

UN38.3 TEST REPORT

UN38.3 检测报告

Report No.:

报告编号:

CMC241015018-1

Name of Goods:

物品名称:

Cylindrical lithium-ion rechargeable cell

圆柱形可充电锂离子电芯

Model:

型号:

IMR14500-400mAh

Type:

规格:

3.7V 400mAh 1.48Wh

Client:

委托单位:

Classification
of test:

检测类别:

Commission Test

委托测试

Tested by:

主检人:

Sago Su 苏子

Approved by:

批准人:

Dong Le 何立

Inspected by:

审核人:

Dylan Dou 董明

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CMC Testing International (Shenzhen) Co., Ltd.

众检检验认证（深圳）有限公司

TEST REPORT

检测报告

Name of Goods 物品名称	Cylindrical lithium-ion rechargeable cell 圆柱形可充电锂离子电芯		Model 型号	IMR14500-400mAh	
Commissioner 委托单位					
Commissioner's Address 委托单位地址					
Manufacturer 生产厂					
Manufacturer's Address 生产厂地址					
Manufacturer's Contact Telephone 制造商联系电话					
Trade Mark/ identification 商标/识别码	--	Shape 形状	Cylinder 圆柱体	Size 尺寸 (D×H)	(14.0×49.5)mm
Nominal Voltage 标称电压	3.7V	Charge Voltage 充电电压	4.2V	Rated Capacity 额定容量	400mAh
Cell Model 电池型号	IMR14500- 400mAh	Cell Nominal Voltage 电池标称电压	3.7V	Cell Rated Capacity 电池额定容量	400mAh
Cells Number 电池数量	1PC	Sample Receiving Date 样品接收日期	2024.10.15	Testing Date 测试日期	2024.10.15 - 2024.10.31
Test conclusion 检测结论	The sample has passed the test items of UNITED NATIONS “Manual of Tests and Criteria” ST/SG/AC.10/11/Rev.7/ Amend.1 Subsection 38.3 经测试，该样品符合联合国《试验和标准手册》（第 7 修订版 修正 1）38.3 标准要求。				

Test Standard 检测标准 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1 Subsection 38.3 联合国《试验和标准手册》(第7修订版 修正1) 38.3 节			
Description and illustration of the sample: The sample's status is good. 样品说明及描述: 样品状况良好。			
Test item 检测项目	Sample No. 样品编号	State 状态	Remark 备注
T1,T2,T3,T4,T5	C01-C05	At first cycle, in fully charged states 第1个充电周期, 完全充电状态	--
T1,T2,T3,T4,T5	C06-C10	After 25 cycles ending in fully charged states 第25个充电周期, 完全充电状态	--
T6	C11-C15	At first cycle at 50% of the design rated capacity 第1个充放电周期 50%设计额定容量状态	--
T6	C16-C20	After 25 cycle at 50% of the design rated capacity 第25个充放电周期 50%设计额定容量状态	--
T8	C21-C30	At first cycle in fully discharged states 第1个充放电周期, 完全放电状态	--
T8	C31-C40	After 25 cycles ending in fully discharged states 第25个充放电周期, 完全放电状态	--
CXX is used as the sample number of cells SN241015018CXX, "X" is 0~9. CXX 代表电芯样板编号 SN241015018CXX, X=0~9。			
Description of the deviation from the standard, if any: -- 检测结果不符合标准项的说明:			
Test environment conditions: Ambient temperature: 25°C±5°C, Ambient humidity: 45%-75% 检测环境条件: 环境温度: 25°C±5°C; 环境湿度: 45%-75%			
Remarks: -- 备注:			



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Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4	Procedure 检测步骤		--
38.3.4.1	Test 1: Altitude simulation 检测 1: 高度模拟 Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hours at ambient temperature (20±5°C). 将电池和电池组在温度为 20±5°C, 大气压力为不大于 11.6kPa 的环境中贮存不少于 6 小时。 Requirements 标准要求: 1) Cells and batteries Mass loss limit reference: Table 38.3.1 样品质量损失限值参考: 表 38.3.1 2) Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90%,此要求不适用于完全放完电的电池或电池组。 3) No leakage, no venting, no disassembly, no rupture and no fire. 样品(电池)应无渗漏、无排气、无解体、无破裂以及无起火现象的发生。	Test Samples: No leakage, no venting, no disassembly, no rupture and no fire. 样品: 无渗漏、无排气、无解体、无破裂以及无起火现象。 The data is shown in Test Table T.1 数据见表 T.1	Pass 合格
38.3.4.2	Test 2: Thermal test 检测 2: 温度试验 Test cells and batteries are to be stored for 电池和电池组存储条件如下: 1) For small cells and batteries: one temperature cycle: 72±2°C (6h) ~ -40±2°C (6h) 对于小型电池和电池组: 一次温度循环为 72±2°C (6h) ~ -40±2°C (6h) For large cells and batteries: one temperature cycle: 72±2°C (12h) ~ -40±2°C (12h) 对于大型电池和电池组: 一次温度循环为 72±2°C (12h) ~ -40±2°C (12h) 2) The maximum time interval between test temperature extremes is 30minutes. 温度转换最大间隔时间为 30min。 3) This procedure is to be repeated 10 times. 重复 10 次循环。 4) after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5°C). 循环结束后, 电池和电池组在 20±5°C 的条件下搁置 24 小时。 Requirement 标准要求: 1) Cells and batteries Mass loss limit reference: Table 38.3.1 样品质量损失限值参考: 表 38.3.1 2) Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90%,此要求不适用于完全放完电的电池和电池组。 3) No leakage, no venting, no disassembly, no rupture and no fire. 样品(电池)应无渗漏、无排气、无解体、无破裂以及无起火现象的发生。	Test Samples: No leakage, no venting, no disassembly, no rupture and no fire. 样品: 无渗漏、无排气、无解体、无破裂以及无起火现象。 The data is shown in Test Table T.2 数据见表 T.2	Pass 合格



