



Shenzhen SEM.Test Technology Co., Ltd.

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd
Road, Bao'an District, Shenzhen, P.R.C. (518101)

Safety Data Sheet

SDS

SAFETY DATA SHEET

Prepared For : Shenzhen Hugnen Technology (HGT) Co.,LTD
No.2,Yinhu , baolihua Village, Guangming , Shenzhen City,
GuangDong Province China

Prepared By : Shenzhen SEM.Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd
Road, Bao'an District, Shenzhen, P.R.C. (518101)

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Approved by: Davis yang



Section 1-Chemical Product and Company Identification

Product: Polymer li-ion battery

Common name: Polymer li-ion battery

Model: 752439-650mAh, 102053-1000mAh, 423040-450mAh, 852439-750mAh, 703062-1400mAh,
401225-80mAh, 401722-100mAh, 531728-175mAh, 451730-190mAh, 511643-300mAh,
611343-300mAh, 502530-300mAh, 423040-450mAh, 602248-560mAh, 702050-670mAh,
411740-240mAh, 511740-900mAh, 903242-1000mAh, 105085-5200mAh, 821960-1000mAh,
952439-850mAh, 602530-400mAh, 701953-700mAh, 602234-420mAh, 362843-350mAh

Rating of battery: 3.7V

Trademark: N/A

Weight: 12.7g

Manufacture: Shenzhen Hugnen Technology (HGT) Co.,LTD

Address: No.2,Yinhu , baolihua Village, Guangming , Shenzhen City, GuangDong Province China

Telephone number of the supplier: 0086-0755-23420683

Fax No: 0086-0755-23420686

Emergency Telephone: 0086-0755-23420683

Post Code: 518110

E-mail address: 327876811@qq.com

Section 2- Hazards 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/SDS per the OSHA hazard communication standard unless ruptured. The hazards indicated are for a ruptured battery

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 1
Specific target organ toxicity (repeated exposure) Category	Category 1

(b) GHS Label elements, including precautionary statements**Emergency Overview****Signal word****Hazard Statements**

Causes skin irritation

Causes serious eye damage

May cause cancer

Suspected of damaging fertility or unborn exposure

Extremely flammable aerosol

Contains gas under pressure; may explode if heated



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

Wash face, hands and any exposed skin thoroughly after handling.

Wear protective gloves/protective clothing/eye protection/face protection

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

Do not eat, drink or smoke when using this product

Precautionary Statements - Response

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

Get medical advice/attention if you feel unwell

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

IF ON SKIN: Wash with plenty of soap and water

If skin irritation occurs: Get medical advice/attention

Take off contaminated clothing and wash before reuse

Precautionary Statements - Storage

No information available.

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

(c) Hazards not otherwise classified (HNOC)

No information available.

(d) Unknown Toxicity

10% of the mixture consists of ingredient(s) of unknown toxicity.

(e) Other information

No information available.

(f) Interactions with Other Chemicals

No information available.

Section 3- Composition/Information on Ingredient

Common Chemical Name	Concentration (%)	CAS Number	EC No.
Lithium Cobalt Oxide (LiCoO ₂)	30-40	12190-79-3	235-362-0
Aluminum Foil (Al)	1-5	7429-90-5	231-072-3
Iron	15-25	7439-89-6	Iron
Graphite (C)	5-10	7782-42-5	231-955-3
Copper Foil (Cu)	5-15	7440-50-8	231-159-6
Artificial Graphite	5-10	7440-44-0	----
Organic electrolyte	15-20	N/A	----
Other	2-3	N/A	----



Section 4- First Aid Measures

The battery is not hazard with eye and skin contact under normal circumstance. In case of the enclosure is damaged, the battery can not be used and touched. It is safety except that the battery is damaged by fire or rupture. The leakage of internal hazardous substance and formation of hazardous substance would occur, take the following measures if contact with the battery.

Skin touch: If there is any unwell reaction, wash thoroughly with soap & water, flush with plenty of water. If irritation persists, seek medical advice.

Eyes touch: Rinse immediately with plenty of water for at least 15 mins. Contact a doctor if symptoms persist.

Inhalation: Remove from exposure site to fresh air. Keep at rest. Obtain medical attention.

Ingestion: Rinse mouth out with water. Seek medical advice immediately.

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.

Information for doctor

Most important sumpoms and effects, both acute and delayed: no further relavant information available.

Indication of any immediate dedical attention and special treatment needed:No further relevant information availabel

Section 5- Fire Fighting Measures

(a) Extinguishing media

Suitable extinguishing media: Use foam, dry powder or dry sand, CO2 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.

Section 6- Accidental Release Measures

Personal precautions, protective equipment and emergency procedures:

If the battery 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 and allow the vapors to dissipate. Avoid skin and eyes contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerated. If leakage of the battery happens, liquid could be absorbed with sand, earth or other inert substance and contaminated area should be ventilated meantime.

Environment precautions:

- Do not allow product to reach sewage system or any water source.
- Inform respective authorities in case of seepage into water course or sewage system.
- Do not allow to enter sewers/ surface or ground water.

Methods and material for containment and cleaning up:

If 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.

Section 7- Handling and Storage

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.

Storage conditions:

If the batteries are subject to storage for such a long term as more than 3 months, it is recommended to recharge the Li-ion battery periodically.

Storage Temperature:

Short period less than 3 months: -20~+45°C, 75%RH Max

Long period more than 3 months: +5°C~+35°C, 75%RH Max

Do not storage Li-ion 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. Do not expose Li-Polymer battery to heat or fire. Avoid storage in direct sunlight. Do not store together with oxidizing and acidic materials.

