



No. 9, Third West Industry Road, Songshan Lake High-Tech Industrial Development Zone,
Dongguan, Guangdong, 523808, P.R. China

Tel: +86 769 23076582

Fax: +86 769 23076582

Website: <http://www.cham.com.cn>

E-mail: overseasales@cham.com.cn

info@cham.com.cn



DONGGUAN CHAM BATTERY TECHNOLOGY CO.,LTD

Lithium-ion Rechargeable Cell Specification

Energy Cylindrical Cell

CMICR18650F8-2600mAh

Prepared by	Checked by	Discussed with	Approved by
Li Zhen	Qinghua Yuan	Hongkun Duan	Youman Zhao

Revision History

Edition	Modified Content	Draftsman	Reviser	Date
A0	First edition	Yan Yu	/	2014-12-21
A1	1. Modify storage temperature, 2. Add charge temperature of environment 3. Use current value to replace the rate 4. Add the color of packaging film 5. Use ration to replace the time 6. Add 7 another safety tests	/	Qinghua Yuan	2017-6-20
A2	1. Modify storage temperature, and add RH control 2. use CAD ptoto to replace sketch map 3. Modify matters need attention	/	Qinghua Yuan	2018-11-16
A3	1. Note with PTC	/	Yangxuan Lu	2019-3-28
A4	1. Add the revision history 2. Modify the charge temperature and current 3. Modify the discharge temperature	/	Yangxuan Lu	2019-4-22
B0	1. Modify format layout 2. Modify the cut-off voltage of performance at low temperatures 3. Update the condition of GB temperature cycling 4. Delete upper limit of charge voltage tolerance 5. Modify the lower limit of discharge operating temperature	/	Li Zhen	2020-4-30

Contents

1. Scope	1
2. Product Specification	1
3. Basic Characteristics	1
3.1 Capacity	1
3.2 Nominal Voltage	1
3.3 Internal Impedance	1
3.4 Discharge Cut-off Voltage	1
3.5 Max. Charge Voltage	1
3.6 Standard Charge Current	1
3.7 Rapid Charge Current	1
3.8 Standard Discharge Current	1
3.9 Constant Discharge Current	1
3.10 Max. Pulse Discharge Current	1
3.11 Weight	1
3.12 Max. Dimension	1
3.13 Operating Temperature	1
3.14 Storage Temperature	2
3.15 Tube color	2
4. Standard Conditions for Test	2
5. Characteristics	2
5.1 Electrical Characteristics	2
5.2 Electrical Tests	3
5.3 Mechanical Tests	4
5.4 Environmental Tests	6
6. Outline Dimensions	7
7. Cautions	7
7.1 Caution in Use	7
7.2 Safety Caution	8
8. Packing	9
9. Transportation	9
10. Long-term Storage	9
11. Warranty	9
12. Exclusion of Liability	9
13. Statements	9

1. Scope

This specification describes the technical parameters and testing standards for the lithium-ion rechargeable cell CMICR18650F8-2600mAh, manufactured and supplied by Cham Battery Technology Co., Ltd. These parameters and standards mainly refer to GB 31241-2014.

2. Product Specification

2.1 Type: Cylindrical Lithium-ion Rechargeable Cell

2.2 Model: CMICR18650F8-2600mAh

3. Basic Characteristics

Technical Parameters	Specification		Condition/Note
3.1 Capacity	Typical	2600mAh	Standard charge/discharge (Refer to 4.1 and 4.2)
	Minimum	2550mAh	
3.2 Nominal Voltage	3.7V		
3.3 Internal Impedance	$\leq 60\text{m}\Omega$ (with PTC)		AC 1kHz
3.4 Discharge Cut-off Voltage	3.0V		
3.5 Max. Charge Voltage	4.20V		
3.6 Standard Charge Current	0.2C(510mA)		
3.7 Rapid Charge Current	0.5C(1275mA)		
3.8 Max. Charge Current	1C(2550mA)		
3.9 Standard Discharge Current	0.2C(510mA)		
3.10 Constant Discharge Current	1C(2550mA)		
3.11 Max. Pulse Discharge Current	2C(5100mA, 200ms)		
3.12 Weight	45.5 $\pm$ 1.0g		
3.13 Max. Dimension	Diameter (Φ)	18.6mm	
	Height (H)	65.2mm	
3.14 Operating Temperature	Charge	$0^{\circ}\text{C} \leq T \leq 15^{\circ}\text{C}$	Charge current $\leq 510\text{mA}$
		$15^{\circ}\text{C} \leq T \leq 25^{\circ}\text{C}$	Charge current $\leq 1275\text{mA}$
		$25^{\circ}\text{C} < T \leq 45^{\circ}\text{C}$	Charge current $\leq 2550\text{mA}$
	Discharge	$-20^{\circ}\text{C} \leq T \leq 60^{\circ}\text{C}$	surface temperature of the cell $< 65^{\circ}\text{C}$

