



# Specification Approval Sheet(PACK)

## 产品规格确认书

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**Battery Type: 40110175P-10000mAh-3.8V**  
**电池型号: 40110175P-10000mAh-3.8V**

|                | Signature 签名 | Date 日期    |
|----------------|--------------|------------|
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| Approved 批准    |              |            |
| Confirmed 客户确认 |              |            |



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1. Scope: This document describes the Product Specification of the Lithium-Polymer rechargeable battery cell supplied by Waitley Battery Corporation Limited.

适用范围: 本规格说明书描述了深圳市威特利电源有限公司生产的可充电锂离子电池的产品性能指标

2.Model: 40110175P-10000mAh-3.8V

型号: 40110175P-10000mAh-3.8V

### 3.Specification

#### 产品规格

| NO. | Items                                     | Specifications   |
|-----|---|--|
| 1   | Charge voltage<br>充电电压                    | 4.35V  |
| 2   | Nominal voltage<br>标称电压                   | 3.8V   |
| 3   | Nominal capacity<br>标称容量                  | 10000mAh @ 0.2C Discharge(放电)  |
| 4   | Charge current<br>充电电流                    | Standard Charging: 0.5C<br>标准充电: 0.5C<br>Rapid charge: 1.0C<br>快速充电: 1.0C  |
| 5   | Standard Charging method<br>标准充电方法        | 0.5C CC (constant current) charge to 4.35V, then CV (constant voltage 4.35V) charge till charge current decline to $\leq 0.04C$<br>0.5C CC (恒流) 充电至 4.35V, 再 CV (恒压 4.35V) 充电直至充电电流 $\leq 0.01C$ |
| 6   | Charging time<br>充电时间                     | Standard Charging: 3.0hours(Ref.)<br>标准充电: 3.0 小时 (参考值)<br>Rapid charge: 2hours(Ref.)<br>快速充电: 2 小时 (参考值)  |
| 7   | Max.charge current<br>最大充电电流              | 1.0C   |
| 8   | Over-current protection current<br>过流保护电流 | 8.5A   |
| 9   | Discharge cut-off voltage<br>放电截止电压       | 2.75V  |
| 10  | Operating temperature<br>工作温度             | Charging: 0°C~40°C<br>充电: 0°C~40°C<br>Discharging: -20°C~55°C<br>放电: -20°C~55°C  |
| 11  | Storage temperature<br>储存温度               | -23°C ~ +5°C   |
| 12  | PACK Weight<br>电池重量                       | Approx: 161g<br>约: 161g  |

