

UN38.3检测报告

(UN38.3 Test report)

报告编号 : MTi251222036-0305B1

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委托单位 : 深圳零零无限科技有限公司

(Applicant) Shenzhen Zero Zero Infinity Technology
Co., Ltd.

产品名称 : 可充电锂离子电池组

(Product Name) Rechargeable lithium ion Battery

检测类别 : 委托检测

(Test Type) (Commissioned Inspection)

深圳市微测检测有限公司
(Shenzhen Microtest Co., Ltd.)

UNITED NATIONS “Manual of Tests and Criteria” (ST/SG/AC.10/11/Rev.8 Section 38.3) 联合国《试验和标准手册》第八修订版 第 38.3 节		
Applicant..... 委托单位	Shenzhen Zero Zero Infinity Technology Co., Ltd. 深圳零零无限科技有限公司	
Applicant's Address..... 委托地址	4th Floor, Qianhai E-metro Tower, Shenzhen-Hong Kong Cooperation Zone, Shenzhen, China 深圳市前海深港合作区南山街道港城街99号深国际前海颐都大厦塔楼401、402	
Product Name..... 产品名称	Rechargeable lithium ion Battery 可充电锂离子电池组	
Trade Mark..... 商标	--	
Model..... 型号	M782555	
Manufacturer..... 制造商	Jiangxi Mic-power New Energy Co., Ltd. 江西微电新能源有限公司	
Manufacturer's Address..... 制造商地址	Plants 2, 3 and 4, Block 2, No. 3, Chetou Avenue, Chancheng New District, Anyuan County, Ganzhou City, Jiangxi Province, P.R. China. 中国江西省赣州市安远县产城新区车头大道 3 号第二地块 2 栋、3 栋、4 栋厂房	
Testing Laboratory..... 测试实验室	Shenzhen Microtest Co., Ltd. 深圳市微测检测有限公司 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China. 广东省深圳市宝安区福海街道新和社区福海大道新兴工业园二区7号101	
Received Date..... 接收日期	2026-01-04	
Tested Date..... 测试日期	2026-01-04 to 2026-01-21	
Test method and criterion / 测试方法和判定标准: UNITED NATIONS “Manual of Tests and Criteria” (ST/SG/AC.10/11/Rev.8 Section 38.3) 联合国《试验和标准手册》第八修订版 第 38.3 节		
Test result: Pass 试验结果: 通过		
编制(Prepared by):	韦乾梨	
审核(Reviewed by):	董 圆	
批准(Approved by):	连 平	

I、Sample Information 样品信息

Rechargeable lithium ion Battery 可充电锂离子电池组			
Sample Model 样品型号	M782555	Rated Capacity/Energy 额定容量/能量	1550mAh/5.968Wh
Dimension	Max (L:57.3mm * W:25.3mm * T:8.25mm)		
Standard Charge Current 标准充电电流	310mA	Maximum Charge Current 最大充电电流	1550mA
Standard Discharge Current 标准放电电流	310mA	Maximum Discharge Current 最大放电电流	1550mA
Limited charging voltage 充电限制电压	4.4V	End of discharge voltage 放电终止电压	3.0V
Cell Number 内含电芯数量	1PCS	Nominal Voltage 标称电压	3.85V
Cell 电芯			
Sample Model 样品型号	M782555	Rated Capacity/Energy 额定容量/能量	1550mAh/5.968Wh
Nominal Voltage 标称电压	3.85V	Cell Shape 电芯形状	Prismatic 棱形
Standard Charge Current 标准充电电流	310mA	Maximum Charge Current 最大充电电流	1550mA
Standard Discharge Current 标准放电电流	310mA	Maximum Discharge Current 最大放电电流	1550mA
Limited charging voltage 充电限制电压	4.4V	End of discharge voltage 放电终止电压	3.0V

II、Conclusion 总结

Standard 标准	Item 项目	Sample number 样品号	Verdict 结论
UNITED NATIONS “Manual of Tests and Criteria” (ST/SG/AC.10/11/Rev.8 Section 38.3) 联合国《试验和标准手册》第八修订版 第 38.3 节	Altitude simulation 高度模拟	B1-B5, B6-B10	PASS 合格
	Thermal test 温度试验		PASS 合格
	Vibration 振动		PASS 合格
	Shock 机械冲击		PASS 合格
	External short circuit 外部短路		PASS 合格
	Impact/Crush 撞击/挤压	C1-C5, C6-C10	PASS 合格
	Overcharge 过度充电	B11-B14, B15-B18	PASS 合格
	Forced discharge 强制放电	C11-C20, C21-C30	PASS 合格
Possible test case Verdicts: 报告中可能用到的结果标识:			
Test case does not apply to the test object.....: 测试项目不适用于该产品:		N/A 不适用	
Test item does meet the requirement.....: 测试项目符合标准的要求		P(ass) 合格	
Test item does not meet the requirement.....: 测试项目不符合标准的要求		F(ail) 不合格	

III、Test Method and Data 测试方法和数据

1. Each battery type is subjected to tests T.1 to T.8. Tests T.1 to T.5 are conducted in sequence on the same battery. Tests 6 and 8 are conducted using not otherwise tested batteries. 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.

每一种类型的电池均应进行T.1至T.8项试验。电池必须按顺序在相同的一组电池上进行试验T.1至T.5。试验T.6和T.8应使用未另外试验过的电池。试验T.7可以使用先前在试验T.1至T.5中使用过的未损坏电池进行,以便测试进行在循环过的电池上。

2. In order to quantify the mass loss, the following procedure is provided: $\text{Mass loss(\%)} = (M1 - M2) / M1 \times 100$

为了量化质量损失,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 is 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 电池或电池组质量	Mass lost limite 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%

3. In test T.1 to T.4, 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 battery after testing is not less than 90% of its voltage immediately prior to this procedure.

