## SECTION 1: PRODUCT & COMPANY IDENTIFICATION

### 1.1 Product Identifiers

Product Name / Description: Lithium Phosphorous Sulfur Chloride powder

CAS Number: A CAS number has not been assigned to this material

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

Identified Uses: Experimental 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 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

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

Flammable solids (Category 1), H228

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

Acute toxicity, oral (Category 3), H301

Skin corrosion (Category 1B), H314

Serious eye damage / eye irritation (Category 1), H318

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 |
| H260 | In contact with water releases flammable gases which may ignite spontaneously |
| H301 | Toxic if swallowed |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious 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. |
| P240 | Ground/bond container and receiving equipment. |

| | |
|---|---|
| P241 | Use explosion-proof electrical/ventilating/lighting equipment. |
| P260 | Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. |
| P264 | Wash skin thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves, protective clothing, & eye protection. |
| 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. |
| P304 + P340 + P310 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. |
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P335 | Brush off loose particles from skin. |
| P363 | Wash contaminated clothing before reuse. |
| P370 + P378 | In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction. |
| P391 | Collect spillage. Hazardous to the aquatic environment. |
| P402 + P404 | Store in a dry place. Store in a closed container. |
| P405 | Store locked up. |
| P422 | Store contents under inert gas. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

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

None

## SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

### 3.1 Substances

| Component | Formula | Synonyms | CAS # | Concentration |
|---|---|---|---|---|
| Lithium Phosphorus Sulfur Chloride | $Li_6PS_5Cl$ | LPSCl, LiPSCl | n/a (experimental) | 100% |

## 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:**

Remove contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Seek immediate medical attention.

**After Eye Contact:**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

**After Swallowing:**

Do NOT induce vomiting. 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. No

classification data on carcinogenic properties of this material is available from EPA, IRAC, NTP, OSHA or ACGIH.

### 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 dry sand, dry chemical or alcohol-resistant foam for extinction. DO NOT USE WATER.

### 5.2 Special Hazards Arising from the Substance or Mixture

Metal oxides, metal sulfides, hydrogen sulfide, phosphorus sulfide, phosphorus oxide, sulfur oxides (SOx)

### 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. Ensure adequate ventilation. Keep unprotected persons away. Avoid breathing dust. Evacuate personnel to safe areas. 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.

### 6.3 Methods and Materials for Containment and Cleaning Up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, 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. Wash hands thoroughly after handling. For precautions, see section 2.2.

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

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

### 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 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:**
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).

**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**
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: | Grey |
| Odor: | Rotten eggs (sulfur) smell |
| 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: | 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

No Data Available

**10.2 Chemical Stability**

Stable under recommended storage conditions (see Section 7.2); handle under inert gas

**10.3 Possibility of Hazardous Reactions**

Contact with water releases flammable gases which may ignite spontaneously

**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**

In the event of fire: Lithium oxides, hydrogen sulfide, phosphorus sulfide, phosphorus oxide, sulfur oxides (SOx)

## 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 |
| Other Information: | No Data Available |

**Skin corrosion/irritation**

No Data Available

**Serious eye damage/eye irritation**

No Data Available

**Respiratory or skin sensitization**

No Data Available

**Germ cell mutagenicity**

No Data Available

**Carcinogenicity**

| | |
|---|---|
| **IARC:** | No component of this product (present at levels greater than or equal to 0.1%) is identified as probable, possible or confirmed human carcinogen by IARC. |
| **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

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. 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 Phosphorous 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 Phosphorous 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 Phosphorous Sulfur Chloride)

### 14.4 Additional Transport Information

HS Code (first 6 digits) / HTS-US (9 digits) #: 2830.90.9000

## 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, flammable solid, toxic by skin contact

**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.

**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** | | **NFPA Rating** | |
|---|---|---|---|
| Health Hazard: | 3 | Health Hazard: | 3 |
| Flammability Hazard: | 1 | Flammability Hazard: | 1 |
| Physical Hazard: | 2 | Reactivity Hazard: | 2 |

**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 –**