### 4.Battery PACK Performance Criteria



电池性能检查及测试

4.1 Electrical characteristics 充放电性能

| NO. | Items                               | Test Method and Condition   | Criteria  |
|-----|-------------------------------------|---|---|
| 1   | Standard Charge<br>标准充电             | Charging the cell initially with constant current at 0.5C to 4.35V and then with constant voltage at 4.35V till charge current declines to 0.04C<br>先用 0.5C 恒流充电至 4.35V，再恒压 4.35V 充电直至充电电流 ≤ 0.01C  |   |
| 2   | Rated Capacity<br>初始容量              | The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.2C with 2.75V cut-off voltage after standard charge.<br>该容量是指标准充电后，0.2C 放电至 2.75V 截止电压所放出的容量。  | ≥ 9600mAh   |
| 3   | Cycle Life<br>循环寿命                  | Test condition:<br>Charge: 0.5C to 4.35V<br>Discharge: 0.5C to 2.75V<br>80% or more of 1 <sup>st</sup> cycle capacity at 0.5C discharge of Operation<br>测试条件:<br>充电: 0.5C 充电到 4.35V<br>放电: 0.5C 放电到 2.75V<br>当放电容量降至初始容量的 80% 时，所完成的循环次数定义为该电芯的循环寿命   | ≥ 300   |
| 4   | Self-discharge<br>自放电               | After the standard charging, stored the cells under the condition as No.4.4 for 30 days, then measured the capacity with 0.2C till 2.75V<br>标准充电后，在 No.4.4 条件下贮存 30 天，再以 0.2C 放电至 2.75V 所放出的容量。   | Residual capacity >90%<br>剩余容量 >90%                       |
| 5   | Initial impedance<br>初始内阻           | Internal resistance measured at AC 1KHz after 50% charge 半充状态下，测量其 AC 1KHz 下的交流阻抗   | ≤ 150mΩ   |
| 6   | PACK Voltage<br>电池电压                | As of shipment.<br>出货状态   | 3.8V~3.9V   |
| 7   | Temperature Characteristics<br>温度特性 | 1. According to item 4.1.1, at 23 ± 5°C.<br>2. Capacity comparison at each temperature, measured with constant discharge current 0.2C with 2.75V cut-off. Percentage as an index of the capacity compared with 100% at 23°C<br>1. 在 23 ± 5°C 条件下，用 4.1.1 方法将电芯充电。<br>2. 在不同温度条件下，用 0.2C 的电流恒流放电至截止电压 2.75V。以 23°C 时放电容量为基准计算百分比。  | -20°C: ≥ 65%<br>23°C: 100%<br>60°C: ≥ 90%                 |
| 8   | Storage Characteristics<br>储存特性     | 1. According to item 4.1.1, at 23 ± 5°C.<br>2. The battery shall be stored at 60 ± 5°C for 4 hours (measure thickness) and rested at room temperature for 1 hour then measured with constant discharge current 0.2C with 2.75V cut-off. (measure Capacity)<br>1. 在 23 ± 5°C 条件下，用 4.1.1 方法将电芯充电。<br>2. 将电池在 60 ± 5°C 条件下贮存 4 小时，然后在常温下静置 2 小时，用 0.2C 的电流恒流放电至 2.75V 截止电压。 | Retained Capacity<br>≥ 90%<br>Retained Thickness<br>≤ 10% |

4.2 Mechanical characteristics



机械特性

| NO. | Items                  | Test Method and Condition  | Criteria                            |
|-----|------------------------|--|-------------------------------------|
| 1   | Vibration Test<br>振动测试 | After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz an 55Hz,the excursion of the vibration is 1.6mm.The cell shall be vibrated for 30 minutes per axis of XYZ axes.<br>将标准充电后的电池固定在振动台上,沿 X、Y、Z 三个方向各振动 30 分钟,振幅 1.6 mm, 振动频率为 10Hz~55Hz,每分钟变化为 1Hz。 | No leakage<br>无泄漏<br>No fire<br>不起火 |
| 2   | Drop Test<br>跌落测试      | The cell is to be dropped from a height of meter twice onto concrete ground.<br>将标准充电后的电池从 1 米高度跌落至混凝土地面 2 次   | No fire, no leakage.<br>无起火、无泄漏     |

4.3 Visual inspection

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

外观检查

不允许有任何影响电池性能的外观缺陷, 诸如裂纹、裂缝、泄漏等。

4.4 Standard environmental test condition

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:

Temperature:  $23 \pm 5^{\circ}\text{C}$

Humidity:  $65 \pm 20\% \text{RH}$

标准测试环境

除非特别说明, 本标准书中所有测试均在以下环境条件下进行:

温度:  $23 \pm 5^{\circ}\text{C}$

湿度:  $65 \pm 20\% \text{RH}$

5.Storage and Others

贮存及其它事项

a) Long Time Storage

If the Cell is stored for a long time, the cell's storage should be 3.6~3.9V and the cell is to be stored in a condition as No.4.4.

长期贮存

长期贮存的电池 (超过 3 个月) 须置于干燥、凉爽处。贮存电压为 3.6~3.9V 且贮存环境要求如 4.4。

b) Others

Any matters that this specification does not cover should be conferred between the customer and GREPOW.