Section 8- Exposure Controls, Personal Protection

(a)Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Lithium Cobalt Oxide (LiCoO ₂) 12190-79-3	TWA: 0.02 mg/m ³		
Aluminum 7429-90-5	TWA: 1 mg/m ³ respirable fraction	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 15 mg/m ³ total dust (vacated) TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 5 mg/m ³ Al Aluminum	TWA: 10 mg/m ³ total dust TWA: 5 mg/m ³ respirable dust
Copper 7440-50-8	TWA: 0.2 mg/m ³ fume TWA: 1mg/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
Phosphate(1-), hexafluoro-, lithium 21324-40-3	TWA: 2.5 mg/m ³ F	TWA: 2.5 mg/m ³ F TWA: 2.5 mg/m ³ dust (vacated) TWA: 2.5 mg/m ³	

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

Respiratory protection: No necessary under normal use. In case electrolyte leakage from the battery, protect hand with chemical resistant rubber gloves. If battery is burning, leave the area immediately. In abuse, use NIOSH approved acid gas filter mask or self-contained breathing apparatus.

Hand protection: None under normal use. In case of spilling, use PVC, neoprene or nitrile gloves of 15mils (0.015 inch) or thicker.

Eye/Face protection: None required under normal conditions. Use approved chemical work safety goggles or face shield, if handling a leaking or rupture battery.

Skin and body protection: No necessary under normal use. Use rubber apron and protective working in case of handling of a rupture battery.

Other protective equipment: Chemical resistance clothing is recommended along with eye wash station and safety shower should be available. Work hygienic practices: Use good chemical hygiene practice. Wash hands after use and before drinking, eating or smoking. Wash hands thoroughly after cleaning-up component spill caused by leaking battery. No eating, drinking, or smoking in battery storage area. Launder contaminated cloth before reuse.

Section 9- Physical and Chemical Properties

Information on basic physical and chemical properties

General information

Form: Solid **Colour:** white **Odour:** Odourless **Odour threshold:** Not available

pH-value: Not available

Change in condition

Melting point/Melting range: Not available

Boiling point/Boiling range: Not available



Freezing point: Not available

Flash point: Not available

Flammability (solid, gaseous): Not available

Auto-Ignition temperature: Not available

Decomposition temperature: Not available

Self-igniting: Product is not selfigniting.

Explosive properties: Risk of explosion by shock, friction, fire or other sources of ignition.

Explosion limits

Lower: Not available

Upper: Not available

Oxidizing properties: Not available

Vapour pressure: Not available

Density: Not available

Relative density: Not available

Vapour density: Not available

Evaporation rate: Not available

Solubility in / Miscibility with water: Not available

Partition coefficient (n-octanol/water): Not available.

Viscosity

Dynamic: Not available.

Kinematic: Not available

Other information: No further relevant information available.

Section 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 Li-ion 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.

Section 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.

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.

Section 12- Ecological Information

Toxicity

- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability:** No further relevant information available.
- **Behaviour in environmental systems:** No further relevant information available
- **Bioaccumulative potential:** No further relevant information available.
- **Mobility in soil:** No further relevant information available.
- **Additional ecological information**
- **General notes:**

Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

· Results of PBT and vPvB assessment

- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects:** No further relevant information available.

Section 13- Disposal Considerations

Nature of waste: Hazardous Waste

Waste disposal methods:

- Disposal of the battery should be performed by permitted, professional disposal firms knowledgeable in



- b. Incineration should never be performed by battery used. The batteries contained recyclable materials.

Recycling options available in your local area should be considered when disposing of this product, through licensed waste carrier.

- c. The battery should have their terminal insulated in order to prevent short circuits during transportation to the disposal site.

Note: Consult your local or region authorities, disposal maybe subject to national, state, or local laws.

Section 14 – Transport Information

According to **PACKING INSTRUCTION 965 ~ 967 of IATA DGR 59th Edition** for transportation, the special provision 188 of IMDG (inc Amdt 35-10). 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.

UN-Number

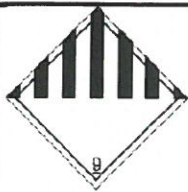
ADR, IMDG, IATA UN3480 or UN3481

UN proper shipping name

· ADR	Polymer li-ion battery
· IMDG, IATA	Polymer li-ion battery

Transport hazard class(es)

· ADR, IMDG, IATA



Class 9 Miscellaneous dangerous substances and articles.

Label 9

Packing group

- ADR, IMDG, IATA II
- Marine pollutant: No

Special precautions for user: Warning: Miscellaneous dangerous substances and articles.

- Danger code (Kemler): -
- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.
- UN "Model Regulation": UN3480 or UN3481, LITHIUM ION BATTERIES, 9, II

Section 15- Regulatory information

OSHA hazard communication standard (29 CFR 1910.1200)

_____ Hazardous _____ ☒ Non-hazardous

Section 16- Other Information

Note: The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

UN38.3 检测报告

UN38.3 Test Report

Client 委托方	Shenzhen Hugnen Technology(HGT) Co., LTD 深圳市辉能科技有限公司
Add. of Client 委托方地址	B2, Baolihua Industrial Park, Baihua Community, Guangming Shenzhen 深圳市光明新区白花洞保利华工业园 2 栋
Name of Sample 样品名称	Polymer Li-ion Cell 聚合物锂离子电芯
Model 型号	602234
Testing Laboratory 测试机构	Shenzhen TCT Testing Technology Co., Ltd. 深圳市通测检测技术有限公司 1F, Building 1, Yibaolai Industrial Park, Qiaotou Village, Fuyong Town, Baoan District, Shenzhen, Guangdong, China 中国广东省深圳市宝安区福永桥头亿宝来工业城 1 栋 1 楼
Report No. 报告编号	TCT170731B001
Report Versions 版本号	V4.0
Issued Date 发行日期	Aug. 08, 2017
Test Conclusion 测试结论: Shown in the Conclusion of test report. 见检测报告结论页.	

