Test Report

Report No. : TCT220722C056 Date : Aug. 05, 2022 Page No.: 1 of 4

Applicant: **Ningbo Yifan Electric Appliance Co., LTD**

Address: **Building 8, Small Appliances Pioneer Park, Wanghai Industrial Park, Xidian Town, Ninghai County, Ningbo City**

The following sample was submitted and identified by/on behalf of the client as:

Sample Name:	Li-ion Polymer Cell
Model No.:	606090
Manufacturer:	Shenzhen Longfengtai Electronic Technology Co., Ltd.
Address:	302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen
Sample Received Date:	2022.07.22
Testing Period:	2022.07.22-2022.08.05
Test Requested:	Accordance with Directive 2006/66/EC, to determine the Lead (Pb), Cadmium (Cd), Mercury (Hg) contents of the submitted sample(s).
Test Method:	Please refer to the following page(s).
Test Result(s):	Please refer to the following page(s).
Conclusion:	Test results of submitted sample(s) comply with the limit set by Directive 2006/66/EC and its amendment 2013/56/EU.

Checked by Approved by

Justin Tomsin

Test Report

Test Results:

Lead, Cadmium and Mercury Content(s)

Test Method: With reference to IEC62321-4:2013+AMD1:2017, IEC 62321-5:2013

Analysis was performed by Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES)

Test Items	Unit	MDL	Labelling Requirement#	Permissible Limit	Test Results
Lead (Pb)	%	0.0010	＞0.004	--	N.D.
Cadmium (Cd)	%	0.0010	＞0.002	0.002##	N.D.
Mercury (Hg)	%	0.0001	＞0.0005	0.0005	N.D.

Specimen Description：

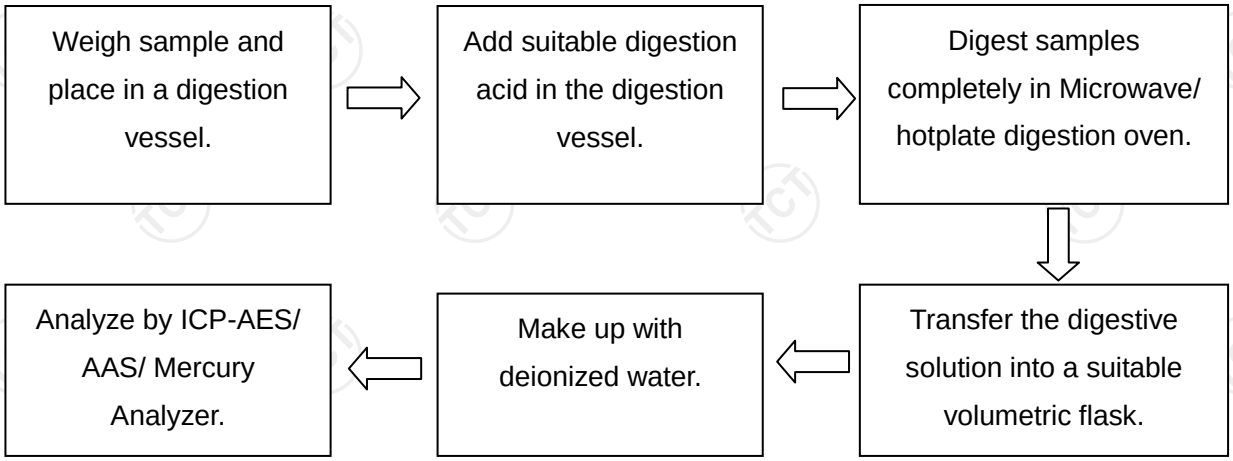
Battery

Note :
- MDL = Method Detection Limit
- N.D.= Not Detected(<MDL)
- 1mg/kg= 1ppm = 0.0001%
- "--"=Not Regulated
- # = According to the article 21.3, batteries, accumulators and button cells containing more than 0,0005 % mercury, more than 0,002 % cadmium or more than 0,004 % lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb.
- ## = Not apply to portable batteries and accumulators intended for use in:
  (a) emergency and alarm systems, including emergency lighting;
  (b) medical equipment.
- According to the article 21.1, all batteries, accumulators and battery packs should be appropriately marked with the crossed-out wheeled bin symbol.

Remark:
- Results shown is/are of total weight of the battery sample.

Test Report

Test Chart:



Photo(s) of the sample(s)

***** End of Report *****

Remark：This report is considered invalidated without the Special Seal for Inspection of the TCT. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of TCT, this test report shall not be copied except in full and published as advertisement.

中国认可
检验
INSPECTION
CNAS IB0078

危险物品
DANGEROUS GOODS

航空运输条件鉴别报告书

Identification and Classification Report for Air Transport of Goods

此报告本年度有效
有效期至2022年12月31日

报告编号：
Issued No.: PEKGZ202112184288YX300001

生效日期：
Effective Date: 2022.01.01

委托单位：深圳市龙丰泰电子科技有限公司

Applicant: Shenzhen Longfengtai Electronic Technology Co.,Ltd

物品名称：锂离子聚合物电芯 606090 3.7V 4000mAh 14.8Wh

Name of Goods: Li-ion Polymer Cell 606090 3.7V 4000mAh 14.8Wh

北京迪捷姆空运技术开发有限公司

Beijing DGM Air Transport Technology Development Co.,Ltd.

报 告 书 使 用 约 定
Terms of the Using of the Report

1. 本公司依据本年度国际航协《危险品规则》以及委托人（托运人或其代理人）提供的物品及其运输信息，确定货物的航空运输条件并出具此报告书。
The report is issued by DGM China according to IATA ***Dangerous Goods Regulations*** published in the current year and the information of the goods and the information of its shipping provided by the applicant (shipper or his agent).

2. 依据鉴别的需要，本公司要求委托人提供真实、完整的货物样品及资料。
According to the demand of identification and classification, DGM China requires the applicant to provide true and exact sample and data of the cargo.

3. 委托人保证申报的物品和/或提供的样品与交运的货物是同一种物质。
The applicant guarantees that the declared goods and/or the sample who provides should be identical with the contents of cargo that is to be transported.

4. 本公司仅对样品的鉴别结果负责。
DGM China is only responsible for the identification and classification of the sample provided by the applicant.

5. 本报告书经主检员、审核人和批准人签字并加盖本公司印章后生效。
This report will be effective only after it is signed by the inspector, checker and approver, and stamped by DGM China.

6. 未经本公司书面批准，不得复制本报告书。
The duplicating of this report is prohibited without the written approval of DGM China.

7. 私自转让、复制、盗用、冒用、涂改、或以任何媒体形式篡改的报告书无效。
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This report is only valid within the year in which the IATA ***Dangerous Goods Regulations*** is effective.