其它事项

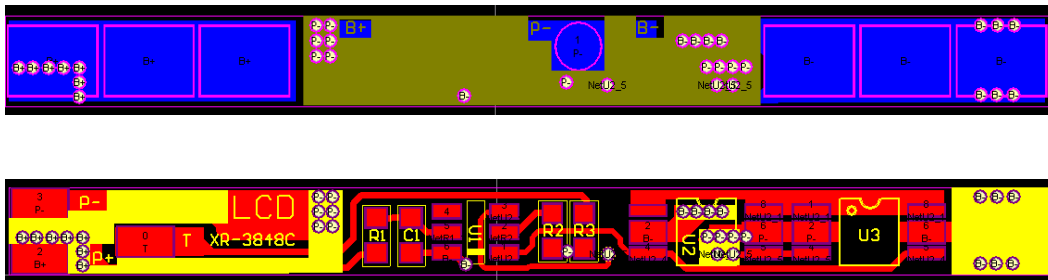
任何本说明书中未提及的事项, 须经双方协商确定

6. Protection Circuit Characteristics (at  $25^{\circ}\text{C}$ )--This specification item is option.

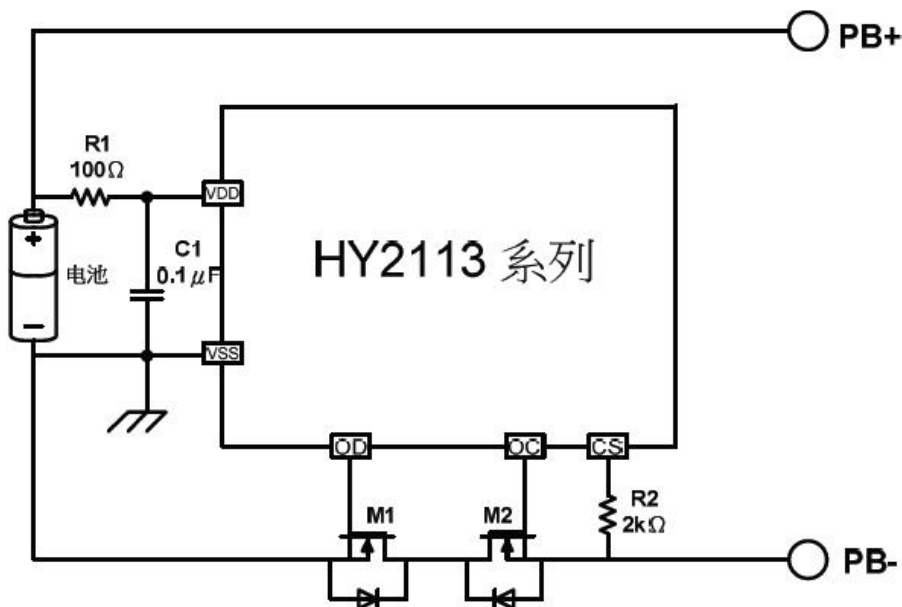
6.1Electrical Characteristic

| 检测项目      | 参数   |      |      |    | 备注 |
|-----------|------|------|------|----|----|
|           | 最小值  | 典型值  | 最大值  | 单位 |    |
| 过充保护检测电压  | 4.35 | 4.42 | 4.45 | V  |    |
| 过充恢复电压    | 4.07 | 4.15 | 4.2  | V  |    |
| 过放保护检测电压  | 2.90 | 3.00 | 3.10 | V  |    |
| 过放解除电压    | 2.90 | 3.00 | 3.10 | V  |    |
| 过流1检测电压   | 0.12 | 0.15 | 0.18 | V  |    |
| 过充电检测延时时间 | 80   | 110  | 200  | ms |    |
| 过放电检测延时时间 | 20   | 40   | 60   | ms |    |
| 过流1检测延时时间 | 5    | 13   | 20   | ms |    |
| 过流保护电流    | 4    | 5    | 6    | A  |    |
| 工作电流消耗    | --   | 5.0  | 7.0  | uA |    |
| 静态电流消耗    | --   | 3.0  | 7.0  | uA |    |