3.15 Storage Temperature	One month	-20℃ ~ 50℃	Relative humidity ≤ 80%
	Three months	-20℃ ~ 45℃	Relative humidity ≤ 80%
	One year	-20℃ ~ 25℃	Relative humidity ≤ 75%
3.16 Tube color	Gray, matte		

4. Standard Conditions for Test

1. Without stating specifically, all the electrical characteristics are obtained under the following conditions: Ambient temperature: $25 \pm 2^{\circ}\text{C}$; Relative humidity: $\leq 75\%$.

2. Without stating specifically, all the safety tests are conducted under the following conditions: Ambient temperature: $20 \pm 5^{\circ}\text{C}$; Relative humidity: $\leq 75\%$.

4.1 Standard Charge	0.2C(510mA), CC-CV to $4.2 \pm 0.05\text{V}$, 0.02C(51mA) cut off
4.2 Standard Discharge	0.2C(510mA), CC to 3.0V

5. Characteristics

5.1 Electrical Characteristics

Items	Test Procedure	Requirements	
5.1.1 Nominal Voltage	Charge as described in 4.1, and discharge as described in 4.2. Calculate the average working voltage during discharge process.	3.7V	
5.1.2 Discharge Characteristic	Charge as described in 4.1, rest less than 1h, and discharge as described in 4.2.	$\geq 2550\text{mAh}$	
5.1.3 Cycle Life	Charge with constant current 0.5C and constant voltage of 4.20V, cut off at 0.02C, and rest for 10min; discharge with the current of 0.5C to 3.0V and then rest for 10min. Repeat cycling till discharge capacity in 2 successive cycles is less than 80% of the initial capacity.	≥ 300 Cycles	
5.1.4 Rate Performance	Fully charge as described in 4.1, rest for 10min, and discharge with different constant currents and cut off at 3.0V. Calculate the ratio of above capacities to the standard discharge capacity as described in 4.2.	0.5C	$\geq 95\%$
		1C	$\geq 90\%$
		2C	$\geq 85\%$

5.1.5 High Temperature Performance	Charge as described in 4.1, rest in the environment with temperature of $55 \pm 2^{\circ}\text{C}$ for 2h, and discharge as described in 4.2. Calculate the ratio of above capacity to the standard discharge capacity as described in 4.2.	Capacity ratio $\geq 95\%$
5.1.6 Low Temperature Performance	Charge as described in 4.1, rest in the environment with temperature of $-10 \pm 2^{\circ}\text{C}$ for 2h, and discharge with current of 0.2C and cut off at 2.5V. Calculate the ratio of above capacity to the standard discharge capacity as described in 4.2.	Capacity ratio $\geq 60\%$
5.1.7 Capacity Retention and Recovery at Room Temperature	Charge as described in 4.1, store for 28 days, discharge as described in 4.2 and calculate the retention ratio of capacity; then charge and discharge as described in 4.1 and 4.2, respectively, and calculate the recovery ratio of capacity.	Retention ratio $\geq 90\%$ Recovery ratio $\geq 95\%$
5.1.8 Capacity Retention and Recovery at High Temperature	Charge as described in 4.1, store for 28 days in the environment with temperature of $45 \pm 2^{\circ}\text{C}$, discharge as described in 4.2 and calculate the retention ratio of capacity; then charge and discharge as described in 4.1 and 4.2, respectively, and calculate the recovery ratio of capacity.	Retention ratio $\geq 85\%$ Recovery ratio $\geq 90\%$