地址：北京首都国际机场货运北路天竺综合保税区BGS货运楼249室　　邮编：101300

电话：010-69479673　　传真：010-69479621

网址：www.dgmchina.com.cn　　E-mail: test@dgmchina.com.cn

项目编号 Item No.		PEKGZ202112184288	签发日期 Issued Date	2021.12.21
鉴别目的 Identification Purpose		是否属于航空运输危险物品 Dangerous Goods or not restricted	鉴别日期 Identification Date	2021.12.21
鉴别依据 Identification Criteria		IATA DGR 63rd, 2022		
物品名称 Name of Goods	中文 Chinese	锂离子聚合物电芯 606090 3.7V 4000mAh 14.8Wh		
	英文 English	Li-ion Polymer Cell 606090 3.7V 4000mAh 14.8Wh		
生产厂家 Manufacturer		深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co.,Ltd.		
件数 Pieces			注：本栏内容为托运人或其代理人在使用本报告书时候填写的运输信息，不属于鉴定内容。运输信息与报告书的关联性以及实际运输货物与报告书的一致性由托运人或其代理人保证，如发生任何不一致由托运人或其代理人承担全部责任。 （请认真填写本栏内容，并盖章） 负责人：　　联系方式：	
运单号 Air waybill No.				
目的港 Destination				
物品信息 Nature of the goods		该样品为银色近长方体电芯。 型号：606090 尺寸：88mm*60mm*6.0mm 每包装件中电池/电芯数量：120 每包装件中电池/电芯净重：8.66kg 该电芯已经做好防短路措施并装入坚固的外包装内。 该锂电芯不属于召回电芯，不属于废弃和回收电芯，并按照DGR3.9.2.6(e)规定的质量体系进行制造 根据委托方所提供的声明：本报告所述锂离子电池（或电芯）交付运输时，其荷电状态不超过设计额定容量的30%。 （注：单块电芯的重量约为72.2g。该电芯的UN38.3检测报告由深圳诚测检测技术有限公司出具，报告编号：CCJC2021A370701。该电芯的1.2米跌落测试报告由深圳诚测检测技术有限公司出具，报告编号：CCJC2021A370703。） 该电芯的UN38.3试验概要由深圳诚测检测技术有限公司出具，详见附页。 This sample is silver almost cuboid cell. Model: 606090 Size: 88mm*60mm*6.0mm Number of batteries / cells per package: 120 Net quantity of batteries/cells per package: 8.66kg Cells have been protected so as to prevent short circuits and packed in strong rigid outer packagings. The lithium cells don't belong to cells returned to the manufacturer for safety reasons, are not waste lithium cells and not lithium cells being shipped for recycling or disposal, are manufactured under a quality management program as described in 3.9.2.6 (e). Lithium ion cells and batteries must be offered for transport at a state of charge(SoC) not exceeding 30% of their rated desigh capacity.		

项目编号 Item No.		PEKGZ202112184288
物品名称 Name of Goods	中文 Chinese	锂离子聚合物电芯 606090 3.7V 4000mAh 14.8Wh
	英文 English	Li-ion Polymer Cell 606090 3.7V 4000mAh 14.8Wh
鉴别结论 Conclusions		该货物为锂离子/聚合物电芯，单独包装。额定瓦特小时为14.8Wh。已通过 UN38.3 测试，已通过包装件1.2米跌落试验，每个包装件上均有锂电池标记。 参考有关资料，根据DGR有关规定，该物质分类识别为第9类（或项）危险品，UN3480。 This goods is lithium ion/polymer cell, packed individually. Watt-hour rating is 14.8Wh. Each battery is of a type proved to meet the Requirements of each test in the UN MANUAL OF TESTS AND CRITERIA, Part III, sub-section 38.3, Each package is capable of withstanding a 1.2m drop test in any orientation without damage to the cells contained therein, without shifting of the contents so as to allow cell to cell contact and without release of contents, Each package is marked with lithium battery mark. According to IATA DGR this substance is classified as dangerous goods Class (or division) 9, UN3480.

建议运输条件 Suggestion for Transport Condition	UN/ID 编号 UN/ID No.	运输专用名称 Proper Shipping Name	类或项 Class or Div. (次要危险性) (Subsidiary Risk)	包装等级 Packing Group
	UN3480	Lithium ion batteries	9	/

包装说明 Packing Inst.	客货机 Passenger and Cargo Aircraft	Forbidden
	仅限货机 Cargo Aircraft only	965，IB
注意事项 Remarks	本货物仅限货机运输。 The goods can be transported on cargo aircraft only.	

主检员 Prepared by: 张国梁　审核人 Checked by: 梁生　批准人 Approved by:

报告单位（盖章） Stamp

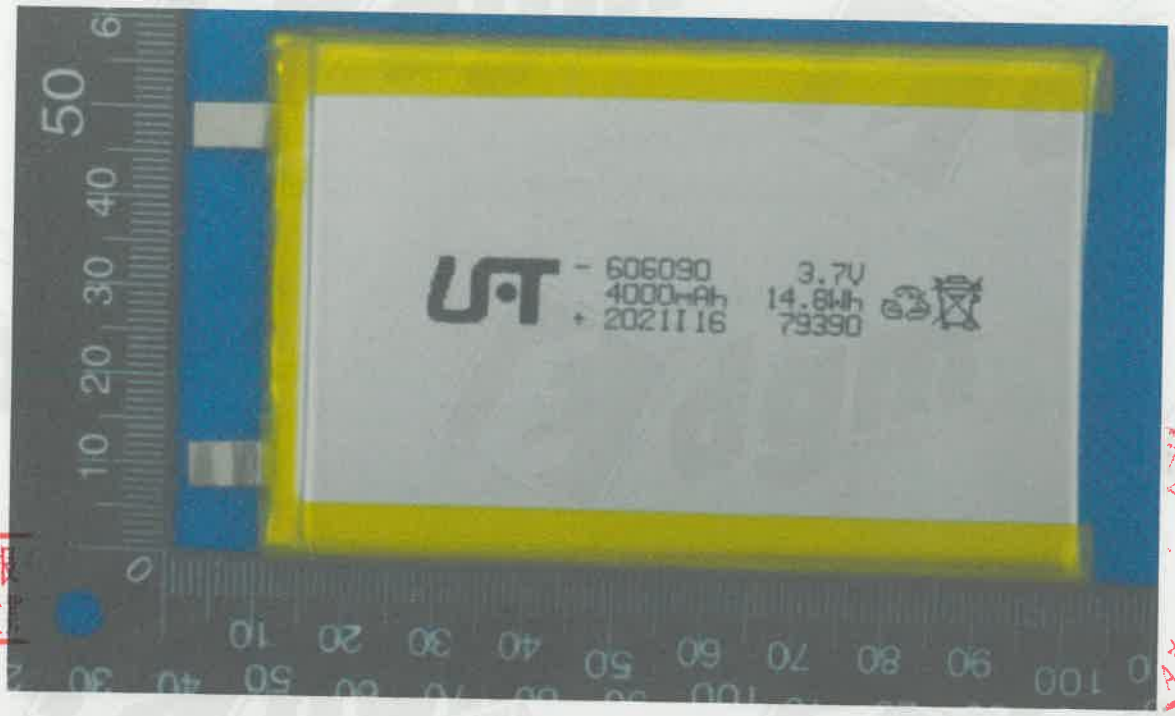
制单：　芦一萱

北京迪捷姆空运技术开发有限公司

项目编号：PEKGZ202112184288

物品名称：锂离子聚合物电芯 606090 3.7V 4000mAh 14.8Wh

电池/电芯 Battery / Cell:



包装件 Package:

UN38.3 试验概要
UN38.3 Test Summary

单位信息 Company information			
委托方 Client	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址 Address	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
联系方式 Contact information	+86-755-21008352	1225804633@qq.com	/
制造商 Manufacturer	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址 Address	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
联系方式 Contact information	+86-755-21008352	1225804633@qq.com	/
生产厂 Factory	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址 Address	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
联系方式 Contact information	+86-755-21008352	1225804633@qq.com	/
测试实验室 Test laboratory	深圳诚测检测技术有限公司 Shenzhen CCJC Technology Co., Ltd.		
地址 Address	广东省深圳市宝安区沙井街道后亭社区沙松路 135-3 号 101(1-3 层) 1-3/F.,Building 101, No.135-3, Shasong Road, Houting, Shajing Street, Bao'an District, Shenzhen, Guangdong, China		
联系方式 Contact information	+86-755-23707853	lab@ccjctek.com	www.ccjctek.com
电池信息 Battery information			
名称 Name	锂离子聚合物电芯 Li-ion Polymer Cell	商标 Brand	UT
型号 Model	606090	原始测试型号 Original tested model	/
标称电压 Nominal voltage	3.7V	容量 Rated Capacity	4000mAh 14.8Wh
描述 Description	锂离子电芯 Li-ion cell	锂含量 Lithium Content	/
质量 Mass	72.2g	外观 Appearance	银色近长方体电芯 Silver almost cuboid cell