Tested by 主检人: Alisa Tu 涂莹莹

Approved by 批准人: _____

Inspected by 审核人: Angy Zeng 曾红

Seal of TCT 报告单位 (盖章): _____

Date of Issue 签发日期: 2017. 08. 08

I、Sample Description 样品描述

Name of Sample 样品名称	Polymer Li-ion Cell 聚合物锂离子电芯	Model 型号	602234		
Manufacturer 制造商	Shenzhen Hugnen Technology(HGT) Co., LTD 深圳市辉能科技有限公司				
Address 地址	深圳市光明新区白花洞保利华工业园 2 栋 B2, Baolihua Industrial Park, Baihua Community, Guangming Shenzhen				
Trade Mark 商标	----	Shape 形状	Prismatic 棱形	Size 尺寸 (L×W×T)	(34.0×22.0×6.0)mm
Nominal Voltage 标称电压	3.7V	Rated Capacity 额定容量	420mAh 1.551Wh	Limited Charge Voltage 充电限制电压	4.2V
Standard Charge Current 标准充电电流	84mA	Maximum Continuous Charge Current 最大持续充电电流	420mA	End Charge Current 结束充电电流	21mA
Cut-off Voltage 放电截止电压	3.0V	Standard Discharge Current 标准放电电流	84mA	Maximum Discharge Current 最大放电电流	420mA
Cell Model 电芯型号	602234	Cell Nominal Voltage 电芯标称电压	3.7V	Cell Rated Capacity 电芯额定容量	420mAh
Cells Number 电芯数量	1PCS	Receiving Date 接收日期	2017-07-31	Completing Date 完成日期	2017-08-08

II、Standard 标准

Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.6) Sixth revised edition

联合国《关于危险货物运输的建议书》第六版。

III、Test Item 测试项目

- | | |
|---|--|
| T.1. ☒ Altitude simulation 高度模拟 | T.5. ☒ External short circuit 外部短路 |
| T.2. ☒ Thermal test 温度试验 | T.6. ☐ Impact / ☒ Crush 重物冲击/挤压 |
| T.3. ☒ Vibration 振动 | T.7. ☐ Overcharge 过充电 |
| T.4. ☒ Shock 冲击 | T.8. ☒ Forced discharge 强制放电 |

IV、Test Method and Requirement 测试方法和要求

Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery. Tests T.6 and T.8 shall be conducted using not otherwise tested cells. Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purposes of testing on cycled batteries.

用相同的电芯或电池按照顺序进行试验 T.1 至 T.5。试验 T.6 和 T.8 用没有进行其他试验的电芯。为了测试循环后的电池，试验 T.7 可用试验 T.1 至 T.5 后没有损坏的电池。

Cells of 1#~10# are full charged after one cycle;

Cells of 11#~15# are 50% charged after one cycle;

Cells of 16#~25# are full discharged after one cycle;

Cells of 26#~35# are full discharged after fifty cycles;

Test environment condition: ambient temperature: 15-25℃, ambient humidity: 40-70%

电芯 1#-10#为一次循环满电状态;

电芯 11#-15#为一次循环后 50%充电状态;

电芯 16#-25#为一次循环完全放电状态;

电芯 26#-35#为 50 次循环完全放电状态;

试验环境条件: 环境温度: 15-25℃, 环境湿度: 40-70%

In order to quantify the mass loss, the following procedure is provided:

$$\text{Mass loss (\%)} = (M1-M2)/M1 \times 100$$

质量损失的量化值，可用以下公式计算：

$$\text{质量损失(\%)}=(M1-M2)/M1 \times 100$$

Where M1 is the mass before the test and M2 is the mass after the test. When mass loss does not exceed the values in Table below, it shall be considered as "no mass loss".

式中：M1 是试验前的质量，M2 是试验后的质量。如果质量损失不超过下表所列的数值，应视为“无质量损失”。

Mass M of cell or battery 电芯或电池的质量	Mass loss limit 质量损失限值
$M < 1g$	0.5%
$1g \leq M \leq 75g$	0.2%
$M > 75g$	0.1%

Leakage means the visible escape of electrolyte or other material from a cell or battery or the loss of material (except battery casing, handling devices or labels) from a cell or battery such that the loss of mass exceeds the values in Table above.

渗漏系指可以看到的电解液或者其他物质从电芯或者电池中漏出，或电芯或电池中的物质损失（不包括电池外壳、搬运装置、或标签），失去的质量超过上表所列的数值。

In test T.1 to T.4, cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

在测试 T.1 至 T.4 中，电池须满足无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%。有关电压要求不适用于测试完全放电状态的电芯和电池。

T.1. Altitude simulation 高度模拟**Test method 测试方法**

Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature ($20 \pm 5^\circ\text{C}$).

