

Safety data sheet for chemical products (SDS)

1. PRODUCT AND COMPANY IDENTIFICATION

- Product name : Lithium Ion Battery Cell (Robust type)
- Product code : Prismatic type cell
UF553048L

- Company name : Sanyo Electric Co., Ltd. Mobile Energy Company
- Address : 222-1, Kaminaizen, Sumoto City, Hyogo, Japan
- Telephone number : +81-799-24-4111
- Telefax number : +81-799-24-4121
- Emergency telephone number : [Weekday] +81-799-23-2926
[Night and holiday] +81-799-24-4131

2. COMPOSITION / INFORMATION ON INGREDIENTS

- Substance or preparation : Preparation
- Information about the chemical nature of product :

Common chemical name / General name	CAS number	Concentration / Concentration range	Classification and hazard labeling
Lithium Manganate (LiMn ₂ O ₄)	12057-17-9	10-20%	-
Lithium Cobaltate (LiCoO ₂)	12190-79-3	10-20%	-
Aluminum	7429-90-5	10-40%	-
Graphite (Natural graphite) (Artificial graphite)	7782-42-5 7740-44-0	10-20%	-
Copper foil	7440-50-8	5-10%	Sensitization of the skin group No.2
Organic electrolyte	-	5-20%	Inflammable Solid

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.

4. FIRST-AID MEASURES

Internal cell materials of an opened battery cell

- Inhalation :
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.

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

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

5. FIRE-FIGHTING MEASURE

- Suitable extinguishing media : Pouring 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

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.
-

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 oxidizers. 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 avoid) : 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 tearproof 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.
- Control parameters

Common chemical name / General name	ACGIH (1999)	
	TLV-TWA	BEI
Lithium Manganate (LiMn ₂ O ₄)	0.2g/m ³ (as cobalt)	
Lithium Cobaltate (LiCoO ₂)	0.02g/m ³ (as cobalt)	-
Aluminum	-	-
Carbon (natural graphite) (Artificial graphite)	Emission nature dust 10mg/m ³	-
Copper foil	Fume 0.05mg/m ³ A coarse particulate, Mist 1.0mg/m ³	-
Organic electrolyte	-	-

ACGIH : American Conference of Governmental Industrial Hygienists ,Inc.

TLV-TWA : Threshold Limit Value-time weighted average concentration

BEI : Biological Exposure Indices

- Personal protective equipment
 - Respiratory protection : Protective against 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
 - 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, 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.

11. TOXICOLOGICAL INFORMATION

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

Lithium cobaltate – LiCoO₂, Lithium Manganate -LiMn₂O₄

- 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 of Manganese Oxide (MnO₂), lungs and a nervous system may

be affected and bronchitis, pneumonia, a nerve disease, and nerve mental disorder (manganese poisoning) may be produced.

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.
LD₅₀, 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 :
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, confirm no leakage and no overspill from a container. 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.

- Codes and classifications according to international regulations for transport

Air

IATA-DGR : special provision A45

- The UN classification number : Class 9 3090

However, since it corresponds to special provision A45 of IATA-DGR, this battery cell can be conveyed normally.

15.REGULATORY INFORMATION

- Regulations specifically applicable to the product :
IATA UN No.3090 (air transportation)
US Department of Transportation 49 Code of Federal Regulations [USA]
Wastes Disposal and Public Cleaning Law [Japan]
Law for Promotion of Effective Utilization of resources [Japan]
-

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 – 44th Edition Effective 1 January 2003 : International Air Transport Association (IATA)

MSDS of raw materials prepared by the manufactures

First edition : Jul. 1 2003

Latest edition :

Prepared and approved by

Sanyo Electric Co., Ltd.

Mobile Energy Company

Ion Technology Business Unit

Technical Service Department