# 检 验 报 告

# Test Report

产 品 名 称 ：锂离子电池组/二次鋰電池組/锂离子聚合物电池组

Sample Name : RECHARGEABLE LITHIUM ION BATTERY / RECHARGEABLE LITHIUM ION POLYMER BATTERY

型号 ：QM45

Model/ Type ：QM45

委托单位 ：珠海冠宇电池股份有限公司

Client : Zhuhai CosMX Battery Co., Ltd.

珠海冠宇电池股份有限公司测试中心

Test Center of Zhuhai CosMX Battery Co., Ltd.

# Applicant information
# 申请资料

| | |
|---|---|
| Name of samples:<br>样品名称： | RECHARGEABLE LITHIUM ION BATTERY / RECHARGEABLE LITHIUM ION POLYMER BATTERY<br>锂离子电池组/二次鋰電池組/锂离子聚合物电池组 |
| Type/Model:<br>型号规格： | QM45 3.89V 4365mAh/16.98Wh( Rated ) 4500mAh/17.51Wh (Typical) |
| Lithium content::<br>锂含量： | — |
| Commission by:<br>委托单位： | Zhuhai CosMX Battery Co., Ltd.<br>珠海冠宇电池股份有限公司 |
| Commissioner address:<br>委托单位地址： | (South Zone, First Floor, A Work Factory) No.209, Zhufeng Road, Jing'an Town, Doumen District, Zhuhai City, Guangdong, P.R. China<br>广东省珠海市斗门区井岸镇珠峰大道 209 号（A厂房首层南区） |
| Manufacturer:<br>制 造 商： | Zhuhai CosMX Power JinWan Subsidiary Co., Ltd.<br>珠海冠宇电源有限公司金湾分公司 |
| Manufacturer Address:<br>制造商地址： | Workshop No.1,No.2,No.3(first,fourth and fifth floors)and No.5,No.3 Qingwan three Road,Qingwan Industry Park, Sanzao Town,Jinwan District,Zhuhai City,Guangdong ,P.R.China.<br>广东省珠海市金湾区三灶镇青湾工业区青湾三路3号的厂房一、厂房二、厂房三（一层、四层、五层）、厂房五 |
| Factory:<br>生产厂： | Zhuhai CosMX Power JinWan Subsidiary Co., Ltd.<br>珠海冠宇电源有限公司金湾分公司 |
| Factory address:<br>生产厂地址： | Workshop No.1,No.2,No.3(first,fourth and fifth floors)and No.5,No.3 Qingwan three Road,Qingwan Industry Park, Sanzao Town,Jinwan District,Zhuhai City,Guangdong ,P.R.China.<br>广东省珠海市金湾区三灶镇青湾工业区青湾三路3号的厂房一、厂房二、厂房三（一层、四层、五层）、厂房五 |
| Appearance:<br>样品外观颜色： | White<br>白色 |
| Sample status:<br>样品状态： | Good<br>完好 |
| Quantity of sample:<br>样品数量： | 48Pcs |
| Sample identification:<br>样品标识序号： | N2023-11-2450-001～018 N2023-11-2456-001～030 |
| Receiving date:<br>接样日期： | 2023.11.09 |
| Start test date:<br>测试开始日期： | 2023.11.09 |
| Completing date:<br>完成日期： | 2023.11.28 |

**Conclusion/**结论：

The submitted samples comply with the requirements of Section 38.3 of the Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7

样品符合联合国《试验和标准手册》第七修订版第 38.3 节的要求。

| | | |
|---|---|---|
| Tested :<br>测试： | Fang Ju 方菊<br>Test Engineer 测试工程师 | Seal/检验专用章：<br>Date of issue：2023.11.28 |
| Reviewed :<br>审核： | Wang Li 王利<br>Quality Manager 质量负责人<br>Xiao Duoyu 肖铎渔<br>Technical Manager 技术负责人 | |
| Approved :<br>批准： | Dong Jiaqin 董家勤<br>Authorized Manager 授权签字人 | |

# General product information
# 样品描述及说明

Sample Type:
样品类型：

| | |
|---|---|
| Rechargeable or not<br>是否可充电 | |

| | | | | |
|---|---|---|---|---|
| ☐ Cell<br>电池 | Use<br>用途 | — | Electrochemistry System<br>电池化学组分 | -- |
| ■ Battery<br>电池组 | Use<br>用途 | Mobile Phone<br>手机 | Battery Model<br>型号 | QM45 |
| | Composing Mode<br>组成方式 | 1S1P<br>1串1并 | Electrochemistry System<br>电池化学组分 | $LiCoO_2$<br>钴酸锂 |
| | Cell model<br>电池型号 | CA526480P | Cell Capacity<br>电池容量 | Typ：4500mAh<br>Min：4385mAh |
| | Manufacturer Of Cell<br>电池生产厂 | Zhuhai CosMX Battery Co., Ltd.<br>珠海冠宇电池股份有限公司 | | |