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Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4.3	Test 3: Vibration 检测 3: 振动 1) Cells and batteries are firmly secured to the platform of the vibration machine. 电池和电池组牢固地安装在振动台（的台面）上。 2) The vibration: a sinusoidal waveform with a logarithmic sweep between 7Hz and 200Hz and back to 7Hz traversed in 15 minutes. 振动以正弦波形式，以 7Hz 增加至 200Hz，然后在减少回到 7Hz 为一个循环，一个循环持续 15 分钟的对数前移传送。 3) For cells and small batteries: from 7Hz a peak acceleration of 1gn is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8gn occurs (approximately 50Hz). A peak acceleration of 8gn is then maintained until the frequency is increased to 200Hz. 对于电池和小型电池：从 7Hz 开始，以 1gn 的峰值加速度保持不变，直到达到 18Hz。然后将振幅保持在 0.8mm（总偏移 1.6mm）并且频率增加直到出现 8gn 的峰值加速度（大约 50Hz）。然后保持 8gn 的峰值加速度，直到频率增加到 200Hz。 For large batteries: from 7Hz a peak acceleration of 1gn is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 2gn occurs (approximately 25Hz). A peak acceleration of 2gn is then maintained until the frequency is increased to 200Hz. 对于大型电池：从 7Hz 开始，以 1gn 的峰值加速度保持不变，直到达到 18Hz。然后将振幅保持在 0.8mm（总偏移 1.6mm）并且频率增加直到出现 2gn 的峰值加速度（大约 25Hz）。然后保持 2gn 的峰值加速度，直到频率增加到 200Hz。 4) This cycle repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting position of the cell. One of the directions of vibration must be perpendicular to the terminal face. 以振动的其中一个方向必须是垂直样品极性，对每个电池从三个互相垂直的方向上循环 12 次，每个方向 3 个小时，共 9 小时。 Requirements 标准要求: 1) Cells and batteries Mass loss limit reference: Table 38.3.1 样品质量损失限值参考：表 38.3.1 2) Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90%,此要求不适用于完全放完电的电池和电池组。 3) No leakage, no venting, no disassembly, no rupture and no fire. 样品（电池）应无渗漏、无排气、无解体、无破裂以及无起火现象的发生。	Test Samples: No leakage, no venting, no disassembly, no rupture and no fire. 样品：无渗漏、无排气、无解体、无破裂以及无起火现象。 The data is shown in Test Table T.3 数据见表 T.3	Pass 合格



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Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4.4	Test 4: Shock 检测 4: 冲击 1) Test cells and batteries shall be secured to the testing machine. 以稳固的托架固定住每个电池和电池组样品的全部配件表面。 2) Each cell shall be subjected to a half-sine shock of peak acceleration of 150g_n and pulse duration of 6 milliseconds. Large cells may be subjected to a half-sine shock of peak acceleration of 50g_n and pulse duration of 11 milliseconds. 对每个电池以峰值为 150g_n 的半正弦的加速度撞击，脉冲持续 6ms，大型电池须经受最大加速度 50g_n 和脉冲持续时间 11ms 的半正弦波冲击。 Small batteries shall be subjected to a half-sine shock of peak acceleration of 150g_n (or Acceleration(g_n)=$\sqrt{(\frac{100850}{mass})}$, which is smaller) acceleration of 50g_n (or Acceleration(g_n)=$\sqrt{(\frac{30000}{mass})}$, which is smaller) and pulse duration of 6 milliseconds, large batteries shall be subjected to a half-sine of peak acceleration of 11 milliseconds. 对每个电池以峰值为 150g_n (或与$\sqrt{(\frac{100850}{mass})}$中较小值) 的半正弦的加速度撞击，脉冲持续 6ms，大型电池须经受最大加速度 50g_n (或与$\sqrt{(\frac{30000}{mass})}$中较小值) 和脉冲持续时间 11ms 的半正弦波冲击。 3) Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks. 每个电池或电池组须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。 Requirements 标准要求: 1) Cells and batteries Mass loss limit: ≤0.2%. 样品质量损失≤0.2% 2) Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90%,此要求不适用于完全放完电的电池或电池组。 3) No leakage, no venting, no disassembly, no rupture and no fire. 样品（电池）应无渗漏、无排气、无解体、无破裂以及无起火现象的发生。	Test Samples: No leakage, no venting, no disassembly, no rupture and no fire. 样品：无渗漏、无排气、无解体、无破裂以及无起火现象。 The data is shown in Test Table T.4 数据见表 T.4	Pass 合格

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Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
	Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm in diameter). 挤压（适用于棱柱形、袋装、硬币/纽扣电池和直径小于 18 毫米的圆柱形电池）。 1) A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. 将电池或元件电池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 厘米/秒。挤压持续进行，直到出现以下三种情况之一： (a) The applied force reaches 13kN ± 0.78kN. 施加的力达到 13 千牛顿±0.78 千牛顿。 (b) The voltage of the cell drops by at least 100mV. 电池的电压下降至少 100 毫伏。 (c) The cell is deformed by 50% or more of its original thickness. 电池变形达原始厚度的 50%或以上。 2). 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. 棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币形电池应从其平坦表面施压。圆柱形电池应从与纵轴垂直的方向施压。 Requirements 标准要求： 1) Cells external temperature not exceed 170°C. 电池的最高表面温度应不超过 170°C。 2) No disassembly, no rupture and no fire during the test and within six hours after the test. 测试中与测试后 6 小时内无解体、无破裂、无起火。	Test Samples: No leakage, no venting, no disassembly, no rupture and no fire. 样品：无渗漏、无排气、无解体、无破裂以及无起火现象。 The data is shown in Test Table T.6 数据见表 T.6	Pass 合格