测试信息 Test information			
UN38.3 报告编号 UN38.3 report No.	CCJC2021A370701	测试报告日期 Test report date	2021-10-26
测试标准 Test criteria	联合国《关于危险货物运输的建议书 试验和标准手册》 ST/SG/AC.10/11/Rev.7 38.3 UNITED NATIONS "Recommendations in the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7 38.3		
T.1 高度模拟 T.1 Altitude simulation	合格 Pass		
T.2 温度测试 T.2 Thermal test	合格 Pass		
T.3 振动 T.3 Vibration	合格 Pass		
T.4 冲击 T.4 Shock	合格 Pass		
T.5 外部短路 T.5 External short circuit	合格 Pass		
T.6 挤压 T.6 Crush	合格 Pass		
T.7 过度充电 T.7 Overcharge	不适用 N/A		
T.8 强制放电 T.8 Forced discharge	合格 Pass		
38.3.3(f)	/		
38.3.3(g)	/		
结论 Conclusion	经测试，样品符合联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7 38.3 标准要求。 The sample has passed the test items of UNITED NATIONS "Recommendations in the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7 38.3.		
备注 Remark	/		
签名 Signature 职务 Title	技术负责人 Technical director	程鹏	签发日期 Issued date 2021-10-26

Report No.：CCJC2021A370704

锂电池类货物
Lithium Battery Goods

货物海运运输条件鉴定书

Certification for Safe Transport of Goods by sea

样品名称及型号	锂离子聚合物电芯 606090
Sample name &Model	Li-ion Polymer Cell 606090
委托单位	深圳市龙丰泰电子科技有限公司
Consignor	Shenzhen Longfengtai Electronic Technology Co., Ltd

深圳诚测检测技术有限公司
Shenzhen CCJC Technology Co., Ltd

货物名称 Goods name	中文 Chinese	锂离子聚合物电芯 606090			
	英文 English	Li-ion Polymer Cell 606090			
委托单位 Consignor		深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.			
制造商 Manufacturer		深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.			
生产厂 Factory		深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.			
检查方法、程序 Inspection method and procedure		《国际海运危险货物规则》(40-20 版) International Maritime Dangerous Goods Code (Amdt.40-20)			
样品外观 Appearance		银色近长方体电池，尺寸 6.0*60.5*90.5(mm) Silver almost cuboid battery, size 6.0*60.5*90.5(mm)			
包装信息 Package information	电池数量 Battery number	120pcs	电池净重 net weight of batteries	8.66kg	
电池信息 Battery information	类型 Type	锂离子电芯 Li-ion Cell	型号 Model	606090	
	放置方式 Placement	只有电芯 Cell only	额定能量 Nominal energy	14.8Wh	

鉴定结论 IDENTIFICATION CONCLUSION

1. 危险性识别(Hazards identification)
锂离子电池。
Lithium ion battery.

2. 海运按照国际海事组织《国际海运危险货物规则》办理的类项(Suggestion according to IMO IMDG Code)
根据特殊规定188，该物品不受IMO IMDG Code限制。
The article is not restricted to IMO IMDG Code according to special provision 188.

3. 包装要求(Packaging requirements)
无。
None.

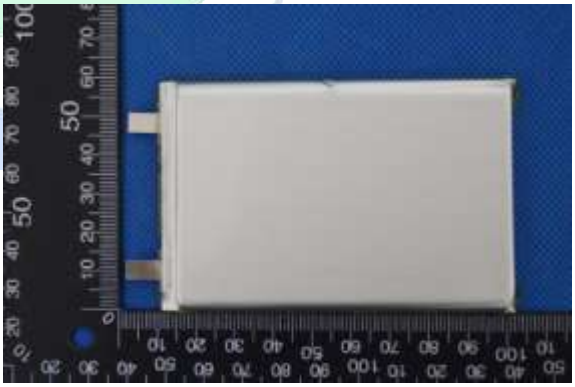
检验日期: Inspection Date:	2021-11-30	签发日期: Issue Date:	2021-12-01	生效日期: Effective Date:	2022-01-01

备注 Comments	/				
编制 Compiler:		审核 Checker:		批准 Approver:	
序号 No.	检查结果及其他事项 Inspection results and other things				

1	本报告所述锂电池按照《国际海运危险货物规则》(40-20 版) 2.9.4.5规定的质量管理体系进行制造。 Lithium cells and batteries listed in this report were manufactured under the quality management programme as described in IMDG CODE 40-20 EDITION 2.9.4.5.
2	本报告所述锂电池已通过《联合国试验和标准手册》第Ⅲ部分38.3 小节相应测试要求。包装件能够承受1.2m跌落试验。 Lithium cells and batteries listed in this report are of the types proven to meet the requirements of each applicable test in the UN Manual of Tests and Criteria, Part Ⅲ, sub-section 38.3. The package has passed the 1.2m drop test.
3	锂电池完全封装在内包装内，位于坚固的外包装中。 Lithium cells and batteries are packed in inner packagings that completely enclose the cell or battery and placed in a strong outer packaging.
4	电池具有适当的防短路措施。 Cells and batteries are properly protected to prevent short circuits.
5	每个包装件必须标示恰当的锂电池标记。 Each package shall be marked with the appropriate lithium battery mark.
6	/
7	/

包装 Package：

电池 Battery：



声 明
Statement

1.本公司依据《国际海运危险货物规则》(40-20 版)以及委托人（托运人或其他代理人）提供的物品及其运输信息，确定货物的海运运输条件并出具此鉴定书。

The certification is issued by CCJC according to International Maritime Dangerous Goods Code (Amdt.40-20) and the information of the goods and the information of its shipping provided by the consignor (shipper of his agent).

2. 委托单位必须如实提供样品及资料，并保证申报品名和样品与运输货物相同。

The consignor should provide sample and relevant data, at the same time, they should guarantee the consistence of the product's name they declared, the samples they provided and the goods to be transported.

3. 本鉴定书的鉴定结论仅对委托单位提供的样品负责。

The conclusion of this certification is responsible for the sample provided by the consignor.

4. 本鉴定书经主检员、审核人和批准人签字并加盖本公司印章后生效。

This certification will be effective only after it is signed by the Appraiser, checker and approver, and stamped by CCJC.

5. 未经本公司许可，不得部分复制、摘用本鉴定书内容。

This certification shall not be reproduced except in full, or extracted, without the written approval of CCJC.

6. 鉴定书涂改无效。

The certification is invalid if it is blotted out.

7. 本鉴定书仅在本年度内有效。

This certification is only valid within the year.

--End of certification--

Material Safety Data Sheet

MSDS 报告

MSDS Report

申请商： Prepared For:	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址： Address:	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
产品名称： Product Name:	锂离子聚合物电芯 Li-ion Polymer Cell		
型号： Model:	606090		
标称电压： Nominal Voltage:	3.7V		
额定容量： Rated Capacity:	4000mAh，14.8Wh		
质量： Weight:	Approx(约). 72.2g		
尺寸： Dimension:	6.0mm×60.5mm×90.5mm (T×W×L)		
编制单位： Prepared By:	深圳诚测检测技术有限公司 Shenzhen CCJC Technology Co.,Ltd. 广东省深圳市宝安区沙井街道后亭社区沙松路135-3号101(1-3层) 1-3/F.,Building 101, No.135-3, Shasong Road, Houting, Shajing Street, Bao'an District, Shenzhen, Guangdong, China		
报告编号： Report No.:	CCJC2021A370702	检验日期： Inspection Date:	2021-09-28
签发日期： Issue date:	2021-12-01	生效日期： Effective Date	2022-01-01

编制 Compiler:		审核 Checker:		批准 Approver :	

Material Safety Data Sheet

第一部分 化学品及企业标识
Section 1 - Chemical Product and Company Identification

产品名称： *Product Name:*	锂离子聚合物电芯 Li-ion Polymer Cell
产品型号 *Product Model:*	606090
制造商： *Manufacture:*	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.
地址： *Address:*	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen
电话： *Tel:*	+86-755-21008352
传真： *Fax:*	/
应急电话： *Emergency Tel:*	+86-755-21008352
邮箱： *E-mail:*	1225804633@qq,com

第二部分 危险性概述
Section 2 - Hazards Identification

危险性类别 *Classification of Danger*	见第十四部分。 See section 14.
浸入途径 *Primary Route(s) of Exposure*	眼睛，皮肤接触，摄入。 Eye, skin contact, ingestion.
健康危害 *Health Hazard*	正常条件下根据制造商的说明使用电池不会产生危害。使用不当的情况下，有破裂、起火、发烫、内部成分泄漏的危险，并可能造成意外损失。使用不当的行为包括但不限于下列情况：长时间充电、短路、投入火中、硬物撞击、尖物刺破、破碎，和破裂。 The batteries are not hazardous when used according to the instructions of manufacturer under normal conditions. In case of abuse, there's risk of rupture, fire, heat, leakage of internal components, with could cause casualty loss. Abuses include but not limited to the following cases: charged for long time, short circuited, put into fire, whacked with hard object, punctured with acute object, crushed, and broken.