试验电芯和电池被放置在压力等于或低于 11.6 kPa 和环境温度($20\pm5^\circ\text{C}$)下存放至少 6 小时。

Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，有关电压要求不适用于测试完全放电状态的电芯和电池。

T.2. Thermal test 温度试验**Test method 测试方法**

Test Cells and batteries are to be stored for at least six hours at a test temperature equal to $75 \pm 2^\circ\text{C}$, followed by storage for at least six hours at a test temperature equal to $-40 \pm 2^\circ\text{C}$. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature ($20 \pm 5^\circ\text{C}$). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

试验电芯和电池放置在试验温度等于 $75\pm2^\circ\text{C}$ 的条件下存放至少 6 小时，接着再在试验温度等于 $-40\pm2^\circ\text{C}$ 的条件下存放至少 6 小时。两个极端试验温度之间的最大时间间隔为 30 分钟。此程序重复进行，共完成 10 次，接着将所有试验电池在环境温度($20\pm5^\circ\text{C}$)下存放 24 小时。对于大型电芯和电池，暴露于极端试验温度的时间应至少为 12 小时。

Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，有关电压要求不适用于测试完全放电状态的电芯和电池。

T.3. Vibration 振动**Test method 测试方法**

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz.

For large batteries: from 7 Hz to a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the

frequency is increased to 200 Hz.

电芯和电池紧固于振动台台面，但不得造成电池变形，并能准确可靠地传播振动。振动应是正弦波形，对数扫描频率在 7 Hz 和 200 Hz 之间，再回到 7 Hz，1 次循环时间为 15 分钟。这一振动过程须对三个互相垂直的电池安装方位的每一方向重复进行 12 次，总共为时 3 小时。其中一个振动方向必须与端面垂直。

做对数频率扫描，对总质量不足 12 千克的电芯和电池（电芯和小型电池），和对 12 千克及更大的电池（大型电池）有所不同。

对电芯和小型电池：从 7 Hz 开始，保持 1 gn 的最大加速度，直到频率达到 18 Hz。然后将振幅保持在 0.8mm（总位移 1.6mm），并增加频率直到峰值加速度达到 8 gn（频率约为 50 Hz）。将峰值加速度保持在 8 gn 直到频率增加到 200 Hz。

对于大型电池：从 7 Hz 开始，保持 1 gn 的最大加速度，直到频率达到 18 Hz。然后将振幅保持在 0.8mm（总位移 1.6mm），并增加频率直到峰值加速度达到 2 gn（频率约为 25 Hz）。将峰值加速度保持在 2 gn 直到频率增加到 200 Hz。

Requirement 要求

Cells and Batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test Cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的 90%。有关电压要求不适用于测试完全放电状态的电芯和电池。

T.4. Shock 冲击

Test method 测试方法

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.

Each cell shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50 gn and pulse duration of 11 milliseconds.

Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.

Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

试验电芯和电池用刚性支架紧固在试验装置上，支架支撑着每个试验电池组的所有安装面。

每个电芯需经受峰值加速度 150 gn 和脉冲持续时间 6 ms 的半正弦波冲击。另外大电芯需要经受峰值加速度 50 gn 和脉冲持续时间 11 毫秒的半正弦波冲击。

每个电池接受半正弦波冲击峰值加速度取决于电池的质量，小型电池脉冲持续时间应为 6 毫秒，大型电池脉冲持续时间为 11 毫秒的半正弦波冲击，下面提供的公式来计算适当的最小峰值加速度。

每个电芯或电池需在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受 18 次冲击。

Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，有关电压要求不适用于测试完全放电状态的电芯和电池。

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 g _n or result of formula $\text{Acceleration}(g_n) = \sqrt{\frac{100800}{\text{mass}}}$ whichever is smaller	6 ms
Large batteries	50 g _n or result of formula $\text{Acceleration}(g_n) = \sqrt{\frac{30000}{\text{mass}}}$ whichever is smaller	11 ms

* Mass is expressed in kilograms.

T.5. External short circuit 外部短路

Test method 测试方法

The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of $57 \pm 4^\circ\text{C}$, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at $57 \pm 4^\circ\text{C}$ shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.

测试的电芯或电池外壳温度达到恒温 $57 \pm 4^\circ\text{C}$ 后, 再进行外部短路。短路的时间取决于电芯或电池的尺寸和设计, 并需被评估和记录。如果这个评估无法进行, 那么小电芯和小电池短路时间至少 6 小时, 大电芯和大电池短路时间至少 12 小时。然后电芯或电池在 $57 \pm 4^\circ\text{C}$ 环境下经受一个阻值小于 0.1Ω 的外部电路短路。

This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57 \pm 4^\circ\text{C}$, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.

电芯或电池温度到 $57 \pm 4^\circ\text{C}$ 之后, 短路时间需持续 1 小时, 大型电池短路温度下降到最大温升的一半或低于 $57 \pm 4^\circ\text{C}$ 。

The short circuit and cooling down phases shall be conducted at least at ambient temperature.

短路和降温阶段至少应在环境温度下进行。

Requirement 要求

Cells and batteries meet this requirement if their external temperature does not exceed 170°C and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

电芯和电池外壳温度不超过 170°C , 并且在试验过程中及试验后 6 小时内无解体、无破裂, 无起火。

T.6. Impact / Crush 重物冲击/挤压

Test method – Impact (applicable to cylindrical cells not less than 18.0 mm in diameter)

测试方法 – 重物冲击 (适用于直径大于等于 18.0 毫米的圆柱形电池)

The sample cell or component cell is to be placed on a flat smooth surface. A $15.8 \text{ mm} \pm 0.1 \text{ mm}$ diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A $9.1 \text{ kg} \pm 0.1 \text{ kg}$ mass is to be dropped from a height of $61 \pm 2.5 \text{ cm}$ at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or

Channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.

