# Material Safety Data Sheet

Report No.:MSLI225568

**Material Name: Lithium-Ion Battery** Date: Jan. 04, 2022

## Section 1 - Chemical Product and Company Identification

Product name: Lithium ion rechargeable battery

Description: 5568-BATT 3.7V 2.6Ah 9.6Wh ·

Synonyms : None ·

Manufacturer Information:

Electrochem Automation (Shanghai) Co., Ltd.

No.5788 Huaxia (w) road, Pudong, Shanghai, China

Tel: 86-21-3390-6630

Fax: 86-21-3390-6902

E-mail: sales@nexcellglobal.com

## SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

·Substance or preparation : Preparation

·Information about the chemical nature of product :

| CAS # | Component | EC No. | Percent Wt. | EU Classification |
|---|---|---|---|---|
| 12190-79-3 | Lithium Cobaltate (LiCoO2) | 235-362-0 | 30-40% | |
| 7429-90-5 | Aluminum foil | 231-072-3 | 3-6% | F; R15 ? 7; S2 ? 7/8 - 43 |
| 21324-40-3 | Phosphate, Lithium | 244-334-7 | 15-20% | --- |
| 24937-79-9 | Poly Vnylidene fluoride (PVDF) | --- | ＜3 | --- |
| 7440-50-8 | Copper Foil (Cu) | 231-159-6 | 6-12% | Sensitization of the skin group No.2 |
| 7782-42-5<br>7740-44-0 | Graphite (natural graphite)<br>(Artificial graphite) | 231-955-3 | 12-24% | --- |
| --- | Organic electrolyte | --- | 10-15% | Inflammable liquid |
| --- | Stainless shell, Nickel and inert materials | --- | Remainder | --- |

## SECTION 3 - HAZARDS IDENTIFICATION

For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage.

However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released.

Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

・Most important hazard and effects

Human health effects :

Inhalation : The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.

Skin contact : The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a sore and a stimulation on the skin.

Eye contact : The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and a stimulation on the eye. Especially, substance that causes a strong inflammation of the eyes is contained.

Environmental effects:

Since a battery cell remains in the environment, do not throw out it into the environment.

・Specific hazards :

If the electrolyte contact with water, it will generate detrimental hydrogen fluoride. Since the leaked electrolyte is inflammable liquid, it does not bring close to fire.

## SECTION 4 - FIRST AID MEASURES

Under normal conditions of use, the battery is hermetically sealed.

**A battery cell and internal cell materials of an opened battery cell**

・Ingestion :

Swallowing a battery can be harmful.

Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

Induce vomiting. When it is impossible or the feeling is not well after vomiting, seek medical attention.

・Inhalation :

Contents of an open battery can cause respiratory irritation. Remove to fresh air immediately and make the victim blow his/her nose, gargle. Seek medical attention if necessary.

・Skin contact :

Remove contaminated clothes and shoes immediately. Wash the adhere or contact region with soap and plenty of water immediately.

・Eye contact :

Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

## SECTION 5 - FIRE-FIGHTING MEASURE

・Suitable extinguishing media : Since vapor, generated from burning batteries may make eyes, nose and throat irritate, be sure to extinguish the fire on the windward side. Pouring water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam are effective.

・Specific hazards : Corrosive gas may be emitted during fire.

・Specific methods of fire-fighting : When the battery burns with other combustibles simultaneously, take fire-extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.

・Special protective equipment for firefighters :

Respiratory protection : Respiratory equipment of a gas cylinder style or protection-against-dust mask
Hand protection : Protective gloves

Eye protection : Goggle or protective glasses designed to protect against liquid splashes

Skin and body protection : Protective cloth

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

Internal cell materials, such as electrolyte leaked from battery cell, are carefully dealt with according to the followings.

・Personal precautions :

Remove leaked materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.

・Environmental precautions : Do not throw out into the environment.

・Method of cleaning up : The leaked solid is moved to a container. The leaked place is wiped off with dry cloth.

・Prevention of secondary hazards : Avoid re-scattering. Do not bring the collected materials close to fire.