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Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4.7	Test 7: Overcharge 检测 7: 过度充电 1) The charge current shall be twice the manufacturer's recommended maximum continuous charge current. 以制造商建议的最大持续充电电流的两倍对样品充电。 2) The minimum voltage of the test shall be as follows: 试验的最小电压如下: a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V. 制造商建议的充电电压不大于 18V 时, 试验的最小电压应是电池组最大充电电压的两倍或 22V 两者中的较小者。 b) when the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage. 制造商建议的充电电压大于 18V 时, 试验的最小电压应为最大充电电压的 1.2 倍。 3) Tests are to be conducted at ambient temperature $20\pm5^{\circ}\text{C}$, The duration of the test shall be 24 hours. 试验应在环境温度 ($20\pm5^{\circ}\text{C}$) 下进行。进行试验的时间应为 24 小时。 Requirements 标准要求: No disassembly and no fire during the test and within seven days after the test. 试验过程中和试验后 7 天内无解体, 无起火。	--	N/A 不适用
38.3.4.8	Test 8: Forced discharge 检测 8: 强制放电 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. 每个电池应在环境温度 ($20\pm5^{\circ}\text{C}$) 下与 12V 直流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。 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 shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere). 将适当大小和额定值的电阻负荷与试验电池串联, 计算得出给定的放电电流。对每个电池进行强制放电, 放电时间(小时)应等于其额定容量除以初始试验电流(安培)。 Requirements 标准要求: No disassembly and no fire during the test and within seven days after the test. 试验过程中和试验后 7 天内无解体, 无起火。	Test Samples: No leakage, no venting, no disassembly, no rupture and no fire. 样品: 无渗漏、无排气、无解体、无破裂以及无起火现象。 The data is shown in Test Table T.8 数据见表 T.8	Pass 合格

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General terms and definitions 一般术语与定义

Table 38.3.1: Mass loss limit

表 38.3.1: 质量损失限值

Mass M of cell or battery 电池或电池组质量 M	Mass loss limit 质量损失限值
$M < 1 \text{ g}$	0.5%
$1 \text{ g} \leq M \leq 75 \text{ g}$	0.2%
$M > 75 \text{ g}$	0.1%

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

$$\text{Mass loss (\%)} = (M_1 - M_2)/M_1 \times 100$$

质量损失的量化值，可用以下公式计算：

$$\text{质量损失(\%)} = (M_1 - M_2)/M_1 \times 100$$

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 38.3.1, 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表 38.3.1 所列的数值，应视为“无质量损失”。

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 38.3.1.

渗漏是指可以看到的电解液或者其他物质从电池或电池组中漏出，或电池或电池组中的物质损失（不包括电池外壳、搬运装置、或标签），质量损失超过表 38.3.1 所列的数值。

Venting means the release of excessive internal pressure from a cell or battery in a manner intended by design to preclude rupture or disassembly.

排气是指按设计方式释放电池或电池组内部过高的压力，防止其破裂或解体。

Disassembly means a vent or rupture where solid matter from any part of a cell or battery penetrates a wire mesh screen (annealed aluminium wire with a diameter of 0.25 mm and grid density of 6 to 7 wires per cm) placed 25 cm away from the cell or battery.

解体是指排气或破裂使电池或电池组任何部分的固体物质穿过放在离电池或电池 25 cm 处的丝网筛（直径 0.25 mm 的软铝丝，网格密度每厘米 6 至 7 条铝丝）。

Rupture means the mechanical failure of a cell container or battery case induced by an internal or external cause, resulting in exposure or spillage but not ejection of solid materials.

破裂是指内部或外部原因引起的电池容器或电池组外壳机械损坏，造成内装物暴露或溢出，但无固体喷射。

Fire means that flames are emitted from the test cell or battery.

起火是指试验电池或电池组有火焰冒出。

Test Data 检测数据

Table T.1 Altitude simulation (表 T.1) 高度模拟

Sample No. 样品编号	Before Mass 测试前 样品质量 (g)	Before Voltage 测试前 开路电压 (V)	After Mass 测试后 样品质量 (g)	After Voltage 测试后 开路电压 (V)	Mass Loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test Result 测试结果
C01	14.851	4.18	14.851	4.18	0.000	100.00	Pass/合格
C02	14.825	4.17	14.824	4.17	0.007	100.00	Pass/合格
C03	14.843	4.18	14.843	4.17	0.000	99.76	Pass/合格
C04	14.839	4.18	14.839	4.18	0.000	100.00	Pass/合格
C05	14.827	4.17	14.827	4.17	0.000	100.00	Pass/合格
C06	14.817	4.16	14.816	4.16	0.007	100.00	Pass/合格
C07	14.811	4.18	14.811	4.18	0.000	100.00	Pass/合格
C08	14.808	4.17	14.808	4.17	0.000	100.00	Pass/合格
C09	14.847	4.18	14.846	4.17	0.007	99.76	Pass/合格
C10	14.833	4.18	14.833	4.18	0.000	100.00	Pass/合格

Notes 注释:

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 检测后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

Table T.2 Thermal test (表 T.2) 温度试验

Sample No. 样品编号	Before Mass 测试前 样品质量 (g)	Before Voltage 测试前 开路电压 (V)	After Mass 测试后 样品质量 (g)	After Voltage 测试后 开路电压 (V)	Mass Loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test Result 测试结果
C01	14.851	4.18	14.847	4.14	0.027	99.04	Pass/合格
C02	14.824	4.17	14.821	4.13	0.020	99.04	Pass/合格
C03	14.843	4.17	14.841	4.14	0.013	99.28	Pass/合格
C04	14.839	4.18	14.835	4.13	0.027	98.80	Pass/合格
C05	14.827	4.17	14.822	4.13	0.034	99.04	Pass/合格
C06	14.816	4.16	14.813	4.12	0.020	99.04	Pass/合格
C07	14.811	4.18	14.809	4.13	0.014	98.80	Pass/合格
C08	14.808	4.17	14.804	4.14	0.027	99.28	Pass/合格
C09	14.846	4.17	14.841	4.14	0.034	99.28	Pass/合格
C10	14.833	4.18	14.830	4.13	0.020	98.80	Pass/合格

Notes 注释:

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 检测后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