5.2 Electrical Tests

Items	Test Procedure	Requirements
5.2.1 Short Circuit at $20 \pm 5^{\circ}\text{C}$	The sample cell should be fully charged as described in 4.1, and short-circuited by connecting positive and negative terminals with a circuit load having a resistance of $80 \pm 20\text{m}\Omega$ at $20 \pm 5^{\circ}\text{C}$. The temperature of the case should be measured during the test. The cell should remain on test for 24 hours or until the temperature of the case declines by 20% of the maximum temperature.	No fire , no explosion, and maximum surface temperature $\leq 150^{\circ}\text{C}$
5.2.2 Short Circuit at High Temperature	The sample cell should be fully charged as described in 4.1, and short-circuited by connecting	No fire , no explosion, and the

	positive and negative terminals with a circuit load having a resistance of $80 \pm 20\text{m}\Omega$ at $55 \pm 5^\circ\text{C}$. The temperature of the case should be measured during the test. The cell should remain on test for 24 hours or until the temperature of the case declines by 20% of the maximum temperature.	maximum surface temperature $\leq 150^\circ\text{C}$
5.2.3 Abnormal Charge	The sample cell should be discharged as described in 4.2, and subjected to the charging process to 4.6V with the current of 3C at $20 \pm 5^\circ\text{C}$. The temperature of the case should be measured during the test. The test should be continued until the charging time reaches 7 hours or the temperature of the case declines by 20% of the maximum temperature.	No fire, no explosion
5.2.4 Forced-Discharge	The sample cell should be discharged as described in 4.2, and subjected to the forced discharge process with the reverse current of 1C. The test time is 90 min.	No fire, no explosion

5.3 Mechanical Tests

Items	Test Procedure	Requirements
5.3.1 Vibration	The sample cell should be fully charged as described in 4.1, and firmly secured to the platform of the vibration machine. Test conditions are: a) Scanning mode: sinusoidal waveform with the logarithmic scanning mode; b) Frequency range: 7Hz~200Hz; c) Specific mode: start at the frequency of 7Hz, and maintain the peak acceleration of $1g_n$ until the frequency is increased to 18Hz; maintain the amplitude of 0.8mm (1.6mm total excursion) and increase frequency to ~50Hz; maintain the peak acceleration of $8g_n$ until the frequency is increased to 200Hz; back to 7Hz; d) Scanning time of each cycle: 15min. The above process should be conducted at both	No fire, no explosion, and no leakage.

	axial and radical directions(three mutually perpendicular directions for prismatic and pouch cell). The test should be repeated 12 times for 3 hours in each direction.	
5.3.2 Drop	The sample cell should be fully charged as described in 4.1, and dropped onto a flat concrete floor from 1m height. The positive and negative electrode side should be dropped once, respectively, and the cylindrical surface twice. Each cell should be dropped four times.	No fire, no explosion.
5.3.3 Shock	The sample cell should be fully charged as described in 4.1, secured to the testing machine and subjected to the shock with half-sine pulse. For each shock the cell is to be accelerated in such a manner that during the initial 3ms the minimum average acceleration is 75 g _n . The peak acceleration shall be between 150 ± 25g _n . The pulse duration is 6 ± 1ms. The test should be repeated 3 times at both axial and radial directions, respectively.	No fire, no explosion, and no leakage.
5.3.4 Impact	The sample cell should be fully charged as described in 4.1, and placed on a flat surface . A metal bar with a diameter of 15.8mm(5/8 in) is to be placed across the center of the sample, and perpendicular to the longitudinal axis of the cell. A weight of 9.1kg(20 lb) is to be dropped from a height of 0.61m(24 in) onto the sample.	No fire, no explosion.
5.3.5 Crush	The sample cell should be fully charged as described in 4.1, placed between two flat surfaces and crushed with its longitudinal axis parallel to the flat surfaces. Crush the cell in the direction perpendicular to the flat surfaces with a crushing force of 13.0±0.2kN. The test is completed once the crushing force reaches the maximum value.	No fire, no explosion.

