Material Safety Data Sheet
材料安全数据表

升级记录

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Material Safety Data Sheet
材料安全数据表

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Section 1- Labelling of chemical products and enterprises
第一节 - 化工产品和企业标识

Product Name: Rechargeable Li-ion Battery 化学品中文名称: 可充电锂离子电池

Product Model 产品型号: 501128PF3

Nominal Voltage 额定电压: 3.8 V

Minimal Capacity 最小容量: 140 mAh

Watt-hour 瓦 时: 0.532 Wh

制造商名称：重庆市紫建电子股份有限公司 Manufacturer's Name:Chongqing VDL Electronics Co., Ltd.

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Referenced documents 参考文件：ISO 11014:2009 Safety data sheet for chemical products

Section 2 - Hazards summarizing
第二节-危险性概述

Lithium-ion batteries are classified as Class IX dangerous goods.Not dangerous with nomal use.Do not dismantle，open or shred the battery ingredients contained within or their ingredients products could be harmful.
锂离子电池属于第九类危险品。正常使用没有危险，不能拆解、打开或分解电池，里面的材料或成分是有害的。
Primary Route s of Exposure：inhalation，ingestion，Skin contact and Eye contact.
接触途径：吸入、食入、皮肤接触、眼睛接触。
Potential Health Effects：潜在健康影响：

- inhalation：

Vapors or mists from a ruptured battery may cause respiratory irritation.

- 吸入：

破裂的电池散发出来的气雾会引起呼吸道刺激。

- Ingestion：

The battery ingredients contained within or their ingredients products can cause serious chemical burns of mouth，esophagus，and gastrointestinal tract.

- 食入：

电池的组成成分或原料可以导致嘴、食道和胃肠道的严重化学烧伤。

- Skin：

Skin contact with contents of an open battery can cause severe iritation or burns to the skin.

- 皮肤：

皮肤接触到电池的内部化学材料可能会导致严重的刺激或烧伤皮肤。

- Eye：

Eye contact with contents of an open battery can cause severe irritation or burns to the eye.

- 眼睛：

眼睛接触到电池的内部化学材料可能会导致严重的刺激或烧伤眼睛。

Section 3 - Composition / Information on Ingredients
第三节-组成/成分信息

Ingredient Name 成分名称	Concentration 含量	CAS No. CAS号
Lithium Cobalt Oxide 钴酸锂	30%~50%	12190-79-3
Nylon 尼龙	0.5%~5%	25038-54-4
Carbon Black 炭黑	0.5%~1%	1333-86-4
Polyvinylidene Fluoride PVDF	0.5%~1%	24937-79-9
Aluminium 铝	5%~10%	7429-90-5
Graphite 石墨	15%~25%	7782-42-5
Styrene-Butadiene Rubber SBR	0.2%~1%	9003-55-8
Carboxy methyl cellulose CMC	0.2%~1%	9004-32-4
Copper 铜	5%~15%	7440-50-8
Nickel 镍	0.5%~1.5%	7440-02-0
Lithium Hexafluorophosphate 六氟磷酸锂	2%~7%	21324-40-3
Ethylene carbonate 碳酸乙烯酯EC	1%~9%	96-49-1
1,3-Propanesultone 1,3-丙烷磺酸内酯	0.075%~0.6%	1120-71-4
Propionic acid ethyl ester 丙酸乙酯	3%-6%	105-37-3
Polyethylene 聚乙烯	1%~5%	9002-88-4
PET	0.5%~5%	25038-59-9
Other 其他	0.5-5%	——

Section 4 - First Aid Measures
第四节-急救措施

If the battery case is ruptured, chemical contact with the human body can be hazardous. In the event of exposure, the following emergency measures should be taken:

如果电池外壳破裂，化学物质接触人体会产生危害，一旦发生接触，应采取以下应急措施：

- Inhalation:

Remove from exposure to fresh air immediately, give oxygen if breathing is difficult, seek medical attention immediately.

