WUHAN FANSO TECHNOLOGY CO., LTD.

According to UN GHS (the 8th revised edition)

Material Safety Data Sheet (MSDS)

Product Name:	Li-$SoCl_2$ Battery
Model No.:	/

Written by: Linda (Linda)

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Approved by: Grealy (Grealy)

TUV-Laboratory (China) Service of Testing Co., Ltd. APPROVED TUV-LAB 140417755181103

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Item No.:	20A028A307
MSDS No.:	E27.210.111.004.WFT-2
Initial Date:	Jan. 11, 2021
Revision Date:	Jan. 14, 2022

Query service

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Section 1 Product and Company Identification

Product identification

Product Name:	Li-$SoCl_2$ Battery
Model No.:	/
Trademark:	FANSO
CAS No.:	Not applicable
EC No.:	Not applicable
Molecular formula:	Not applicable

Relevant identified uses of the substance or mixture and uses advised against

Identified uses:	Used for electronic instrument
Uses advised against:	No special note

Details of the applicant, supplier

Company name:	WUHAN FANSO TECHNOLOGY CO., LTD.
Address:	1 Sitai Wu Lu, Sitai Industrial Park, Yongfeng Street, Hanyang District, Wuhan
Post code:	/
Telephone:	+86-18627884463
Fax:	/
E-mail:	/

Emergency telephone number

Emergency telephone:	+86-19947659915

Section 2 Hazard Description

1	For the battery, chemical materials are stored in a hermetically sealed 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. However, do not open, short-circuit, squeeze, burn, disassemble, expose to flame, mix different models, different chemical properties or different types of batteries. The battery case will be breached at the extreme, hazardous materials may be released.

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Hazard description

Physical and chemical hazards

	Non-flammable, no special explosive characteristics.

Health hazards

Inhalation:	The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.
Ingestion:	Abdominal pain, vomiting.
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 hazards

	Please refer to Section 12 of MSDS.

Section 3 Composition/Ingredient Data

☐Material ■Mixture

Component(s)	Content, %	CAS No.
Thionyl Chloride	40.0-45.0	7719-09-7
Litium	4.5-5.5	7439-93-2
Carbon	3.0-4.0	7782-42-5
Aluminum Chloride	1.0-5.0	7446-70-0
Tetrafluoroethylene	0.02	9002-84-0

Section 4 First Aid Measures

Description of first aid measures

General advice:	Show this material safety data sheet to the doctor in attendance. After receiving the first-aid measure required, consult a physician if necessary.

Skin contact:	Remove contaminated clothing and shoes. Wash off with mild soap and plenty of water. If skin irritation occurs or persists, consult a physician immediately.
Eyes contact:	Check for and remove any contact lenses, occasionally lifting the upper and lower eyelids. Immediately flush eyes with running water, disappear until the chemical residues so far. Provide a readily-accessible eyewash facility and quick-drench safety shower. Do not rubbing eyes with hand. If eye irritation occurs or persists, consult a physician immediately.
Inhalation:	Move exposed person to fresh air. Maintain an open airway. Keep person warm and at rest. If breathing is irregular, provide artificial respiration or oxygen by trained personnel. Get medical attention if adverse health effects persist or are severe.
Ingestion:	Wash out mouth with water. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person.

Most important acute and delayed symptoms/effects

1	The most important known symptoms and effects are described in section 2 and/or in section 11.

Immediate/special treatment

1	Continue with first aid measures. Treat symptomatically and supportively.
2	Symptoms may be delayed.

Section 5 Firefighting Measures

Extinguishing agent

Suitable/Unsuitable extinguishing agents:	In case of fire, water flooded ground fire. If the battery is burning, water may not be extinguished, but can use water cooling adjacent batteries so as to control

	the spread of fire. The preferred medium for small fire is carbon dioxide, dry powder, or foam extinguishing agent, but for the lithium battery is burning may be no use, the battery will burn until complete combustion. In fact, all lithium batteries can be controlled by water. However, when using water to produce hydrogen gas may be mixed with air to form explosive mixture. LITH-X (graphite powder) or copper powder fire extinguishers, sand, dry, powdered dolomite or soda can be used as smothering agent