Table T.3 Vibration (表 T.3) 振动

Sample No. 样品编号	Before Mass 测试前 样品质量 (g)	Before Voltage 测试前 开路电压 (V)	After Mass 测试后 样品质量 (g)	After Voltage 测试后 开路电压 (V)	Mass Loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test Result 测试结果
C01	14.847	4.14	14.847	4.13	0.000	99.76	Pass/合格
C02	14.821	4.13	14.821	4.13	0.000	100.00	Pass/合格
C03	14.841	4.14	14.840	4.14	0.007	100.00	Pass/合格
C04	14.835	4.13	14.835	4.13	0.000	100.00	Pass/合格
C05	14.822	4.13	14.822	4.13	0.000	100.00	Pass/合格
C06	14.813	4.12	14.813	4.12	0.000	100.00	Pass/合格
C07	14.809	4.13	14.809	4.12	0.000	99.76	Pass/合格
C08	14.804	4.14	14.804	4.14	0.000	100.00	Pass/合格
C09	14.841	4.14	14.840	4.14	0.007	100.00	Pass/合格
C10	14.830	4.13	14.830	4.13	0.000	100.00	Pass/合格

Notes 注释:

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 检测后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

Table T.4 Shock (表 T.4) 冲击

Sample No. 样品编号	Before Mass 测试前 样品质量 (g)	Before Voltage 测试前 开路电压 (V)	After Mass 测试后 样品质量 (g)	After Voltage 测试后 开路电压 (V)	Mass Loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test Result 测试结果
C01	14.847	4.13	14.847	4.13	0.000	100.00	Pass/合格
C02	14.821	4.13	14.821	4.12	0.000	99.76	Pass/合格
C03	14.840	4.14	14.840	4.14	0.000	100.00	Pass/合格
C04	14.835	4.13	14.834	4.13	0.007	100.00	Pass/合格
C05	14.822	4.13	14.822	4.13	0.000	100.00	Pass/合格
C06	14.813	4.12	14.813	4.12	0.000	100.00	Pass/合格
C07	14.809	4.12	14.809	4.12	0.000	100.00	Pass/合格
C08	14.804	4.14	14.804	4.13	0.000	99.76	Pass/合格
C09	14.840	4.14	14.840	4.14	0.000	100.00	Pass/合格
C10	14.830	4.13	14.829	4.13	0.007	100.00	Pass/合格

Notes 注释:

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 检测后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

Table T.5 External short circuit (表 T.5) 外部短路

Sample No. 样品编号	Max. External Temperature 样品表面最高温度(°C)	Test Result 测试结果
C01	88.4	Pass/合格
C02	91.2	Pass/合格
C03	95.6	Pass/合格
C04	94.3	Pass/合格
C05	92.5	Pass/合格
C06	90.4	Pass/合格
C07	89.6	Pass/合格
C08	93.6	Pass/合格
C09	96.1	Pass/合格
C10	92.3	Pass/合格

Notes 注释:

Test sample 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.

检测样品表面温度不超过 170 °C，检测中与检测后 6 小时内无解体、无破裂、无起火。

Table T.6 Crush (表 T.6) 挤压

Sample No. 样品编号	Max. External Temperature 样品表面最高温度(°C)	Test Result 测试结果
C11	24.5	Pass/合格
C12	24.2	Pass/合格
C13	24.3	Pass/合格
C14	24.6	Pass/合格
C15	24.4	Pass/合格
C16	24.5	Pass/合格
C17	24.2	Pass/合格
C18	24.4	Pass/合格
C19	24.3	Pass/合格
C20	24.6	Pass/合格

Notes 注释:

Test sample 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.

检测样品表面温度不超过 170 °C，检测中与检测后 6 小时内无解体、无破裂、无起火。

Table T.7 Overcharge (表 T.7) 过度充电
Not applicable 不适用

Table T.8 Forced discharge (表 T.8) 强制放电

Sample No. 样品编号	Test Result 测试结果	Sample No. 样品编号	Test Result 测试结果
C21	Pass/合格	C31	Pass/合格
C22	Pass/合格	C32	Pass/合格
C23	Pass/合格	C33	Pass/合格
C24	Pass/合格	C34	Pass/合格
C25	Pass/合格	C35	Pass/合格
C26	Pass/合格	C36	Pass/合格
C27	Pass/合格	C37	Pass/合格
C28	Pass/合格	C38	Pass/合格
C29	Pass/合格	C39	Pass/合格
C30	Pass/合格	C40	Pass/合格

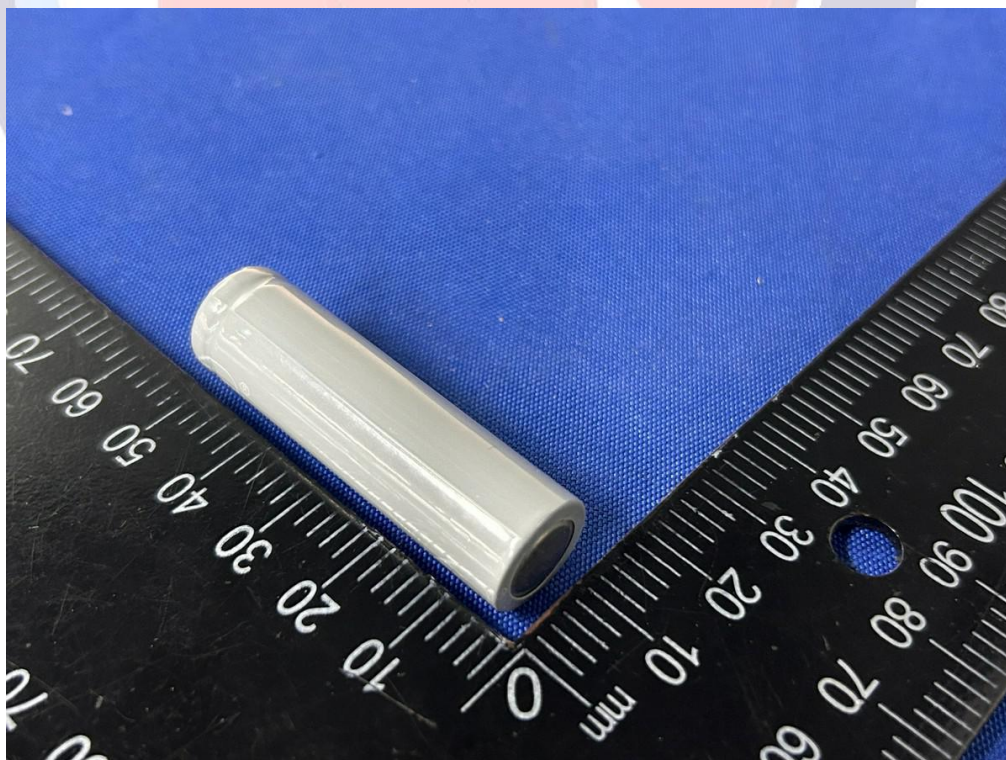
Notes 注释:

There is no disassembly and no fire during the test and within seven days after the test.
样品在检测中和检测后 7 天内无解体、无起火。

Photos of Samples 样品照片



Picture 1. Front view of cell
图片 1. 电池前视图



Picture 2. Back view of cell
图片 2. 电池后视图

Important 注意事项

1. The test report is invalid if it is not affixed the official seal of the laboratory to it.
检测报告无本实验室公章（或检验检测专用章）无效。
2. Copies of the test report without the official seal of the laboratory are invalid.
复制检测报告未重新加盖本实验室公章(或检验检测专用章)无效。
3. It is forbidden to copy the test report partially without the written approval of the laboratory.
未经本实验室书面批准不得部分复制检测报告。
4. The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.
检测报告无检测、审核、批准人签名无效。
5. The test report is invalid if it is blotted out.
检测报告涂改无效。
6. Objections to the test report must be submitted to CMC Testing International (Shenzhen) Co., Ltd. within 15 days.
对检测报告若有异议，应于收到报告之日起十五天内向众检检验认证（深圳）有限公司提出。
7. The test report is valid for the tested samples only.
本检测报告仅对检测样品负责。
8. As for the Verdict, "--" means "no need for judgment", "P" means "pass", "F" means "fail" and "N/A" means "not applicable".
判定栏中 "--" 表示 "不需要判定", "P" 表示 "通过", "F" 表示 "不通过", "N/A" 表示 "不适用"。

*** End of Report ***

*** 报告结束 ***

Testing laboratory: CMC Testing International (Shenzhen) Co., Ltd.

检测单位: 众检检验认证（深圳）有限公司

Address: 101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China

地址: 中国广东省深圳市宝安区福海街道和平社区荔园路恺辉茂工业园厂房 B 栋 101、104

Tel (电话): 400-1668-320

Email: info@cmczj-lab.com

<http://www.cmczj-lab.com>

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检测
TESTING
CNAS L9291

编号 No.: DSP24120434-2

UN38.3 测试报告

UN38.3 Test Report

样 品 名 称 : 锂离子电池
3.7V 800mAh 2.96Wh

Sample name : Li-ion Battery
3.7V 800mAh 2.96Wh

型号 Model : 18650

委 托 单 位 :

Consignor :



东莞市中认联科检测技术有限公司
Dongguan ZRLK Testing Technology Co., Ltd.

东莞市中认联科检测技术有限公司
Dongguan ZRLK Testing Technology Co., Ltd.
广东省东莞市松山湖园区科技十路 1 号 2 栋
Building 2, No.1, Technology 10th Road, Songshan Lake Park, Dongguan, Guangdong, China

TRF_UN38.3_Rev.7+A1_01

Tel: +86-769-26621775
Web: www.zrklab.com
E-mail: Marketing@zrklab.com



第 1 页,共 16 页

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编号 No.: DSP24120434-2

委托单位信息 Consignor information	名称 Name	
	地址 Address	
制造商信息 Manufacturer information	名称 Name	
	地址 Address	
	电话 Phone number	
	邮箱地址 Email address	
	网址 Website	
工厂信息 Factory information	名称 Name	
	地址 Address	
	电话 Phone number	
	邮箱地址 Email address	
	网址 Website	
(电芯) 制造商信息 (Cell) Manufacturer information	名称 Name	
	地址 Address	
	电话 Phone number	
	邮箱地址 Email address	
	网址 Website	

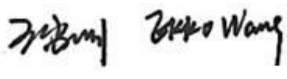


编号 No.: DSP24120434-2

样品描述及说明 General product information			
样品类型(是否可充电) Sample Type(Rechargeable or not)	☒ 是/Yes		☐ 否/No
样品信息 Sample information:			
产品名称 Product Name	锂离子电池 Li-ion Battery	型号 Model	18650
商标 Trade mark	无 N/A	样品编号 Sample No.	B1#~B18# C1#~C30#
标称电压 Nominal Voltage	3.7V	额定容量 Rated Capacity	800mAh
额定能量 Rated Energy	2.96Wh	充电截止电压 Charge Cut-off Voltage	4.2V
最大充电电流 Max. Charging Current	800mA	标准充电电流 Standard Charging Current	160mA
充电截止电流 Charge Cut-off Current	16mA	放电终止电压 Discharge Cut-off Voltage	2.75V
最大放电电流 Max. Discharging Current	800mA	标准放电电流 Standard Discharging Current	160mA
形状 Shape	圆柱体 Cylinder	尺寸 Size	Φ18.4*65.8mm
样品质量 Sample Mass	29.9g	串并联方式 Connection composition of series-parallel	1S1P
电芯信息 Cell information:			
电芯型号 Cell Model	18650	标称电压 Nominal Voltage	3.7V
额定容量 Rated Capacity	800mAh	最大放电电流 Max. Discharging Current	800mA