第三部分 成分/组成信息
Section 3 – Composition/Information on Ingredients

化学名称 Chemical Composition	CAS 编号 CAS No.	浓度或浓度范围(%) Concentration or concentration ranges (%)
钴酸锂 Lithium Cobalt Oxide	12190-79-3	37.82
聚偏氟乙烯 Polyvinylidene Fluoride(PVDF)	24937-79-9	1.46
铝 Aluminum(Al)	7429-90-5	9.03
石墨 Graphite	7782-42-5	16.48
丁苯橡胶 Styrene-Butadiene Rubber (SBR)	9003-55-8	0.39
羧甲基纤维素 Carboxymethylcellulose	9000-11-7	0.31
铜 Copper (Cu)	7440-50-8	9.74
镍 Nickel (Ni)	7440-02-0	1.08
六氟磷酸锂 Lithium Hexafluorophosphate	21324-40-3	18.56
聚乙烯 Polyethylene	9002-88-4	3.03
尼龙 Nylon	24937-16-4	0.8
聚丙烯 Polypropylene	9003-07-0	1.3

标签根据EC指令。
Labeling according to EC directives.

不需要象形符号和危险短语。
No symbol and risk phrase are required.

注意: CAS 号是化学文摘服务注册号码。
Note: CAS number is Chemical Abstract Service Registry Number.

N/A =不适用。
N/A=Not apply.

第四部分 急救措施
Section 4 - First Aid Measures

眼睛 *Eye*	万一接触，立即用大量的清水冲洗至少15 分钟，翻起上下眼睑，直到化学的残留物消失为止，迅速就医。 Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

皮肤 *Skin*	万一接触，用大量水冲洗至少15 分钟，同时除去污染的衣物和鞋子，迅速就医。 Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.
吸入 *Inhalation*	立即从暴露处移至空气清新处，如果呼吸困难给予输氧，立即就医。 Remove from exposure and move to fresh air immediately. Use oxygen if available.
食入 *Ingestion*	饮用至少两杯牛奶或水。如果当事人仍然清醒可以采取催吐的方法，并且立即就医。 Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician.

第五部分 消防措施
Section 5 - Fire Fighting Measures

危险特性 *Characteristics of Hazard*	高密度粉尘遇空气会形成爆炸性混合物。燃烧生成有毒烟雾。 Dusts at sufficient concentrations can form explosive mixtures with air. Combustion generates toxic fumes.
燃烧产生的危险物品 *Hazardous Combustion Products*	二氧化碳。 Carbon dioxide.
灭火方法及灭火剂 *Fire-extinguishing Methods and Extinguishing Media*	对于小型火险，可使用水枪，干冰（也就是液态二氧化碳）或化学泡沫。 For small fires, use water spray, dry chemical, carbon dioxide or chemical foam.
灭火注意事项 *Attention in Fire-extinguishing*	因为压强关系，要穿戴可呼吸式全身防护装备，MSHA/NIOSH（经认证或等效的）， 以及佩戴全套防护装置。 Wear self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

第六部分 泄露应急处理
Section 6 - Accidental Release Measures

个人预防措施、防护装备和应急程序 *Personal Precautions, protective equipment, and emergency procedures*	万一破裂。注意！腐蚀性物质。避免接触皮肤，眼睛或衣服。确保空气流通。根据需要使用个人防护装备。将人员撤离到安全区域。让人们远离溢出/泄漏处和处于逆风。参考第七部分和第八部分中列出的防护措施。 In case of rupture. Attention! Corrosive material. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Refer to protective measures listed in Sections 7 and 8.
环境保护措施 *Environmental Precautions*	防止产品污染土壤和进入下水道或水道。 Prevent product from contaminating soil and from entering sewers or waterways.
方法和材料控制 *Methods and materials for Containment*	出于安全，阻止泄漏，可以用干砂或泥土来遏制液体溢出，立即清理溢出物。 Stop the leak if safe to do so. Contain the spilled liquid with dry sand or earth. Clean up spills immediately.

清理的方法和材料 *Methods and materials for cleaning up*	用惰性吸收剂(干砂或泥土)吸收溢出的材料。污染物转移到可接受的废物容器中。收集所有受污染的吸收剂，按照第十三部分的说明进行处理。用洗涤剂和水清洁污染区域，收集所有受污染的洗涤水，妥善处理。 Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of according to directions in Section 13. Scrub the area with detergent and water; collect all contaminated wash water for proper disposal.

第七部分 操作处置与储存
Section 7 - Handling and Storage

操作 *Handling*	拆解、挤压、直接放入火中或高温条件下，电池可能发生爆炸和燃烧。禁止短路或将电池正负极错误的安装在设备中。 In case of rupture. Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Use personal protection equipment.
储存 *Storage*	储藏于阴凉，干燥，通风处，远离接触会发生反应的材料。存储锁定。放在儿童无法接触的地方。 Store in a cool, dry, well-ventilated area away from incompatible substances. Store locked up. Keep out of the reach of children.
其他要注意的防范措施 *Other Precautions*	万一破裂。按照良好的工业卫生和安全规范进行操作。 避免接触皮肤，眼睛或衣服。使用个人防护设备。 The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

第八部分 接触控制和个体防护
Section 8 - Exposure Controls/Personal Protection

工程控制 *Engineering Controls*	保证空气流通使空气密度保持在低水平。如果在会生成微粒的情况下使用，应仔细观察 3mg/m^3 ACGIH TLV-TWA 的吸入量（总量为 10mg/m^3）。 Use adequate ventilation to keep airborne concentrations low. If used under conditions that generate particulates, the ACGIH TLV-TWA of 3mg/m^3 respirable fraction (10mg/m^3 total) should be observed.
个人防护设备 *Personal Protective Equipment*	眼睛和脸部保护：消费者无需使用。如果有接触危险： 密封安全护目镜。面部防护罩。 Eye and Face Protection: None required for consumer use. If there is a risk of contact: Tight sealing safety goggles. Face protection shield. 皮肤和身体防护：消费者无需使用。如果有接触危险：穿戴防护手套和防护服。 Skin and Body Protection: None required for consumer use. If there is a risk of contact: Wear protective gloves and protective clothing. 呼吸系统防护：正常使用条件下不需要防护设备。如果超过暴露限值或发生刺激，可能需要通风和疏散。 Respiratory Protection: No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

第九部分 理化特性
Section 9 - Physical and Chemical Properties

物理状态 *Physical State*	外形：棱形 Appearance: Prismatic
	颜色：银色 Color: Silver
	气味：泄漏时，医用乙醚的气味。 Odour: If leaking, smells of medical ether.
变化的条件: *Change in condition*	
酸碱度 *pH*	不适用。 Not applicable as supplied.
闪点 *Flash Point*	除非单个的组件暴露，否则不适用。 Not applicable unless individual components exposed.
易燃度 *Flammability*	除非单个的组件暴露，否则不适用。 Not applicable unless individual components exposed.
相对密度 *Relative density:*	除非单个的组件暴露，否则不适用。 Not applicable unless individual components exposed.
溶解性（水溶性） *Solubility (water)*	除非单个的组件暴露，否则不适用。 Not applicable unless individual components exposed.
溶解性（其他） *Solubility (other)*	除非单个的组件暴露，否则不适用。 Not applicable unless individual components exposed.

第十部分 稳定性和反应性
Section 10 - Stability and Reactivity

化学稳定性 *Chemical Stability*	稳定的。 Stable.
危险反应的可能性 *Possibility of Hazardous Reactions*	不适用。 Not Available.
应避免的条件 *Conditions to Avoid*	火焰、火花和其他火源，不相容的材料。 Flames, sparks, and other sources of ignition, incompatible materials.
不相容材料 *Incompatible materials*	氧化剂、酸、碱。 Oxidizing agents, acid, base.
有危害分解物 *Hazardous Decomposition Products*	一氧化碳、二氧化碳、氧化锂烟雾。 Carbon monoxide, carbon dioxide, lithium oxide fumes.