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%。

Test T.1: Altitude simulation 高度模拟

(1) Test procedure 试验过程

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.

试验的电芯或电池应在11.6kPa或更少的气压下存放至少6小时，温度控制在(20±5)°C

(2) 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.

电芯或电池应满足以下要求：无漏液、无排气、无分解、无破裂以及无着火现象的发生。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电状态的电池和电芯。

Data 数据如下表：

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失(%)	Voltage after test/ Voltage pre- test 试验后电压/试验 前电压(%)	Verdict 结论
	Mass 质量(g)	Voltage 电压(V)	Mass 质量(g)	Voltage 电压(V)			
B1	22.595	4.38	22.595	4.38	0.000	100.00	PASS/合格
B2	23.222	4.38	23.222	4.38	0.000	100.00	PASS/合格
B3	22.639	4.38	22.639	4.37	0.000	99.77	PASS/合格
B4	22.644	4.37	22.644	4.37	0.000	100.00	PASS/合格
B5	22.641	4.37	22.641	4.37	0.000	100.00	PASS/合格
B6	22.651	4.38	22.651	4.38	0.000	100.00	PASS/合格
B7	23.154	4.38	23.153	4.38	0.004	100.00	PASS/合格
B8	22.512	4.37	22.512	4.37	0.000	100.00	PASS/合格
B9	22.856	4.38	22.856	4.38	0.000	100.00	PASS/合格
B10	23.168	4.37	23.168	4.37	0.000	100.00	PASS/合格

#: No leakage, No venting, No disassembly No rupture and no fire.

#: 无漏液、无排气、无分解、无破裂以及无着火现象。

No.B1 to B5 five batteries at first cycle, in fully charged state;

编号B1-B5 5个在第一个充放电周期后完全充电状态的电池；

No.B6 to B10 five batteries after 25 cycles, in fully charged state.

编号B6-B10 5个在第二十五个充放电周期后完全充电状态的电池。

Test T.2: Thermal test 温度试验

(1) Test procedure 试验过程

Test cells and batteries are to be stored for at least six hours at a test temperature equal to $(72 \pm 2)^{\circ}\text{C}$, 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.

试验电池和电池组在试验温度等于 $(72 \pm 2)^{\circ}\text{C}$ 下存放至少6小时,接着在试验温度等于 $(-40 \pm 2)^{\circ}\text{C}$ 下存放至少6小时。两个极端温度之间的最大时间间隔为30分钟。这一过程须重复10次,接着将所有电池在环境温度 $(20 \pm 5)^{\circ}\text{C}$ 下存放24小时。对于大型电池和电池组,暴露于极端试验温度的时间至少应为12小时。

(2) 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.

电芯或电池满足以下要求:无漏液、无排气、无分解、无破裂以及无着火现象的发生。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状态的电池和电芯。

Data 数据如下表:

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失(%)	Voltage after test/ Voltage pre- test 试验后电压/试验 前电压(%)	Verdict 结论
	Mass 质量(g)	Voltage 电压(V)	Mass 质量(g)	Voltage 电压(V)			
B1	22.595	4.38	22.592	4.36	0.013	99.54	PASS/合格
B2	23.222	4.38	23.220	4.36	0.009	99.54	PASS/合格
B3	22.639	4.37	22.637	4.36	0.009	99.77	PASS/合格
B4	22.644	4.37	22.643	4.36	0.004	99.77	PASS/合格
B5	22.641	4.37	22.640	4.36	0.004	99.77	PASS/合格
B6	22.651	4.38	22.650	4.36	0.004	99.54	PASS/合格
B7	23.153	4.38	23.152	4.37	0.004	99.77	PASS/合格
B8	22.512	4.37	22.510	4.34	0.009	99.31	PASS/合格
B9	22.856	4.38	22.853	4.37	0.013	99.77	PASS/合格
B10	23.168	4.37	23.166	4.35	0.009	99.54	PASS/合格

#: No leakage, No venting, No disassembly No rupture and no fire.

#: 无漏液、无排气、无分解、无破裂以及无着火现象。

No.B1 to B5 five batteries at first cycle, in fully charged state;

编号B1-B5 5个在第一个充放电周期后完全充电状态的电池;

No.B6 to B10 five batteries after 25 cycles, in fully charged state.

编号B6-B10 5个在第二十五个充放电周期后完全充电状态的电池。

Test T.3: Vibration 振动

(1) Test procedure 试验过程

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. / 电池和电池组紧固于振动机平台, 但紧固程度不能造成电池变形以致不能准确传递振动。振动应是正弦波形, 对数频率扫描从 7 赫兹到 200 赫兹, 再回到 7 赫兹, 跨度为 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。

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries). / 作对数式频率扫描, 对总质量不足 12 千克的电池和电池组(电池和小型电池组), 和对 12 千克及更大的电池组(大型电池组)应有所不同。

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. / 对电池和小型电池组: 从 7 赫兹开始, 保持 1 gn 的最大加速度, 直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米), 并增加频率直到最大加速度达到 8 gn(频率约为 50 赫兹)。将最大加速度保持在 8gn 直到频率增加到 200 赫兹。

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. / 对大型电池组: 从 7 赫兹开始, 保持 1 gn 的最大加速度, 直到频率达到 18 赫兹。然后将振幅保持在 0.8毫米(总偏移 1.6 毫米), 并增加频率直到最大加速度达到 2 gn(频率约为 25 赫兹)。将最大加速度保持在 2 gn 直到频率增加到 200 赫兹。

(2) 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 directly after testing in its third perpendicular mounting position 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.