Sample parameters:
样品参数：

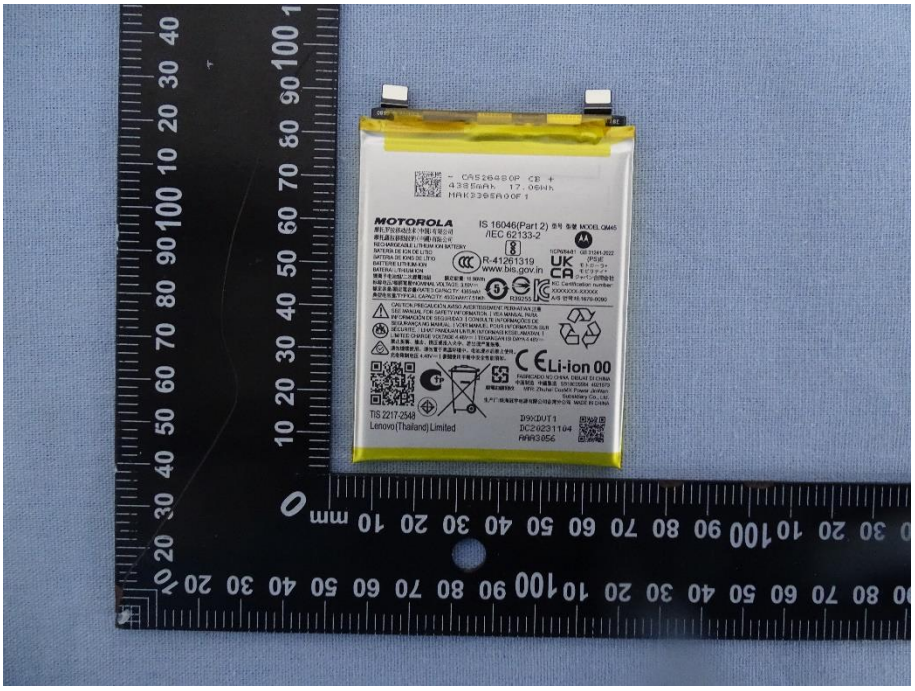
| | | | | | |
|---|---|---|---|---|---|
| Nominal Voltage<br>标称电压 | 3.89V | Rated Capacity<br>额定容量 | 4365mAh | Rated Energy<br>额定能量 | 16.98Wh |
| Limited Charging Voltage<br>充电限制电压 | 4.48V | Max.Charging Current<br>最大持续充电电流 | 23.000A | Standard Charging Current<br>标准充电电流 | 2.180A |
| Discharge Cut-off Voltage<br>放电终止电压 | 3.00V | Max. Discharging Current<br>最大持续放电电流 | 4.365A | Charge Cut-off Current<br>充电截止电流 | 0.220A |

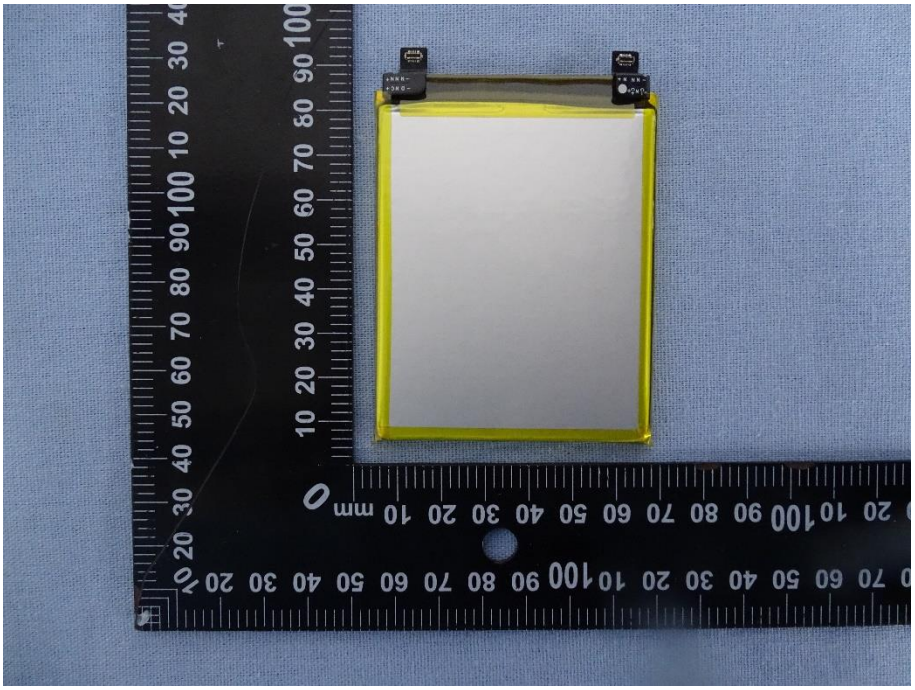
# Test Conclusion
# 测试结论

| No.<br>序号 | Name of test<br>测试项目名称 | | Test result<br>测试结果 | Conclusion<br>本项结论 | Remarks<br>备注 |
|---|---|---|---|---|---|
| **1** | Altitude simulation<br>高度模拟 | The submitted samples comply with the requirements of Section 38.3 of the Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7<br><br>样品符合联合国《试验和标准手册》第七修订版第38.3节的要求。 | See Appendix 1 | P | |
| **2** | Thermal test<br>温度试验 | | See Appendix 2 | P | |
| **3** | Vibration<br>振动 | | See Appendix 3 | P | |
| **4** | Shock<br>冲击 | | See Appendix 4 | P | |
| **5** | External Short-circuit<br>外部短路 | | See Appendix 5 | P | |
| **6** | Impact<br>撞击 | | See Appendix 6 | N/A | |
| | Crush<br>挤压 | | See Appendix 6 | P | N2023-11-2456 |
| **7** | Overcharge<br>过度充电 | | See Appendix 7 | P | |
| **8** | Forced discharge<br>强制放电 | | See Appendix 8 | P | N2023-11-2456 |