### 6.2 PCB Pad description



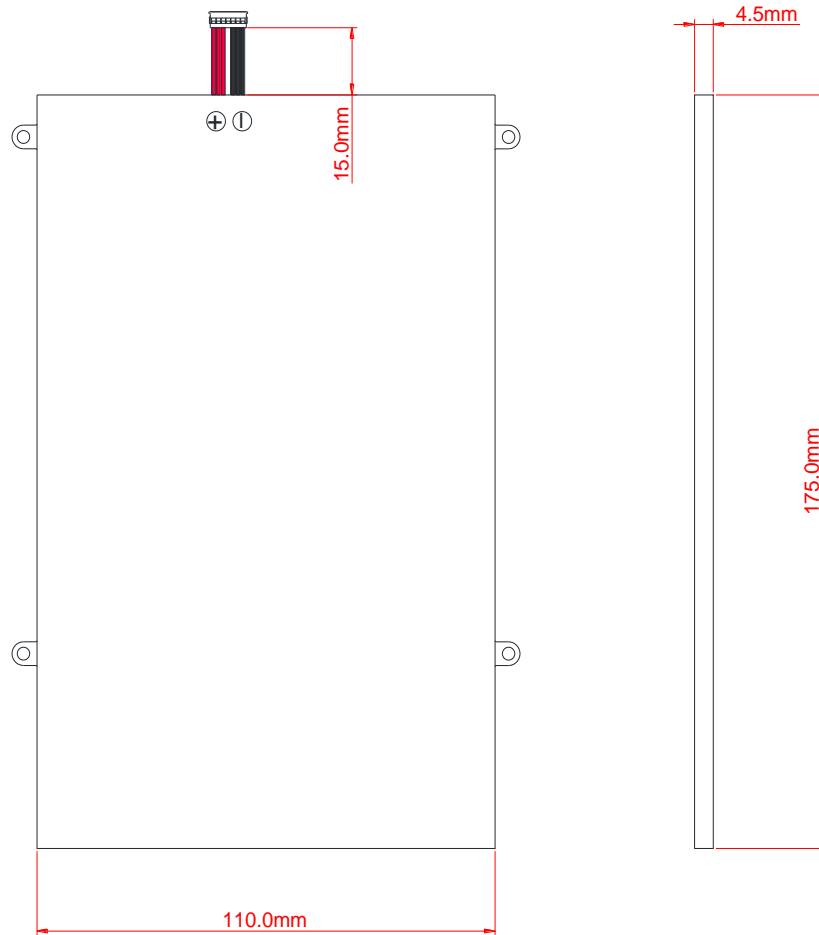
### 6.3 Application Circuit



### 7. Pack Drawing

#### 7.1 Soft pack drawing

4.0±0.5mm(T)\*110.0±0.5mm(W)\*175±0.5mm(L) 15mm±2.0mm(H)



### 7.2 BOM of Product

|   | Item     | Model                  | Specification  | Remarks |
|---|----------|------------------------|--|---------|
| 1 | Red Wire | 1.2-7P 正向端子            | 线长外露 15mm  | 1       |
| 4 | Tape     | Kapton                 | See the real figure  |         |
| 2 | PCM      | Li-ion single cell PCM | Over Voltage Protect:<br>4.35 ± 0.05V<br>Over Discharge Protect:<br>2.75 ± 0.05V | 高压双 mos |
| 3 | Cell     | 4070105                | 5000mAh  | 2       |

### 7.3 Battery products physical figure



## Appendix

### 附录

## Handling Precautions and Guideline For (Lithium-Ion Polymer)Rechargeable Batteries 锂离子充电电池操作指示及注意事项

### Preface

This document of 'Handling Precautions and Guideline Rechargeable Batteries shall be applied to the battery cells manufactured by Waitley

### 前言

本文件“锂离子充电电池操作指示及注意事项”仅适用于深圳市威特利电源有限公司生产的电池。

### Note(1):

The customer is requested to contact Waitley in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

### 声明一:

客户若需要将电池用于超出文件规定以外的设备，或在文件规定以外的使用条件下使用电池，应事先联系威特利，因为需要进行特定的实验测试以核实电池在该使用条件下的性能及安全性。

### Note(2):

Waitley will take no responsibility for any accident when the cell is used under other conditions than those



described in this Document.

