MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT IDENTIFICATION

- **Product Identification**

Polymer Lithium-Ion Rechargeable Battery	
Nominal Voltage(V):	3.85
Cell P/N:	SP546778SH
Minimum Cell Capacity(mAh):	5000
Cell UL NO:	MH66797
Customer P/N:	N/A

PACK P/N:	AAQM546778SA
Minimum PACK Capacity(mAh):	4960
PACK UL NO:	MH27663
Customer Project Name:	N/A

- **Manufacture Identification**

Tianjin Juyuan New Energy Te Co.,Ltd
6 Lanyuan Road, Huayuan Hi-Tech
Industry Park, Tianjin 300384, China
Http://www.lishen.com.cn

86 - 22 - 83710366
Phone Number (For Information)
86 - 22 - 83710366
Emergency Phone Number Telex'
86 - 22 - 83710366

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

SECTION 2 HAZARDS IDENTIFICATION

Primary Routes of Entry	■ Inhalation ■ Ingestion ■ Skin Absorption ■ Eye contact	**CARCINOGEN LISTED IN**	□ NTP □ OSHA □ LARC Monograph □ NOT Listed

Health Hazards	**Acute and chronic** All chemicals are contained in a sealed can. Risk of exposure occurs only,if the battery is mechanically or electrically abused(mechanical, thermal, electrical), which leads to the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/fire may follow, depending upon the circumstances.
Medical Conditions Generally Aggravated By Exposure	An acute exposure will not generally aggravate any medical condition.
Symptoms of Exposure	Skin contact, no effect under routine handling and use.
Eye Contact	No effect under routine handling and use
Skin Contact	No effect under routine handling and use
Ingestion	No effect under routine handling and use
Inhalation	No
Reported as carcinogen	Not applicable

SECTION 3 COMPOSITION & INFORMATION ON INGREDIENTS

Equivalent lithium content per cell（g）			1.905	OSHA	ACGIH	CAS Number	OTHER LIMITS
COMPONENTS-Chemical Name and Common Names (Hazardous Components 1% or greater, Carcinogens 0.1% or greater)			%	PEL	TLV		RECOMMENDED
Hazardous Ingredients:	**Cathode active material**	**Lithium Cobalt Oxide**	43.2%			12190-79-3	
	Anode active material	**Graphite**	23.1%			7782-42-5	
	Electrolyte	**$LiPF_6$ 12%**	1.1%			21324-40-3	
		EC 30%	2.1%			96-49-1	
		EMC 50%	4.1%			623-53-0	
		PC 8%	0.7%			108-32-7	
Non-Hazardous Ingredients:	**Anode tab**	**Nickel**	0.4%			7440-02-0	
	Cathode tab	**Aluminum**	0.3%			7429-90-5	
	AL foil	**Aluminum**	5.5%			7429-90-5	
	Cu foil	**Copper**	8.6%			7440-50-8	
	Conductive additive	**Carbon**	2.0%			7440-44-0	
	Adhesive	**Polyvinylidene fluoride**	2.0%			24937-79-9	
	Tape	**Polypropylene**	1.4%			9003-07-0	
	Separator	**Polypropylene**	2.5%			9003-07-0	
		Polyethylene				9002-88-4	
	Package	**Nylon**	3.0%			32131-17-2	
		Aluminum				7429-90-5	
		Polypropylene				9003-07-0	
Total			100.0%				

SECTION 4 FIRST-AID MEASURES

If exposure to internal materials in cell due to damaged outer casing, the following actions are recommended.

Eye Contact	In case of eye contact, flush with lot of water for 15 minutes, and get medical help.
Skin Contact	In case of skin contact with contents of battery, flush immediately with water.
Inhalation	In case of light inhalation ,move to an area with flash air immediately, if irritation persists, get medical help.
Ingestion	In case of ingestion, drink milk/water to induce vomiting and wash out, get medical help.

SECTION 5 FIREFIGHTING MEASURES

Extinguisher Media:

CO_2 or dry chemical power

Special Fire-Fighting Procedures:

In case of fire in cell original containers, use CO2 or dry chemical extinguisher; For fire in an adjacent area, water can be used.

SECTION 6 ACCIDENTAL RELEASE MEASURES

On Land:

Place material into suitable containers, If the skin has come into contact with the electrolyte, it should be washed thoroughly with water, Sand or earth should be used to absorb any exuded material. Seal leaking battery and contaminated absorbent material should be treated by local regulation, and call local fire/police department to ask for help.

In Water:

If possible, remove from water far from body in special fixture, and call local fire/police department to ask for help

SECTION 7 HANDING AND STORAGE

Handling:

Take all precautions mentioned in this document and operate the battery within the temperature range of -20℃ and 45℃.

No special protective clothing required for handling individual cells in corrective operational method.

Improper handling of lithium ion battery may result in injury or damage from electrolyte leakage, heating, ignition or explosion. So do not crush, pierce, short cell/battery terminals with conductive material; Do not directly heat or solder; do not throw into fire; do not place cell/battery in non conductive trays.

Storage:

Store the battery in a cool, drying place, without chemical vapor or excessive humidity.

SECTION 8 EXPOSURE CONTROLS & PERSONAL PROTECTION

Engineering Controls:

keep away from heat and open flame, prevent hard & sharp thing penetration, store in a cool & dry place.

Personal Protection:

Respiratory Protection: Not necessary under normal operations condition. SCAB required in the event of a fire.

Eye/Face Protection: Not necessary under normal operation condition.

Glove protection: Not necessary under normal operation condition

Foot Protection: Steel toed shoes recommended for Large container handling.

Ventilation to Be Used	□ **Local Exhaust** Not necessary under conditions of Normal use.	□ **Mechanical (General)** Not necessary under conditions of Normal use.
		□ **Special** Not necessary under conditions of Normal use.
	□ **Other (Specify)** Not necessary under normal operation conditions.	