Special hazards arising from the substance or mixture

1	If this product is involved in a fire, the following can be released: Carbon oxides, metal oxides, etc.

Fire precautions and measures

1	Firefighters must wear self-contained breathing apparatus, wear full body fire suit, fire extinguishing in the upwind.
2	As far as possible will be transferred to empty containers from the scene.
3	Keep the fire water spray containers cooling, until the end of fire.
4	If the containers in the fire ground have been color, must be evacuated immediately.
5	Isolated accident scene, prohibit access.
6	Receiving and processing of fire, to prevent environmental pollution.

Section 6 Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

1	No action shall be taken involving any personal risk or without suitable training.
2	Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering.
3	Do not touch or walk through spilt material, avoid slipping.
4	Avoid breathing steam.
5	Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate.
6	Put on appropriate personal protective equipment (see section 8).

Environmental precautions

1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

1	Small spill: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor. Large spill: Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth.
2	Contaminated absorbent material may pose the same hazard as the spilt product.
3	Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

Section 7 Handling and Storage

Precautions for safe handling

1	Don’t uses or leave the battery near a heat source as fire or heater.
2	If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use or storage, immediately remove it from the device and stop using.
3	Don't put the battery excessive vibration, avoid short circuit, however accidental short circuit for a short period of time will not have a serious impact on the battery.
4	Long-term short circuit can make battery loss of energy, generate a lot of heat burn skin, and even cause a fire or explosion.
5	Chaos of the battery in bulk in containers, coins, metal accessories, metal workbench, covered by or metal belt and so on battery device can be used for assembly is the source of cause a short-circuit.
6	Transport or storage battery should have effective measures of prevent short circuit.
7	Don’t disassembly or damage to the battery.
8	Keep away from heat/sparks/open flames/hot surfaces.
9	Handling carefully to prevent damage the packaging and container.
10	Equipped with corresponding varieties and number of fire equipment and spill contingency processing equipment.

Precautions for storage

1	Stored in a cool, dry and ventilated place, may cause the battery performance loss under high temperature, leakage, rust.

2	Don't expose the battery under the open flame, stored away from water and strong oxidizing agent.
3	Equipped with corresponding varieties and number of fire equipment and spill contingency processing equipment.
4	Keep out of reach of children and pets.

Section 8 Exposure Controls/Personal Protection

Control parameters

◆ Occupational Exposure limit values

Components CAS No.	Country/region	Occupational exposure limits (8h)		Occupational exposure limits (Short time)	
		ppm	mg/m^3	ppm	mg/m^3
Thionyl Chloride 7719-09-7	USA-NIOSH	-	-	1	5
	Korea	-	-	0.2	1
	New Zealand	-	-	1	4.9
	Ireland	-	-	0.5	2.4
	Denmark	1	5	1	5
	Australia	-	-	1	4.9

Engineering controls

1	Ensure adequate ventilation, especially in confined areas.
2	Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

General requirements:	
Respiratory protection:	Respiratory protective equipment is not necessary if used as intended. Respiratory protection may be required under exceptional circumstances when excessive air contamination exists. If the batteries leaks must try to keep the air circulation, avoid operating in a narrow place.
Eye protection:	Not necessary if used as intended, wear goggles/safety glasses giving complete eye protection if the battery damaged or leaking.

Skin and body protection:	Not necessary if used as intended, wear appropriate clothing and boots to minimize skin exposure if the battery damaged or leaking.
Hands protection:	Not necessary if used as intended, wear appropriate protective gloves if the battery damaged or leaking. Check protective gloves prior to each use for their proper condition. The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Section 9 Physical and Chemical Properties