电芯或电池满足以下要求: 无漏液、无排气、无分解、无破裂以及无着火现象的发生。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状态的电池和电芯。

Data 数据如下表:

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失(%)	Voltage after test/ Voltage pre- test 试验后电压/试验 前电压(%)	Verdict 结论
	Mass 质量(g)	Voltage 电压(V)	Mass 质量(g)	Voltage 电压(V)			
B1	22.592	4.36	22.592	4.36	0.000	100.00	PASS/合格
B2	23.220	4.36	23.220	4.35	0.000	99.77	PASS/合格
B3	22.637	4.36	22.637	4.36	0.000	100.00	PASS/合格
B4	22.643	4.36	22.642	4.36	0.004	100.00	PASS/合格
B5	22.640	4.36	22.640	4.36	0.000	100.00	PASS/合格
B6	22.650	4.36	22.648	4.36	0.009	100.00	PASS/合格
B7	23.152	4.37	23.152	4.36	0.000	99.77	PASS/合格
B8	22.510	4.34	22.509	4.34	0.004	100.00	PASS/合格
B9	22.853	4.37	22.853	4.37	0.000	100.00	PASS/合格
B10	23.166	4.35	23.165	4.35	0.004	100.00	PASS/合格

#: No leakage, No venting, No disassembly No rupture and no fire.

#: 无漏液、无排气、无分解、无破裂以及无着火现象。

No.B1 to B5 five batteries at first cycle, in fully charged state;

编号B1-B5 5个在第一个充放电周期后完全充电状态的电池;

No.B6 to B10 five batteries after 25 cycles, in fully charged state.

编号B6-B10 5个在第二十五个充放电周期后完全充电状态的电池。

Test T.4: Shock 机械冲击

(1) Test procedure 试验过程

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 or battery shall be subjected to a halfsine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. 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. However, large cells and large batteries shall be subjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds. Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.

以稳固的支架固定住每个电芯和电池样品的全部试验表面。对每个电芯或电池以峰值为150gn的半正弦的加速度冲击，脉冲持续6毫秒，大型电池和大型电池组须经受最大加速度50gn和脉冲持续时间11毫秒的半正弦波冲击。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。

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 gn or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ Whichever is smaller	6 ms
Large batteries	50 gn or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{30000}{mass^*}\right)}$ Whichever is smaller	11 ms

* Mass is expressed in kilograms.

(2) 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.

电芯或电池应满足以下要求：无漏液、无排气、无分解、无破裂以及无着火现象的发生。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芯。

Data 数据如下表：

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失(%)	Voltage after test/ Voltage pre- test 试验后电压/试验 前电压(%)	Verdict 结论
	Mass 质量(g)	Voltage 电压(V)	Mass 质量(g)	Voltage 电压(V)			
B1	22.592	4.36	22.592	4.36	0.000	100.00	PASS/合格
B2	23.220	4.35	23.220	4.35	0.000	100.00	PASS/合格
B3	22.637	4.36	22.637	4.35	0.000	99.77	PASS/合格
B4	22.642	4.36	22.642	4.36	0.000	100.00	PASS/合格
B5	22.640	4.36	22.639	4.36	0.004	100.00	PASS/合格
B6	22.648	4.36	22.648	4.36	0.000	100.00	PASS/合格
B7	23.152	4.36	23.152	4.36	0.000	100.00	PASS/合格
B8	22.509	4.34	22.508	4.34	0.004	100.00	PASS/合格
B9	22.853	4.37	22.853	4.37	0.000	100.00	PASS/合格
B10	23.165	4.35	23.165	4.35	0.000	100.00	PASS/合格

#: No leakage, No venting, No disassembly No rupture and no fire.

#: 无漏液、无排气、无分解、无破裂以及无着火现象。

No.B1 to B5 five batteries at first cycle, in fully charged state;

编号B1-B5 5个在第一个充放电周期后完全充电状态的电池；

No.B6 to B10 five batteries after 25 cycles, in fully charged state.

编号B6-B10 5个在第二十五个充放电周期后完全充电状态的电池。

Test T.5: External short circuit 外部短路

(1) Test procedure 试验过程

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches $(57\pm4)^{\circ}\text{C}$ and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at $(57\pm4)^{\circ}\text{C}$. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $(57\pm4)^{\circ}\text{C}$.

试验电芯和电池在 $(57\pm4)^{\circ}\text{C}$ 的环境温度下, 经受外部电阻小于0.1欧姆的短路试验, 短路时间持续到至少电芯或电池表面温度回复到 $(57\pm4)^{\circ}\text{C}$ 后1小时才结束。

(2) 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.

电芯或电池应满足以下要求: 在试验过程中以及试验后6个小时内不起火、不解体、无破裂、表面温度不超过 170°C 。

Data 数据如下表:

No. 编号	Peak temperature($^{\circ}\text{C}$) 表面最高温度	Verdict 结论
B1	57.3	PASS/合格
B2	58.2	PASS/合格
B3	57.8	PASS/合格
B4	58.0	PASS/合格
B5	58.5	PASS/合格
B6	57.4	PASS/合格
B7	58.1	PASS/合格
B8	57.3	PASS/合格
B9	58.8	PASS/合格
B10	57.9	PASS/合格

#: No leakage, No venting, No disassembly No rupture and no fire.

#: 无漏液、无排气、无分解、无破裂以及无着火现象。

No.B1 to B5 five batteries at first cycle, in fully charged state;

编号B1-B5 5个在第一个充放电周期后完全充电状态的电池;

No.B6 to B10 five batteries after 25 cycles, in fully charged state.

