
Flammability Hazard: 1
Physical Hazard: 1

NFPA Rating

Health Hazard: 3
Flammability Hazard: 1
Reactivity Hazard: 1

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2.2 Label Elements

GHS Label Elements, including precautionary statements



Signal Word: Danger

Hazard Statement(s):

- H228 Flammable solid
- H260 In contact with water releases flammable gases which may ignite spontaneously
- H301 Toxic if swallowed
- H314 Causes severe skin burns and eye damage
- H332 Harmful if inhaled
- H335 May cause respiratory irritation
- H336 May cause drowsiness or dizziness
- H351 Suspected of causing cancer
- H373 May cause damage to organs (Liver, Blood) through prolonged or repeated exposure if swallowed
- H373 May cause damage to organs (Central nervous system) through prolonged or repeated exposure if inhaled
- H400 Very toxic to aquatic life

Precautionary Statement(s):

- P201 Obtain special instructions before use
- P202 Do not handle until all safety precautions have been read and understood
- P210 Keep away from heat/sparks/open flames/hot surfaces – No smoking.
- P223 Keep away from any possible contact with water because of violent reaction and possible flash fire.
- P231 + P232 Handle under inert gas. Protect from moisture.
- P260 Do not breathe dust/fume/gas/mist/vapors/spray
- P271 Use only outdoors or in a well-ventilated area
- P273 Avoid release to the environment.
- P280 Wear protective gloves, protective clothing, face protection & eye protection.
- P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
- 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.
- P308 + P313 IF exposed or concerned: Get medical advice / attention.
- P310 Immediately call a POISON CENTER or doctor/physician.
- P321 Specific treatment (see supplemental first aid instructions on this label).
- P332 + P313 If skin irritation occurs: Get medical advice / attention.
- P337 + P313 If eye irritation persists: Get medical advice / attention.
- P362 Take off contaminated clothing and wash before reuse.
- P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
- P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.
- P422 Store contents under inert gas.
- P501 Dispose of contents / container to an approved waste disposal plant.

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2.3 Other Hazards (not otherwise classified) or not covered in GHS

None

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS
3.1 Substances

COMPONENT	CAS #	CONCENTRATION
Lithium Tin Phosphorus Sulfide (LSPS)	N/A	25 – 35 wt%
Dichloromethane	75-09-2	65 – 75 wt%
Proprietary Additives	-	1 – 2 wt%

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) To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. See section 8.1 for details.

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: metal oxides, phosphorus oxide, sulfur oxides

Other: None

5.3 Advice for Firefighters

Wear full protective clothing and self-contained breathing apparatus approved for firefighting. Do not breathe smoke, gases, or vapors generated.

5.4 Further Information

Flammable in the presence of a source of ignition, through friction or retained heat. May burn in presence of air, or emit a flammable gas in the presence of water or water vapor. Keep away from heat / sparks / open flame / hot surface. No smoking.

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. Keep unprotected persons away. Avoid breathing dust. Evacuate personnel to safe areas. For more personal protection information, see Section 8.

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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. Avoid inhalation of vapor or mist. Wash hands thoroughly after handling. For precautions, see section 2.2.

7.2 Conditions for Safe Storage (including any incompatibilities)

Keep container tightly sealed. Store in cool, dry, well-ventilated place. Store under inert gas. Protect from moisture. Never allow product to get in contact with water during storage. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Heat Sensitive.

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:

Components	CAS #	Value	Control Parameters	Basis
Li ₁₀ SnP ₂ S ₁₂	n/a	n/a	n/a	Occupational exposure limit values are unknown for this product.