The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm $\pm$ 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

试样电池或电池组放在平坦光滑表面上。一根 316 型不锈钢棒横放在试样中心，钢棒直径 15.8 毫米 $\pm$ 0.1 毫米，长度至少 6 厘米，或电池最长短的尺度，取二者之长者。将一块 9.1 千克 $\pm$ 0.1 千克的重锤从 61 $\pm$ 2.5 厘米高度跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。

垂直轨道或管道用于引导落锤沿与水平撑表面成 90 度落下。受撞击的试样，纵轴应于平坦表面平行并与横放在试样中心的直径 15.8 $\pm$ 0.1 毫米弯曲表面的纵轴垂直。每一试样只经受一次撞击。

Test method – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter)

测试方法 – 挤压（适用于棱形，袋，硬币/纽扣电池和圆柱形电池直径小于 18.0 毫米）

A component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.

- (a) The applied force reaches 13 kN $\pm$ 0.78 kN;
- (b) The voltage of the cell drops by at least 100 mV; or
- (c) The cell is deformed by 50% or more of its original thickness.

Once the maximum pressure has been obtained, the voltage drops by 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.

A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.

Each component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using component cells that have not previously been subjected to other tests.

将电芯放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为 1.5 cm/s。挤压持续进行，直到出现以下三种情况之一：

- (a) 施加的力量达到 13 kN $\pm$ 0.78 kN;
- (b) 电芯的电压下降至少 100mV；或
- (c) 电芯形变达原始厚度的 50%或更多。

一旦达到最大压力、电压下降 100mV 或更多，或电芯形变至少达原厚度的 50%，即可解除压力。

棱柱形或袋装电池须从最宽的面施压。纽扣/硬币形电池须从平坦表面施压。圆柱形电池须从与纵轴垂直的方向施压。

每个试样电芯只做一次挤压试验。试样须继续观察 6 小时。试验须使用之前未做过其他试验的电芯进行。

Requirement 要求

Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassembly and no fire within six hours after the test.

电芯外壳温度不超过 170°C，并且在试验过程中及试验后 6 小时内无解体，无起火。

T.7. Overcharge 过充电

Test method 测试方法

The charge current is twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

- (a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test is the lesser of two times the maximum charge voltage of the battery or 22V.
- (b) When the manufacturer's recommended charge voltage is more than 18 V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.

Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

充电电流为制造商建议的最大持续充电电流的两倍。试验的最小电压如下：

(a) 制造商建议的充电电压不大于 18 伏时，试验的最小电压应是电池组最大充电电压的两倍或 22 伏两者中的较小者。

(b) 当制造商建议的充电电压超过 18 伏，试验的最小电压应 1.2 倍的最大充电电压。

试验应在环境温度下进行。进行试验的时间应为 24 小时。

Requirement 要求

Rechargeable Batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

可充电电池在试验过程中和试验后 7 天内无解体，无起火。

T.8. Forced discharge 强制放电**Test method 测试方法**

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.

The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell is forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

每个电芯在环境温度下与 12V 直流电电源串联在起始电流等于制造商给定的最大放电电流的条件下强制放电。

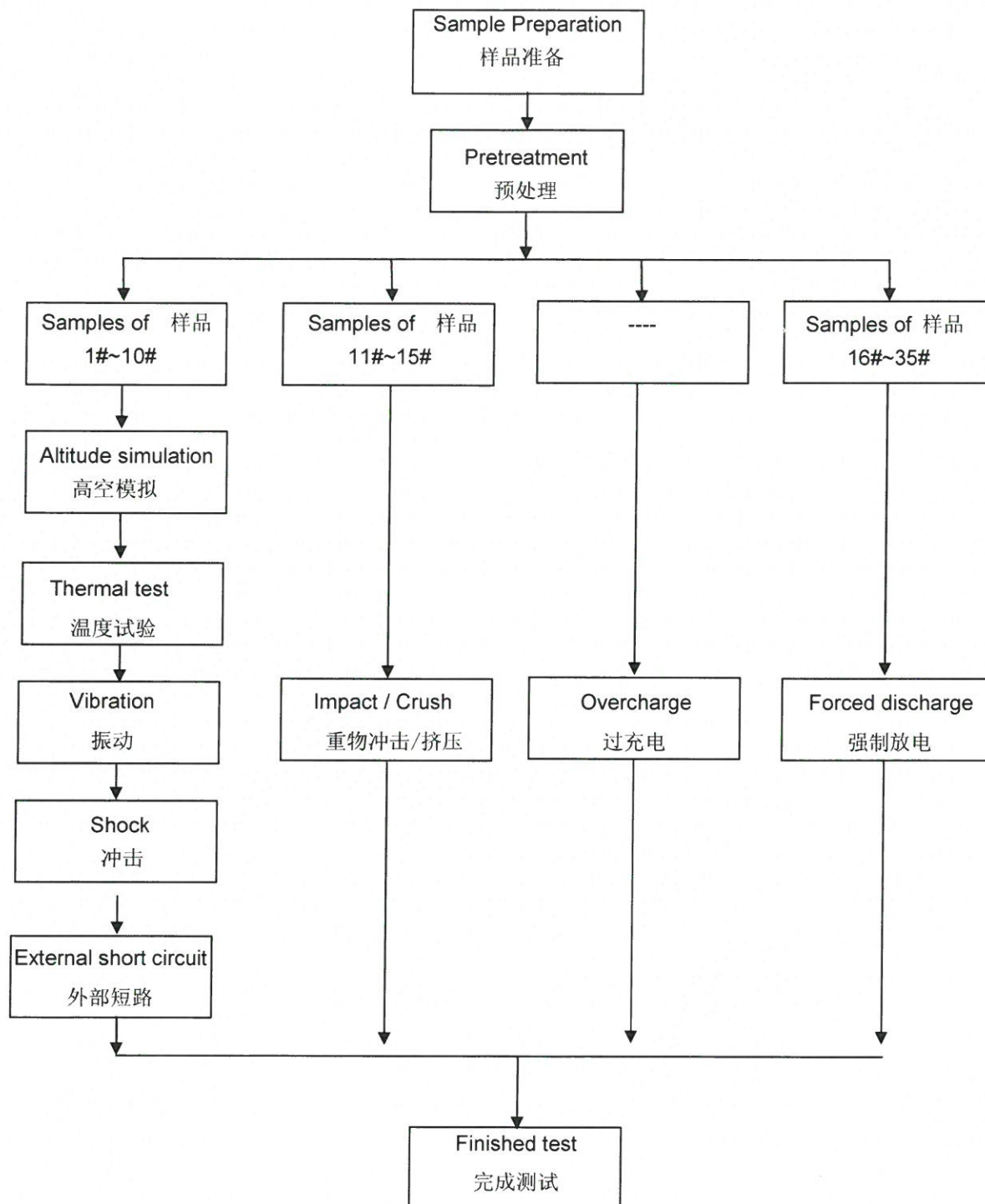
电芯与一个适当大小的电阻负载串联以调节到规定大小的放电电流。每块电芯的放电时间（单位为 h）等于电芯的额定容量除以试验初始放电电流（单位 A）。

