Date: **2019/5/15** MSDS NO.:201905150001

Section 1 - Identification(of the product/manufacturer/undertaking)

第一部分 产品、制造商及使用识别

Product Name:Lithium Ion Battery

报告物名称: 锂离子电池组

Product model： AEC521128		Rate capacity：	145 mAh	Nominal voltage：	3.84 V
产品型号： AEC521128		额定容量：	145 mAh	标称电压：	3.84 V

Manufacturer's Name:Apower Electronics Co.,Ltd.

制造商名称:广东国光电子有限公司

Adress： Unit F2, Guoguang Industrial Park, No.8, jinghu Road of Xinya street, Huadu District, Guangzhou City, Guangdong Province, P.R.China

地址：中国广东省广州市花都区新雅街镜湖大道8号国光工业园F2栋

Postal Code:510800

邮政编码：510800

Telephone No.：+86-20-28609370

联系电话: +86-20-28609370

www.aecbattery.com

In case of emergency contact：+86- 15818896765

紧急情况请联系：86- 15818896765

・Recommended use of the chemical and restrictions on use

・推荐使用及限制使用

Recommended Use:Used in portable electronic equipments

推荐使用：用于便携式电子设备

Uses advidsed against:

限制使用：

a) Do not dismantle, open or shred secondary cells or batteries.

不可随意将电池或电池组拆开、解体。

b) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.

不可将电池或电池组置于高温环境或火焰之中。不可将电池或电池组置于阳光下暴晒。

c) Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.

不可短路电池或电池组。请勿将电池或电池组存放于杂乱的箱柜之中，以防其相互短路或被金属物品短路。

d) Do not remove a cell or battery from its original packaging until required for use.

不可将电池或电池组从其原包装中拆出，除非确有使用需要。

e) Do not subject cells or batteries to mechanical shock.

不可对对电池或电池组进行机械冲击。

f) In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.

如果发生电池漏液，请勿让液体接触皮肤或眼睛。一旦发生接触，请立即用大量清水冲洗接触区域并求医救助。

g) Do not use any charger other than that specifically provided for use with the equipment.

请勿使用非原装适配的充电器。

h) Observe the plus (+) and minus (–) marks on the cell, battery and equipment and ensure correct use.

清楚地识别在电池、电池组或设备上的正（+）负（-）极标识，确保正确使用。

i) Do not use any cell or battery which is not designed for use with the equipment.

请勿使用非原装电池或电池组。

j) Do not mix cells of different manufacture, capacity, size or type within a device.

不可对不同制造商生产的电池，或尺寸、容量、型号不一致的电池混装使用。

k) Battery usage by children should be supervised.

儿童在受监督下方可使用。

l) Seek medical advice immediately if a cell or a battery has been swallowed.

如果发生电池或电池组被吞咽，请立即就医。

m) Always purchase the battery recommended by the device manufacturer for the equipment.

请勿使用非原装适配的充电器。

n) Keep cells and batteries clean and dry.

请保持电池及电池组清洁干燥。

o) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.

如果电池或电池组连接端脏污，请用清洁的干布擦拭。

p) Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions.

电池或电池组在使用前需充电。请使用按照说明书以设备制造商推荐的充电器充电。

q) Do not leave a battery on prolonged charge when not in use.

电池组不用时请勿长时间充电。

r) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.

在电池或电池组超过储存延长期后，请对电池或电池组进行几次充放电以保证电池的性能。

s) Retain the original product literature for future reference.

请注意保留产品文件资料以备后续使用。

t) Use only the cell or battery in the application for which it was intended.

请购买设备制造商推荐的电池或电池组。

u) When possible, remove the battery from the equipment when not in use.

如果可以，在电池组长时间不用时建议从设备中取出。

v) Dispose of properly.

合理地处理处置废弃电池。

Section 2 - Hazards Identification

第二部分：有害物质鉴定

・Substance or mixture in Li-ion battery:

锂离子电池组的构成物质

Aluminum(Al)铝

Nickel(Ni)镍

Copper(Cu)铜

Lithium Cobaltate($LiCoO_2$)钴酸锂

Graphite石墨

Electrolyte电解液：Lithium hexafluorophosphate六氟磷酸锂；Solvent溶剂；

Substances above are not on the list of SVHC and are non-hazardous.