编号 No.: DSP24120434-2

样品接收日期 Accepted date	2024-11-18	测试起始日期 Test date	2024-11-18 ~ 2024-12-09
测试方法 和判定标准 Test method and criterion	联合国《试验和标准手册》(第7版 修订1) 38.3 节 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsection 38.3		
测试项目 Test items	高度模拟、温度试验、振动、冲击、外部短路、重物冲击、过度充电、强制放电 Altitude simulation, Thermal test, Vibration, Shock, External short circuit, Impact, Overcharge, Forced discharge.		
测试结论 Conclusion	经测试, 该样品符合联合国《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, 38.3 标准要求。 The sample has passed the test items of UNITED NATIONS "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1, 38.3. 签发日期(Issue date): 2024-12-09		
备注 Remark	--		
主检(职位) Tested by: (Position)	黄嘉杰 Vincent Huang (Test Engineer)		东莞市中认联科检测技术有限公司 Dongguan ZRLK Testing Technology Co., Ltd.
审核(职位) Checker: (Position)	王盛明 Ekko Wang (Item Engineer)		
批准(职位) Approver: (Position)	马孝琴 Ailis Ma (Approved by)		



编号 No.: DSP24120434-2

序号 No.	测试项目名称 Name of test	标准要求或标准条款号 Standard requirement or the clause number of standard	测试结果 Test result	本项结论 Test conclusion	备注 Remarks
1	高度模拟 Altitude simulation	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.1 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.1	见附表 1 See Appendix 1	合格 Passed	/
2	温度试验 Thermal test	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.2 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.2	见附表 2 See Appendix 2	合格 Passed	/
3	振动 Vibration	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.3 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.3	见附表 3 See Appendix 3	合格 Passed	/
4	冲击 Shock	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.4 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.4	见附表 4 See Appendix 4	合格 Passed	/
5	外部短路 External short-circuit	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.5 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.5	见附表 5 See Appendix 5	合格 Passed	/
6	重物冲击 Impact	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.6 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.6	见附表 6 See Appendix 6	合格 Passed	/
7	过度充电 Overcharge	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.7 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.7	见附表 7 See Appendix 7	合格 Passed	/
8	强制放电 Forced discharge	联合国《试验和标准手册》(第7版 修订 1) 38.3 节试验 T.8 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend.1/Subsecti on 38.3 Test T.8	见附表 8 See Appendix 8	合格 Passed	/
测试环境条件 Test environment condition		环境温度: 20℃ - 25℃; 环境湿度: 45% - 75% Ambient temperature: 20℃ - 25℃, Ambient humidity: 45% - 75%			



Procedure 说明

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 至 T.8 用没有进行其他试验的电芯。试验 T7 可以使用原先在试验 T1 至 T5 中使用过的未损坏的电池进行，以便测试交替充电放电的电池。

Single cell batteries of B1#~B5#, B11#~B14# are full charged after one cycle;

Single cell batteries of B6#~B10#, B15#~B18# are full charged after twenty-five cycles;

Rechargeable cells of C1#~C5# are 50% charged after one cycle;

Rechargeable cells of C6#~C10# are 50% charged after twenty-five cycles;

Rechargeable cells of C11#~C20# are full discharged after one cycle;

Rechargeable cells of C21#~C30# are full discharged after twenty-five cycles;

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

单电芯电池 B1#~B5#, B11#~B14#为 1 次循环满电状态;

单电芯电池 B6#~B10#, B15#~B18#为 25 次循环满电状态;

可充电电芯 C1#~C5#为 1 次循环后 50%充电状态;

可充电电芯 C6#~C10#为 25 次循环后 50%充电状态;

可充电电芯 C11#~C20#为 1 次循环完全放电状态;

可充电电芯 C21#~C30#为 25 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%



编号 No.: DSP24120434-2

附 表 1

Appendix 1

序号 No.	1	测试项目名称 Name of Test Items	高度模拟 Altitude simulation					
样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result	
	电池质量 m ₁ (g)	开路电压 V ₁ (V)	电池质量 m ₂ (g)	开路电压 V ₂ (V)				
B01	29.6376	4.185	29.6372	4.182	0.00	99.9	O	
B02	29.8815	4.186	29.8797	4.183	0.01	99.9	O	
B03	29.4718	4.192	29.4715	4.191	0.00	100.0	O	
B04	29.8500	4.186	29.8480	4.184	0.01	100.0	O	
B05	29.3977	4.187	29.3962	4.185	0.01	100.0	O	
B06	29.3005	4.183	29.2976	4.180	0.01	99.9	O	
B07	29.4481	4.183	29.4453	4.181	0.01	100.0	O	
B08	29.5781	4.191	29.5772	4.187	0.00	99.9	O	
B09	29.9018	4.189	29.9005	4.188	0.00	100.0	O	
B10	29.8112	4.184	29.8106	4.181	0.00	99.9	O	
No. B01-B05: 编号 B01-B05:	At first cycle, in fully charged states 第 1 个充电周期, 完全充电状态							
No. B06-B10: 编号 B06-B10:	After 25 cycles ending in fully charged states 第 25 个充电周期, 完全充电状态							
注: L-泄露; V-排气; D-解体; R-破裂; F-起火; O-无泄露、无排气、无解体、无破裂、无起火。 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage, no venting, no disassembly, no rupture & no fire								



编号 No.: DSP24120434-2

附 表 2

Appendix 2

序号 No.	2	测试项目名称 Name of Test Items	温度试验 Thermal test				
样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result
	电池质量 m ₁ (g)	开路电压 V ₁ (V)	电池质量 m ₂ (g)	开路电压 V ₂ (V)			
B01	29.6372	4.182	29.6239	4.121	0.05	98.5	O
B02	29.8797	4.183	29.8643	4.120	0.05	98.5	O
B03	29.4715	4.191	29.4555	4.133	0.05	98.6	O
B04	29.8480	4.184	29.8318	4.127	0.05	98.6	O
B05	29.3962	4.185	29.3793	4.133	0.06	98.8	O
B06	29.2976	4.180	29.2815	4.130	0.06	98.8	O
B07	29.4453	4.181	29.4277	4.123	0.06	98.6	O
B08	29.5772	4.187	29.5618	4.133	0.05	98.7	O
B09	29.9005	4.188	29.8812	4.133	0.07	98.7	O
B10	29.8106	4.181	29.7923	4.125	0.06	98.7	O
No. B01-B05: 编号 B01-B05:	At first cycle, in fully charged states 第 1 个充电周期, 完全充电状态						
No. B06-B10: 编号 B06-B10:	After 25 cycles ending in fully charged states 第 25 个充电周期, 完全充电状态						
注: L-泄露; V-排气; D-解体; R-破裂; F-起火; O-无泄露、无排气、无解体、无破裂、无起火。 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage, no venting, no disassembly, no rupture & no fire							