Components	CAS #	Value	Control Parameters	Basis
Methylene Chloride	75-09-2	TWA	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks: Central Nervous System impairment, Carboxyhemoglobinemia, Substances for which there is a Biological Exposure Index or Indices (see BEI® section). Confirmed animal carcinogen with unknown relevance to humans for Substance listed; for more information see OSHA document 1910.1052 (See Table Z-2)				

Components	CAS #	Value	Control Parameters	Basis
Methylene Chloride	75-09-2	PEL	25 ppm	OSHA Specifically Regulated Chemicals/Carcinogens
Remarks: 1910.1052 - This section applies to all occupational exposures to methylene chloride (MC), Chemical Abstracts Service Registry Number 75-09-2, in general industry, construction and shipyard employment. Methylene chloride (MC) means an organic compound with chemical formula, CH ₂ Cl ₂ . Its Chemical Abstracts Service Registry Number is 75-09-2. Its molecular weight is 84.9 g/mole OSHA specifically regulated carcinogen				

Components	CAS #	Value	Control Parameters	Basis
Methylene Chloride	75-09-2	STEL	125 ppm	OSHA Specifically Regulated
1910.1052 - This section applies to all occupational exposures to methylene chloride (MC), Chemical Abstracts Service Registry Number 75-09-2, in general industry, construction and shipyard employment. Methylene chloride (MC) means an organic compound with chemical formula, CH ₂ Cl ₂ . Its Chemical Abstracts Service Registry Number is 75-09-2. Its molecular weight is 84.9 g/mole OSHA specifically regulated carcinogen.				

Biological occupational exposure limits

Component	CAS #	Parameters	Value	Bio Specimen	Basis
Methylene Chloride	75-09-2	Dichloromethane	0.3000 mg/l	Urine	ACGIH – Biological Exposure Indices (BEI)

Remarks: End of shift (As soon as possible after exposure ceases)

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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.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES
9.1 Information on Basic Physical and Chemical Properties

Physical State:	Dispersion of solid in a liquid
Color:	Grey-Black
Odor:	Rotten eggs (sulfur) smell
Odor Threshold:	No Data Available
pH:	No Data Available
Melting Point / Range:	Melting point / range: -97 °C (-143 °F) – for dichloromethane
Boiling Point / Range:	39.8 – 40 °C (103.6 – 104 °F) – for dichloromethane
Flash Point:	No Data Available
Evaporation Rate:	0.71 – for dichloromethane
Flammability:	No Data Available
Upper Explosion Limit:	Upper explosion limit: 19 % (V) – for dichloromethane
Lower Explosion Limit:	12.5 (V) – for dichloromethane
Vapor Pressure:	470.9 hPa (353.2 mmHg) at 20.0 °C (68.0 °F) – for dichloromethane
Vapor Density:	2.93 – (Air = 1.0) – for dichloromethane
Relative Density:	No Data Available
Water Solubility:	Slightly soluble
Partition Coefficient:	No Data Available
Auto-ignition Temperature:	556.1 °C (1,033.0 °F) – for dichloromethane 662.0 °C (1,223.6 °F) – for dichloromethane
Decomposition Temperature:	No Data Available
Viscosity:	No Data Available

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SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Reacts violently with water

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

Heat, flames and sparks. Exposure to sunlight. Exposure to moisture

10.5 Incompatible Materials

Avoid contact with water, strong oxidizing agents, alkali metals, aluminum, bases, amines, magnesium, strong acids and strong based, vinyl compounds or combustible materials which may result in ignition.

10.6 Hazardous Decomposition Products

Lithium oxides, hydrogen sulfide, phosphorus sulfide, phosphorus oxide, sulfur oxides (SOx)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

The full toxicological effects of this product are unknown. The following information is based on the main component, Dichloromethane.