编号B6-B10 5个在第二十五个充放电周期后完全充电状态的电池。

Test T.6: Impact (applicable to cylindrical cells not less than 18.0mm in diameter) / Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0mm in diameter) 撞击(适用于直径不小于18.0mm的圆柱形电池) / 挤压(适用于棱形、袋状、硬币/纽扣电芯和直径小于18.0mm的圆柱形电芯)

(1) Test procedure 试验过程- Impact 撞击

The sample cell or component cell is to be placed on a flat smooth surface. A $(15.8\pm0.1)\text{mm}$ diameter, at least 6cm 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 ± 0.1) kg mass is to be dropped from a height of (61 ± 2.5) 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 ± 0.1) mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

将试验电池或元件电池放在平坦光滑平面上，将一根直径为 (15.8 ± 0.1) mm的长度取6 cm或比电池更长的尺寸中的最长那个的不锈钢棒横放在样品中心，将一质量为 (9.1 ± 0.1) kg的重锤从 (61 ± 2.5) cm的高度跌落到钢棒与试验样品交叉点上。重锤跌落由一个滑摩擦的、对重锤阻力最小的垂直轨道或管道加以控制用以引导落锤沿水平支撑表面呈90度落下。待试电池纵轴与平面平行，与横放在试样中心的直径 (15.8 ± 0.1) mm弯曲表面的纵轴垂直。每个样品只经受一次撞击。

(2) Test procedure 试验过程—Crush 挤压

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 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 ± 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 test cell or 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 test cells or component cells that have not previously been subjected to other tests.

将电芯或电芯组件放在两个平面之间进行挤压。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 ± 0.78) kN;
- (b) 电芯的电压下降至少100 mV; 或
- (c) 电芯变形达原始厚度的50%或以上。

棱形或袋状电芯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，圆柱形电芯应从与纵轴垂直的方向施压。每块电芯或组成电芯只进行一次挤压测试，试验样品应持续观察6 h。本试验应用从未进行过其它试验的电芯或电芯组件。

(3) 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 during the test and within six hours after this test.

电芯与电芯组件应满足以下要求：试验过程中及试验结束后6个小时之内不起火、不解体、表面温度不超过170°C。

Data 数据如下表:

No. 编号	Peak temperature(°C) 表面最高温度	Verdict 结论
C1	23.6	PASS/合格
C2	24.8	PASS/合格
C3	24.0	PASS/合格
C4	23.9	PASS/合格
C5	24.7	PASS/合格
C6	25.0	PASS/合格
C7	24.3	PASS/合格
C8	24.7	PASS/合格
C9	25.1	PASS/合格
C10	24.4	PASS/合格

No.C1 to C5 five cells at first cycle at 50% of the design rated capacity;

编号C1-C5 5个在第一个充放电周期50%额定容量状态的电芯;

No.C6 to C10 five cells after 25 cycles at 50% of the design rated capacity.

编号C6-C10 5个在第二十五个充放电周期50%额定容量状态的电芯。

Test T.7: Overcharge 过度充电

(1) Test procedure 试验过程

The charge current shall be 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 shall be 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 18V, 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.

以2倍制造商推荐的最大持续充电电流对样品充电, 本测试最小充电电压如下:

(a) 如果制造商推荐的充电电压不超过18V, 本测试的最小充电电压应取两倍的制造商规定的最大充电电压或者是22V中的较小者

(b) 如果制造商推荐的充电电压超过18V, 本测试的最小充电电压应该为1.2倍的制造商规定的最大充电电压

在环境温度下, 试验持续24小时。

(2) 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.

可充电电池应满足以下要求: 试验样品在试验中和试验后7天内不解体、不起火。

Data 数据如下表:

No. 编号	Verdict 结论
B11	PASS/合格
B12	PASS/合格
B13	PASS/合格
B14	PASS/合格
B15	PASS/合格
B16	PASS/合格
B17	PASS/合格
B18	PASS/合格

No.B11 to B14 four batteries at first cycle, in fully charged state;

编号B11-B14 4个在第一个充放电周期后完全充电状态的电池;

No.B15 to B18 four batteries after 25 cycles, in fully charged state.

编号B15-B18 4个在第二十五个充放电周期后完全充电状态的电池。

Test T.8: Forced discharge 强制放电

(1) Test procedure 试验过程

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 shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

在环境温度下, 将电池连接在12V的直流电源上进行强制放电, 此直流电源提供给电芯的初始电流为制造商规定的最大放电电流。对于指定的放电电流则需要和测试电芯串联一个匹配的电阻负载, 每一个电芯的强制放电时间等于额定容量除以试验初始的放电电流。

(2) 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.

一次或可充电电芯应满足以下要求: 试验样品在试验后7天内不解体、不起火。

Data 数据如下表:

No.编号	Verdict 结论
C11	PASS/合格
C12	PASS/合格
C13	PASS/合格
C14	PASS/合格
C15	PASS/合格
C16	PASS/合格
C17	PASS/合格
C18	PASS/合格
C19	PASS/合格
C20	PASS/合格
C21	PASS/合格
C22	PASS/合格
C23	PASS/合格
C24	PASS/合格
C25	PASS/合格
C26	PASS/合格
C27	PASS/合格
C28	PASS/合格
C29	PASS/合格
C30	PASS/合格

No.C11 to C20 ten cells at first cycle, in fully discharged state states;

编号C11-C20 10个为在第一个交替充电放电周期完全放电状态的电芯;

No.C21 to C30 ten cells after 25cycle, in fully discharged state states.