附表 3

Appendix 3

序号 No.	3	测试项目名称 Name of Test Items		振动 Vibration				
样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result	
	电池质量 m ₁ (g)	开路电压 V ₁ (V)	电池质量 m ₂ (g)	开路电压 V ₂ (V)				
B01	29.6239	4.121	29.6192	4.115	0.02	99.9	O	
B02	29.8643	4.120	29.8597	4.112	0.02	99.8	O	
B03	29.4555	4.133	29.4511	4.125	0.02	99.8	O	
B04	29.8318	4.127	29.8270	4.122	0.02	99.9	O	
B05	29.3793	4.133	29.3753	4.125	0.01	99.8	O	
B06	29.2815	4.130	29.2785	4.123	0.01	99.8	O	
B07	29.4277	4.123	29.4245	4.116	0.01	99.8	O	
B08	29.5618	4.133	29.5564	4.127	0.02	99.9	O	
B09	29.8812	4.133	29.8758	4.128	0.02	99.9	O	
B10	29.7923	4.125	29.7885	4.117	0.01	99.8	O	
No. B01-B05: 编号 B01-B05:	At first cycle, in fully charged states 第 1 个充电周期, 完全充电状态							
No. B06-B10: 编号 B06-B10:	After 25 cycles ending in fully charged states 第 25 个充电周期, 完全充电状态							
注: L-泄露; V-排气; D-解体; R-破裂; F-起火; O-无泄露、无排气、无解体、无破裂、无起火。 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage, no venting, no disassembly, no rupture & no fire								



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附表 4
Appendix 4

Appendix 1

序号 No.	4	测试项目名称 Name of Test Items	冲击 Shock				
样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result
	电池质量 m ₁ (g)	开路电压 V ₁ (V)	电池质量 m ₂ (g)	开路电压 V ₂ (V)			
B01	29.6192	4.115	29.6184	4.112	0.00	99.9	O
B02	29.8597	4.112	29.8589	4.108	0.00	99.9	O
B03	29.4511	4.125	29.4501	4.125	0.00	100.0	O
B04	29.8270	4.122	29.8268	4.119	0.00	99.9	O
B05	29.3753	4.125	29.3751	4.122	0.00	99.9	O
B06	29.2785	4.123	29.2781	4.121	0.00	100.0	O
B07	29.4245	4.116	29.4222	4.113	0.01	99.9	O
B08	29.5564	4.127	29.5537	4.125	0.01	100.0	O
B09	29.8758	4.128	29.8748	4.126	0.00	100.0	O
B10	29.7885	4.117	29.7856	4.113	0.01	99.9	O
No. B01-B05: 编号 B01-B05:	At first cycle, in fully charged states 第 1 个充电周期, 完全充电状态						
No. B06-B10: 编号 B06-B10:	After 25 cycles ending in fully charged states 第 25 个充电周期, 完全充电状态						
注: L-泄露; V-排气; D-解体; R-破裂; F-起火; O-无泄露、无排气、无解体、无破裂、无起火。 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage, no venting, no disassembly, no rupture & no fire							



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附表 5

Appendix 5

序号 No.	5	测试项目名称 Name of Test Items	外部短路 External short circuit	
样品编号 Sample No.		样品表面最高温度 Max. External Temperature (℃)	测试结果 Test result	备注 Remark
B01		57.2	O	/
B02		57.6	O	/
B03		58.3	O	/
B04		58.0	O	/
B05		57.0	O	/
B06		58.2	O	/
B07		58.1	O	/
B08		57.8	O	/
B09		57.6	O	/
B10		58.3	O	/
No. B01-B05: 编号 B01-B05:		At first cycle, in fully charged states 第 1 个充电周期, 完全充电状态		
No. B06-B10: 编号 B06-B10:		After 25 cycles ending in fully charged states 第 25 个充电周期, 完全充电状态		
注: D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。 Note: D-Disassembly, R-Rupture, F-Fire, O-No disassembly, no rupture & no fire				

附表 6

Appendix 6

序号 No.	6	测试项目名称 Name of Test Items	重物冲击 Impact	
样品编号 Sample No.		样品表面最高温度 Max. External Temperature (℃)	测试结果 Test result	备注 Remark
C01		99.0	O	/
C02		92.1	O	/
C03		101.4	O	/
C04		94.0	O	/
C05		110.2	O	/
C06		102.7	O	/
C07		102.0	O	/
C08		98.7	O	/
C09		101.8	O	/
C10		103.1	O	/
No. C01-C05: 编号 C01-C05:		At first cycle at 50% of the design rated capacity 第 1 个充放电周期 50%设计额定容量状态		
No. C06-C10: 编号 C06-C10:		After 25 cycle at 50% of the design rated capacity 第 25 个充放电周期 50%设计额定容量状态		
注: D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。 Note: D-Disassembly, R-Rupture, F-Fire, O-No disassembly, no rupture & no fire				



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附表 7
Appendix 7

序号 No.	7	测试项目名称 Name of Test Items	过度充电 Overcharge
样品编号 Sample No		测试结果 Test result	备注 Remark
B11		O	/
B12		O	/
B13		O	/
B14		O	/
B15		O	/
B16		O	/
B17		O	/
B18		O	/
No. B11-B14: 编号 B11-B14:		At first cycle, in fully charged states 第 1 个充电周期，完全充电状态	
No. B15-B18: 编号 B15-B18:		After 25 cycles ending in fully charged states 第 25 个充电周期，完全充电状态	
注： D-解体； F-起火； O-无解体、无起火。 Note: D-Disassembly, F-Fire, O-No disassembly & no fire			