以上物质不在SVHC29种高关注物质清单内，所以无危险性。

Section 3 - Composition, Information on Ingredients

第三部分：成份特点

Ingredient Name 主要部件		Composition Material 组成材料	CAS No.	Concentration 含量
Energy Value 能量值		…	…	0.5568 Wh/pcs
Equivalent Max Lithium Content 最大锂含量		…	…	0.0435 g/pcs
Positive 正极	Tab 极耳	Aluminum(Al) 铝	7429-90-5	0.22%
		Polypropylene 聚丙烯	9003-07-0	0.10%
	Slurry 浆料	$LiCoO_2$ 钴酸锂	12190-79-3	39.10%
		NMP 烷铜	872-50-4	0.00%
	Aluminum(Al) 铝		7429-90-5	5.18%
Negative负极	Tab 极耳	Nickel(Ni) 镍	7440-02-0	0.74%
		Polypropylene 聚丙烯	9003-07-0	0.10%
	Slurry 浆料	Graphite石墨	7782-42-5	18.63%
		Carbon black 导电碳	1333-86-4	0.19%
	Cu 铜		7440-50-8	7.38%
Septum隔膜（PP/PE）		PP	9003-07-0	0.00%
		PE	9002-88-4	3.34%
Al lamination film 铝塑膜		Aluminum(Al) 铝	7429-90-5	4.99%
		Polypropylene 聚丙烯	9003-07-0	2.08%
		O-Ny 尼龙	24937-16-4	1.16%
Electrolyte 电解液		lithium Salt 锂盐	21324-40-3	1.94%
		Solvent 溶剂	confidential	13.60%
Adhesive Tape 胶带		Polyimide PI膜	25038-81-7	1.25%
		Silicone 硅油	63148-58-3	0.00%
Inert components 惰性成分			…	balance

・trade secret claims.

・商业保密声明

Because chemical composition involving company technology , the component ratio listed is an approximation, and for some trace amounts of harmful components not listed.

因化学组分涉及公司技术，故所列组分比例均为近似值，且对一些极微量的不对人体有害的组分未有列出。

Section 4 - First Aid Measures

第四部分：急救措施

・Inhalation: Make the victim blow his/her nose, gargle.Seek medical attention if necessary

吸入：使受害者呼吸畅通，必要时寻找医药救助

・Skin contact: Remove contaminated clothes and shoes immediately. Immediately wash extraneous matter or contact region with soap and plenty of water.

皮肤接触：立即脱去受污染的衣服和鞋子。立即用肥皂和大量的水清洗外部受污皮肤。

・Eye contact: Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.

眼睛接触：不要揉眼睛。立刻用水不断的冲洗眼部至少15分钟。寻找医药救助。

A battery/ cell spilled internal cell materials 电池组/电池内部的物质溢出

・Ingestion: Make the victim vomit. Immediately seek medical attention.

摄入：使食入者立即呕吐。并立即寻找医药救助。

Section 5 - Fire Fighting Measures

第五部分：消防扑救方法

・Suitable extinguishing media: Plenty of water, carbon dioxide gas,nitrogen gas, chemical powder fire extinguishing medium and fire foam.

适宜的灭火物质：大量水，二氧化碳气体，氮气，化学粉末灭火器和泡沫灭火器

Specific hazards: Corrosive gas may be emitted during fire.

请保存好产品资料以备后续参考。

・Specific methods of fire-fighting: When the battery burns with other combustibles simultaneously, take fire extinguishing method which corresponds to the combustibles.

Extinguish a fire from the windward as much as possible.

特殊的灭火方法：当电池与其他易燃物同时燃烧时，应采取与该易燃物相应的灭火措施，尽可能的在顺风向灭火。

・Special protective equipment for firefighters. Respiratory protection:Respiratory equipment of a gas cylinder style or protection-against-dust mask. Hand protection: Protective gloves.

Eye protection: Goggle or protective glasses designed to protect against liquid splashes.

Skin and body protection: Protective clothes.

灭火时需要保护器材.呼吸保护：供呼吸的气筒设备或防护面具。手部保护：护手套。眼部保护：护目鏡或者其他设计用來防止液体进入眼睛。皮肤及身体保护：防护装。

Section 6 - Accidental Release Measures

第六部分：意外事故解决措施

Emergency Procedures 步驟

Minor Spills of Cell Materials 少量物质溢出

・Remove all ignition sources.

移去所有易燃的物料

・Clean up all spills immediately.

立即清除所有的溢出物

・Avoid contact with skin and eyes.

避免溢出物与眼和皮肤接触

・Control personal contact by using protective equipment.

通过使用保护设备从为避免人体与其接触

・Use dry clean up procedures and avoid generating gas or volatile.

使整个过程在干燥条件下进行，并且避免产生气体或者挥发物。

・Ventilate the storage area.