## SECTION 7 - HANDLING AND STORAGE

・Handling

Technical measures

Prevention of user exposure: Not necessary under normal use.

Prevention of fire and explosion: Not necessary under normal use.

Precaution for safe handling: Do not damage or remove the external tube.

Specific safe handling advice: Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water and seawater. Do not expose to strong oxdizers. Do not give a strong mechanical shock or throw down. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. In the case of charging, use only dedicated charger or charge according to the conditions specified by Sanyo.

・Storage

Technical measures

Storage conditions (suitable, to be avoided): Avoid direct sunlight, high temperature, high humidity and the places where it is exposed to the static electricity. Store in cool place (temperature : -20 ~ 35 degree C, humidity : 45 ~ 85%). Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids Packing material (recommended, not suitable): Insulative and tear proof materials are recommended.

## SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

**·Component Occupational Exposure Limits**

**Aluminum (7429-90-5)**

ACGIH: 10 mg/m3 TWA (metal dust)

German DFG: 1.5 mglm3 MAK (respirable fraction)

United Kingdom: 10 mglm3 TWA (total inhalable dust); 4 mglm3 TWA: (respirable dust)

Sweden: 5 mg/m3 LLV (total dust); 2 mg/m3 LLV (respirable dust)

**Copper (7440-50-8)**

ACGIH: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dusts and mists, as Cu)

German DFG: 1 mglm3 MAK (inhalable fraction); 0.1 mg/m3 MAK (fume, respirable fraction)
2 mg/m3 Peak (inhalable fraction); 0.2 mglm3 Peak (fume, respirable fraction)

United Kingdom: 0.2 ppm TWA (fume, as Cu); 1 mg/m3 TWA (dusts and mists, as Cu)
2 mg/m3 STEL (dusts and mists)

Sweden: 1 mglm3 LLV (total dust); 0.2 mg/m3 LLV (respirable dust)

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

·Appearance

Physical state : Solid

Form : Cylindrical (Single cell)

Color : Metallic color (without tube)

Odor : No odor

Nominal voltage : 3.6 volts (Single cell)

·pH : NA

·Specific temperatures/temperature ranges at which changes in physical state occur.

There is no useful information for the product as a mixture.

·Flash point : NA

·Explosion properties : NA

·Density : NA

·Solubility ,with indication of the solvent(s) : Insoluble in water

### Engineering Controls

General ventilation under normal use conditions.

### Personal Protective Equipment

Eyes/Face: None under normal use conditions. Wear safety glasses when handling leaking batteries.
Skin: None under normal use conditions. Use butyl gloves when handling leaking batteries.

**Respiratory:** None under normal use conditions. During handle leaking batteries, follow the European Standard EN 149. Use a European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**General:** Good personal hygiene practices should always be followed.

## SECTION 10 – CHEMICAL STABILITY AND REACTIVITY INFORMATION

・Stability : Stable under normal use

・Hazardous reactions occurring under specific conditions

・Conditions to avoid : When a battery cell is exposed to an external short-circuit, crushes, modification, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.

・Materials to avoid : Conductive materials, water, seawater, strong oxidizers and strong acids.

・Hazardous decomposition products : Acrid or harmful gas is emitted during fire.

## SECTION 11 - TOXICOLOGICAL INFORMATION

There is no data available on the product itself. The information of the internal cell materials is as follows.

**Lithium Cobalt – $LiCoO_2$**

・Acute toxicity : Unknown.

・Local effects : Unknown.

・Sensitization : The nervous system of respiratory organs may be stimulated sensitively.

・Chronic toxicity/Long term toxicity :

By the inhalation of coarse particulate and steamy gas of cobalt, it is possible to cause the serious respiratory-organs disease. The person of allergy-natured or sensitive-natured may cause a skin reaction or a lung disease.

・Local effects(skin) : Although it is very rare, the rash of the skin and allergic erythema may result.

**Graphite**

・Acute toxicity : Unknown.

・Local effects : Unknown.