声明二:

对于在超出文件规定以外的条件下使用电池而造成的任何意外事故，威特利概不负责。

Note(3):

Waitley will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the cell, if it is deemed necessary.

声明三:

如有必要威特利会以书面形式告之客户有关正确操作使用电池的改进措施。

## 1. Charging

### 充电

#### 1.1 Charging current:

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical and safety performance and could lead to heat generation or leakage.

充电电流

充电电流不得超过本标准书中规定的最大充电电流。使用高于推荐值电流充电将可能引起电池的充放电性能、机械性能和安全性能的问题，并可能会导致发热或泄漏。

#### 1.2 Charging voltage:

Charging shall be done by voltage less than that specified in the Product Specification (4.35V/cell). Charging beyond 4.35V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

充电电压

充电电压不得超过本标准书中规定的额定电压（4.35V/电芯）。4.35V 为充电电压最高极限，充电器的设计应满足此条件。

电芯电压高于额定电压值时，将可能引起电池的充放电性能、机械性能和安全性能的问题，可能会导致发热或泄漏。

#### 1.3 Charging temperature:

The cell shall be charged within 0°C~65°C range in the Product Specification.

充电温度

电池必须在 0°C~65°C 的环境温度范围内进行充电。

#### 1.4 Prohibition of reverse charging:

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring, In case of the cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the

cell safety, and could cause heat generation or leakage.

#### 禁止反向充电

正确连接电池的正负极，严禁反向充电。若电池正负极接反，将无法对电池进行充电。同时，反向充电会降低电池的充放电性能、安全性，并会导致发热、泄漏。

## 2. Discharging

### 放电

#### 2.1 Discharging current

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification.

High discharging current may reduce the discharging capacity significantly or cause over-heat.

#### 放电电流

放电电流不得超过本标准书规定的最大放电电流，大电流放电会导致电池容量剧减并导致过热。

#### 2.2 Discharging temperature

The cell shall be discharged within  $-20^{\circ}\text{C}\sim 40^{\circ}\text{C}$  range specified in the Product Specification.

电池必须在 $-20^{\circ}\text{C}\sim 40^{\circ}\text{C}$ 的环境温度范围内进行放电。

#### 2.3 Over-discharging:

It should be noted that the cell would be at over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.6V and 3.9V.

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voyage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging procedures as follows:

The cell battery pack shall start with a low current (0.01C) for 15-30 minutes, i.e.-charging, before rapid charging starts. The rapid charging shall be started after the (individual) cell voltage has been reached above 3V within 15-30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) cell voltage does not rise to 3V within the pre-charging time, then the charger shall have functions to stop further charging and display the cell/pack is at abnormal state.

#### 过放电

需要注意的是，在电池长期未使用期间，它可能会用其它自放电特性而处于某种过放电状态。为防止放电的发生，电池应定期充电，将其电压维持在 3.6V 至 3.9V 之间。

过放电会导致电池性能、电池功能的丧失。

充电器应有装置来防止电池放电至低于本标准书规定的截止电压。此外，充电器还应有装置以防止重复充电，步骤如下：

电池在快速充电之前，应先以一小电流（0.01C）预充电 15~30 分钟，以使（每个）电芯的电压达到 3V 以上，再进行快速充电。可用一记时器来实现该预充电步骤。如果在预充电规定时间内，（个别）电池的电压仍未升到 3.0V 以上，充电器应能够停止下一步快速充电，并显示该/电池正处于非正常状态。

### 3. Storage

#### 贮存

The cell shall be storied within  $-10^{\circ}\text{C}\sim 60^{\circ}\text{C}$  range environmental condition.