使储存区保持通风

・Discharge the cell to Zero Voltage by a over 5 Ohm resistance, before place into waste container.

将电池扔进废气盒之前，先将其在电阻超过5欧姆的条件下放电至零压。

・Place in a suitable labeled container for waste disposal.

将废弃电池放入有对应标识的废弃盒。

Major Spills of Cell Materials 大量物质溢出

・Clean up all spills immediately.

立即清除所有的溢出物。

・Wear protective clothing, safety glasses, dust mask, gloves.

穿保护服，保护眼睛，防尘面具，手套

Section 7 - Handing and Storage

第七部分：处理和存放

Steps to be Taken in Case Material is Released or Spilled : The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

原料释放或溢出时应采取的措施：首先是离开电池组附近，让电池组冷却及蒸汽消失。避免眼睛与皮肤接触或者吸入蒸汽。用吸收剂和燃烧的方法除掉溢出液。

Waste Disposal Method: Open cells should be disposed of in accordance with local regulations.

废弃物的处理方法：电池处理应与相关规定相符。

Precautions to be Taken in Handling and Storing: Avoid mechanical or electrical abuse. Batteries may explode or causeburns, if disassembled, crushed or exposed to fire orhigh temperatures. Do not short or install with incorrect polarity.

使用和储存的预防措施：避免机械的和电气的滥用。当拆卸，撞击或者将电池掷于火中或者高温环境中时，将引起电池组爆炸或自燃，请勿短路或反极性安装。

Storage: Avoid direct sunlight, high temperature, high humidity.Store in cool place (emperature:-20～45℃,humidity:45～85%)

储存：避免阳光直射、高温和高湿。放置在干爽的地方（温度：:-20～45℃；湿度：45～85%）

Section 8 - Exposure Controls, Personal Protection

第八部分：安全控制和人员保护

Personal protective equipment 个人保护装置

Respiratory protection: Respirator with air cylinder, dust mask

呼吸保护：气筒呼吸器，防尘面具

Hand protection: Protective gloves

手部保护：防护手套

Eye protection:Goggle or protective glasses designed to protect against liquid splashes

眼部保护：护目镜或者是带有液体喷射防护设计的眼镜

Skin and body protection: Working clothes with long sleeve and long trousers

皮肤和身体保护：带有长袖和长裤的工作服

Section 9 - Physical And Chemical Properties

第九部分：物理状态化学特性

Appearance外观

Physical state 物理状态： Solid, 固态

Form 形状: Geometric solid 几何固体

Color: Metallic color 颜色：金属色

Odor: No odor 气味：无

• pH: NA pH 值：NA

• Specific temperatures/temperature ranges at which changes in physical state occur.

需明确给出发生物理状态发生变化时的温度/温度范围

There is no useful information for the product as a mixture.

因产品是混合物，所以无相关咨询

• Flash point: NA 闪点：NA

• Explosion properties: NA 爆炸特性： NA

• Density: NA 密度： NA

• Solubility, with indication of the solvent(s): Insoluble in water

溶解性（溶剂指示）：不溶于水

Section 10 - Stability and Reactivity

第十部分：稳定性和活性

Stability:Stable under normal conditions of use

稳定性：在正常使用條件下是稳定的

Conditions to Avoid: Hazardous reactions occurring under specific conditions

应避免的情况：在特殊条件下将发生危险反应

• Conditions to avoid: When cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will cause heat generation and ignition. Avoid direct sunlight and high humidity.

应避免的外部条件：当电池处于外部短路，压力，变形或超过100℃高温时将产生大量热和燃烧，避免阳光直照和高温。

• Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.

应避免的材料：可导电材料：水，海水，强氧化剂和酸

• Hazardous decomposition products: Acrid or harmful gas is emitted during fire.

产品分解的危险性：着火时会有刺激性气体或有害气体产生。

Section 11 - Toxicological Information

第十一部分：毒性信息

Lithium cobalt Oxide - $LiCoO_2$ 钴酸锂

・Acute toxicity: No applicable data.

剧毒性：无数据

Reference 参考： cobalt: LDLo, oral - Guinea pig 20mg/kg

钴：公布的最低致死剂量，20mg/kg （口服-天竺鼠剂量）

・Local effects: Unknown.