Requirement 要求

Primary or rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

不可充电或可充电的电芯在试验过程中和试验后 7 天内无解体，无起火

V、Test Procedure 测试流程



VI、Main Test Apparatus 主要测试仪器

Serial No. 设备编号	Name of Equipment 设备名称	Model 型号	Calibration Date /Due Date 校准日期/到期日
TC-B01	Vacuum chamber (for battery test) 电池测试真空箱	GX-3020-Z	2017. 04. 26
			2018. 04. 25
TC-B04	Shock test instrument 冲击测试仪器	SY10-2	2017. 04. 26
			2018. 04. 25
TC-B05	Vibration test instrument 振动测试仪器	ES-3-150	2017. 04. 26
			2018. 04. 25
TC-B07	Rechargeable battery test system 充电电池测试系统	CTS-20V/10A-GGS	2017. 04. 26
			2018. 04. 25
TC-B10	Temperature circulation chamber 温度循环设备	BE-TH-150M8-4	2017. 04. 26
			2018. 04. 25
TC-B12	Crush test instrument 挤压测试仪器	BE-6045T	2017. 04. 26
			2018. 04. 25
TC-B13	Battery short circuit test instrument 电池短路测试仪器	BE-1000W	2017. 04. 26
			2018. 04. 25
TC-B14	Electronic Balance 电子天平	PTT-A+300	2017. 04. 26
			2018. 04. 25
TC-B15	Data acquisition unit 数据采集器	34970A	2017. 04. 26
			2018. 04. 25
TC-B18	DC regulated power supply 直流稳压电源	PSW 80-27	2017. 04. 26
			2018. 04. 25
TC-B21	Impact test instrument 撞击测试仪器	BE-5066	2017. 04. 26
			2018. 04. 25
TC-B24	Digital Multimeter 数字万用表	15B	2017. 04. 26
			2018. 04. 25
TC-B25	Battery anti-explosion chamber 电池防爆箱	GX-100	2017. 04. 26
			2018. 04. 25

VII、Test Data 测试数据

T.1. Altitude simulation 高度模拟

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	1#	7.882	4.19	7.881	4.19	0.01	100.0	Pass 合格
	2#	7.855	4.18	7.855	4.18	0.00	100.0	Pass 合格
	3#	7.713	4.19	7.713	4.18	0.00	99.8	Pass 合格
	4#	7.766	4.18	7.766	4.18	0.00	100.0	Pass 合格
	5#	7.773	4.19	7.773	4.19	0.00	100.0	Pass 合格
	6#	7.781	4.18	7.781	4.18	0.00	100.0	Pass 合格
	7#	7.793	4.19	7.793	4.19	0.00	100.0	Pass 合格
	8#	7.820	4.18	7.819	4.18	0.01	100.0	Pass 合格
	9#	7.827	4.19	7.827	4.19	0.00	100.0	Pass 合格
	10#	7.791	4.18	7.791	4.17	0.00	99.8	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.2°C

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.

测试后, 电池未渗漏、未泄气、未解体、未破裂和未起火。

T.2. Thermal test 温度试验

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	1#	7.881	4.19	7.878	4.15	0.04	99.0	Pass 合格
	2#	7.855	4.18	7.851	4.14	0.05	99.0	Pass 合格
	3#	7.713	4.18	7.710	4.15	0.04	99.3	Pass 合格
	4#	7.766	4.18	7.762	4.14	0.05	99.0	Pass 合格
	5#	7.773	4.19	7.770	4.15	0.04	99.0	Pass 合格
	6#	7.781	4.18	7.779	4.15	0.03	99.3	Pass 合格
	7#	7.793	4.19	7.790	4.15	0.04	99.0	Pass 合格
	8#	7.819	4.18	7.816	4.14	0.04	99.0	Pass 合格
	9#	7.827	4.19	7.824	4.15	0.04	99.0	Pass 合格
	10#	7.791	4.17	7.787	4.14	0.05	99.3	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.1°C

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.

