

SECTION 1: PRODUCT & COMPANY IDENTIFICATION

1.1 Product Identifiers

Product Name: Cl-rich LPSCI

Product Description: Lithium Phosphorus Sulfur Chloride (Li_{5.5}PS_{4.5}Cl_{1.5}) powder

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

Identified Uses: Solid electrolyte material; laboratory chemicals; synthesis of substances

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 ET)

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

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

Flammable solids (Category 1), H228

Substances and mixtures which, in contact with water, emit flammable gases (Category 2), H261

Acute toxicity, oral (Category 3), H301

Skin corrosion (Category 1B), H314

Acute toxicity, inhalation (Category 4), H332

Acute aquatic toxicity (Category 1), H400

2.2 GHS Label elements, including precautionary statements

Pictogram(s):



Signal Word: Danger

Hazard Statement(s):

H228 Flammable solid

H261 In contact with water releases flammable gas

H301 Toxic if swallowed

H314 Causes severe skin burns and eye damage

H332 Harmful if inhaled

H400 Very toxic to aquatic life

Precautionary Statement(s):

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.

P273 Avoid release to the environment.

P280 Wear protective gloves, protective clothing, & eye protection.

Cl-rich "LPSCI" - Lithium Phosphorus Sulfur Chloride (Li_{5.5}PS_{4.5}Cl_{1.5}) powder

P301 + P310 + P330 + P331 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

P402 + P404 + P422 Store in a dry place. Store in a closed container. Store contents under inert gas.

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

Reacts violently with water; lachrymator; stench

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

| Component | Formula | Synonyms | CAS # | Weight % |
|--|---|---------------------|---------|----------|
| Lithium Phosphorus Sulfur Chloride | Li _{5.5} PS _{4.5} Cl _{1.5} | Argyrodite, "LPSCI" | unknown | ≤ 100% |
| Hazard Classifications: Flammable solid (Cat. 1, H228); In contact with water releases flammable gases (Cat. 2, H261); Toxic if swallowed (Cat. 3, H301); Causes severe skin burns and eye damage (Cat. 1B, H314); Harmful if inhaled (Cat. 4, H332); Very toxic to aquatic life (Cat. 1, H400) | | | | |

SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

General Advice:

In the event of injury or emergency, move out of dangerous area and seek immediate medical attention. Provide a copy of this safety data sheet to the emergency responders or physician.

After Inhalation:

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

After Skin Contact:

If skin contact occurs, and/or skin or clothing are on fire, immediately drench in the safety shower with copious amounts of water for no less than 15 minutes to remove any remaining contaminants. If possible to do so without further injury, remove any remaining jewelry or clothing. Seek medical attention. Wash contaminated clothing before reuse.

After Eye Contact:

Rinse thoroughly with plenty of water using an eyewash station for at least 15 minutes, occasionally lifting the upper and lower eyelids. Remove contact lenses if possible. Continue rinsing eyes during transport to hospital.

After Swallowing:

Do NOT induce vomiting unless directed otherwise by the SDS. Never give anything by mouth to an unconscious person. Rinse mouth with water. Seek immediate 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

DO NOT USE WATER – use dry powder or dry sand

5.2 Special hazards arising from the substance or mixture

Lithium oxides, hydrogen sulfide (H₂S), phosphorus sulfide, phosphorus oxide, sulfur oxides (SO_x), hydrogen chloride gas

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

Reacts violently with water. 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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust. For more personal protection information, see Section 8.

6.2 Environmental Precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and Materials for Containment and Cleaning Up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal. Dispose of as hazardous waste

6.4 Reference to Other Sections

For disposal see Section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for Safe Handling

Handle in a glovebox under inert gas. Avoid contact with skin and eyes. Flame-resistant lab coat or clothing should be worn when working with water-reactive materials. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition – no smoking. Take measures to prevent the buildup of electrostatic charge. For additional precautions, see section 2.2.