局部的影响：未知

・Sensitization: The nervous system of respiratory organs may be stimulated sensitively.
敏感性：呼吸器官的神经系统将因受到刺激而过敏。
・Chronic toxicity/Long term toxicity: 慢性毒性/长期毒性
By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
由于长期的吸入钴微粒或钴蒸汽，可能会引起严重的呼吸器官疾病。易过敏的或高敏感者可能会引起皮肤过敏或者肺部疾病。
・Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.
皮肤碱性：虽然这种情况发生的非常少，但也会引起皮疹和红斑。
Manganese 锰
・When manganese's concentration is 0.1 mg/L in water, make BOD5 reduced
水中浓度 0.1mg/L时,使BOD5降低
・Mainly for chronic poisoning,damage to the central nervous system especially extrapyramidal system
主要为慢性中毒，损害中枢神经系统尤以锥体外系统突出。
LD50：9000 mg/kg(through the rats mouth),LC50：No data
・LD50：9000 mg/kg(大鼠经口)，LC50：无资料
Aluminum 铝
・Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
局部影响：铝自身并无毒性。当它与伤口接触时将引起皮炎。
・Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).
慢性毒性/长期毒性：由于长期的吸入粗造的微粒或者浓烟，可能导致肺部受损。
Copper 铜
・Acute toxicity: 60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation. TDLo, hypodermic - Rabbit 375mg/kg
剧毒性：60-100mg的粗糙微粒会导致伴有恶心反胃的肠胃不适。公布的最低致死剂量，375mg/kg （皮下注射-兔子剂量）
・Local effects: 局部作用
Coarse particulate stimulates nose and tracheal. When it goes into one’s eyes, reddening and pain may occur.
粗糙微粒会刺激鼻子和呼吸管道，进入眼睛会疼痛
・Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.
致敏：长期性或反复接触可能会导致皮肤过敏
・Reproductive toxicity: TDLo, oral - Rat 152mg/kg
再生毒性：公布的最低致死剂量，152mg/kg（口服-老鼠剂量）
Nickel镍
・Local effects: Through the pores and sebaceous glands penetrate into the skin，causing skin allergies inflammation，Its clinical manifestations is dermatitis and eczema
局部的影响：镍离子可以通过毛孔和皮脂腺渗透到皮肤里面去，从而引起皮肤过敏发炎，其临床表现为皮炎和湿疹。
Graphite 石墨
・Acute toxicity: Unknown.
剧毒性：未知。

・Local effects: When it goes into one's eyes, it stimulates one's eyes; conjunctivitis,thickening of corneal epithelium or edematous inflammation palpebra may be caused.
局部作用：当它进入眼睛后，将刺激眼睛；将引起结膜炎，上皮细胞角膜增厚或者眼睑发炎浮肿。
・Chronic toxicity/Long term toxicity: Long-term inhalation of high levels of graphite coarse particulate may cause lung disease or a tracheal disease.
慢性毒性/长期毒性：长期或高强度的吸入石墨粗粒可能引起肺部疾病或者气管疾病。
Carcinogenicity: 致癌性
Graphite is not recognized as a cause of cancer.
石墨不是认定的致癌物。
Organic Electrolyte 有机电解液
Acute toxicity: 剧毒性：
LD50, oral - Rat 2,000mg/kg or more 半数致死量，2,000mg/kg 或更多（口服-老鼠剂量）
60-100毫克的铜微粒将引起胃部的恶心与发炎
・Local effects: Unknown.
局部作用：未知
・Skin irritation study: Rabbit – Mild
皮肤刺激研究：兔子-轻微
・Eye irritation study: Rabbit - Very severe
眼睛刺激研究：兔子-非常严重

Section 12 - Ecological Information
第十二部分：生态学信息
Marine Pollutant: Not Determined
海洋污染：无
No data for Polymer Lithium-ion Battery.
沒有关于聚合物锂电池组的相关资料
Kindly Reminder：温馨提示:
• Disallow material discharge or abandon a natural environment that have no government's permission .
在没有的到政府许可的情况下，不允许物料的排放或丢弃到环境中。废置物的处理必须按照相关的规定。
• The lithium ion battery disposal must, in accordance with professional treatment：Enterprise treat hazardous waste and transport the waste must accord with the government and local government requirements.
Don't allow individuals to burn the battery.
锂离子电池组的处置必须按照专业处理：企业按照政府以及当地政府要求，处理有害废弃物，对废弃物的运输。不允许个人进行焚烧电池或电池组。

Section 13 - Disposal Considerations
第十三部分：处理注意事项
California regulated Debris
加利福尼亚对电池组废弃物的管制
RCRA Waste Code：Non-regulated
资源保护和回收法废物代号：没有规定
Dispose of according to all federal,state,and local regulations.

电池废弃物的处理都可以按照联邦、州和地方政府的规定进行.