测试后, 电池未渗漏、未泄气、未解体、未破裂和未起火。

T.3. Vibration 振动

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	1#	7.878	4.15	7.878	4.14	0.00	99.8	Pass 合格
	2#	7.851	4.14	7.851	4.14	0.00	100.0	Pass 合格
	3#	7.710	4.15	7.710	4.15	0.00	100.0	Pass 合格
	4#	7.762	4.14	7.761	4.14	0.01	100.0	Pass 合格
	5#	7.770	4.15	7.770	4.15	0.00	100.0	Pass 合格
	6#	7.779	4.15	7.779	4.14	0.00	99.8	Pass 合格
	7#	7.790	4.15	7.790	4.15	0.00	100.0	Pass 合格
	8#	7.816	4.14	7.816	4.14	0.00	100.0	Pass 合格
	9#	7.824	4.15	7.824	4.15	0.00	100.0	Pass 合格
	10#	7.787	4.14	7.786	4.14	0.01	100.0	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: $1.013 \times 10^5 \text{ Pa}$, Ambient temperature 环境温度: 23.4°C
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后, 电池未渗漏、未泄气、未解体、未破裂和未起火。

T.4. Shock 冲击

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	1#	7.878	4.14	7.878	4.14	0.00	100.0	Pass 合格
	2#	7.851	4.14	7.851	4.13	0.00	99.8	Pass 合格
	3#	7.710	4.15	7.709	4.15	0.01	100.0	Pass 合格
	4#	7.761	4.14	7.761	4.14	0.00	100.0	Pass 合格
	5#	7.770	4.15	7.770	4.15	0.00	100.0	Pass 合格
	6#	7.779	4.14	7.779	4.14	0.00	100.0	Pass 合格
	7#	7.790	4.15	7.790	4.15	0.00	100.0	Pass 合格
	8#	7.816	4.14	7.816	4.14	0.00	100.0	Pass 合格
	9#	7.824	4.15	7.823	4.14	0.01	99.8	Pass 合格
	10#	7.786	4.14	7.786	4.14	0.00	100.0	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: $1.013 \times 10^5 \text{ Pa}$, Ambient temperature 环境温度: 23.3°C
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后, 电池未渗漏、未泄气、未解体、未破裂和未起火。

T.5. External short circuit 外部短路

The state of cells 样品状态	No. 编号	External Peak temperature(°C) 电池表面最高温度(°C)	Status 结果
Full charged after one cycle 一次循环后满电状态	1#	98.3	Pass 合格
	2#	95.4	Pass 合格
	3#	96.6	Pass 合格
	4#	95.1	Pass 合格
	5#	96.2	Pass 合格
	6#	92.7	Pass 合格
	7#	95.3	Pass 合格
	8#	97.0	Pass 合格
	9#	95.6	Pass 合格
	10#	94.9	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.2°C
There is no disassembly, no rupture and no fire within six hours after test.
电池在测试后 6 小时内未解体、未破裂, 未起火。

T.6. Crush 挤压

The state of cells 样品状态	No. 编号	External Peak temperature(°C) 电池表面最高温度(°C)	Status 结果
50% charged after one cycle 一次循环后 50% 充电状态	11#	25.3	Pass 合格
	12#	25.2	Pass 合格
	13#	25.5	Pass 合格
	14#	26.2	Pass 合格
	15#	25.1	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.4°C
There is no disassembly, no rupture and no fire within six hours after test.
电池在测试后 6 小时内未解体、未起火。

T.7. Overcharge 过充电
(Not Applicable)

T.8. Forced discharge 强制放电

The state of cells 样品状态	No. 编号	Status 结果
Full discharged after one cycle 一次循环完全放电状态	16#	Pass 合格
	17#	Pass 合格
	18#	Pass 合格
	19#	Pass 合格
	20#	Pass 合格
	21#	Pass 合格
	22#	Pass 合格
	23#	Pass 合格
	24#	Pass 合格
	25#	Pass 合格
Full discharged after fifty cycles 50 个循环完全放电状态	26#	Pass 合格
	27#	Pass 合格
	28#	Pass 合格
	29#	Pass 合格
	30#	Pass 合格
	31#	Pass 合格
	32#	Pass 合格
	33#	Pass 合格
	34#	Pass 合格
	35#	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: $1.013 \times 10^5 \text{Pa}$, Ambient temperature 环境温度: 23.5°C
There is no disassembly and no fire during the test and within seven days after the test.
电芯在测试中和测试测试后 7 天内未解体, 未着火。

