

Product name: Lithium Ion Polymer Battery Cell

Material Safety Data Sheet for Li-ion Battery (MSDS)

BATTERY-LiPo110mAh, BATTERY-LiPo250mAh, BATTERY-LiPo1400mAh, BATTERY-LiPo800mAh, BATTERY-LiPo2200mAh, BATTERY-LiPo4400mAh, BATTERY-LiPo6600mAh

## 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Lithium Ion Polymer Battery Cell

Company name: OLIMEX LTD, 2 Pravda St, Plovdiv, Bulgaria

Telephone number: +359-32-626259

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

Substance or preparation: Preparation

Information about the chemical nature of product:

Common chemical name / CAS number Concentration / General name Concentration range

Lithium Cobaltate 12190-79-3 25-40% (LiCoO<sub>2</sub>)

Aluminium 7429-90-5 10-40%

Graphite 7782-42-5 10-20% (Natural graphite) 7740-44-0 (Artificial graphite)

Copper 7440-50-8 5-15%

Organic electrolyte - 10-20%

Classification and hazard labeling

Sensitization of the skin group No.2 Inflammable liquid

## 3. HAZARDS IDENTIFICATION

For the battery cell, chemical materials are stored in a soft package of sealed aluminium foil 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, strike cell with any sharp edge parts, the soft aluminium foil will be easily damaged. 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 stimulation on the skin.

Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and 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 contacts with water, it will generate detrimental hydrogen fluoride.

Since the leaked electrolyte is inflammable liquid, do not bring close to fire.

## 4. FIRST-AID MEASURES

Spilled internal cell materials

Inhalation:

Make the victim blow his/her nose, gargle. Seek medical attention if necessary.

Skin contact:

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

Eye contact:

Do not rub one's eyes. Immediately flush eyes with water continuously for at least 15 minutes.

Seek medical attention immediately.

A battery cell and spilled internal cell materials

Ingestion:

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

## 5. FIRE-FIGHTING MEASURE

Suitable extinguishing media: Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.

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.

## 6. ACCIDENTAL RELEASE MEASURES

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

Precautions for human body:

Remove spilled 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 spilled solids are put into 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.

## 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 strike cell with any sharp edge parts, Trim your nail or wear glove before taking cell, Clean worktable to make sure no any sharp particle.

Specific safe handling advice: Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water or seawater. Do not expose to strong oxidizers. Do not give a strong mechanical shock or fling. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. Do not bend or fold sealing edge, Do not open or deform folding edge, Do not bend tab. In the case of charging, use only

dedicated charger or charge according to the conditions specified by J & A Electronics.

Storage

Technical measures:

Storage conditions (suitable, to be avoided): Avoid direct sunlight, high temperature, high humidity.

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.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures:

No engineering measure is necessary during normal use. In case of internal cell materials' leakage, operate the local exhaust or improve ventilation.

Personal protective equipment

Respiratory protection: Respirator with air cylinder, dust mask

Hand protection: Protective gloves

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

Skin and body protection: Working clothes with long sleeve and long trousers.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state: Solid

Form: Prismatic

Color: Metallic color (with tab)

Odor: No odor

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.

## 10. STABILITY AND REACTIVITY

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, deformation, 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.

## 11. TOXICOLOGICAL INFORMATION

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

Lithium cobaltate –  $\text{LiCoO}_2$

Acute toxicity: No applicable data.

Reference cobalt: LDLo, oral - Guinea pig 20mg/kg

Local effects: Unknown.

Sensitization:

The nervous system of respiratory organs may be stimulated sensitively.

Chronic toxicity/Long term toxicity:

By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.

Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.

Aluminum

Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused. Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause a lung damage (aluminum lungs).

Graphite

Acute toxicity: Unknown.

Local effects: When it goes into one's eyes, it stimulates one's eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.

Chronic toxicity/Long term toxicity:

Since the long-term inhalation of high levels of graphite coarse particulate may become a cause of a lung disease or a tracheal disease.

Carcinogenicity:

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

Copper

Acute toxicity:

60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.

TDLo, hypodermic - Rabbit 375mg/kg

Local effects:

Coarse particulate stimulates a nose and a tracheal.

When it goes into one's eyes, the symptom of the reddening and the pain is caused.

Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.

Reproductive effects: TDLo, oral - Rat 152mg/kg

Organic Electrolyte

Acute toxicity:

LD50, oral - Rat 2,000mg/kg or more

Local effects: Unknown.

Skin irritation study: Rabbit - Mild

eye irritation study: Rabbit - Very severe

## 12. ECOLOGICAL INFORMATION

Persistence/degradability:

Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.

## 13. DISPOSAL CONSIDERATIONS

Recommended methods for safe and environmentally preferred disposal:

Product (waste from residues)

Do not throw out a used battery cell. Recycle it through the recycling company.

Contaminated packaging

Neither a container nor packing is contaminated during normal use. When internal materials leaked

from a battery cell contaminates, dispose as industrial wastes subject to special control.

#### 14. TRANSPORT INFORMATION

In the case of transportation, avoid exposure to high temperature and prevent the formation of any condensation. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section 7-HANDLING AND STORAGE also.

UN classification: However this product's shipping name is "Lithium ion batteries" (or "Lithium ion Rechargeable Batteries" or "Lithium ion Batteries contained in equipment"), it is not recognized as "DANGEROUS GOODS" when its transport condition accords with "packing instruction 965 part 1 of IATA DGR"

(or "packing instruction 966 part 1" or "packing instruction 967 part 1") or "special provision 188 of IMO-IMDG Code".

#### 15. REGULATORY INFORMATION

Regulations specifically applicable to the product:

IATA-DGR (air transportation)

IMO-IMDG Code (sea transportation)

US Department of Transportation 49 Code of Federal Regulations [USA]

#### 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: International Occupational Safety and Health Information Centre (CIS)

2002 TLVs and BEIs: American Conference of Governmental Industrial Hygienists (ACGIH)

Dangerous Goods Regulations - 50th Edition Effective 1 January 2009: International Air Transport Association (IATA)

IMDG Code - 2008 Edition: International Maritime Organization (IMO)