Other Protective Clothing and Equipment

Not necessary under normal operation conditions.

Hygienic Work Practices

Not necessary under normal operation conditions.

SECTION 9 PHYSICAL /CHEMICAL PROPERTIES

Specific Gravity (H2O=1):

$LiCoO_2$:3.80 Graphite:2.0~2.2

Melting Point:

LiCoO2:1130℃ Graphite:3500-3900℃

Appearance and Odor:

$LiCoO_2$ is a gray odorless power; Graphite is a black or odorless power;

Organic solvent is a colorless liquid; Lithium salt is a white, crystalline and odorless power.

SECTION 10 STABILITY & REACTIVITY DATA

Stability ■ Stable □ Unstable	**Conditions to Avoid:** Do not heat or incinerate the battery，Never impact, pierce or crush the battery. Do not disassemble or modify the battery， Do not charge the battery under high temperature conditions such as near a fire or in the direct sunlight. Do not shot-circuit the battery by connect the positive and negative terminals with a metal material. Do not allow the battery to get wet or be immersed in water.

Incompatibility (Materials to Avoid)

Water, salted water, other solvent with water

Hazardous Decomposition Products

N/A

Hazardous Polymerization □ May Occur ■ Will Not Occur	Conditions to Avoid

SECTION 11 TOXICOLOGICAL INFORMATION

This product does not elicit toxicological properties during routine handling and use.

SECTION 12 ECOLOGICAL INFORMATION

Cobalt and its compounds can pose a threat if released to environment. The detail information are showed in waste disposal method in Section 13 "Disposal Consideration".

SECTION 13 DISPOSAL CONSIDERATIONS

There is no contamination during normal operation and use. Lithium batteries should have their terminals insulated prior to disposal, do not throw away a used battery and provide them for recycling company.

Open cells should be treated as hazardous waste. If the leakage or other material is Released, we should take actions as follows:

Leave the area, allow the batteries to cool down, let the vapors to dissipate .

Avoid skin and eye contact or inhalation of vapors. Remove spiller liquid with absorbent and incinerate after.

Waste Disposal method Opened cells should be treated as hazardous waste.

Incineration: incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

Landfilling:According to the proper laws and regulations in different countries or areas, the battery should be buried deeply in the specified place;

Recycling: Send to authorized recycling facilities to get Co,Cu and Al,eventually through licensed waste carrier;

SECTION 14 Transportation

Lishen's SP546778SH Lithium Ion batteries are considered to be "rechargeable batteries" and meet the requirements of transportation by th U.S. Department of Transportation, Civil Aviation Organization (ICAO) Technical Instructions (2018-2019 Edition), the International Air Transport Association (IATA) Dangerous Goods Regulations (65th Edition, 2024). Packing instruction 965 Section IB or II for Lithium Ion battery, the International Maritime Dangerous Goods (IMDG) Code (2020 Edition) with special provision 188 & 230, US Harzardous Materials Regulations 49 CFR(Code of Federal Regulations)Sections 173-185 Lithium batteries and cells. the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries, 6th revised edition(UN3481) as "non-dangerous goods" or "non-hazardous materials". The mentioned batteries are complied with the special provision, Section II of PI965 to PI967. These lithium batteries can be transported in nonrestrictive material and as Non-Dangerous Goods as they meet all the requirements in below:

1	Lithium content requirement
1.1	For the bar cells, the lithium content can not overpass 20Wt/h;
1.2	For the batteries, the lithium content can not overpass 100Wt/h;
2	Meet with UN Test Requirement
2.1	All the cell and battery must be verified to meet with all the requirements in Part 3 -38.3 item (UN38.3 tests) for "Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria" . .
3	Package Requirement
3.1	The cell and battery must be packaged specially and singly, and put into hard outer package to prevent short-circuit if they do not be assembled in finished equipments (such as mobile phone,camera,NBPC.and so on)
3.2	The cell quantity is more than 24pcs or the battery quantity is more than 12pcs, they must be asked to meet with the requirements in blow besides they are assembled in finished equipment.
a	Every package must be marked in the content that the packages are loaded in lithium cells or batteries, also add new lithium iron operation label , also need point out the corrective actions when the packages are damaged.
b	Every batch shipment must be appendixes document which should contain the content that the packages are loaded in lithium cells or batteries, also need point out the corrective actions when the packages are damaged.
c	Every package must pass 1.2mm fall test in any direction. No damage for the cells and batteries, no move and touch together, no cells or batteries escape from the package.
d	Every package weight can not overpass 10kg if the batteries can not be assembled in finished equipment.

SECTION 15 REGULATORY INFORMATION

OSHA Hazard Communication Standard (29 CFR 1910.1200)

☐ Hazardous ☑ Non-hazardous

SECTION 16 OTHER INFORMATION

There is no hazards in accordance with the UN recommendations test.(UN manual of tested and criteria 38.3)

Cell Part Number	**SP546778SH**
Nominal Voltage	**3.85V**
Minimum Cell Capacity	**5000mAh**
Cell Mass	**70g max**
Equivalent Lithium Content	**1.905g**

Test NO	Test Item	Criteria	Result
38.3.4.1	Altitude Test	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.2	Thermal Test	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.3	Vibration	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.4	Shock	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.5	External Short Circuit	External temperature should not exceed 170degC.No disassembly, and fire within six hours of this test.	Passed
38.3.4.6	Crush	External temperature should not exceed 170degC.No disassembly, and fire within six hours of this test.	Passed
38.3.4.7	Overcharge	No disassembly, and fire within seven days of this test.	Passed
38.3.4.8	Forced Discharge	No disassembly, and fire within seven days of this test.	Passed