# Photos of samples and markings
# 样品及标识照片

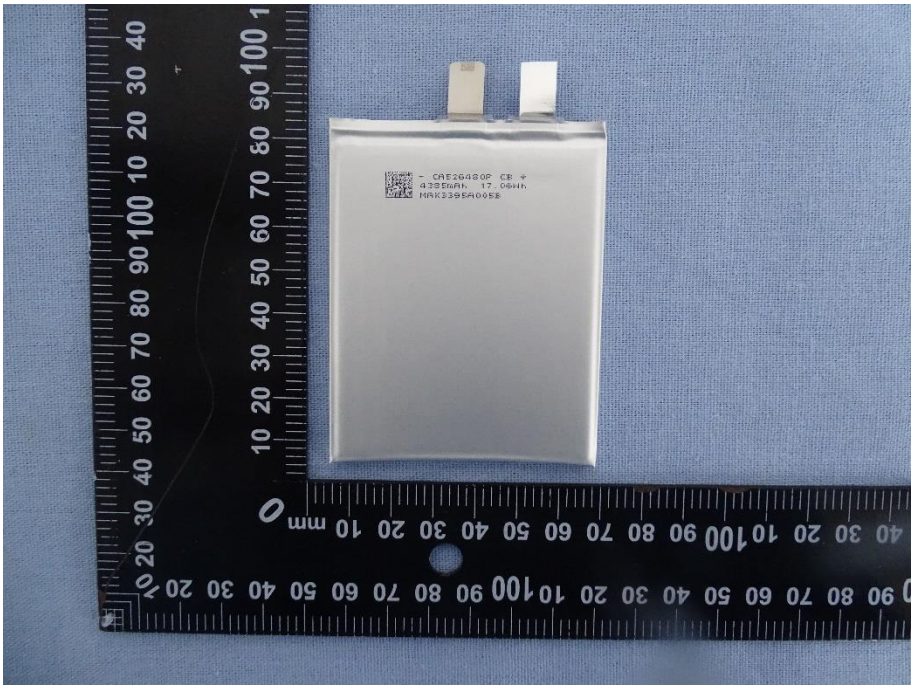
**Battery（QM45 3.89V 4365mAh/16.98Wh( Rated ) 4500mAh/17.51Wh (Typical)）**

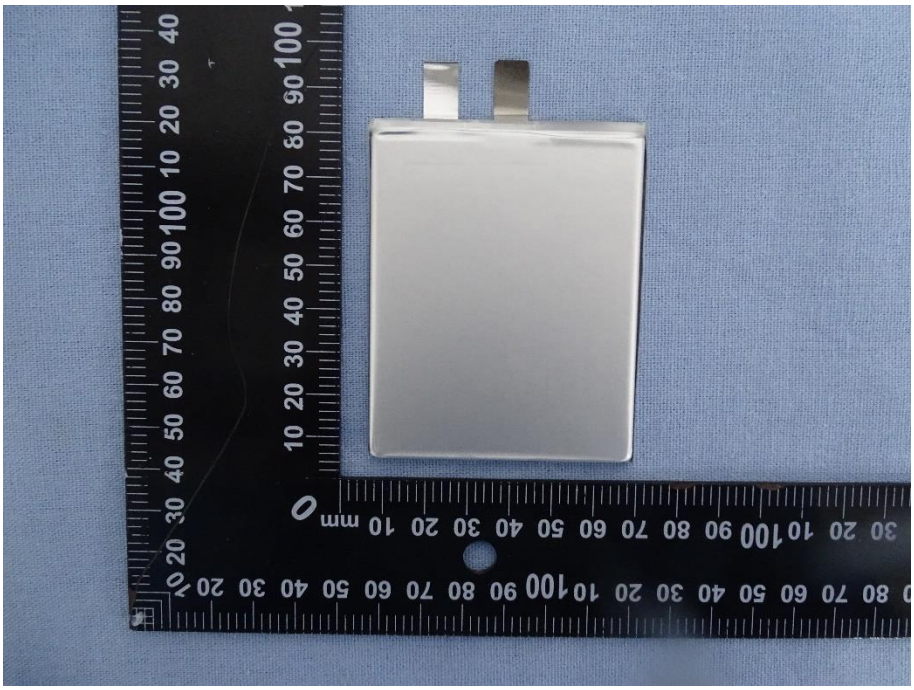


# Photos of samples and markings
# 样品及标识照片

**Cell（CA526480P 3.89V 4385mAh）**





# Appendix 1
# 附表 1

| | |
|---|---|
| Test Items<br>测试项目 | Altitude simulation<br>高度模拟 |
| **1.1** | **Test procedure**<br>测试步骤 |
| | 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℃).<br>试验电池芯和电池在环境温度(20±5℃)下，储存在小于等于11.6kPa的压力下至少六小时。 |
| **1.2** | **Sample status**<br>样品状态 |
| | N2023-11-2450-009 ~ 013, at first cycle in fully charged states;在第1个循环完全充电；<br>N2023-11-2450-014 ~ 018, after 25 cycle in fully charged states.在第25个循环完全充电。 |
| **1.3** | **Result**<br>测试结果 |