- 吸入：

需要立即从有害物质暴露处移至空气清新处，如果呼吸困难给予输氧，立即就医。

- Ingestion:

If ingestion of contents of an open battery occurs, never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 60 to 240 mL (2-8 oz.) of water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration and have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

- 摄入:

如果摄入了电池的内部物质，如果患者突然失去意识，或是无意识的抽搐，不要给患者口服任何东西。让患者用清水彻底清洗口腔。不要催吐，让患者饮用60到240毫升2-8盎司的清水。如果发生自然地呕吐是自然现象，让患者身体自然前倾和再次用水清洗口腔。迅速将患者送往急救中心。

- Skin contact:

Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.

- 皮肤接触：

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。

- Eye contact:

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

- 眼睛接触：

不要擦拭眼睛。立即用清水冲洗眼睛至少15分钟，寻求医疗援助。

Section 5 - Fire Fighting Measures
第五节-消防措施

- Suitable extinguishing media:

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

- 合适的灭火媒介:

大量的水，二氧化碳气体，氮气，化学干粉灭火介质或泡沫介质。

- Specific hazards:

Corrosive gas may be emitted during fire.

- 具体危害：

火灾期间可能释放腐蚀性气体 一氧化碳，二氧化碳，锂氧化物烟气等 。

- Specific fire extinguishing measures:

when the battery and other combustible materials are burned, the fire extinguishing mode can be taken corresponding to the combustible materials. Put out the fire on the upwind whenever possible.

- 具体灭火措施：

当电池和其他可燃物燃烧的同时可采取与可燃物相对应得灭火方式.尽可能在上风向进行灭火。

- Special protective equipment for firefighters:

1. Respiratory protection: Respiratory equipment of a gas cylinder style or protection-against-dust mask Hand protection；2.Protective gloves Eye protection；3. Goggle or protective glasses ； 3.designed to protect against liquid splashes Skin and body protection: Protective clothes.

- 消防人员的特殊防护设备：

1.呼吸防护: 气瓶式呼吸设备或防尘口罩手防护；2.护眼防护手套；3.护目镜或防护眼镜；4.用于防止液体飞溅皮肤和身体防护：防护服。

Section 6 - Accidental Release Measures
第六节-泄漏应急处理

Emergency Procedures应急程序：

- Minor Spills of Cell Materials
- 电池材料的轻微泄露

Remove all ignition sources.
移除所有点火源。
Clean up all spills immediately.
迅速清理所有泄露。
Avoid contact with skin and eyes.
避免接触皮肤和眼睛。
Control personal contact by using protective equipment.
使用防护设备控制个人接触。
Use dry clean up procedures and avoid generating gas or volatile.
使用干式清洁程序，避免产生气体或挥发性物质。
Ventilate the storage area.

给储藏区通风。
Discharge the cell to Zero Voltage by a over 5 Ohm resistance, before place into waste container.
在放入废物容器之前，通过超过5欧姆的电阻将电池放电至零电压。
Place in a suitable labeled container for waste disposal.
放置在适当的贴有标签的容器中进行废物处理。
- Major Spills of Cell Material
- 电池材料的重大泄漏

Clean up all spills immediately.
迅速清理所有泄露。
Wear protective clothing, safety glasses, dust mask, gloves.
穿戴防护服、安全眼镜、防尘口罩、手套。
Secure load if safe to do so. Collect recoverable product.
如果安全的话，固定负载.收集可回收产品。
Use dry clean up procedures and avoid generating gas or volatile.
使用干式清洁程序，避免产生气体或挥发性物质。
Ventilate the storage area.
给储藏区通风。
Discharge the cell to Zero Voltage by a over 5 Ohm resistance, before place into waste container.
在放入废物容器之前，通过超过5欧姆的电阻将电池放电至零电压。
Collect remaining material in containers with covers for disposal.
将剩余材料收集在带盖子的容器中进行处理。
Flush spill area with water.
用水冲洗溢出区域。
- Protective Actions for Spill
- 泄露的保护措施

Measures to be taken in the event of a material leak or spill: The preferred response is to leave the area and allow the cell to cool and the vapours to dissipate. Avoid skin and eye contact or inhalation of vapours. Remove spilled liquid with absorbent
材料泄漏或溢出时应采取的措施：首选的反应是离开该区域，让电池冷却，蒸汽消散。避免皮肤和眼睛接触或吸入蒸汽。用吸收剂清除溢出的液体并焚烧。