Information on basic physical and chemical properties

Appearance and character:	Red/white column shape, solid
Odor:	Odorless
Flash point (˚C):	No data/Not applicable
Melting point/freezing point (˚C):	No data/Not applicable
Initial boiling point and boiling range (˚C):	No data/Not applicable
Evaporation rate:	No data/Not applicable
Steam pressure (20˚C):	No data/Not applicable
Relative density (water=1):	No data/Not applicable
Partition coefficient: n-octanol/water:	No data/Not applicable
Decomposition temperature (˚C):	No data/Not applicable
pH value:	No data/Not applicable
Auto ignition temperature (˚C):	No data/Not applicable
Explosion limit [%（v/v）]:	Non explosives
Relative vapor density(air=1):	No data/Not applicable

Solubility:	Insoluble in water
Flammability (solid, gas):	Non-flammable
Oxidizing properties:	The substance does not belong to oxidizing substances

Section 10 Stability and Reactivity

Stability and Reactivity

Stability:	The product is chemically stable.
Reactivity:	Stable under recommended storage and handling conditions.
Incompatible materials:	Strong oxidizing agents, strong acids and strong bases.
Conditions to avoid:	In contrast to the nature of the material, overheating, exposed to damp air or water, mechanical vibration and power abuse.
Hazardous decomposition products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11 Toxicological Information

Acute toxicity

Component(s)	CAS No.	LD_{50}(Oral)	LD_{50}(Dermal)	LC_{50}(Inhalation)
Aluminum Chloride	7446-70-0	Rat: 3450mg/kg Mouse: 1130mg/kg	Rabbit: >2000mg/kg	No data
Thionyl Chloride	7719-09-7	No data	No data	Rat: 500ppm/1H

Skin corrosion/irritation:	Causes severe skin burns (Category 1B).
Eye corrosion/irritation:	Causes serious eye damage (Category 1).
Respiratory sensitization:	These products are not known to cause human respiratory sensitization.
Skin sensitization:	These products are not known to cause skin sensitization.
Germ cell mutagenicity:	According to the existing data, the product is not classified.
Carcinogenicity:	No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

Reproductive toxicity:	1,2-dimethoxyethane: Reproductive toxicity (Category 1B).
Specific target organ toxicity - single exposure:	According to the existing data, the product is not classified.
Specific target organ toxicity - repeated exposure:	According to the existing data, the product is not classified.
Aspiration hazard:	According to the existing data, the product is not classified.
Additional reproductive toxicity hazards:	According to the existing data, the product is not classified.

Section 12 Ecological Information

Acute aquatic toxicity

Component(s)	CAS No.	LC_{50} Fish(96h)	EC_{50} Crustaceans (48h)	ErC_{50} Algae
Aluminum Chloride	7446-70-0	6.17mg/L	1.9mg/L	0.515 (96h)

Persistence and degradability

Persistence:	No data.

Bioaccumulative potential

Bioaccumulation:	No data.

Mobility in soil

Mobility:	No data.

Other adverse effects

1	Do not allow material to be released to the environment without proper governmental permits.

Section 13 Disposal Considerations

Waste disposal

Residual waste:	Before disposal should refer to the relevant national and local laws and regulation. The generation of waste should be avoided or minimized wherever possible.

	Recommended transfer to a suitable container and arrange for collection by specialized disposal company if recycling is not feasible.
Contaminated packaging:	The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.
Disposal considerations:	Dispose of container and unused contents in accordance with national and local relevant regulations laws.

Section 14 Transport Information

Transport Information

UN No.:	UN3090 or UN3091
UN Transport name:	Lithium Metal Batteries(including Lithium Primary Batteries) or; Lithium Metal Batteries Contained In Equipment(including Lithium Primary Batteries) or Lithium Metal Batteries Packed With Equip (including Lithium Primary Batteries)
Hazard class(es) :	IMDG: 9 IATA: 9 ADR/RID: 9 Depending on their lithium metal content, some single cells and small multi-cell battery packs may be non-assigned to Class 9.
Packaging group:	N/A
Environmental hazard Marine pollutant (Yes/No):	No
ICAO/ATA:	The transportation of primary lithium cells and batteries is regulated by the International Air Transport Association (According to Section II/Section 1B of PACKING INSTRUCTION 968, or Section II of PACKING INSTRUCTION 969~970 of IATA DGR 63rd Edition for transportation), International Civil Aviation Organization, International Maritime Dangerous Goods Code and the US Department of Transportation. The batteries must meet the following criteria for shipment: Meet the requirements for the US Department of Transportation listed in 49 CFR 173.185.