编号C21-C30 10个为在二十五个交替充电放电周期结束后完全放电状态的电芯。

Photos of The Sample 样品图片



Photo 1

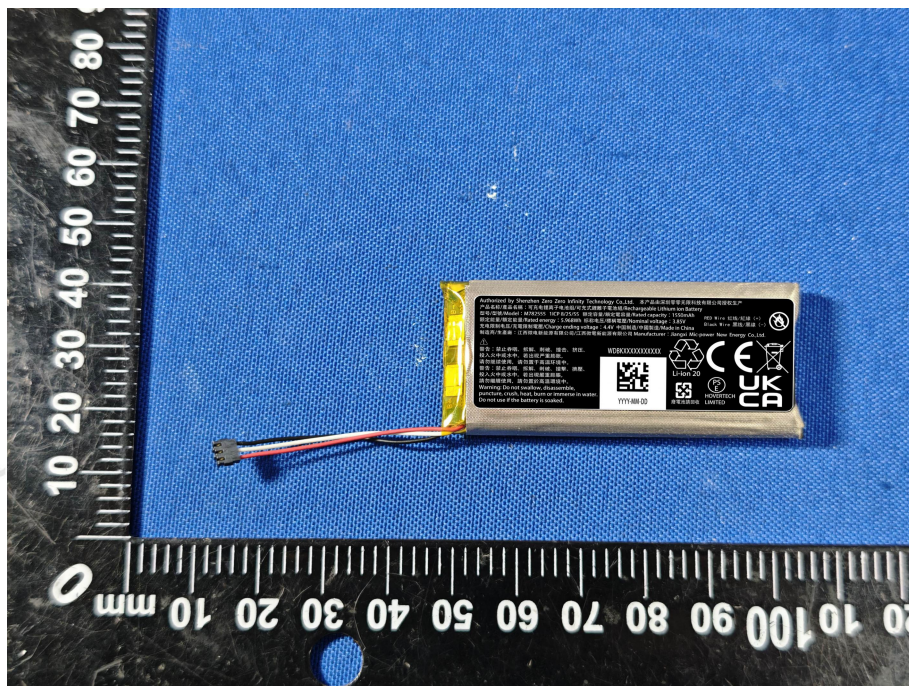


Photo 2

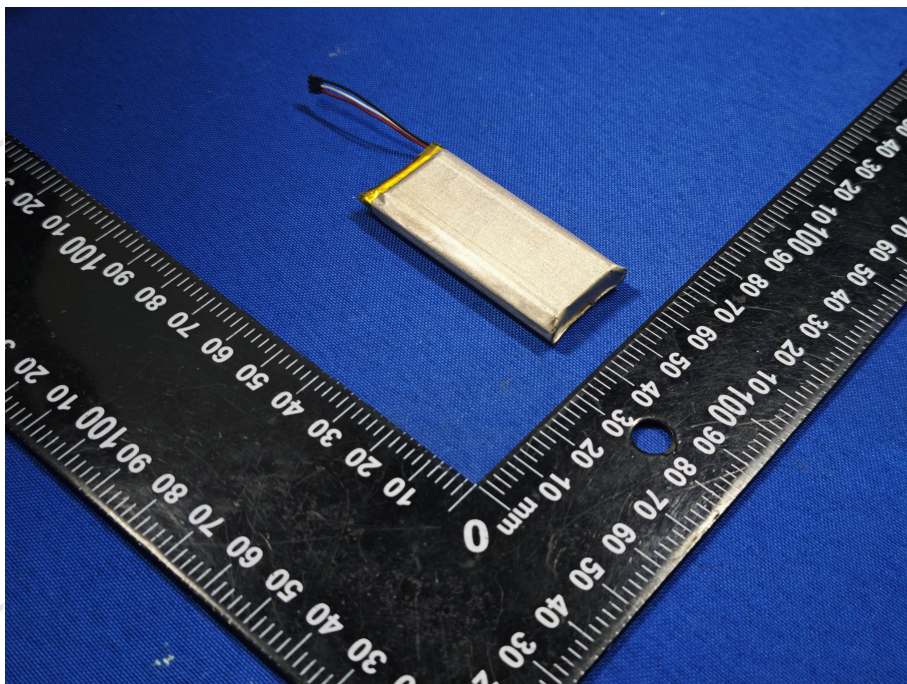