第十一部分 毒理学信息
Section 11 - Toxicological Information

刺激 *Irritation*	内部物质暴露的情况下，蒸汽烟雾可能对眼睛和皮肤的刺激性。 In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.
致敏 *Sensitization*	不适用。 Not Available.
再生毒性 *Reproductive Toxicity*	不适用。 Not Available.
协同材料毒理学 *Toxicologically Synergistic Materials*	不适用。 Not Available.

第十二部分 生态学信息
Section 12 - Ecological Information

通用信息： *General note:*	不允许未稀释或大量的产品接触地下水、水道或污水处理统。 Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
化学产品在环境/可能的环境预期的行为的一种生态毒性 *Anticipated behavior of a chemical product in environment/possible environmental impact/ ecotoxicity*	不适用。 Not Available.

第十三部分 废弃处置
Section 13 - Disposal Considerations

废弃处置方法 *Waste Treatment*	建议遵照国家和地方法规处置或再利用。 Recycle or dispose of in accordance with government, state & local regulations.
废弃注意事项 *Attention for Waste Treatment*	废电池不能被当作普通垃圾。不能扔进火中或置于高温下。不能解体，刺穿，破碎或类似的处理。最好的处理办法是回收利用。 Deserted batteries couldn't be treated as ordinary trash. Couldn't be thrown into fire or placed in high temperature. Couldn't be dissected, pierced, crushed or treated similarly. Best way is recycling.

第十四部分 运输信息
Section 14 - Transport Information

UN 编号 *UN number*	UN3480 or UN3481

运输专用名称 *Proper shipping name*	锂离子电池（包括锂离子聚合物电池）或 Lithium ion batteries (including lithium ion polymer batteries) or 与设备包装在一起的锂离子电池（包括锂离子聚合物电池）或 Lithium ion batteries packed with equipment (including lithium ion polymer batteries) or 内置在设备中的锂离子电池（包括锂离子聚合物电池） Lithium ion batteries contained in equipment (including lithium ion polymer batteries)
危险货物类别 *Class or division*	9
海洋污染物（是/否） *Marine pollutant (Yes/No)*	否 No
包装等级 *Packing group*	不适用 N/A
无论是对内还是对外的运输或运输方式，用户都需要注意或遵守的特殊预防措施。 *Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises*	
国际民间航空组织/国际航空运输协会： *ICAO / IATA:*	货物可根据民用航空组织(ICAO)，TI 或国际航空运输协会(IATA)，DGR 63rd (2022版)包装说明(PI)965 Section IB或PI 966 Section II 或PI 967 Section II 相关规定进行空运。 Can be shipped by air in accordance with International Civil Aviation Organization (ICAO), TI or International Air Transport Association (IATA), DGR Packing Instructions (PI) 965 Section IB, or (PI) 966 Section II, or (PI) 967 Section II appropriate of IATA DGR 63rd (2022 Edition) for transportation.
国际海运危险货物规则： *IMDG CODE:*	根据特殊规定188，该电池不受IMDG Code 2020 版(Amdt 40-20)限制。 The batteries are not restricted to IMDG Code 2020 Edition (Amdt 40-20) according to special provision 188.
此外，每个锂电池和电池组类型都必须通过联合国《关于危险货物运输的建议书 试验和标准手册》第38.3节规定的适用测试 In addition, to be permitted in transport each lithium cell and battery types must have passed the applicable tests set out in Subsection 38.3 of the UN Manual of Tests and Criteria.	

第十五部分 法规信息
Section 15 - Regulatory Information

a) 《危险物品规则》
Dangerous Goods Regulations
b) 联合国《关于危险货物运输的建议书 规章范本》
Recommendations on the Transport of Dangerous Goods-Model Regulations
c) 联合国《关于危险货物运输的建议书 试验和标准手册》
Recommendations on the Transport of Dangerous Goods-Manual of Tests and Criteria
d) 《国际航空运输协会》（IATA）
International Air Transport Association (IATA)
e) 《国际海运危险货物规则》（IMDG）
International Maritime Dangerous Goods (IMDG)

f) 《危险货物安全运输技术指南》
Technical Instructions for the Safe Transport of Dangerous Goods
g) 《危险货物分类和品名编号》- GB 6944-2012
Classification and code of dangerous goods (GB 6944-2012)
h) 2012《职业安全与健康标准》危险通信标准（29 CFR 1910.1200）
2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)
i) 《有毒物质控制法》（TSCA）
Toxic Substance Control Act (TSCA)
j) 《联邦条例》
Code of Federal Regulations
k) 符合所有联邦、州和地方法律
In accordance with all Federal, State and local laws

第十六部分 其他信息
Section 16 - Other Information

本份 MSDS 中的信息只是基于我们当前所拥有的相关材料的信息而编制的，只是为了描述本品的健康、安全与环境需求，以使各有关方面能更好地了解和信任本产品。这些信息只是提供给您，以供考虑、研究和确认。其中的一些危害预防措施描述并非是唯一的。所以本份 MSDS 不能作为使用本品实现任何特定目的的保证。各有关使用者有责任预先完成本品的安全性及其他方面的测试，以评判其是否满足您的使用目的。

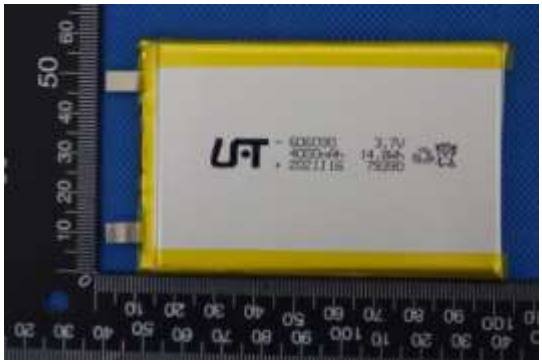
To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

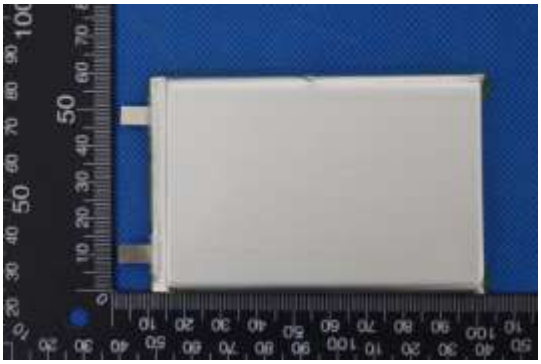
本文所包含的数据/信息已经过审核和批准，但本文档不包含出口管制信息。

The data/information contained herein has been reviewed and approved for general release on the basis that this document contains no export controlled information.

样品图片：

Sample photo:





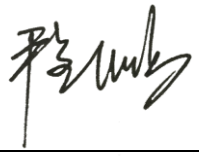
--报告结束--

--End of report--

UN38.3 试验概要
UN38.3 Test Summary

单位信息 Company information			
委托方 Client	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址 Address	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
联系方式 Contact information	+86-755-21008352	1225804633@qq.com	/
制造商 Manufacturer	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址 Address	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
联系方式 Contact information	+86-755-21008352	1225804633@qq.com	/
生产厂 Factory	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.		
地址 Address	深圳市龙华区大浪街道高峰社区上早村工业区 13 号 302 302, No. 13, shangzaocun Industrial Zone, Gaofeng community, Dalang street, Longhua District, Shenzhen		
联系方式 Contact information	+86-755-21008352	1225804633@qq.com	/
测试实验室 Test laboratory	深圳诚测检测技术有限公司 Shenzhen CCJC Technology Co., Ltd.		
地址 Address	广东省深圳市宝安区沙井街道后亭社区沙松路 135-3 号 101(1-3 层) 1-3/F.,Building 101, No.135-3, Shasong Road, Houting, Shajing Street, Bao'an District, Shenzhen, Guangdong, China		
联系方式 Contact information	+86-755-23707853	lab@ccjctek.com	www.ccjctek.com