5.4 Environmental Tests

Items	Test Procedure	Requirements
5.4.1 Temperature Cycling	The sample cell should be fully charged as described in 4.1, and stored in a test chamber. Test conditions are: 1) Raise the chamber temperature to $72 \pm 2^{\circ}\text{C}$ and maintain this temperature for at least 6 hours; 2) Reduce the chamber temperature to $-40 \pm 2^{\circ}\text{C}$ and maintain this temperature for at least 6 hours; 3) Repeat above steps 10 times. The time interval between two test temperatures should be less than 30 minutes.	No fire, no explosion and no leakage
5.4.2 Low Pressure	The sample cell should be fully charged as described in 4.1, and stored for 6 hours at an absolute pressure of 11.6kPa (1.68psi) and a temperature of $20 \pm 5^{\circ}\text{C}$, followed by 1 hour's observation.	No fire, no explosion, and no leakage
5.4.3 Heating	The sample cell should be fully charged as described in 4.1, and placed in a gravity or circulating air convection oven with an initial temperature of $20 \pm 5^{\circ}\text{C}$. Raise the oven temperature at a rate of $5 \pm 2^{\circ}\text{C}/\text{min}$ to the test temperature $130 \pm 2^{\circ}\text{C}$ and remain at this temperature for 30 minutes.	No fire, No explosion.
5.4.4 Projectile Test	The sample cell should be fully charged as described in 4.1, and placed on the platform table with steel wire screen in the center. The cell should be surrounded with an eight-sided aluminum wire cage constructed of 0.25mm diameter aluminum wire with 16~18 wires per inch (25.4mm) in each direction. The sample is to be heated and shall remain on the screen until it explodes or the cell or battery has ignited and burned out or the test time reaches to 30min without burning or explosion.	No part of an exploding cell or battery shall penetrate the wire screen

6. Outline Dimensions



Fig.1 Outline Dimensions of CMICR18650F8-2600mAh(with tube)

7. Cautions

Please read this specification carefully before testing or using the cells because improper handling of the Li-ion cells may lead to efficiency loss, heating, electrolyte leakage, ignition or even explosion.

7.1 Caution in Use

7.1.1 Abnormal operations such as overcharge (voltage > 4.20V), over discharge (voltage < 3.0V) and overcurrent charge-discharge (maximum current allowed at present temperature) should be prohibited during cell using. It is strictly prohibited to use the cell in the environment easily causing problems, such as static electricity and poor sealing (water and dust entering).

7.1.2 Charging with the current more than 0.5C, using in the high-temperature/low-temperature, vibration, or humid environment, and matching unstable cells will reduce the cycle life of the cell.

7.1.3 The cell shall not be used in the environment of high frequency microwave or ultrasonic wave. When using in series and parallel, it is recommended to coat the high-voltage wire with electromagnetic insulation cover to prevent the electromagnetic wave from damaging adjacent devices and human body.

7.1.4 Avoid overlapping or contact between the positive and negative terminal wires of the battery to

reduce the risk of short circuit.

7.1.5 The battery should be charged and discharged in strict accordance with this specification to ensure the battery's cycle life and safety.

7.1.6 When the batteries are assembled in a module for use, the cells with the same capacity, internal resistance, batch and charged state shall be used. The packing standard of the batteries should be strictly in accordance with the technical agreement. The temperature difference inside the battery pack should be less than 5°C when the pack is working.

7.1.7 Do not charge the battery when temperature is less than 0°C. Please store it in the environment with temperature more than 0°C for a period of time before charging. Recommended store time as follows:

Outside Temperature	$-5^{\circ}\text{C} \leq T \leq 0^{\circ}\text{C}$	$-10^{\circ}\text{C} \leq T \leq -5^{\circ}\text{C}$	$-15^{\circ}\text{C} \leq T \leq -10^{\circ}\text{C}$	$-20^{\circ}\text{C} \leq T \leq -15^{\circ}\text{C}$
Time	2h	5h	8h	10h

7.2 Safety Caution

7.2.1 The battery should be placed away from babies and children. If there is any emergency such as deglutition, scald or explosion, please go to the hospital immediately.

7.2.2 When charging or discharging the battery, please use professional test equipment designed for Li-ion batteries. Do not use ordinary constant current or constant voltage (CC/CV) power chargers without limitation of current or voltage. These chargers do not protect the battery from being overcharged and over-discharged, and may lead to function failure and be dangerous.

7.2.3 When charging, discharging, or assembling the battery, avoid reversing the positive and negative terminals. Or it would lead to overcharge and over-discharge of the battery, causing serious failure, or even explosion.

7.2.4 Do not solder the battery directly. Do not disassemble the battery.

7.2.5 Do not put the battery in pockets or bags with metal objects, such as necklaces, hairpins, coins, screws, etc. Neither store the battery without proper isolation, nor connect the positive and negative electrodes directly with conductive materials. Or the battery may be short-circuited.