VIII、Conclusion 结论

No. 编号	Test item 测试项目	Sample number 样品数量	Test reference 测试参考	Conclusion 结论
1	Altitude simulation 高空模拟	1#~10#	UN Manual of Test and Criteria, part III, subsection 38.3.4.1 UN 试验和标准手册,第III部分,第 38.3.4.1 节	Pass 合格
2	Thermal test 温度试验		UN Manual of Test and Criteria, part III, subsection 38.3.4.2 UN 试验和标准手册,第III部分,第 38.3.4.2 节	Pass 合格
3	Vibration 振动		UN Manual of Test and Criteria, part III, subsection 38.3.4.3 UN 试验和标准手册,第III部分,第 38.3.4.3 节	Pass 合格
4	Shock 冲击		UN Manual of Test and Criteria, part III, subsection 38.3.4.4 UN 试验和标准手册,第III部分,第 38.3.4.4 节	Pass 合格
5	External short circuit 外部短路		UN Manual of Test and Criteria, part III, subsection 38.3.4.5 UN 试验和标准手册,第III部分,第 38.3.4.5 节	Pass 合格
6	Impact/Crush 重物冲击/挤压	11#~15#	UN Manual of Test and Criteria, part III, subsection 38.3.4.6 UN 试验和标准手册,第III部分,第 38.3.4.6 节	Pass 合格
7	Overcharge 过度充电	----	UN Manual of Test and Criteria, part III, subsection 38.3.4.7 UN 试验和标准手册,第III部分,第 38.3.4.7 节	Not Applicable 不适用
8	Forced discharge 强制放电	16#~35#	UN Manual of Test and Criteria, part III, subsection 38.3.4.8 UN 试验和标准手册,第III部分,第 38.3.4.8 节	Pass 合格

The submitted samples were complied with the stated requirements of UN manual of test and criteria, part III, subsection 38.3

经检测,提交的测试样品均符合 UN38.3 的要求,测试结论为合格。

IX、Photo of The Sample 样品图片

Model 型号: 602234

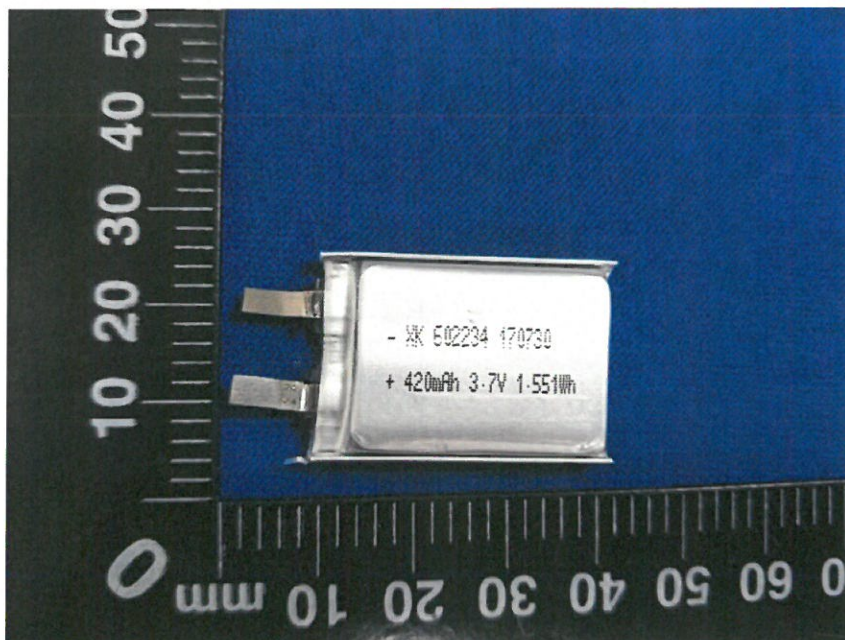


Photo 1 Front 正面

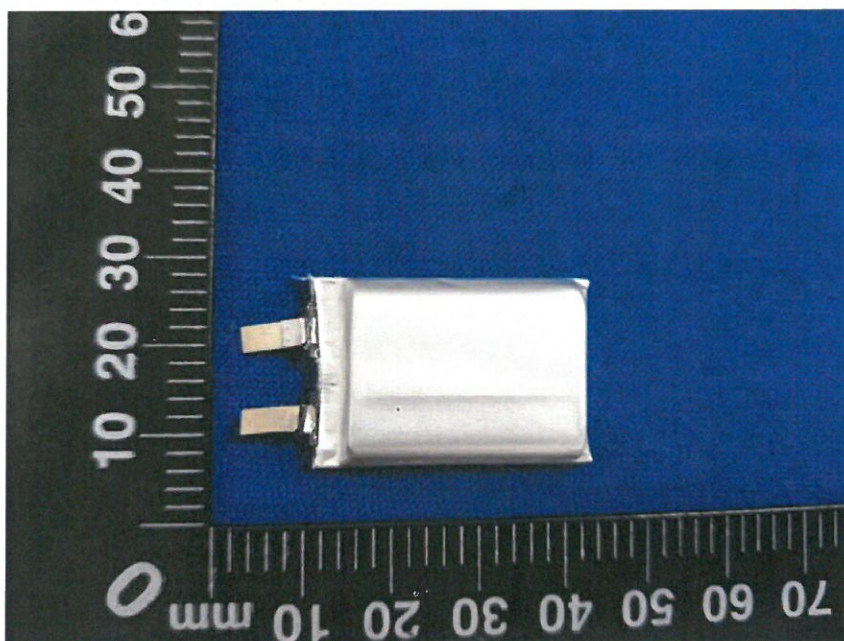


Photo 2 Rear 反面

*******End of Report 报告结束*******

注意事项

Important Notice

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对报告书若有异议，应于收到报告之日起 15 天内向本公司提出。
6. The test report is valid for the tested samples only.
本报告仅对本次测试样品有效。
7. The Chinese contents in this report are only for reference.
本报告中的中文内容仅供参考。