Section 7 - Handling and storage
第七节-操作处置与储存

The battery should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container. Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

禁止打开、毁坏或焚烧电池，因为电池有可能在这些处理过程中发生爆炸、破裂或泄露等事故。禁止将电池短路、过充、强制放电或扔入火中。禁止挤压刺穿电池或将电池浸入溶液中。

Operation Disposition:
Don't handing the batteries in manner that allows terminals to short circuit. Do not open, disassemble, crush or burn battery.
操作处置：
不要以让接头短路的方式对电池进行操作。不要打开，分解，挤压或燃烧电池。
Precautions in storage:
储存中的防范措施：
must be stored in an air-conditioned environment, requirements: -20°C ≤ temperature ≤ 35°C, humidity: ≤ 75%; try to isolate from organic solvents and toxic, corrosive substances, such as by the conditions can not be isolated, the battery should be avoided and any toxic, corrosive substances or organic solvents in contact with the contact (including gas contact). Prohibit high temperature storage of the battery, contact with heating equipment, avoid direct sunlight, etc., and the distance from the heat source (heating equipment, etc.) shall not be less than 2m.

必须在空调环境中存储，要求：-20°C≤温度≤35°C，湿度：≤75%；尽量与机溶剂及有毒、有腐蚀性的物质隔离，如受条件限制不能隔离，应避免电池与任何有毒、有腐蚀性物质或有机溶剂接触(包括气体接触)。禁止将电池高温储存、接触加热设备、避免阳光直射等，与热源(暖气设备等)的距离不得小于2m。

Other Precautions:
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.

其他要注意的防范措施：

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。禁止短接或将电池正负极错误的安装在设备
Keep out of reach of children.
储存在小孩接触不到的地方。

Section 8 - Exposure Controls, Personal Protection
第八节-接触控制/个体防护

Personal protective equipment
个人防护设施
Respiratory protection: Respirator with air cylinder, dust mask.
呼吸防护：带气瓶的呼吸器、防尘口罩。
Hand protection: Protective gloves.
接触防护：防护手套。
Eye protection:Goggle or protective glasses designed to protect against liquid splashes.
眼睛防护：设计用于防止液体飞溅的护目镜或防护眼镜。
Skin and body protection: long sleeves, trousers, work clothes.
皮肤和身体防护：长袖、长裤、工作服。

Section 9 - Physical And Chemical Properties
第九节-理化特性

Physical state :Solid
物理状态 ：固态
Odor: Odorless
气味: 无气味
pH: NA
酸碱度: 不适用
Specific temperatures/temperature ranges where changes in physical state occur: No useful information on mixture products.
具体温度/物理状态发生变化的温度范围：没有关于混合物产品的有用信息。
Flash point: NA
闪点: 不适用
Explosion properties: NA
爆炸特性: 不适
Density: NA
稠度: 不适用
Solubility, with indication of the solvent(s): Insoluble in water
溶解性，有溶剂指示：不溶于水。

Section 10 - Stability and Reactivity
第十节-稳定性和反应性

Stability:Stable under normal conditions of use
稳定性：在正常使用条件下稳定

- Conditions to avoid: Hazardous reactions occurring under specific conditions.
- 避免的条件：在特定条件下发生的危险反应。
- 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.
- 应避免的条件：当电池暴露在外部短路、挤压、变形、温度高于100摄氏度时，会导致发热和点火。避免阳光直射和高湿度。
- Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.
- 避免使用的材料：导电材料、水、海水、强氧化剂和强酸。
- Toxic Fumes，and may form peroxides.
- 有毒烟雾，并可能形成过氧化物。

If leaked，forbidden to contact with strong oxidizers，mineral acids，strong alkalis，halogenated hydrocarbons.
如果发生泄露，避免与强氧化剂，无机酸，强碱，卤代烃接触。

Section 11 - Toxicological Information
第十一节-毒理学信息

Lithium cobalt Oxide - $LiCoO_2$钴酸锂 - $LiCoO_2$

- Acute toxicity: No applicable data.
- 急性毒性：无适用数据。
- Reference：cobalt: LDLo, oral - Guinea pig 20mg/kg