7.2.6 Do not hammer, throw or trample the battery. Do not put the battery into washing machines or high-pressure containers.

7.2.7 Keep the battery away from heat sources, such as fires, heaters, etc. Do not use or store the battery in direct sunlight or at places where temperature could exceed 60°C. Or the battery may generate excessive heat, ignite and fail.

7.2.8 Do not get the battery wet or throw it into water. When the battery is not in use, place it in a dry environment with relatively low temperature.

7.2.9 If the battery becomes abnormally hot, give out smell, change color, deform or show any other

abnormalities during using, testing or storing, please stop using or testing immediately. Attempt to isolate the battery and stay away.

7.2.10 If the leaking electrolyte from the battery gets into your eyes, do not rub your eyes. Rinse the eyes with clean water and seek medical attention if problems remain. If the electrolyte gets onto the skin or clothing, wash with clean water immediately.

8. Packing

Cells need to be at half-charged state when packed. The surface of the packing boxes shall contain the following information: product name, type, nominal voltage, quantity, gross weight, date, capacity and impedance.

9. Transportation

During transportation, do not subject the cells or the boxes to violent shaking, bumps, rain or direct sunlight. Cells can be transported by truck, train, ship and airplane, etc.

10. Long-term Storage

When delivered, cells are charged to the voltage of 3.20V ~ 4.00V. Storing cells at/more than 80% SOC for a long time will lead to capacity loss and cycle life loss, please keep cells into use within 90 days when the capacity is more than 80%.

Cells may have lower capacity than they're expected due to the self-discharge when cells are to be delivered at 30% SOC.

Do not use or store the cells when the voltage is less than 2.5V.

11. Warranty

The warranty period of this product is 12 months from the ex-factory date. This warranty will be void if the cells are used in ways that deviate from this specification.

12. Exclusion of Liability

The company is not liable for any problems arising from non compliance with this specification.

The company is not liable for any problems arising from the use of electrical circuits, battery packs and chargers.

The company does not guarantee the quality of the defective batteries caused by customers in the battery assembly process after shipment.

13. Statements

The information in this specification is subjected to change without prior notice.

For those applications not described here, please consult your nearest CHAM Sales Office or Distributors.

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

1. Identification

(a) Product identifier

Product name: Rechargeable Li-ion cell

(b) Other means of identification

Product description: Model:14500
Nominal Voltage:3.7V
Typical Capacity: 600mAh
Watt-hour: 2.22Wh

(c) Recommended use of the chemical and restrictions on use

Recommended use: No information available.

Restriction on use: No information available.

(d) Details of the supplier of the product

Applicant's name: Shenzhen Shenchao New Energy Technology Co., Ltd

Applicant's address: 301, E Building, No.10, Hongling Industrial District, Liulian Community, Pingdi Street,
Longgang District, 518117Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Manufacturer's name: Jiangxi Shenchao Energy Technology Co., Ltd

Manufacturer's address: Nanfeng County Industrial Park ,Fuzhou City,Jiangxi Province

E-mail: 1013806121@qq.com

Telephone: +86-13600438111

(e) Emergency phone number

+86-13600438111

2. Hazard(s) identification

(a) Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). This product is an article which is a sealed battery and as such does not require an MSDS per the OSHA hazard communication standard unless ruptured. The hazards indicated are for a ruptured battery.

Acute toxicity - Oral	Category 4
Acute toxicity - Dermal	Category 4
Skin corrosion/irritation	Category 1 Sub-category B
Serious eye damage/eye irritation	Category 1
Carcinogenicity	Category 2
Specific target organ toxicity (repeated exposure)	Category 1

(b) GHS Label elements, including precautionary statements

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

Emergency Overview

Signal word

Danger

Hazard Statements

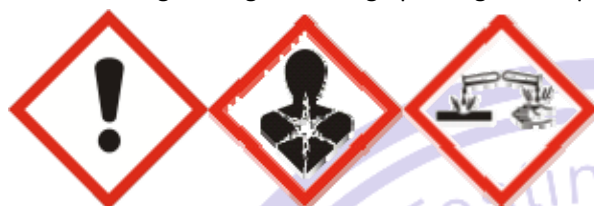
Harmful if swallowed

Harmful in contact with skin

Causes severe skin burns and eye damage

Suspected of causing cancer

Causes damage to organs through prolonged or repeated exposure



This product is an article which contains a chemical substance. Safety information is given for exposure to the article as sold. Intended use of the product should not result in exposure to the chemical substance. This is a battery. In case of rupture: the above hazards exist.