电池信息 Battery information			
名称 Name	锂离子聚合物电芯 Li-ion Polymer Cell	商标 Brand	
型号 Model	606090	原始测试型号 Original tested model	/
标称电压 Nominal voltage	3.7V	容量 Rated Capacity	4000mAh 14.8Wh
描述 Description	锂离子电芯 Li-ion cell	锂含量 Lithium Content	/
质量 Mass	72.2g	外观 Appearance	银色近长方体电芯 Silver almost cuboid cell

测试信息 Test information			
UN38.3 报告编号 UN38.3 report No.	CCJC2021A370701	测试报告日期 Test report date	2021-10-26
测试标准 Test criteria	联合国《关于危险货物运输的建议书 试验和标准手册》 ST/SG/AC.10/11/Rev.7 38.3 UNITED NATIONS “Recommendations in the TRANSPORT OF DANGEROUS GOODS” Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7 38.3		
T.1 高度模拟 T.1 Altitude simulation	合格 Pass		
T.2 温度测试 T.2 Thermal test	合格 Pass		
T.3 振动 T.3 Vibration	合格 Pass		
T.4 冲击 T.4 Shock	合格 Pass		
T.5 外部短路 T.5 External short circuit	合格 Pass		
T.6 挤压 T.6 Crush	合格 Pass		
T.7 过度充电 T.7 Overcharge	不适用 N/A		
T.8 强制放电 T.8 Forced discharge	合格 Pass		
38.3.3(f)	/		
38.3.3(g)	/		
结论 Conclusion	经测试，样品符合联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7 38.3 标准要求。 The sample has passed the test items of UNITED NATIONS “Recommendations in the TRANSPORT OF DANGEROUS GOODS” Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7 38.3.		
备注 Remark	/		
签名 Signature 职务 Title	 技术负责人 Technical director	程 鹏	签发日期 Issued date 2021-10-26

Report No.：CCJC2021A370701

中国认可
国际互认
检测
TESTING
CNAS L9856

UN38.3 测试报告
UN38.3 Test Report

样品名称及型号	锂离子聚合物电芯 606090
Sample name &Model	Li-ion Polymer Cell 606090
委托单位	深圳市龙丰泰电子科技有限公司
Consignor	Shenzhen Longfengtai Electronic Technology Co., Ltd

深圳诚测检测技术有限公司
Shenzhen CCJC Technology Co., Ltd

样品名称 Sample Name	锂离子聚合物电芯 Li-ion Polymer Cell		样品型号 Sample Model	606090	
委托单位 Consignor	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.				
制造商 Manufacturer	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.				
生产厂 Factory	深圳市龙丰泰电子科技有限公司 Shenzhen Longfengtai Electronic Technology Co., Ltd.				
标称电压 Normal Voltage	3.7V	额定容量 Rated Capacity	4000mAh 14.8Wh	充电限制电压 Limited Charge Voltage	4.2V
充电电流 Charge Current	800mA	最大连续充电电流 Max Continuous Charge Current	2000mA	充电截止电流 End Charge Current	80mA
终止电压 Cut-off Voltage	3.0V	最大放电电流 Max Discharge Current	2000mA	商标 Trademark	
测试方法和判定标准 Test method and criterion	联合国《关于危险货物运输的建议书 试验和标准手册》 ST/SG/AC.10/11/Rev.7 38.3 UNITED NATIONS “Recommendations in the TRANSPORT OF DANGEROUS GOODS” Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7 38.3				
样品接收日期 Accepted date	2021-09-28		测试起讫日期 Test date	2021-09-28 ~ 2021-10-26	
测试项目 Test items	高度模拟、温度试验、振动、冲击、外部短路、挤压、强制放电。 Altitude simulation, Thermal test, Vibration, Shock, External short circuit, Crush, Forced discharge.				
测试结论 Conclusion	经测试，样品符合联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7 38.3 标准要求。 The sample has passed the test items of UNITED NATIONS “Recommendations in the TRANSPORT OF DANGEROUS GOODS” Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7 38.3. 签发日期(Issue date)：2021-10-26				

编制 Compiler:		审核 Checker:		批准 Approver:	

样品说明及描述：
Description and illustration of the sample:

Test items	Sample Number
T.1: 高度模拟/Altitude simulation	C01 – C10
T.2: 温度测试/ Thermal test	
T.3: 振动/ Vibration	
T.4: 冲击/ Shock	
T.5: 外短路/External short circuit	
T.6: 挤压/ Crush or 撞击/Impact	C01 – C20
T.7 过充电/ Overcharge	N/A
T.8: 强制放电/ Forced discharge	C21 – C40

样品状况良好。
The sample's status is good.

样品编号 C01~C05 为第一次循环充放电周期完全充电状态的电池组。
The conditions of the cells of samples No. C01 to C05 are at first cycle, in fully charged states.

样品编号 C06~C10 为二十五次循环充放电周期后完全充电状态的电池组。
The conditions of the cells of samples No. C06 to C10 are after 25 cycles ending in fully charged states.

样品编号 C11~C15 为第一次循环充放电周期充电至标称容量的 50%状态的电池。
The conditions of the cells of samples No. C11 to C15 are at first cycle at 50% of the design rated capacity.

样品编号 C16~C20 为第二十五次循环充放电周期充电至标称容量的 50%状态的电池。
The conditions of the cells of samples No. C16 to C20 are at 25 cycles at 50% of the design rated capacity.

样品编号 C21~C30 为第一次循环充放电周期完全放电状态的电池。
The conditions of the cells of samples No. C21 to C30 are at first cycle, in fully discharged states.

样品编号 C31~C40 为二十五次循环充放电周期后完全放电状态的电池。
The conditions of the cells of samples No. C31 to C40 are after 25 cycles ending in fully discharged states.

测试步骤：

Test Procedure:

1. 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。

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.

2. 为了量化质量损失，可用以下公式计算：质量损失(%)=(M_1-M_2)/M_1×100

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

Mass loss(%)=(M_1-M_2)/M_1×100

式中：M_1 是试验前的质量，M_2 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”。

Where M_1 is the mass before the test and M_2 is the mass after the test. When mass loss does not exceed the values in Table below, it is considered as "no mass loss".

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

3. 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%。

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.

4. 备注 Remark：

测试判定： Possible test case verdicts:	
判定不适用于测试对象 Test case does not apply to the test object.....：	N/A
测试符合规定 Test object does meet the requirement.....：	P (Pass)
测试不符合规定 Test object does not meet the requirement.....：	F (Fail)

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3.4.1	**Test T.1: 高度模拟/Altitude simulation**		**P**
	试验电池和电池组应在压力等于或低于 11.6 千帕和环境温度（20℃±5℃）下存放至少 6 小时。/Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20±5°C)		P
	电池和电池组无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。/Cells and batteries meet this requirement if there is no mass loss, 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.	无渗漏、无排气、无解体、无破裂和无起火现象。 No leakage, no venting, no disassembly, no rupture and no fire. 测试数据见表 1。 The data see table 1.	P
38.3.4.2	**Test T.2: 温度试验/Thermal test**		**P**
	试验电池和电池组应先在试验温度等于 72℃±2℃的条件下存放至少 6 小时，接着再在试验温度等于-40℃±2℃的条件下存放至少 6 小时。两个极端试验温度之间的最大时间间隔为 30 分钟。此程序重复进行，共完成 10 次，接着将所有试验电池和电池组在环境温度（20℃±5℃）下存放 24 小时。/Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2°C, followed by storage for at least six hours at a test temperature equal to - 40±2°C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ±5°C).		P
	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。/For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.		P
	电池和电池组无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。/Cells and batteries meet this requirement if there is no mass loss, 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.	无渗漏、无排气、无解体、无破裂和无起火现象。 No leakage, no venting, no disassembly, no rupture and no fire. 测试数据见表 2。 The data see table 2.	P