| Sample No.<br>样品编号 | Before Test测试前 | | After Test测试后 | | Mass loss<br>质量损失<br>(M<1g: 0.5%<br>1g≤M≤75g: 0.2%<br>M>75g: 0.1%) | Residual OCV<br>剩余电压<br>(≥90%) | Test result<br>测试结果 |
|---|---|---|---|---|---|---|---|
| | Mass<br>样品质量<br>(g) | Voltage<br>开路电压<br>(V) | Mass<br>样品质量<br>(g) | Voltage<br>开路电压<br>(V) | | | |
| N2023-11-2450-009 | 64.7814 | 4.4414 | 64.7738 | 4.4357 | 0.0117 | 99.8712 | **O** |
| N2023-11-2450-010 | 64.7385 | 4.4392 | 64.7301 | 4.4330 | 0.0130 | 99.8608 | **O** |
| N2023-11-2450-011 | 64.8989 | 4.4429 | 64.8902 | 4.4373 | 0.0134 | 99.8744 | **O** |
| N2023-11-2450-012 | 64.8100 | 4.4394 | 64.8020 | 4.4332 | 0.0123 | 99.8599 | **O** |
| N2023-11-2450-013 | 65.1619 | 4.4418 | 65.1537 | 4.4361 | 0.0126 | 99.8714 | **O** |
| N2023-11-2450-014 | 64.7706 | 4.4363 | 64.7634 | 4.4321 | 0.0111 | 99.9053 | **O** |
| N2023-11-2450-015 | 64.7748 | 4.4351 | 64.7670 | 4.4308 | 0.0120 | 99.9026 | **O** |
| N2023-11-2450-016 | 64.8636 | 4.4356 | 64.8552 | 4.4312 | 0.0130 | 99.9015 | **O** |
| N2023-11-2450-017 | 64.9328 | 4.4295 | 64.9256 | 4.4246 | 0.0111 | 99.8903 | **O** |
| N2023-11-2450-018 | 64.8863 | 4.4361 | 64.8800 | 4.4316 | 0.0097 | 99.8999 | **O** |

Note: **L**-Leakage, **V**-Venting, **D** -Disassembly, **R** -Rupture, **F**-Fire, **O**-No leakage, no venting, no disassembly, no rupture, no fire.

注：L- 泄漏；V- 排气；D- 解体；R- 破裂；F - 起火；O- 无泄漏、无排气、无解体、无破裂、无起火。

# Appendix 2
# 附表 2

| Test Items 测试项目 | Thermal test 温度测试 |
|---|---|
| **1.1** | **Test procedure** 测试步骤 |
| | Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2℃, followed by storage for at least six hours at a test temperature equal to -40±2℃, The maximum time interval between test temperature extremes in 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±5℃).<br>将电芯和电池在温度为72±2℃的条件下贮存不少于6个小时，然后，在温度-40±2℃条件下贮存不少于6个小时，两个温度间的间隔最长为30min,重复操作上述步骤直到10次，然后，将其在环境温度为20±5℃的条件下放置24个小时。 |
| **1.2** | **Sample status** 样品状态 |
| | N2023-11-2450-009 ~ 013, at first cycle in fully charged states;在第1个循环完全充电；<br>N2023-11-2450-014 ~ 018, after 25 cycle in fully charged states.在第25个循环完全充电。 |
| **1.3** | **Result** 测试结果 |

| Sample No. 样品编号 | Before Test测试前 | | After Test测试后 | | Mass loss 质量损失 (M<1g: 0.5% 1g≤M≤75g: 0.2% M>75g: 0.1%) | Residual OCV 剩余电压 (≥90%) | Test result 测试结果 |
|---|---|---|---|---|---|---|---|
| | Mass 样品质量 (g) | Voltage 开路电压 (V) | Mass 样品质量 (g) | Voltage 开路电压 (V) | | | |
| N2023-11-2450-009 | 64.7738 | 4.4357 | 64.7563 | 4.2221 | 0.0270 | 95.1854 | **O** |
| N2023-11-2450-010 | 64.7301 | 4.4330 | 64.7125 | 4.2207 | 0.0272 | 95.2116 | **O** |
| N2023-11-2450-011 | 64.8902 | 4.4373 | 64.8811 | 4.2250 | 0.0140 | 95.2147 | **O** |
| N2023-11-2450-012 | 64.8020 | 4.4332 | 64.7916 | 4.2182 | 0.0160 | 95.1500 | **O** |
| N2023-11-2450-013 | 65.1537 | 4.4361 | 65.1322 | 4.2223 | 0.0330 | 95.1798 | **O** |
| N2023-11-2450-014 | 64.7634 | 4.4321 | 64.7424 | 4.2349 | 0.0324 | 95.5499 | **O** |
| N2023-11-2450-015 | 64.7670 | 4.4308 | 64.7610 | 4.2336 | 0.0093 | 95.5482 | **O** |
| N2023-11-2450-016 | 64.8552 | 4.4312 | 64.8322 | 4.2341 | 0.0355 | 95.5520 | **O** |
| N2023-11-2450-017 | 64.9256 | 4.4246 | 64.9113 | 4.2266 | 0.0220 | 95.5246 | **O** |
| N2023-11-2450-018 | 64.8800 | 4.4316 | 64.8609 | 4.2327 | 0.0294 | 95.5118 | **O** |

Note: **L**-Leakage, **V**-Venting, **D** -Disassembly, **R** -Rupture, **F**-Fire, **O**-No leakage, no venting, no disassembly, no rupture, no fire.