Acute Toxicity:

- Oral LD50 -rat: > 2,000 mg/kg
- Inhalation LC50 -rat: 52,000 mg/m³
- Dermal LD50 -rat: > 2,000 mg/kg
- Other Information: No Data Available

Skin corrosion/irritation:

Skin – rabbit: Result: Irritating to skin. – 24h (Draize Test)

Serious eye damage/eye irritation:

Eyes – rabbit: Irritation to eyes. – 24h (Draize Test)

Respiratory or skin sensitization

No Data Available

Germ cell mutagenicity:

Rat – DNA damage

Carcinogenicity:

Carcinogenicity - Rat - Inhalation
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors
Limited evidence of carcinogenicity in animal studies
Suspected human carcinogens
IARC: 2B - Group 2B: Possibly carcinogenic to humans (Methylene chloride)
NTP: Reasonably anticipated to be a human carcinogen (Methylene chloride)
OSHA: OSHA specifically regulated carcinogen (Methylene chloride)

Reproductive toxicity

No Data Available

Teratogenicity

No Data Available

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

May cause respiratory irritation, drowsiness or dizziness.

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

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Inhalation - may cause damage to organs through prolonged or repeated exposure (central nervous system)

Oral - may cause damage to organs through prolonged or repeated exposure (liver, blood)

Aspiration hazard

No Data Available

Potential Health Affects

Inhalation: Toxic if inhaled. May cause respiratory tract irritation.

Ingestion: Toxic if swallowed.

Skin: May be harmful if absorbed through skin. May cause skin burns.

Eyes: May cause eye burns.

Signs and Symptoms of Exposure

No Data Available

Synergistic Effects

No Data Available

Additional Information

RTECS: PA8050000

Dichloromethane is metabolized in the body producing carbon monoxide which increases and sustains carboxyhemoglobin levels in the blood, reducing the oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air, anesthetic effects, difficulty in breathing, headache, and dizziness. Prolonged or repeated contact with skin may cause defatting and dermatitis. Contact with eyes can cause redness, blurred vision, and provoke tears. Effects due to ingestion may include: gastrointestinal discomfort, central nervous system depression, paresthesia, drowsiness, convulsions, conjunctivitis, and pulmonary edema. Effects may be delayed. Irregular breathing, stomach / intestinal disorders, nausea, vomiting, increased liver enzymes, weakness, heavy or prolonged skin exposure may result in the absorption of harmful amounts of material.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: ECOLOGICAL INFORMATION

The full ecological effects of this material have not been investigated. The following information is based on the main component, Dichloromethane.

12.1 Ecotoxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 193.00 mg/l - 96 h

NOEC - Cyprinodon variegatus (sheepshead minnow) - 130 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates - EC50 - Daphnia magna (Water flea) - 1,682.00 mg/l - 48 h

12.2 Persistence and Degradability

Biodegradability Result: < 26 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative Potential

Does not bioaccumulate.

12.4 Mobility in Soil

No Data Available

12.5 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**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Processing, use or

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contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations.

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 UN Number

DOT (US) / IMDG / IATA: 2810

14.2 UN Proper Shipping Name

DOT (US) / IMDG / IATA: Toxic liquid, organic, n.o.s.
(mixture of dichloromethane and lithium tin phosphorous sulfide)

14.3 Transport Hazard Class(es)

DOT (US) / IMDG / IATA: 6.1(4.3, 8)

14.4 Packaging Group

DOT (US) / IMDG / IATA: II

14.5 Environmental Hazards

No Data Available

14.6 Special Precautions for User

No Data Available

14.7 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

Water Reactive, Toxic by ingestion, Corrosive, Teratogen, Target Organ Effect, Toxic by inhalation, Carcinogenicity, Flammable

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.

SARA 302 Components

To our knowledge, 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:

<u>Chemical</u>	<u>CAS Number</u>
Methylene Chloride	75-09-2

Right To Know Components for Massachusetts, New Jersey, & Pennsylvania

<u>Chemical</u>	<u>CAS Number</u>
Methylene Chloride	75-09-2

CALIFORNIA PROPOSITION 65

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

<u>Chemical</u>	<u>CAS Number</u>
Methylene Chloride	75-09-2

15.2 Chemical Safety Assessment

A chemical safety assessment was not carried out for this product

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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 -