・Chronic toxicity/Long term toxicity :

Since the prolonged inhalation under the high concentration of a graphite coarse particulate may become a cause of a lung disease or a tracheal disease, it is regulated by the coarse particulate

obstacle prevention rule and the dust-lung method enforcement regulations.

・Carcinogenicity : Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

**Copper foil**

・Acute toxicity : Coarse particulate stimulates a nose and a tracheal. $LD_{50}$, oral-sheep 18,000-182,000mg/kg 60-100mg of coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.

・Local effects : Unknown.

**Organic Electrolyte**

・Acute toxicity : $LD_{50}$, oral-rat 2,000mg/kg or more

・Local effects : Unknown.

·Skin irritation study : Rabbit - Mild

·eye irritation study : Rabbit - Very severe

## SECTION 12 - ECOLOGICAL INFORMATION

**Component Analysis - Ecotoxicity - Aquatic Toxicity**

**Copper (7440-50-8)**

**Test & Species**

| | |
|---|---|
| 96 Hr LC50 fathead minnow | 23 ug/L |
| 96 Hr LC50 rainbow trout | 13.8 ug/L |
| 96 Hr LC50 bluegill | 236 ug/L |
| 72 Hr EC50 freshwater algae (Scenedesmus subspicatus) | 120 ug/L |
| 96 Hr LC50 water flea | 10 ug/L |
| 96 Hr LC50 water flea | 200 ug/L |

## SECTION 13 - DISPOSAL CONSIDERATIONS

**·Waste Disposal Instructions**

Do not crush, puncture or incinerate waste lithium batteries. If significant amount of unreacted or unconsumed lithium remaining in the waste lithium batteries may be considered as a reactive hazardous waste. Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulation.

## SECTION 14 - TRANSPORT INFORMATION

**Land Transport (ADR/RID)**

The product fulfils the requirements of Special provision 188 of ADR/RID and therefore, keeping the prescribed quantity limits, except from the application of the dangerous goods regulations.

**Sea transport (IMDG)** The product fulfils the requirements of Special provision 188, 230 of IMDG-Code and therefore, keeping the prescribed quantity limits, except from the application of the dangerous goods regulations.

Marine pollutant: NO.

**Air Transport (IATA)**

ICAO/IATA Class: Class 9
UN/ID Number: UN3481 (battery packed with or contained in the equipment)
UN/ID Number: UN3480 (Li-ion battery only)
Environmental hazards: N/A

The product fulfils the requirements of special provision PI966 of IATA-DGR 63rd Edition. Cells and battery are packed according to the requirements of PI966 Section II of IATA Dangerous Goods Regulations (DGR). Cells and batteries are protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to short circuit.

## SECTION 15 - REGULATORY INFORMATION

**European Union Regulatory Information**

This product is not classified according to the EU regulations

**Label Requirements Symbol** None

**R-Phrases/S-phrases** None

**Additional Regulatory Information**

| Component | CAS # | EINECS |
|---|---|---|
| Polyvinylidene fluoride (PVDF) | 24937-79-9 | No |
| Aluminum | 7429-90-5 | Yes |
| Copper | 7440-50-8 | Yes |

## SECTION 16 - OTHER INFORMATION

The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.

This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

---

Reference

Chemical substances information: Japan Advanced Information center of Safety and Health International Chemical Safety Cards (ICSCs):

International Occupational Safety and Health Information Centre (CIS)

1999 TLVs and BEIs : American Conference of Governmental Industrial Hygienists (ACGIH)

Dangerous Goods Regulations – 63rd Edition: International Air Transport Association (IATA)

IMDG Code: International Maritime Organization (IMO)

MSDS of raw materials prepared by the manufacturers.

Electrochem Automation (Shanghai) Co., Ltd.
No.5788 Huaxia (w) road, Pudong, Shanghai, China
Tel: 86-21-3390-6630
Fax: 86-21-3390-6902
E-mail: sales@nexcellglobal.com

www.nexcellglobal.com
USA Sales & Service Center: Monrovia, CA, 91016
Tel: 1-626-358-0121
Fax: 1-626-358-5322
E-mail: usasales@nexcellglobal.com