注：L- 泄漏；V- 排气；D- 解体；R- 破裂；F - 起火；O- 无泄漏、无排气、无解体、无破裂、无起火。

# Appendix 3
# 附表 3

| Test Items 测试项目 | Vibration 振动 |
|---|---|
| **1.1** | **Test procedure** 测试步骤 |
| | 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 wave form 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 position of the cell.<br>将电芯和电池牢固地安装在振动台的台面上，然后开始振动。振动以正弦波形式，以7Hz增加至200Hz，然后再减少回到7Hz为一个循环，一个循环持续15分钟的对数扫频。每个电芯和电池从三个互相垂直的方向上循环12次，3个小时。 |
| **1.2** | **Sample status** 样品状态 |
| | N2023-11-2450-009 ~ 013, at first cycle in fully charged states;在第1个循环完全充电；<br>N2023-11-2450-014 ~ 018, after 25 cycle in fully charged states.在第25个循环完全充电。 |
| **1.3** | **Result** 测试结果 |

| Sample No. 样品编号 | Before Test测试前 | | After Test测试后 | | Mass loss 质量损失 (M<1g: 0.5% 1g≤M≤75g: 0.2% M>75g: 0.1%) | Residual OCV 剩余电压 (≥90%) | Test result 测试结果 |
|---|---|---|---|---|---|---|---|
| | Mass 样品质量（g) | Voltage 开路电压 (V) | Mass 样品质量 (g) | Voltage 开路电压 (V) | | | |
| N2023-11-2450-009 | 64.7563 | 4.2221 | 64.7503 | 4.2053 | 0.0093 | 99.6019 | **O** |
| N2023-11-2450-010 | 64.7125 | 4.2207 | 64.7093 | 4.2041 | 0.0049 | 99.6055 | **O** |
| N2023-11-2450-011 | 64.8811 | 4.2250 | 64.8711 | 4.2085 | 0.0154 | 99.6095 | **O** |
| N2023-11-2450-012 | 64.7916 | 4.2182 | 64.7821 | 4.2018 | 0.0147 | 99.6126 | **O** |
| N2023-11-2450-013 | 65.1322 | 4.2223 | 65.1287 | 4.2058 | 0.0054 | 99.6111 | **O** |
| N2023-11-2450-014 | 64.7424 | 4.2349 | 64.7361 | 4.2181 | 0.0097 | 99.6038 | **O** |
| N2023-11-2450-015 | 64.7610 | 4.2336 | 64.7589 | 4.2179 | 0.0032 | 99.6294 | **O** |
| N2023-11-2450-016 | 64.8322 | 4.2341 | 64.8266 | 4.2177 | 0.0086 | 99.6115 | **O** |
| N2023-11-2450-017 | 64.9113 | 4.2266 | 64.9087 | 4.2105 | 0.0040 | 99.6177 | **O** |
| N2023-11-2450-018 | 64.8609 | 4.2327 | 64.8578 | 4.2160 | 0.0048 | 99.6057 | **O** |

Note: **L**-Leakage, **V**-Venting, **D** -Disassembly, **R** -Rupture, **F**-Fire, **O**-No leakage, no venting, no disassembly, no rupture, no fire.

注：L- 泄漏；V- 排气；D- 解体；R- 破裂；F - 起火；O- 无泄漏、无排气、无解体、无破裂、无起火。

# Appendix 4
# 附表 4

| Test Items 测试项目 | Shock 冲击 |
|---|---|
| **1.1** | **Test procedure** 测试步骤 |
| | Test cells and batteries shall be secured to the testing machine, and each cell shall be subjected to a half-sine shock of peak acceleration of 150$g_n$ and pulse duration of 6 milliseconds. Large cells may be subjected to a half-sine shock of peak acceleration of 50$g_n$ and pulse duration of 11 milliseconds. Small batteries shall be subjected to a half-sine shock of peak acceleration of 150$g_n$ (or Acceleration($g_n$)= $\sqrt{\left(\frac{100850}{mass}\right)}$,which is smaller) 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<br>以稳固的托架固定住每个电芯和电池样品的全部配件表面。对每个电芯以峰值为150$g_n$的半正弦的加速度撞击，脉冲持续6毫秒，大型电芯须经受最大加速度50$g_n$和脉冲持续时间11毫秒的半正弦波冲击。对每个电池以峰值为150$g_n$（或与$\sqrt{\left(\frac{100850}{mass}\right)}$中的较小值）的半正弦的加速度撞击，脉冲持续6毫秒，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。 |
| **1.2** | **Sample status** 样品状态 |
| | N2023-11-2450-009 ~ 013, at first cycle in fully charged states;在第1个循环完全充电；<br>N2023-11-2450-014 ~ 018, after 25 cycle in fully charged states.在第25个循环完全充电。 |
| **1.3** | **Result** 测试结果 |