Photo 3

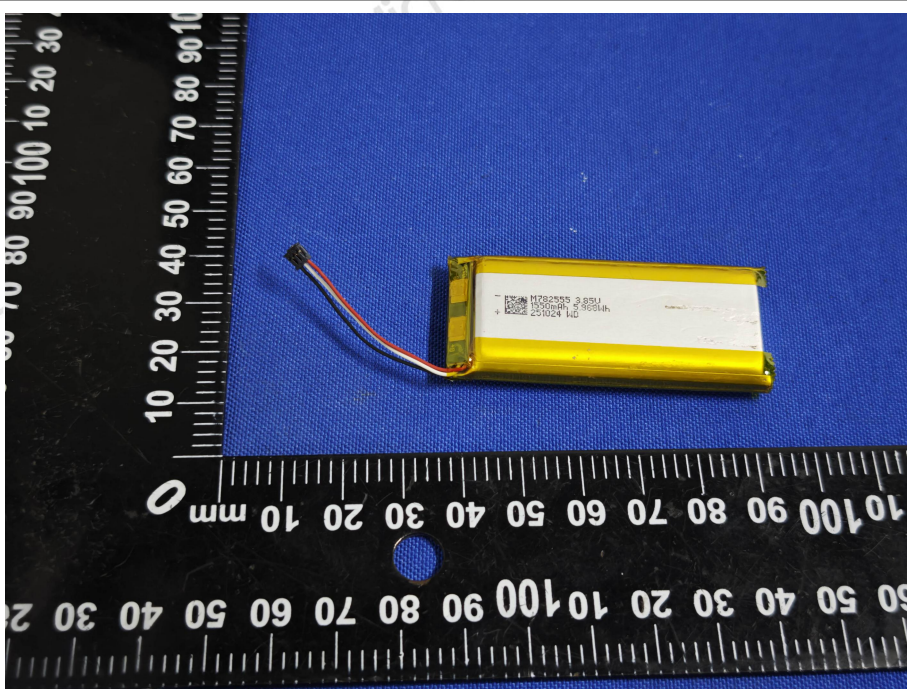
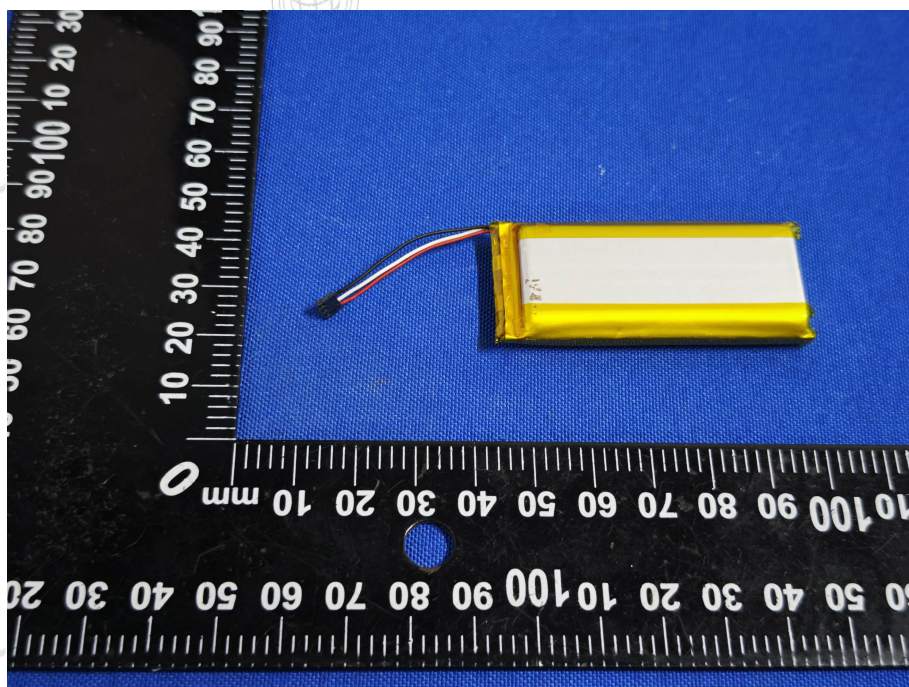
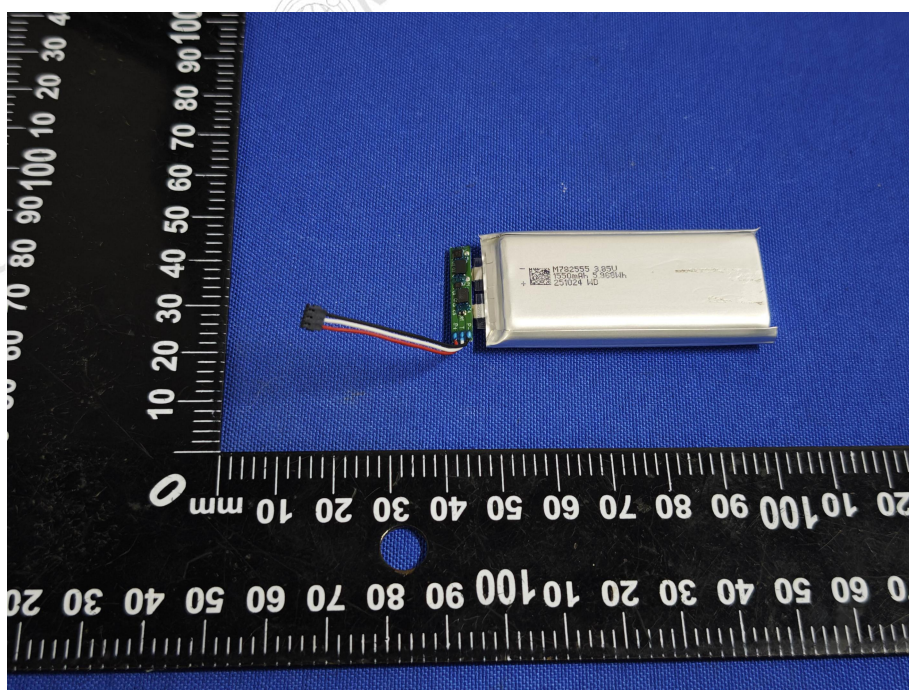