Section 14 - Transport Information

第十四部分：运输信息

When Lithium ion batteries' containing no more than 20Wh/cell, 100Wh/battery pack and meet the pakage requirement of Table 965-II can be treated as "Non-dangerous goods" under the United Nations Recommendations on the Transport of Dangerous Goods, provided that packaging is strong and prevent the products from short-circuit.

根据在联合国关于危险货物的运输法规，在包装牢固,防止产品短路的前提下，没有超过20Wh的锂离子电池芯及没有超过100Wh锂离子电池组且包装要求符合表965-II的可看作“为非危险品”。

With regard to air transport,the following regulations are cited and considered:

对于空运,以下规定应被引用和遵循：

I)The technical specifications of the international civil aviation organization (icao) (2019 version)

I)国际民航组织规定的技术说明（2019版本）

II)2019 International Air Transport Association(IATA)Dangerous Goods Regulations(60th ed.)

pakage requirement:(Section II of PI965/PI966/PI967, Section IB of PI965,Section IA of PI965,Section I of PI966/PI967

II)2019年国际航空运输协会(IATA)危险品条例（60th ed.）

包装要求：(Section II of PI965/PI966/PI967, Section IB of PI965,Section IA of PI965，Section I of PI966/PI967)

III)The US Hazardous Materials Regulation(HMR)pursuant to a final rule issued by RSPA (Part 49 CFR Sections 100-185),

III)美国有害物质控制(HMR)根据最后的规则RSPA签发(Part 49 CFR Sections 100-185),

IV)The Office of Hazardous Materials Safety within the US Department of Transportation's (DOT) Research and Special Programs Administration(RSPA),and

IV)在美国交通部危险化学品安全,及研究与特殊项目管理局(RSPA)

V)According with the UN38.3（UNDOT）（the following has detailed description）

V)依照《联合国危险物品运输试验和标准手册》的第3部分38. 3款（下列有详细说明）

VI)The UN classification number:(Class 9 3480 Class 9 3481).

VI)联合国分类号:（3480 第九类，3481 第九类）

With regard to transport by sea,the following regulations are cited and considered:

对于海运,引用并遵循以下规定：

I)According The United Nations dangerous goods of the proposal

依照联合国危险物品建议书的规范本

II)According he International Maritime Dangerous Goods (IMDG) Code,packaging requirement is special provision 188

依照国际海运危险品(《国际海运危险货物运输规则)的代码，包装要求为条款188

III)According with the UN38.3（UNDOT）（the following has detailed description）

依照《联合国危险物品运输试验和标准手册》的第3部分38. 3款（下列有详细说明）

VI)The UN classification number:(Class 9 3480 Class 9 3481).

VI)联合国分类号:（3480 第九类，3481 第九类）

Our products are properly classified,described,packaged,marked,and labeled,and are in proper condition for transportation according to all the applicable international and national governmental regulations,not limited to the above mentioned.We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1~T8) on the Transport of Dangerous Goods Model Regulations and Manual of the Testes and Criteria that can be treated as "Non-Dangerous Goods"

我们的产品都有适当的分类、描述、包装、标记并标示的,根据所有适用的国际和国家政府规定，在正常条件

下运输不受上述的限制；我们进一步证明产品：已经进行过测试并满足联合国建议的(T1~T8项目) 危险货物运输中的相关条件与要求，因此可被视为非危险品。

Manual of Test and Criteria(38.3 Lithum battery)测试和标准指南（锂电池组38.3条）

No.序号	Test Item 测试项目	Test Results 测试结果	Remark 备注
T1	Altitude Simulation 高度模拟	Passed 合格的	
T2	Thermal Test 温度循环测试	Passed 合格的	
T3	Vibration 震动	Passed 合格的	
T4	Shock 加速度冲击	Passed 合格的	
T5	External Short Circuit 外部短路	Passed 合格的	
T6	Impact 重物冲击	Passed 合格的	
T7	Overcharge 过充	Passed 合格的	for pack only只适用于电池（组）
T8	Forced Discharge 强制放电	Passed 合格的	for cell only只适用于电池（芯）

Section 15 -Regulatory information

第十五部分：法规信息

OSHA hazard communication standard (29 CFR 1910.1200)

美国职业健康安全管理局OSHA危害通识标准（29 CFR 1910.1200）

☐Hazardous ■ Non- hazardous

□有危险的 ■ 没危险

Section 16 - Other information

第十六部分：其它相关信息

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E-mail: qc@aecbattery.com

Remark: The batteries are safe for transportation, and it is advised to use dry power fire extinguisher in case of explosion or inflammation .

备注：电池组在运输中是安全的，建议使用干粉灭火器以防爆炸或者燃烧的情况出现。