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3.4.3	**Test T.3: 振动/Vibration**		**P**
	电池和电池组紧固于振动机平台，但不得造成电池变形，并能准确可靠地传播振动。振动应是正弦波形，对数扫描频率在 7Hz 和 200Hz 之间，再回到 7Hz，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。/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.		P
	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）有所不同。 /The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).		P
	对电池和小型电池组：从 7Hz 开始，保持 $1g_n$ 的最大加速度，直到频率达到 18Hz。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 $8g_n$（频率约为 50Hz）。将最大加速度保持在 $8g_n$ 直到频率增加到 200 Hz。 /For cells and small batteries: from 7 Hz a peak acceleration of $1g_n$ 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 $8g_n$ occurs (approximately 50 Hz). A peak acceleration of $8g_n$ is then maintained until the frequency is increased to 200 Hz.		P
	对大型电池组：从 7Hz 开始，保持 $1g_n$ 的最大加速度，直到频率达到 18Hz。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 $2g_n$（频率约为 25Hz）。将最大加速度保持在 $2g_n$ 直到频率增加到 200Hz。 /For large batteries: from 7 Hz to a peak acceleration of $1g_n$ 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 $2g_n$ occurs (approximately 25 Hz). A peak acceleration of $2g_n$ is then maintained until the frequency is increased to 200 Hz.		N/A

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	电池和电池组试验中和试验后无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在第三个垂直安装方位上的试验后测得的开路电压不小于在进行这一试验前电压的 90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。/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.	无渗漏、无排气、无解体、无破裂和无起火现象。 No leakage, no venting, no disassembly, no rupture and no fire. 测试数据见表 3。 The data see table 3.	P
38.3.4.4	**Test T.4: 冲击/Shock**		**P**
	试验电池和电池组用坚硬支架紧固在试验装置上，支架支撑着每个试验电池组的所有安装面。/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.		P
	每个电池必须经受最大加速度 150g_n 和脉冲持续时间 6 毫秒的半正弦波冲击。针对大型电池必须经受最大加速度 50g_n 和脉冲持续时间 11 毫秒的半正弦波冲击。/Each cell shall be subjected to a half-sine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds		P
	每个电池组应根据电池组的质量而受到峰值加速度的半正弦冲击。对于小型电池组的脉冲持续时间应为 6 毫秒，对于大型电池组的脉冲持续时间应为 11 毫秒。下面的公式用于计算适当的最小峰值加速度。/Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.		N/A

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

* Mass is expressed in kilograms.

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	每个电池或电池组须在三个互相垂直的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。/ Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.		P
	电池和电池组无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。/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.	无渗漏、无排气、无解体、无破裂和无起火现象。 No leakage, no venting, no disassembly, no rupture and no fire. / 测试数据见表 4。 The data see table 4.	P
38.3.4.5	**Test T.5: 外部短路/External short circuit**		**P**
	待测试的电池或电池组应加热一段时间，以使其外表面温度达到均匀稳定的 57±4℃的温度。加热时间取决于电池或电池组的大小和设计，并应进行评估和记录。如果这种评估是不可行的，对于小型电池和小型电池组至少在 57±4℃的环境下存放 6 小时，对于大型电池和大型电池组至少在 57±4℃的环境下存放 12 小时。然后，电池或电池组在 57±4℃的环境中，应接受一个外部总电阻小于 0.1 欧姆的短路条件。/The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57±4°C, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at 57±4°C shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.		P
	这一短路条件应在电池或电池组外壳温度回到 57±4℃后继续短路 1 小时，或对于大型电池组其外壳温度已下降了一半的最大温升，并保持低于该值。短路和冷却过程至少在环境温度中进行。/This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57±4°C, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value. The short circuit and cooling down phases shall be conducted at least at ambient temperature.		P

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	电池和电池组外壳温度不超过 170℃，并且在试验过程中及试验后 6 小时内无解体，无破裂，无起火。/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.	在测试过程中以及之后 6 个小时内，外表温度不超 170°C，并且无解体，无破裂，无起火现象发生。 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. 测试数据见表 5。 The data see table 5.	P
38.3.4.6	**Test T.6: 撞击/挤压/Impact / Crush**		**P**
	撞击(适合于直径大于或等于 18mm 的圆柱形电芯)/Test procedure – Impact (applicable to cylindrical cells greater than or equal to 18 mm in diameter)	棱柱形电芯/Prismatic cell	N/A
	试样电池或元件电池放在平坦光滑的表面上，一根 316 型不锈钢棒横放在试样中心，钢棒直径 15.8 毫米 ± 0.1 毫米，长度至少 6 厘米，或电池最长端的尺度，取二者之长者。将一块 9.1 千克 ± 0.1 千克的重锤从 61 ± 2.5 厘米高处跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。垂直轨道或管道用于引导落锤沿与水平支撑表面呈 90 度落下。/The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm±0.1mm diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A 9.1 kg±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.		N/A
	接受撞击的试样，纵轴应与平坦表面平行并与横放在试样中心的直径 15.8 ±0.1 毫米弯曲表面的纵轴垂直。每一试样只经受一次撞击。/The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm±0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.		N/A
	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）/Test Procedure – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18 mm in diameter).	棱柱形电芯/Prismatic cell	P

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	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 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.		P
	(a) 施加力达到 13kN±0.78kN The applied force reaches 13kN±0.78kN		P
	(b) 样品的电压下降至少 100mV The voltage of the cell drops by at least 100 mV		N/A
	(c) 电池变形达原始厚度的 50%以 上。 The cell is deformed by 50% or more of its original thickness.		N/A
	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。/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.		P
	每个试样电池或元件电池只做一次挤压试验。试样应继续观察 6 小时。试验应使用之前未做过其他试验的电池或元件电池进行。/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.		P
	电芯满足要求：在测试过程中以及之后 6 个小时内，外表温度不超过 170°C，并且无解体和无起火现象发生。/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.	无解体，无起火现象发生。 No disassembly and no fire. 测试数据见表 6。 The data see table 6.	P
38.3.4.7	**Test T.7: 过充电/Overcharge**		**N/A**
	充电电流必须是制造商建议的最大持续充电电流的两倍。试验的最小电压如下：/The charge current shall be twice the manufacturer's recommended maximum continuous charge current. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours. The minimum voltage of the test shall be as follows:		N/A

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	(a) 制造商建议的充电电压不大于 18 伏时，试验的最小电压应是电池组最大充电电压的两倍或 22 伏两者中的较小者/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.		N/A
	(b) 制造商建议的充电电压大于 18 伏时，试验的最小电压应为最大充电电压的 1.2 倍。/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.		N/A
	充电电池组在试验过程中和试验后 7 天内无解体，无起火。/Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.		N/A
38.3.4.8	**Test T.8: 强制放电/Forced discharge**		**P**
	每个电池应在环境温度下与 12 伏直流电电源串联在起始电流等于制造商给定的最大放电电流的条件下强制放电。/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.		P
	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）。/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).		P
	原电池或充电电池在试验过程中和试验后 7 天内无解体，无起火/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.	无解体，无起火现象发生。 No disassembly and no fire. 测试数据见表 8 The data see table 8.	P

表 1 Table 1	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 (%)	电压损失 Voltage loss (%)	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)			
C01	72.768	4.19	72.765	4.18	0.004	0.24	P
C02	72.439	4.19	72.437	4.18	0.003	0.24	P
C03	71.976	4.19	71.974	4.18	0.003	0.24	P
C04	71.866	4.19	71.863	4.18	0.004	0.24	P
C05	72.300	4.19	72.298	4.19	0.003	0.00	P
C06	72.281	4.19	72.278	4.19	0.004	0.00	P
C07	71.630	4.19	71.628	4.19	0.003	0.00	P
C08	72.410	4.19	72.407	4.18	0.004	0.24	P
C09	72.460	4.19	72.458	4.18	0.003	0.24	P
C10	72.278	4.19	72.276	4.18	0.003	0.24	P

表 2 Table 2	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 (%)	电压损失 Voltage loss (%)	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)			
C01	72.765	4.18	72.745	4.12	0.027	1.44	P
C02	72.437	4.18	72.416	4.12	0.029	1.44	P
C03	71.974	4.18	71.953	4.11	0.029	1.67	P
C04	71.863	4.18	71.843	4.12	0.028	1.44	P
C05	72.298	4.19	72.278	4.13	0.028	1.43	P
C06	72.278	4.19	72.257	4.12	0.029	1.67	P
C07	71.628	4.19	71.607	4.13	0.029	1.43	P
C08	72.407	4.18	72.386	4.12	0.029	1.44	P
C09	72.458	4.18	72.438	4.11	0.028	1.67	P
C10	72.276	4.18	72.256	4.12	0.028	1.44	P