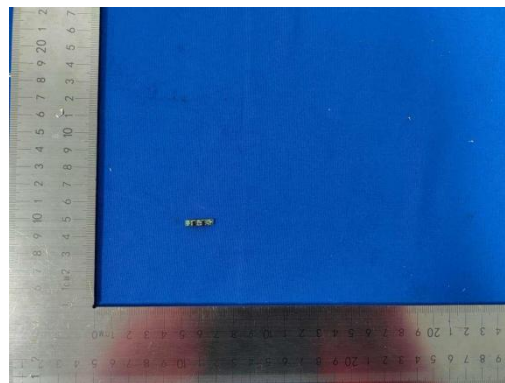
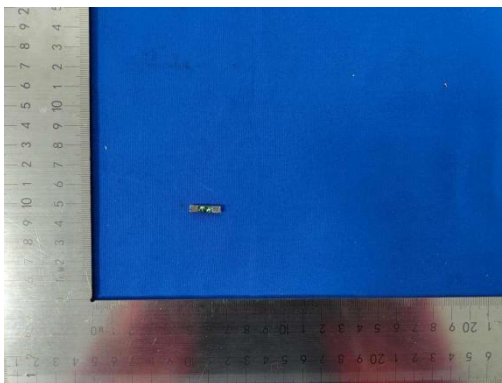
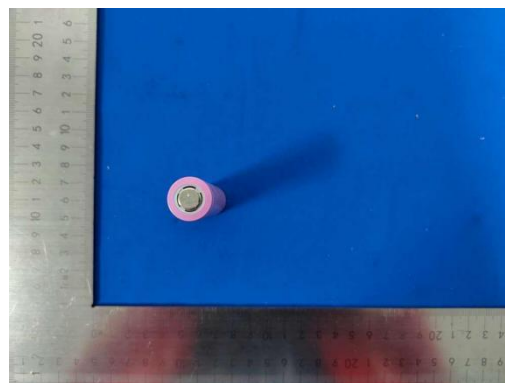
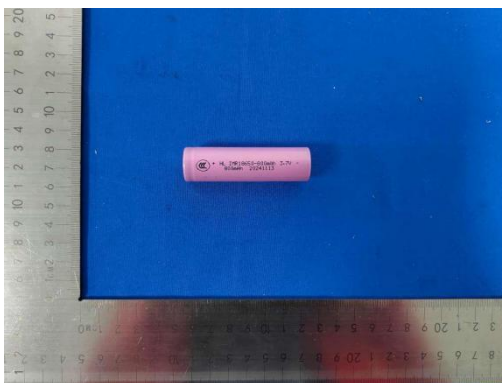
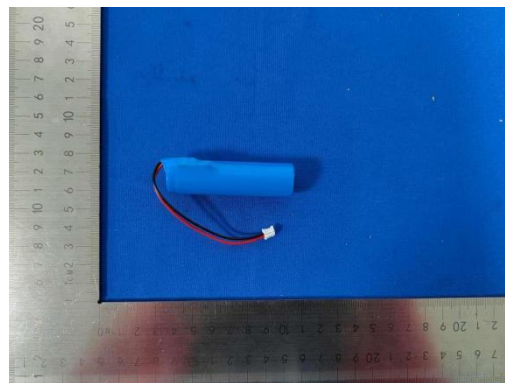
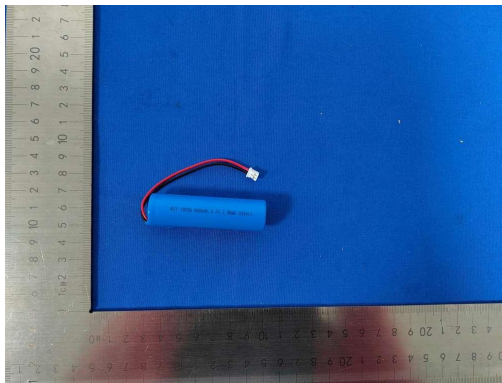


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附表 8
Appendix 8

序号 No.	8	测试项目名称 Name of Test Items	强制放电 Forced discharge
样品编号 Sample No		测试结果 Test result	备注 Remark
C11		O	/
C12		O	/
C13		O	/
C14		O	/
C15		O	/
C16		O	/
C17		O	/
C18		O	/
C19		O	/
C20		O	/
C21		O	/
C22		O	/
C23		O	/
C24		O	/
C25		O	/
C26		O	/
C27		O	/
C28		O	/
C29		O	/
C30		O	/
No. C11-C20: 编号 C11-C20:		At first cycle in fully discharged states 第 1 个充放电周期，完全放电状态	
No. C21-C30: 编号 C21-C30:		After 25 cycles ending in fully discharged states 第 25 个充放电周期，完全放电状态	
注： D-解体； F-起火； O-无解体、无起火。 Note: D-Disassembly, F-Fire, O-No disassembly & no fire			

样品照片 Sample photo



***** The end *****



注意事项 Important Notice

1. 本报告无 ZRLK 盖章无效。
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The test report is invalid without the signatures of Approver, Checker and Compiler.
4. 客户必须如实提供样品及资料，并保证申报品名和样品以及运输货物相同，否则本检测单位不承担任何相关责任。
The client should provide samples and relevant data, at the same time, they should guarantee the consistence of the product's name the declared, the samples they provided and the goods to be transported. Otherwise we will not bear any relevant responsibilities.
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The test report is invalid if altered.
6. 对检验报告若有异议，应于收到报告之日起十五天内向检验单位提出。
Objection to the test report must be submitted to ZRLK within 15 days.
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ZRLK's liability under no circumstance will exceed the testing fee received from applicant for test conducted hereof this testing report.
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