7.2 Conditions for Safe Storage (including any incompatibilities)

Keep container tightly sealed in a cool, dry, and well-ventilated place. **Never** allow product to get in contact with water during storage. Stench. Air and moisture sensitive. Handle and store under inert gas.

Storage class (TRGS 510 / LGK) – 4.3: Hazardous materials which set free flammable gases upon contact with water

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

Occupational exposure limit values are unknown for this product.

8.2 Exposure Controls

Appropriate Engineering Controls

Handle in a glovebox under inert gas. Avoid contact with skin, eyes, and clothing. 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 before breaks and immediately after handling the product.

Personal Protective Equipment

Eye / Face Protection:

Safety glasses with side-shields conforming to EN166 should be worn. Use eye protection equipment that is 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:

Flame-resistant lab coat (Nomex IIIA, NFPA 2112) should be worn when working with water reactive materials.

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

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

| | |
|----------------------------|------------------------------------|
| Physical State: | Solid (powder) |
| Color: | Light brown, beige |
| Odor: | Rotten eggs (sulfur) smell, stench |
| 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 (solid, gas): | 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 |
| Explosive Properties: | No Data Available |
| Oxidizing Properties: | No Data Available |

9.2 Other Information

No additional information available

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); handle and store under inert gas

Cl-rich "LPSCI" - Lithium Phosphorus Sulfur Chloride (Li_{5.5}PS_{4.5}Cl_{1.5}) powder

10.3 Possibility of Hazardous Reactions

Contact with water releases flammable gases.

10.4 Conditions to Avoid

Moisture, Water, Heat, flames, and sparks.

10.5 Incompatible Materials

Avoid contact with water, acids, strong oxidizing agents, or combustible materials which may result in ignition.

10.6 Hazardous Decomposition Products

Contact with water liberates toxic gas; Other decomposition products – unknown

Under fire conditions: Lithium oxides, hydrogen sulfide, phosphorus sulfide, phosphorus oxide, sulfur oxides (SO_x), hydrogen chloride gas. In the event of fire, see section 5

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

Skin corrosion/irritation

Causes severe skin burns; No Data Available

Serious eye damage/eye irritation

Causes serious eye damage; No Data Available

Respiratory or skin sensitization

No Data Available

Germ cell mutagenicity

No Data Available

Carcinogenicity

No classification data on carcinogenic properties of this material is available from EPA, IRAC, NTP, OSHA or ACGIH.

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

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

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

The toxicological properties of this material have not been investigated.

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. Harmful to aquatic life with long lasting effects.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods – Product

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

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)

UN number: 3131

Class: 4.3 (8)

Packing Group: II

Proper Shipping Name: Water-reactive solid, corrosive, n.o.s. (Lithium Phosphorus Sulfur Chloride)

14.2 International Maritime Dangerous Goods (IMDG)

UN number: 3131

Class: 4.3 (8)

Packing Group: II

Proper Shipping Name: Water-reactive solid, corrosive, n.o.s. (Lithium Phosphorus Sulfur Chloride)

14.3 International Air Transport Association (IATA)

UN number: 3131

Class: 4.3 (8)

Packing Group: II

Proper Shipping Name: Water-reactive solid, corrosive, n.o.s. (Lithium Phosphorus Sulfur Chloride)

14.4 Additional Transport Information

HS Code: 2830.90

Schedule B: 2830.90.9000

Air Excepted Quantities (EQ): 30g (max net, inner pkg) / 500g (max net, outer pkg) [E2] – *carrier restrictions apply*

Air Limited Quantities (LQ): 5kg (net/pkg) [Y475] – *carrier restrictions apply*

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

Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

CALIFORNIA PROPOSITION 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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: 3
Flammability Hazard: 2
Physical Hazard: 2

NFPA Rating

Health Hazard: 3
Fire Hazard: 2
Reactivity Hazard: 2
Special Hazard: W

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.

– END OF SDS –