表 3 Table 3	振动 Vibration						
样品编号 Sample No	测试前 Before		测试后 After		质量损失 Mass loss (%)	电压损失 Voltage loss (%)	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)			
C01	72.745	4.12	72.745	4.12	0.000	0.00	P
C02	72.416	4.12	72.416	4.12	0.000	0.00	P
C03	71.953	4.11	71.953	4.11	0.000	0.00	P
C04	71.843	4.12	71.842	4.12	0.001	0.00	P
C05	72.278	4.13	72.278	4.12	0.000	0.24	P
C06	72.257	4.12	72.256	4.11	0.001	0.24	P
C07	71.607	4.13	71.607	4.12	0.000	0.24	P
C08	72.386	4.12	72.386	4.12	0.000	0.00	P
C09	72.438	4.11	72.438	4.11	0.000	0.00	P
C10	72.256	4.12	72.256	4.11	0.000	0.24	P

表 4 Table 4	冲击 Shock						
样品编号 Sample No	测试前 Before		测试后 After		质量损失 Mass loss (%)	电压损失 Voltage loss (%)	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)			
C01	72.745	4.12	72.745	4.11	0.000	0.24	P
C02	72.416	4.12	72.415	4.12	0.001	0.00	P
C03	71.953	4.11	71.953	4.11	0.000	0.00	P
C04	71.842	4.12	71.842	4.12	0.000	0.00	P
C05	72.278	4.12	72.278	4.11	0.000	0.24	P
C06	72.256	4.11	72.256	4.11	0.000	0.00	P
C07	71.607	4.12	71.607	4.12	0.000	0.00	P
C08	72.386	4.12	72.385	4.11	0.001	0.24	P
C09	72.438	4.11	72.438	4.10	0.000	0.24	P
C10	72.256	4.11	72.256	4.11	0.000	0.00	P

表5 Table5	外部短路 External short circuit									
样品编号 Sample No	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10
温度 (°C) Temp (°C)	123.1	124.9	116.3	120.3	117.0	119.6	123.6	125.1	120.8	121.7

表 6 Table6	挤压 Crush									
样品编号 Sample No	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
试验前电压(V) OCV prior to test	3.88	3.89	3.88	3.88	3.88	3.89	3.89	3.88	3.88	3.88
温度 (°C) Temp (°C)	23.1	22.7	23.0	22.9	23.2	23.4	22.7	23.0	22.8	23.2

表 7 Table7	电池过充试验 Overcharge Test of batteries							
样品编号 Sample No	--	--	--	--	--	--	--	--
试验前电压(V) OCV prior to test	--	--	--	--	--	--	--	--

表 8 Table 8	强制放电 Forced discharge									
样品编号 Sample No	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30
试验前电压(V) OCV prior to test	3.10	3.11	3.10	3.12	3.10	3.10	3.11	3.11	3.10	3.10
样品编号 Sample No	C31	C32	C33	C34	C35	C36	C37	C38	C39	C40
试验前电压(V) OCV prior to test	3.11	3.10	3.10	3.10	3.10	3.10	3.11	3.12	3.10	3.11

样品图片
Sample photos

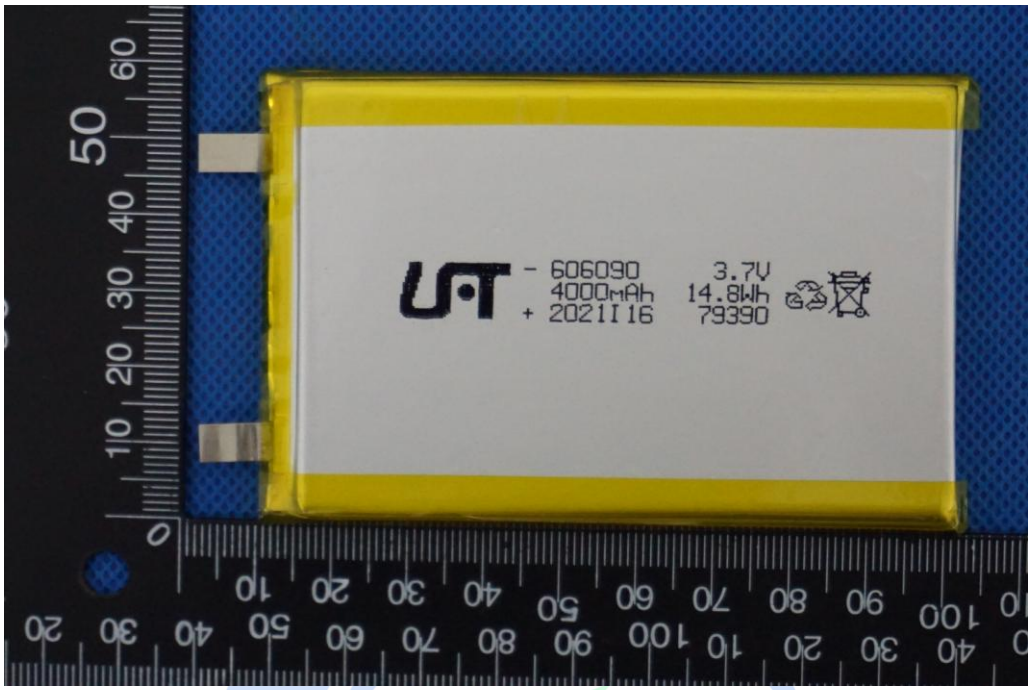


Fig. 1 – Front view of Cell

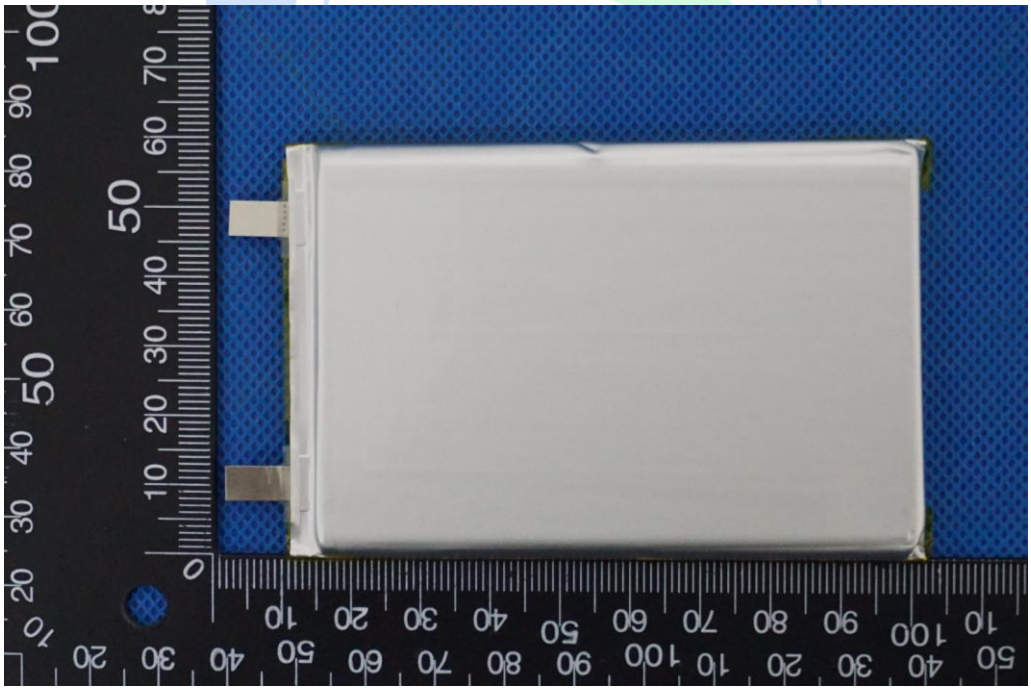


Fig.2 – Back view of Cell

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--End of test report--