| Sample No. 样品编号 | Before Test测试前 | | After Test测试后 | | Mass loss 质量损失 (M<1g: 0.5% 1g≤M≤75g: 0.2% M>75g: 0.1%) | Residual OCV 剩余电压 (≥90%) | Test result 测试结果 |
|---|---|---|---|---|---|---|---|
| | Mass 样品质量 (g) | Voltage 开路电压 (V) | Mass 样品质量 (g) | Voltage 开路电压 (V) | | | |
| N2023-11-2450-009 | 64.7503 | 4.2053 | 64.7460 | 4.1919 | 0.0066 | 99.6816 | **O** |
| N2023-11-2450-010 | 64.7093 | 4.2041 | 64.7039 | 4.1908 | 0.0083 | 99.6844 | **O** |
| N2023-11-2450-011 | 64.8711 | 4.2085 | 64.8630 | 4.1953 | 0.0125 | 99.6859 | **O** |
| N2023-11-2450-012 | 64.7821 | 4.2018 | 64.7736 | 4.1889 | 0.0131 | 99.6920 | **O** |
| N2023-11-2450-013 | 65.1287 | 4.2058 | 65.1246 | 4.1927 | 0.0063 | 99.6878 | **O** |
| N2023-11-2450-014 | 64.7361 | 4.2181 | 64.7323 | 4.2048 | 0.0059 | 99.6845 | **O** |
| N2023-11-2450-015 | 64.7589 | 4.2179 | 64.7392 | 4.2036 | 0.0304 | 99.6626 | **O** |
| N2023-11-2450-016 | 64.8266 | 4.2177 | 64.8233 | 4.2044 | 0.0051 | 99.6847 | **O** |
| N2023-11-2450-017 | 64.9087 | 4.2105 | 64.9037 | 4.1974 | 0.0077 | 99.6886 | **O** |
| N2023-11-2450-018 | 64.8578 | 4.2160 | 64.8513 | 4.2026 | 0.0100 | 99.6817 | **O** |

Note: **L**-Leakage, **V**-Venting, **D**-Disassembly, **R**-Rupture, **F**-Fire, **O**-No leakage, no venting, no disassembly, no rupture, no fire.

注：L- 泄漏；V- 排气；D- 解体；R- 破裂；F - 起火；O- 无泄漏、无排气、无解体、无破裂、无起火。

# Appendix 5
# 附表 5

| Test Items<br>测试项目 | External short circuit<br>外部短路 |
|---|---|
| **1.1** | **Test procedure**<br>测试步骤 |
| | The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57±4℃ 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±4℃, This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57±4℃, the cell or battery must be observed for a further six hour for the test to be concluded.<br>保持试验环境温度稳定在57±4℃，以使电芯或电池样品外表温度达到57±4℃，然后，在此温度下，将其正负极用小于0.1欧姆的线路短接，待电芯或电池的外表温度恢复到57±4℃之后再持续1小时以上，对电芯或电池必须进一步观察6个小时才能下结论。 |
| **1.2** | **Sample status**<br>样品状态 |
| | N2023-11-2450-009 ~ 013, at first cycle in fully charged states;在第1个循环完全充电；<br>N2023-11-2450-014 ~ 018, after 25 cycle in fully charged states.在第25个循环完全充电。 |
| **1.3** | **Result**<br>测试结果 |

| Sample No.<br>样品编号 | Max. External Temperature<br>样品表面最高温度(℃) | Test result<br>测试结果 | Remark<br>备注 |
|---|---|---|---|
| N2023-11-2450-009 | 61.0 | **O** | — |
| N2023-11-2450-010 | 58.4 | **O** | — |
| N2023-11-2450-011 | 57.5 | **O** | — |
| N2023-11-2450-012 | 57.9 | **O** | — |
| N2023-11-2450-013 | 57.9 | **O** | — |
| N2023-11-2450-014 | 57.6 | **O** | — |
| N2023-11-2450-015 | 73.6 | **O** | — |
| N2023-11-2450-016 | 57.7 | **O** | — |
| N2023-11-2450-017 | 58.0 | **O** | — |
| N2023-11-2450-018 | 57.5 | **O** | — |

Note: **D** –Disassembly, **R** –Rupture, **F** –Fire, **OT** –Over Temperature, **O** –no disassembly, no rupture, no fire, no Over temperature

注： D- 解体；R- 破裂；F– 起火；OT– 超过170℃；O– 无解体、无破裂、无起火、不超过170℃

# Appendix 6
# 附表 6

| | |
|---|---|
| Test Items<br>测试项目 | Crush 挤压 |
| **1.1** | **Test procedure**<br>测试步骤 |
| | 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 13kN±0.78kN; (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.<br>电池芯或组成电池芯在两个平面间挤压。挤压在第一个接触点以约1.5cm/s 的速度慢慢进行，直到下面三个选项之一达到为止：(a)作用力达到 13kN±0.78kN；(b)电池芯电压降至少达到100mV；(c)电池厚度和最初比较变形至少50%。 |
| **1.2** | **Sample status**<br>样品状态 |
| | N2023-11-2456-021 ~ 025, at first cycle at 50% of the design rated capacity;在第1个循环充50%的额定容量；<br>N2023-11-2456-026 ~ 030, after 25 cycle at 50% of the design rated capacity. 在第25个循环充50%的额定容量。 |
| **1.3** | **Result**<br>测试结果 |

| Sample No.<br>样品编号 | Max. External Temperature<br>样品表面最高温度(℃) | Ending condition<br>终止条件 | Test result<br>测试结果 | Remark<br>备注 |
|---|---|---|---|---|
| N2023-11-2456-021 | 23.89 | a | **O** | — |
| N2023-11-2456-022 | 24.48 | a | **O** | — |
| N2023-11-2456-023 | 24.06 | a | **O** | — |
| N2023-11-2456-024 | 24.52 | a | **O** | — |
| N2023-11-2456-025 | 24.46 | a | **O** | — |
| N2023-11-2456-026 | 24.45 | a | **O** | — |
| N2023-11-2456-027 | 24.31 | a | **O** | — |
| N2023-11-2456-028 | 24.08 | a | **O** | — |
| N2023-11-2456-029 | 23.98 | a | **O** | — |
| N2023-11-2456-030 | 24.16 | a | **O** | — |