	The transport of primary lithium batteries is prohibited aboard passenger aircraft.
IMDG CODE:	The batteries are not restricted to IMDG Code 2020 Edition (Amdt 40-20) according to special provision 188.
ADR/AND:	The batteries are not subject to the provisions of United Nations Economic Commission for Europe (UNECE) ADR/ADN if they meet the requirements of special provision 188 of Chapter 3.3. Applicable as from 1 January 2019.

Separate batteries when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport.
In addition, to be permitted in transport each lithium cell and battery types must have passed the applicable tests set out in Subsection 38.3 of the UN Manual of Tests and Criteria.

Section 15 Regulatory Information

Regulatory information:

Reference to the local, national, US, EU, CA and international regulations.

CAS No.	TSCA	EINECS	DSL	IECSC	NZIoC	PICCS	KECI	AICS
7439-93-2	√	√	√	√	√	√	√	√
7782-42-5	√	√	√	√	√	√	√	√
9002-84-0	√	√	√	√	√	√	√	√
7719-09-7	√	√	√	√	√	√	√	√
7446-70-0	√	√	√	√	√	√	√	√

TSCA:	United States Toxic Substances Control Act Inventory
EINECS:	European Inventory of Existing Commercial Chemical Substances
DSL:	Canadian Domestic Substances List
IECSC:	China Inventory of Existing Chemical Substances
PICCS:	Philippines Inventory of Chemicals and Chemical Substances
NZIoC:	New Zealand Inventory of Chemicals
KECI:	Existing and Evaluated Chemical Substances
AICS:	List of existing chemical substances in Australia

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★Note:	" √ " Indicates that the substance included in the regulations "× " That no data or included in the regulations

Section 16 Other Information

Abbreviations or phrases

ACGIH:	American Conference of Governmental Industrial Hygienists
ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS:	Chemical Abstracts Service
CLP:	Classification, labeling and packaging
EC:	Council of Europe
ECHA:	European Chemicals Agency
EINECS:	European Inventory of Existing commercial Chemical Substances
GHS:	Globally Harmonized System of Classification and Labelling of Chemicals
IARC:	International Agency for Research on Cancer
IATA:	International Air Transport Association
RID:	Regulation for rail International transportation of Dangerous goods
ICAO:	International Civil Aviation Organization
IMDG:	International Maritime Dangerous Goods Code
IC_{50}:	Inhibitory Concern Triton 50%
LC_{50}:	Lethal Concentration 50%
LD_{50}:	Median Lethal Dose 50%
MAPROL:	International Convention for the Prevention of Pollution from Ships
REACH:	REGULATION concerning the Registration, Evaluation, Authorization and Restriction of Chemicals
STEL:	Short Term Exposure Limit
TWA:	Time Weighted Average
MAC:	Maximum Allowable Concentration
OSHA:	Occupational Safety and Health Administration
NIOSH:	National Institute for Occupational Safety and Health

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TLV:	Threshold Limit Value
TLV-TWA:	Threshold Limit Value-Time Weighted Average
TLV- STEL:	Threshold Limit Value-Short term Exposure Limit
PC-TWA:	Permissible Concentration-Time Weighted Average
PC-STEL:	Permissible Concentration-Short Term Exposure Limit
PEL:	Permissible Exposure Limit
OELs:	Occupational Exposure Limits

Reference

1	IARC
2	OECD: The Global Portal to Information on Chemical Substances
3	U.S. Department of Transportation: ERG
4	Germany GESTIS-database on hazard substance
5	CAMEO Chemicals
6	NLM: ChemIDplus
7	EPA: Integrated Risk Information System
8	IPCS: The International Chemical Safety Cards (ICSC)

Disclaimer

1	The above information is believed to be correct but we can not guarantee the absolute universality and accuracy and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.
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