Appearance Blue

Physical State Solid

Odor Odorless

Precautionary Statements - Prevention

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Use personal protective equipment as required

Wash face, hands and any exposed skin thoroughly after handling

Do not eat, drink or smoke when using this product

Do not breathe dust/fume/gas/mist/vapors/spray

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician

Specific treatment (see supplemental first aid instructions on this label)

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing

Immediately call a POISON CENTER or doctor/physician

Skin

Call a POISON CENTER or doctor/physician if you feel unwell

Wash contaminated clothing before reuse

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

Inhalation

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Do NOT induce vomiting

Precautionary Statements - Storage

Store locked up

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

(c) Hazards not otherwise classified (HNOC)

Not applicable

(d) Unknown Toxicity

14.4 % of the mixture consists of ingredient(s) of unknown toxicity

(e) Other information

Very toxic to aquatic life with long lasting effects

(f) Interactions with Other Chemicals

No information available.

3. Composition/information on ingredients

(a) Mixtures information

Chemical name	CAS No.	Concentration%
Lithium Cobalt Oxide (CoLiO ₂)	12190-79-3	32
Graphite	7782-42-5	18
Copper	7440-50-8	19
Aluminum	7429-90-5	20
1,1-Difluoroethylene polymer	24937-79-9	5
Styrene-butadiene rubber	9003-55-8	6

4. First-aid measures

(a) Description of first aid measures

General Advice First aid is upon rupture of sealed battery.

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

Eye contact:	Show this safety data sheet to the doctor in attendance. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists. Do not rub affected area.
Skin contact:	Remove contaminated clothes and rinse the skin with plenty of water. Get medical advice / attention if you feel unwell.
Inhalation:	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, (trained personnel should) give oxygen. Get medical advice / attention if you feel unwell.
Ingestion:	Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Get medical aid.
Self-protection of the first aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

(b) Most important symptoms/effects, acute and delayed

Contact with internal components may cause allergic skin sensitization (rash) and irritate eyes, skin, nose, throat, respiratory system. Cobalt and Cobalt compounds are considered to be possible human carcinogen(s).

(c) Immediate medical attention and special treatment

No information available.

5. Fire-fighting measures

(a) Extinguishing media

Suitable extinguishing media: Use water or dry sand as appropriate.

Unsuitable extinguishing media: No information available.

(b) Special hazards arising from the chemical

Under fire conditions, batteries may burst and release hazardous decomposition products when exposed to a fire situation. This could result in the release of flammable or corrosive materials. Hazardous combustion products: CO, CO₂, Metal oxides, Irritating fumes

(c) Special protective equipment and precautions for fire-fighters

Firefighters must wear fire resistant protective equipment and appropriate breathing apparatus. The staff must equip with filtermask (full mask) or isolated breathing apparatus. The staff must wear the clothes which can defense the fire and the toxic gas. Put out the fire in the upwind direction. Remove the container to the open space as soon as possible. Spray water on the containers in the fireplace to keep them cool until finish extinguishment.

6. Accidental release measures

(a) Personal precautions, protective equipment and emergency procedures

If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. The preferred response is to leave the area, dispose the case after the batteries cool and vapors dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors.

(b) Environmental Precautions

Prevent material from contaminating soil and from entering sewers or waterways.

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

(c) Methods and materials for containment and cleaning up

If the battery casing is dismantled, small amounts of electrolyte may leak. Collect all released material in a plastic lined container. Dispose off according to the local law and rules. Avoid leached substances to get into the earth, canalization or waters.

7. Handling and storage

(a) Precautions for safe handling

Always follow the warning information on the batteries and in the manuals of devices. Only use the recommended battery types. Keep batteries away from children. For devices to be used by children, the battery casing should be protected against unauthorized access. Unpacked batteries shall not lie about in bulk. In case of battery change always replace all batteries by new ones of identical type and brand. Do not swallow batteries. Do not throw batteries into water. Do not throw batteries into fire. Avoid deep discharge. Do not short-circuit batteries Use recommended charging time and current.