Note: **D** -Disassembly, **R** -Rupture, **F**-Fire, **OT** –Over Temperature, **O**- no disassembly, no fire, no Over temperature

注：D- 解体；R- 破裂；F - 起火；OT– 超过170℃；O-无解体、无起火、不超过170℃

# Appendix 7
# 附表 7

| | |
|---|---|
| Test Items<br>测试项目 | Overcharge<br>过度充电 |
| **1.1** | **Test procedure**<br>测试步骤 |
| | 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 or 22V，whichever is less. When the manufacturer's recommended charge voltage is more than 18V, the charging voltage of the test shall be 1.2 times maximum charge voltage. The charging current is 2 times of the maximum charging current recommended by the manufacturer。<br>如果厂家推荐的充电电压不超过18V，本测试的最小充电电压应该是两倍的厂家标定最大充电电压或者是22V，取其中较小者。如果厂家推荐的充电电压超过18V，充电电压应该为 1.2倍的厂家标定最大充电电压。充电电流为厂家推荐的最大充电电流2倍。 |
| **1.2** | **Sample status**<br>样品状态 |
| | N2023-11-2450-001 ~ 004, at first cycle in fully charged states; 在第1个循环完全充电；<br>N2023-11-2450-005 ~ 008, after 25 cycle in fully charged states. 在第25个循环完全充电。 |
| **1.3** | **Result**<br>测试结果 |

| Sample No.<br>样品编号 | Voltage Before test(V)<br>测试前开路电压(V) | Voltage test(V)<br>试验电压(V) | Test result<br>测试结果 | Remark<br>备注 |
|---|---|---|---|---|
| N2023-11-2450-001 | 4.4371 | 8.9600 | O | — |
| N2023-11-2450-002 | 4.4397 | 8.9600 | O | — |
| N2023-11-2450-003 | 4.4345 | 8.9600 | O | — |
| N2023-11-2450-004 | 4.4410 | 8.9600 | O | — |
| N2023-11-2450-005 | 4.4333 | 8.9600 | O | — |
| N2023-11-2450-006 | 4.4278 | 8.9600 | O | — |
| N2023-11-2450-007 | 4.4270 | 8.9600 | O | — |
| N2023-11-2450-008 | 4.4289 | 8.9600 | O | — |

Note: **D** -Disassembly, **F**-Fire, **O**- no disassembly, no fire.

注： D- 解体；F - 起火；O-无解体、无起火。

# Appendix 8
# 附表 8

| Test Items<br>测试项目 | Forced discharge<br>强制放电 |
|---|---|
| **1.1** | **Test procedure**<br>测试步骤 |
| | 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 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).<br>在20±5℃的环境温度下，将单个电芯连接在12V的直流电源上进行强制放电，此直流电源提供每个电芯初始电流为制造厂指定的最大放电电流，放电时间为额定容量除以初始电流。 |
| **1.2** | **Sample status**<br>样品状态 |
| | N2023-11-2456-001 ~ 010, at first cycle in fully discharged states; 在第1个循环完全放电；<br>N2023-11-2456-011 ~ 020, after 25 cycles ending in fully discharged states. 在第25个循环完全放电。 |
| **1.3** | **Result**<br>测试结果 |

| Sample No.<br>样品编号 | Voltage Before test<br>测试前开路电压(V) | Test result<br>测试结果 | Sample No.<br>样品编号 | Voltage Before test<br>测试前开路电压(V) | Test result<br>测试结果 |
|---|---|---|---|---|---|
| N2023-11-2456-001 | 3.5614 | **O** | N2023-11-2456-011 | 3.5687 | **O** |
| N2023-11-2456-002 | 3.5481 | **O** | N2023-11-2456-012 | 3.5634 | **O** |
| N2023-11-2456-003 | 3.5319 | **O** | N2023-11-2456-013 | 3.5808 | **O** |
| N2023-11-2456-004 | 3.5462 | **O** | N2023-11-2456-014 | 3.5880 | **O** |
| N2023-11-2456-005 | 3.5145 | **O** | N2023-11-2456-015 | 3.5683 | **O** |
| N2023-11-2456-006 | 3.5449 | **O** | N2023-11-2456-016 | 3.5890 | **O** |
| N2023-11-2456-007 | 3.5456 | **O** | N2023-11-2456-017 | 3.5866 | **O** |
| N2023-11-2456-008 | 3.5788 | **O** | N2023-11-2456-018 | 3.5759 | **O** |
| N2023-11-2456-009 | 3.5261 | **O** | N2023-11-2456-019 | 3.5692 | **O** |
| N2023-11-2456-010 | 3.5827 | **O** | N2023-11-2456-020 | 3.5977 | **O** |

Note: **D** -Disassembly, **F**-Fire, **O**- no disassembly, no fire.