Photo 4


Photo 5

Photo 6

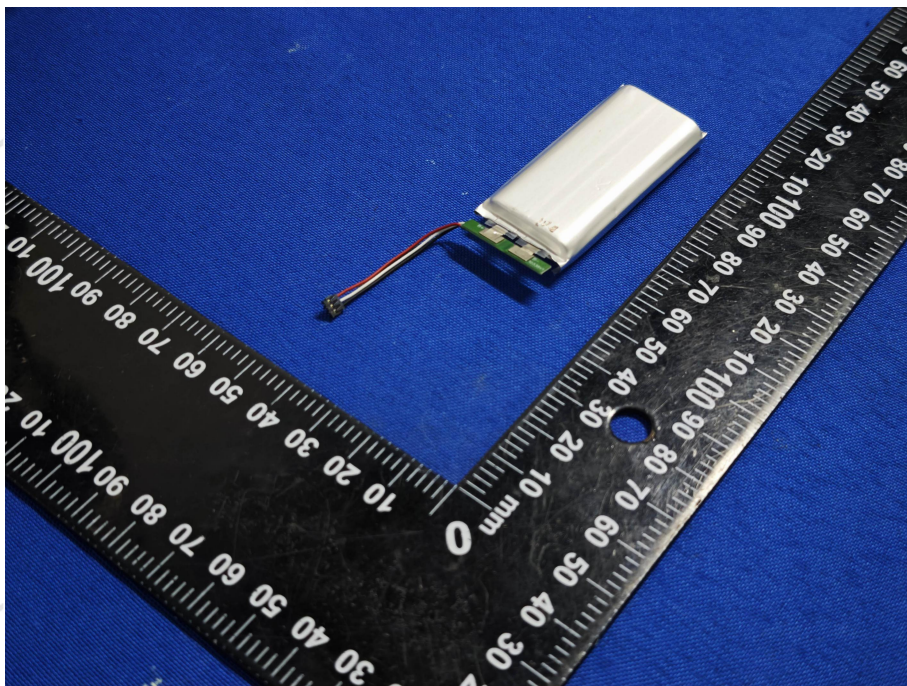


Photo 7

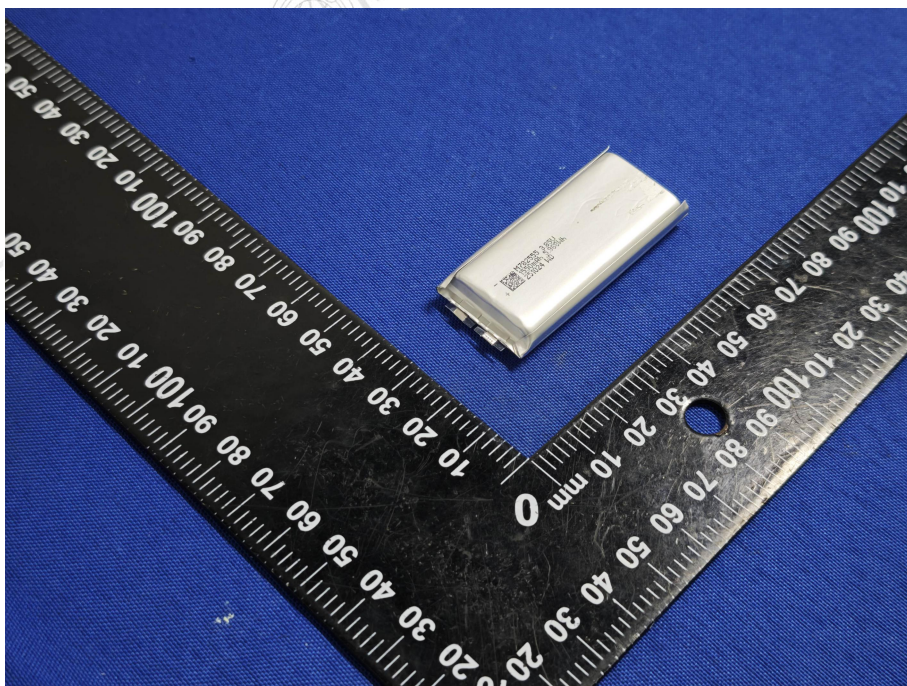
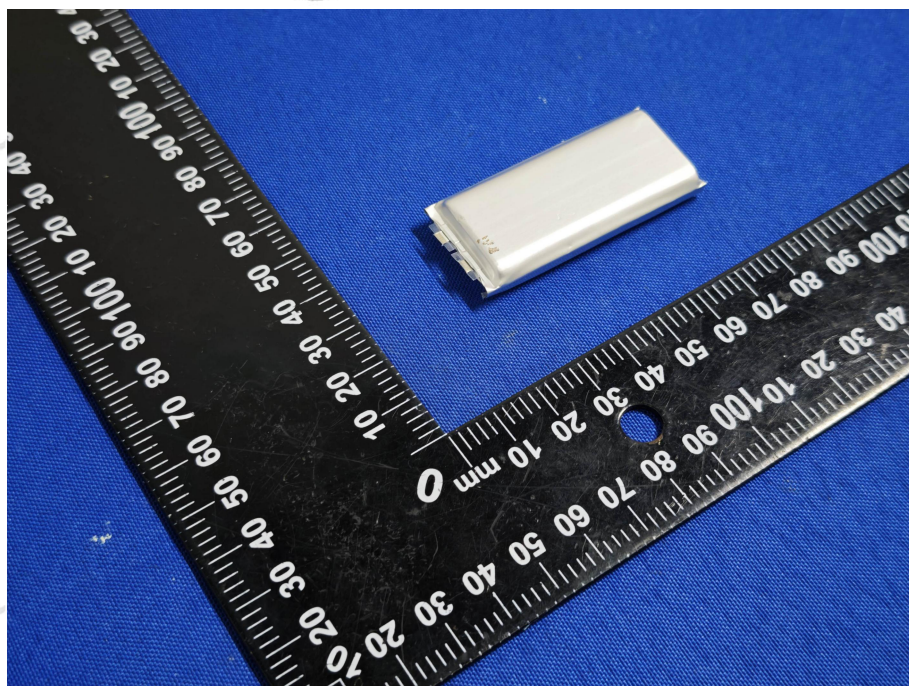
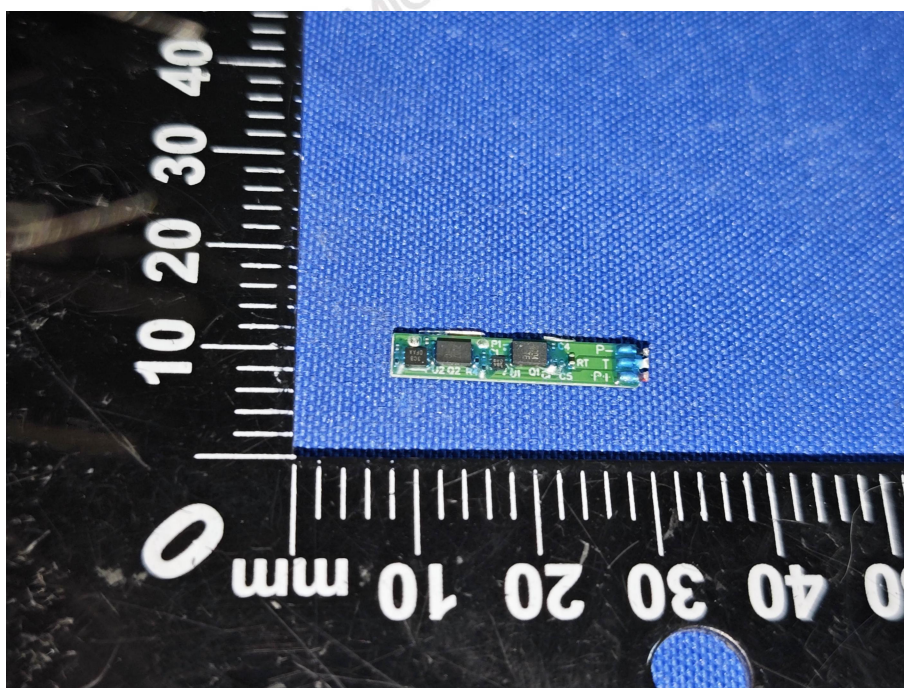