(b) Conditions for safe storage, including any incompatibilities

If the battery is subject to storage for such a long term as more than 3 months, it is recommended to recharge the battery periodically. And recommended at -5 °C~45 °C for 1 month storage, at -5 °C~35 °C for 3 months storage. Do not storage the battery haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects. Keep out of reach of children.

8. Exposure controls/personal protection

(a) Control parameters

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Lithium Cobalt Oxide (CoLiO ₂) 12190-79-3	TWA: 0.02 mg/m ³		
Graphite 7782-42-5	2 mg/m ³ TWA (Respirable fraction)	15 mppcf (Z-3)	2.5 mg/m ³ TWA
Copper 7440-50-8	TWA: 0.2 mg/m ³ fume TWA: 1 mg/m ³ Cu dust and mist	TWA: 0.1 mg/m ³ fume TWA: 1 mg/m ³ dust and mist (vacated) TWA: 0.1 mg/m ³ Cu dust, fume, mist	IDLH: 100 mg/m ³ dust, fume and mist TWA: 1 mg/m ³ dust and mist TWA: 0.1 mg/m ³ fume

ACGIH TLV: American Conference of Governmental Industrial Hygienists -Threshold Limit Value

OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits Immediately Dangerous to Life or Health

Other Exposure Guidelines: Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962(11th Cir., 1992) See section 15 for national exposure control parameters

(b) Appropriate engineering controls

Engineering Measures:

- 1.Showers
- 2.Eyewash stations
- 3.Ventilation systems

(c) Individual protection measures, such as personal protective equipment

Eye/Face Protection: Not necessary under normal conditions, wear safety glasses if handling an open or leaking battery.

Skin and body Protection: Not necessary under normal conditions, Wear protective gloves and protective clothing such as long sleeved clothing, impervious gloves, chemical resistant apron, and antistatic boots if handling an open or leaking battery.

Respiratory Protection: Not necessary under normal conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

Hygiene Measures:

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink, or smoke in work area. Maintain good housekeeping.

9. Physical and chemical properties

(a) Appearance	Blue Solid
(b) Odor	Odorless
(c) Odor threshold	No data available.
(d) pH	No data available.
(e) Melting point/freezing point	No data available.
(f) Initial boiling point and boiling range	No data available.
(g) Flash point	No data available.
(h) Evaporation rate	No data available.
(i) Flammability	No data available.
(j) Upper/lower flammability or explosive limits	No data available.
(k) Vapor pressure	No data available.
(l) Vapor density	No data available.
(m) Relative density	No data available.
(n) Solubility(ies)	Insoluble in water.
(o) Partition coefficient: n-octanol/water	No data available.
(p) Auto-ignition temperature	No data available.
(q) Decomposition temperature	No data available.
(r) Viscosity	No data available.

10. Stability and reactivity

(a) Reactivity

Stable under recommended storage and handling conditions.

(b) Chemical stability

Stable under normal conditions.

(c) Possibility of hazardous reactions

When heated above 150°C the risk of rupture occurs. Due to special safety construction, rupture implies controlled release of pressure without ignition.

(d) Conditions to avoid

Do not subject the battery to mechanical shock. Keep away from open flames, high temperature.

(e) Incompatible materials

Strong oxidizer, strong acid.

(f) Hazardous decomposition products

Under fire conditions, the electrode materials can form carcinogenic nickel and cobalt oxides.

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

11. Toxicological information

(a) Information on the likely routes of exposure

Inhalation: Inhalation of a large number of vapors or fumes released due to heat may cause respiratory.
Ingestion: Ingestion of battery contents may cause mouth, throat and intestinal burns and damage.
Skin contact: Contact with battery electrolyte may cause burns and skin irritation.
Eye contact: Contact with battery electrolyte may cause burns. Eye damage is possible.

Under normal conditions (during charge and discharge) release of ingredients does not occur. If accidental release occurs see information in section 4. Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up.

(b) Information on toxicological characteristics

Acute toxicity: No data available.
Skin corrosion/irritation: The liquid in the battery irritates.
Serious eye damage/irritation: The liquid in the battery irritates.
Respiratory sensitization: The liquid in the battery may cause sensitization to some person.
Skin sensitization: The liquid in the battery may cause sensitization to some person.
Carcinogenicity: Cobalt and Cobalt compounds are considered to be possible human carcinogen(s).
Germ Cell Mutagenicity: No data available.
Reproductive Toxicity: No data available.
STOT-Single Exposure: No data available.
STOT-Repeated Exposure: No data available.
Aspiration Hazard: No data available.