注： D- 解体；F - 起火；O-无解体、无起火。

# Test equipment list
# 仪器设备清单

| No.<br>序号 | Name<br>名 称 | Type<br>型号 | Equipment No.<br>编 号 | Calibration Date<br>校准有效期至 | Used<br>本次使用<br>（√） |
|---|---|---|---|---|---|
| 1 | Battery Charge And Discharging Tester<br>电池测试系统 | CT3002K | GYA-E-4970 | 2024-04-20 | √ |
| 2 | Low Pressure Chamber<br>低压高空模拟试验箱 | GX-3020-Z | GYA-O-0039 | 2024-07-26 | √ |
| 3 | Rapid Temperature Test<br>可程式快速温变试验箱 | GK-RTH150C | GYA-T-0243 | 2024-07-26 | √ |
| 4 | Vibration Platform<br>振动试验台 | ES-10LS3-240 | GYA-O-1195 | 2024-04-23 | √ |
| 5 | Shock Platform<br>气动垂直冲击碰撞试验台 | SY11-25 | GYA-F-0146 | 2024-07-27 | √ |
| 6 | Crush Platform<br>伺服挤压试验机 | BE-6045-2TD | GYA-F-2220 | 2024-04-18 | √ |
| 7 | DC regulated power supply<br>直流稳压电源 | IT6512 | GYA-E-1690 | 2024-07-26 | √ |
| 8 | DC regulated power supply<br>直流稳压电源 | IT6512 | GYA-E-1691 | 2024-07-26 | √ |
| 9 | DC regulated power supply<br>直流稳压电源 | IT6163 | GYA-E-1271 | 2024-07-26 | √ |
| 10 | DC regulcted power supply<br>直流稳压电源 | IT6522C | GYA-E-1616 | 2024-07-26 | √ |
| 11 | DC electronic locd<br>直流电子负载 | IT8816 | GYA-E-1617 | 2024-07-26 | √ |
| 12 | DC regulated power supply<br>直流稳压电源 | IT6512 | GYA-E-1692 | 2024-07-26 | √ |
| 13 | DC electronic load<br>直流电子负载 | IT8816 | GYA-E-1693 | 2024-07-26 | √ |
| 14 | DC regulated power supply<br>直流稳压电源 | IT6522D | GYA-E-8285 | 2024-10-13 | √ |
| 15 | DC regulated power supply<br>直流稳压电源 | IT6522D | GYA-E-8286 | 2024-10-13 | √ |
| 16 | DC regulated power supply<br>直流稳压电源 | IT6522D | GYA-E-8287 | 2024-10-13 | √ |

| No.<br>序号 | Name<br>名 称 | Type<br>型号 | Equipment No.<br>编 号 | Calibration Date<br>校准有效期至 | Used<br>本次使用<br>（√） |
|---|---|---|---|---|---|
| 17 | DC electronic load<br>直流电子负载 | IT8511 | GYA-E-1944 | 2024-10-13 | √ |
| 18 | DC electronic load<br>直流电子负载 | IT8512 | GYA-E-8301 | 2024-11-09 | √ |
| 19 | DC electronic load<br>直流电子负载 | IT8513 | GYA-E-2184 | 2024-05-12 | √ |
| 20 | Multichannel short circuit<br>电池短路试验机 | GK-8048 | GYA-T-0155 | 2024-07-25 | √ |
| 21 | Data Collector<br>数据采集仪 | HIOKI | GYA-E-0717 | 2024-04-27 | √ |
| 22 | Multichannel short circuit<br>电池短路试验机 | GK-8048 | GYA-T-0245 | 2024-07-25 | √ |
| 23 | Data Collector<br>数据采集仪 | HIOKI | GYA-E-1122 | 2023-12-09 | √ |
| 24 | Electronic Scale<br>电子天平 | ESJ200-4B | GYA-F-1435 | 2024-07-27 | √ |
| 25 | Internal resistance tester<br>电压内阻测试仪 | BT3562 | GYA-E-1806 | 2024-05-09 | √ |
| 26 | Electronic Scale<br>电子天平 | ESJ200-4B | GYA-F-2236 | 2024-05-17 | √ |
| 27 | Internal resistance tester<br>电压内阻测试仪 | BT3562 | GYA-E-5083 | 2024-05-16 | √ |
| 28 | Ppg tester<br>PPG测试仪 | ATMPPG200-1000 | GYA-L-3086 | 2024-11-10 | √ |
| 29 | Internal resistance tester<br>电压内阻测试仪 | BT3562 | GYA-E-1875 | 2024-08-14 | √ |
| 30 | Electronic Scale<br>电子天平 | ESJ200-4B | GYA-F-1578 | 2024-06-13 | √ |
| 31 | Data Collector<br>数据采集仪 | HIOKI | GYA-E-0401 | 2024-08-14 | √ |

# 注 意 事 项
# Attention

1. 本报告无检测单位“检验专用章”无效。
   The test report is invalid without the official stamp of the lab.
2. 未经本实验室书面同意，不得部分地复制本报告。
   Nobody is allowed to photocopy or partly photocopy this report without written permission of the lab.
3. 本报告无批准人、审核人签名无效。
   The test report is invalid without the signature of ratifier, reviewer.
4. 本报告涂改无效。
   The test report is invalid if altered.
5. 如果报告中部分项目相对于测试依据有偏离的，将在当前测试项目中予以说明。
   If any test method is deviation from the designated test method, must be commented in the test data sheet.
6. 对检测报告若有异议，应于收到报告之日起十五天内向检测单位提出。
   Objections to the test report must be submitted to lab within 15 days.
7. 本报告仅对送检样品负责。
   The test report is valid for the tested sample only.
8. 本检测结果中**“N/A”**表示“不适用”，**“P”**表示“通过”，**“F”**表示“不通过”。
   As for the test result “N/A” means “Not Applicable”, “P” means “Pass” and “F” means “Fail”.

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