If the cell has to be storied for a long time (Over 3 months),the environmental condition should be:

Temperature:  $23\pm 5^{\circ}\text{C}$

Humidity:  $65\pm 20\%\text{RH}$

The voltage for a long time storage shall be  $3.6\text{V}\sim 3.9\text{V}$  range.

电池储存温度必须在 $-10^{\circ}\text{C}\sim 60^{\circ}\text{C}$ 的范围内。

长期存储电池（超过3个月）须置于温度为 $23\pm 5^{\circ}\text{C}$ 、湿度为 $65\pm 20\%\text{RH}$ 的环境中。

贮存电压为 $3.6\text{V}\sim 3.9\text{V}$

### 4. Handling of Cells

#### 电池操作注意事项

#### 4.1 Soft Aluminum foil

The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles.

- Don't strike battery with any sharp edge parts
- Trim your nail or wear glove before taking battery
- Clean worktable to make sure no any sharp particle

铝箔包装材料易被尖锐部件损伤，诸如镍片，尖针。

- 禁止用尖锐部件碰撞电池；
- 取放电池时，请修短指甲或戴上手套；
- 应清洁工作环境，避免有尖锐物体存在

#### 4.2 Folding edge

The folding edge is form in battery process and passed all hermetic test

- Don't open or deform folding edge

#### 折边

折边在电池生产过程中已完成，并通过了密封测试。

- 禁止打开或破坏折边。

#### 4.3 Mechanical shock

- Don't Fall, hit, bend battery body

#### 机械撞击

- 禁止坠落、冲击、弯折电池。

### 5. Notice Designing Battery Pack

#### 电池外壳设计注意事项

#### 5.1 Pack design

- Battery pack should have sufficient strength and battery should be protected from mechanical shock
- No Sharp edge components should be inside the pack containing the battery.

#### 外壳设计

- 电池外壳应有足够的机械强度以保证其内部电芯免受机械撞击。

- 外壳内安装电芯的部位不应有锋利的边角。

## 6. Notice for Assembling Battery Pack

电池与外壳组装注意事项

### 6.1 Cell fixing

- The battery should be fixed to the battery pack by its large surface area.
- No cell movement in the battery pack should be allowed.

电池的安装

- 应将电芯的宽面安装在外壳内；
- 电池不得在壳内活动。

## 7. Others

其它事项

### 7.1 Prevention of short circuit within a battery pack

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.

### 7.2 Prohibition of disassembly

严禁拆卸电池

#### 1) Never disassemble the cells

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, or other problems.

在任何情况下不得拆卸电池，拆卸电池可能会导致内部短路，进而引起鼓气、着火及其它问题。

#### 2) Electrolyte is harmful

LIP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

电解液有害，聚合物锂电池理论上不存在流动的电解液，但万一有电解液泄漏而接触到皮肤、眼睛或身体其它部位，应立即用清水冲洗电解液并就医。

### 7.3 Prohibition of dumping of cells into fire

Never incinerate nor dispose the cells in fire. These may cause firing of the cells, which is very dangerous and is prohibited.

严禁将电池投入火中，在任何情况下，不得燃烧电池或将电池投入火中，否则会引起电芯燃烧，这是非常危险的，应绝对禁止。

### 7.4 Prohibition of cells immersion into liquid such as water

The cells shall never be soaked with liquids such as water, seawater drinks such as soft drinks, juices coffee or others.

严禁将电池浸入液体，如水

不得将电池浸泡液体，如淡水、海水、饮料（果汁、咖啡等）。

### 7.5 Battery cells replacement

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.



#### 电芯的更换

更换电芯应由电芯供应商或设备供应商完成，用户不得自行更换。

#### 7.6 Prohibition of use of damaged cells

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of electrolyte, electrolyte leakage and others, the cells shall never be used any more.

The cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing.

#### 禁止使用已损坏的电池

电池在运输过程中可能因撞击等原因而损坏，若发现电池有任何异常特征，如电池塑料封边损坏，外壳破损，闻到电解液气体，电解液泄漏等，该电池不得使用。有电解液泄漏或散发电解液气味的电池应远离火源以避免着火。