(c) Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization: No data available.
Mutagenic Effects: No data available.
Carcinogenicity: No data available.
Reproductive Toxicity: No data available.
Chronic Toxicity: No data available.
Target Organ Effects: No data available.
Aspiration Hazard: No data available.

12. Ecological information

(a) Ecotoxicity

Water hazard class 1(Self-assessment): slightly hazardous for water.

(b) Persistence and Degradability

No information available.

(c) Bioaccumulative potential

No information available.

Safety Data Sheet

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

(d) Mobility in soil

No information available.

(e) Other adverse effects

No information available.

13. Disposal considerations

Safe handling and methods of disposal

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Local regulations may be more stringent than regional or national requirements.

Product disposal recommendation: Observe local, state and federal laws and regulations.

Packaging disposal recommendation: Be aware discarded batteries may cause fire, tape the battery terminals to insulate them. Don't disassembly the battery. Completely discharge containers (no tear drops, no powder rest, scraped carefully). Containers may be recycled or re-used. Observe local, state and federal laws and regulations.

The potential effects on the environment and human health of the substances used in batteries and accumulators; the desirability of not disposing of waste batteries and accumulators as unsorted municipal waste and of participating in their separate collection so as to facilitate treatment and recycling.

14. Transport information

According to Section II/Section IB of PACKING INSTRUCTION 965, or Section II of PACKING INSTRUCTION 966~967 of the 2021 IATA Dangerous Goods regulations 62nd Edition and the special provision 188 of IMDG (inc Amdt 39-18). The batteries should be securely packed and protected against short-circuits. Examine whether the package of the containers are integrate and tighten closed before transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles. Don't put the goods together with oxidizer and chief food chemicals. The transport vehicle and ship must be cleaned and sterilized otherwise it is not allowed to assemble articles. During transport, the vehicle should prevent exposure, rain and high temperature. For stopovers, the vehicle should be away from fire and heat sources. When transported by sea, the assemble place should keep away from bedroom and kitchen, and isolated from the engine room, power and fire source. Under the condition of Road Transportation, the driver should drive in accordance with regulated route, don't stop over in the residential area and congested area. Forbid to use wooden, cement for bulk transport.

(a) UN number	3480 or 3481
(b) UN Proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries) or; LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)
(c) Transport Hazard class(es)	Class 9 (PI965 Section IB) or N/A (PI965~967 Section II)
(d) Packing group (if applicable)	II
(e) Marine pollutant (Yes/No)	No
(f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)	No information available.

Safety Data Sheet

NCT Technology

According to HCS-2012 APPENDIX D TO §1910.1200

Version: 2.0/EN

Product name: Rechargeable Li-ion cell

Issue date: 2021.06.08

(g) Special precautions

No information available.

15. Regulatory information

With regard to transport, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions.
- The International Air transport Association (IATA) Dangerous Goods Regulations.
- The International Maritime Dangerous Goods (IMDG) Code.
- The Office of Hazardous Materials Safety within the US Department of Transportation (DOT)
- Research and Special Programs Administration (RSPA)

16. Other information, including date of preparation or last revision

(a) Preparation and revision information

Date of previous revision: 2015.04.29

Date of this revision: 2019.01.01

Revision summary: The Second New SDS

(b) Abbreviations and acronyms

TSCA:	Toxic Substances Control Act, The American chemical inventory.
DSL	Domestic Substances List
EINECS:	European Inventory of Existing Commercial chemical Substances
ENCS	Japanese Existing and New Chemical Substances
ECL:	Existing Chemicals List, the Korean chemical inventory.
IECSC:	Inventory of existing chemical substances in China.

(c) Disclaimer

Because all of our batteries are defined as "articles", they are exempted from the requirements of the Hazard Communication Standard. The information in this SDS is provided all the relevant data fully and truly. However, the information is provided without any warranty on their absolute extensiveness and accuracy. This SDS was prepared to provide safety preventive measures for the users who have got professional training. The personal user who obtained this SDS should make independent judgment for the applicability of this SDS under special conditions. In these special cases, we do not assume responsibility for the damage.

----- End of the SDS -----

Very truly yours,

Noah Shao

Engineer
Engineering Services



Reviewed by
H. A. [Signature]
Senior Professional Engineer
Engineering Services