Photo 8


Photo 9

Photo 10

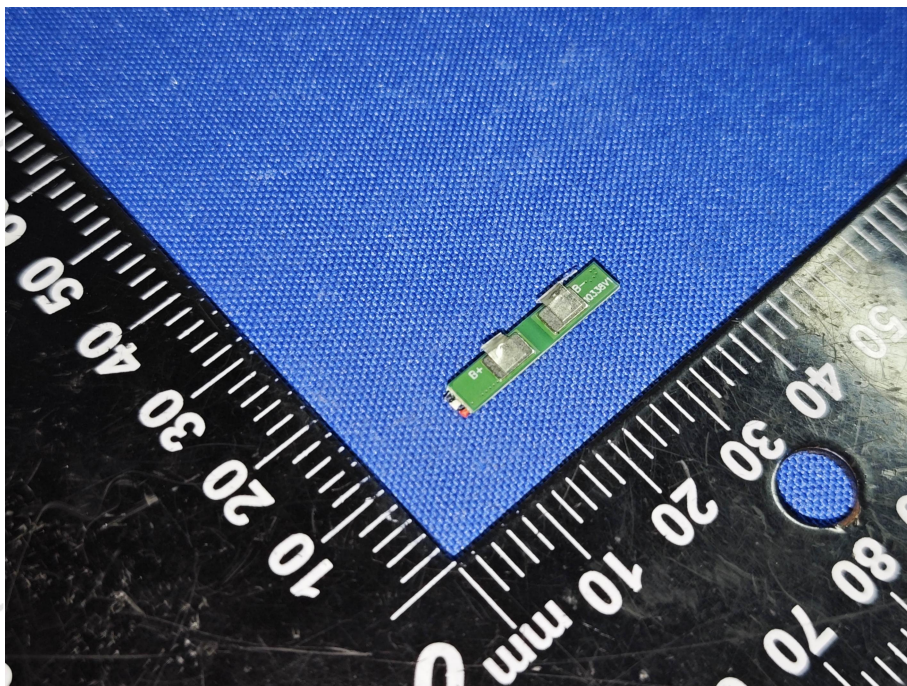


Photo 11

Main Test Equipment 主要测试设备

No.序号	Code编号	Instrument Name 仪器名称
1	MTi-B001	Low Pressure Chamber 低气压试验箱
2	MTi-B003	High-Low Temperature Chamber 高低温试验箱
3	MTi-B072	Shock testing machine 冲击试验机
4	MTi-B007	Vibration testing machine 振动试验机
5	MTi-B065	Temperature Control Battery Short Circuit Tester 温控型电池短路试验机
6	MTi-B020	Electronic Balance 电子天平
7	MTi-B074	Electronic Balance 电子天平
8	MTi-B024	10V/10A Battery Charger System 电池充放电系统
9	MTi-B026	25V/10A Battery Charger System 电池充放电系统
10	MTi-B071	60V/25ABattery charging and discharging cabinet 电池充放电柜
11	MTi-B061	DC Source 直流稳压电源
12	MTi-B032	DC Source 直流稳压电源
13	MTi-B033	DC Electronic load 直流电子负载
14	MTi-B044	Temperature Recorder 温度记录仪
15	MTi-B075	Multimeter 万用表
16	MTi-B050	Battery Test System 高精度电池性能测试系统
17	MTi-B051	Mobile Power Test System 移动电源测试系统
18	MTi-B005	Battery extrusion testing machine 电池挤压试验机
19	MTi-B004	Battery Impact Tester 电池重物冲击试验机

Remark:The above equipment are within the calibration cycle.

备注:以上仪器设备均在计量校准周期内。

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