- 参考：钴： LDLo, 口服-豚鼠20mg/kg
- Local effects: Unknown.
- 局部效应：未知。
- Sensitization: The nervous system of respiratory organs may be stimulated sensitively.
- 致敏：呼吸器官的神经系统可能受到敏感刺激。
- Chronic toxicity/Long term toxicity: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.
- 慢性毒性/长期毒性：长期吸入粗颗粒物或钴蒸气，有可能导致严重的呼吸器官疾病。过敏或过敏症患者可能会出现皮肤反应或肺部疾病。
- Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.
- 皮肤腐蚀性：虽然非常罕见，但可能会导致皮肤皮疹和过敏性红斑。

Manganese锰

- When manganese's concentration is 0.1 mg/L in water, make BOD_5 reduced.
- 当锰在水中的浓度为0.1mg/L时，使BOD_5降低。
- Mainly for chronic poisoning,damage to the central nervous system especially.
- 主要用于慢性中毒，尤其是对中枢神经系统的损害。
- Extrapyramidal system锥体外系：LD_{50}：9000 mg/kg(through the rats mouth),LC_{50}：No dataLD_{50}：9000 mg/kg 通过鼠口腔 ，LC_{50}：无数据。

Aluminum铝

- Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
- 局部效应：铝本身没有毒性。当它进入伤口时，可能会引起皮炎。
- 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：长期吸入粗颗粒物或烟雾可能导致肺损伤 铝肺 。

Copper铜

- Acute toxicity: 60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation. TDLo, hypodermic - Rabbit 375mg/kg
- 急性毒性：60-100mg大小的粗颗粒会引起胃肠道紊乱，伴有恶心和炎症。TDLo，皮下注射-兔子375mg/kg
- Local effects:Coarse particulate stimulates nose and tracheal. When it goes into one’s eyes, reddening and pain may occur.
- 局部影响：粗颗粒刺激鼻子和气管。当它进入眼睛时，可能会变红和疼痛。
- Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.
- 致敏：皮肤的致敏可能是由长期或反复接触引起的。
- Reproductive toxicity: TDLo, oral - Rat 152mg/kg.
- 生殖毒性： TDLo, 口服-大鼠 152mg/kg。

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.
- 局部效应：皮脂腺通过毛孔渗入皮肤，引起皮肤过敏性炎症，其临床表现为皮炎和湿疹。

Graphite石墨

- Acute toxicity: Unknown.
- 急性毒性：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.
- 局部效应：当它进入眼睛时，刺激眼睛；可能引起结膜炎、角膜上皮增厚或眼睑水肿性炎症。
- 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：长期吸入高水平的石墨粗颗粒可能导致肺部疾病或气管疾病。

- Carcinogenicity:致癌性：
- Graphite is not recognized as a cause of cancer.石墨不被认为是致癌的原因。

Organic Electrolyte有机电解液

- Acute toxicity:LD50, oral - Rat 2,000mg/kg or more HLD(half lethal dose)，2,000mg/kg or more take orally ;60-100mg copper particles can cause stomach sicchasia and inflammation.
- 急性毒素：LD50,口服-大鼠 2,000mg/kg 或 更多HLD 半致死剂量 ，2,000mg/kg 或更多 口服 ;60-100mg铜颗粒可导致胃干燥和炎症。
- Local effects: Unknown.
- 局部效应：未知。
- Skin irritation study: Rabbit – Mild.
- 皮肤刺激性研究：兔子-轻度。
- Eye irritation study: Rabbit - Very severe.
- 眼睛刺激性研究：兔子 - 重度。

Section 12 - Ecological Information
第十二节-生态信息

Marine Pollutant: Not Determined.No data for Polymer Lithium-ion Battery.
海洋污染物：未确定。没有聚合物锂离子电池的数据。
Kindly Reminder：Disallow material discharge or abandon a natural environment that have no government's permission .
温馨提醒：不允许物质排放或放弃未经政府许可的自然环境。
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
企业处理危险废物和运输危险废物必须符合政府和当地政府的要求，不允许个人焚烧电池。

Section 13 - Disposal Consideration
第十三节-废弃处置

Waste disposal must be in accordance with the applicable regulations. Disposal of the lithium ion battery/cell should be performed by permitted, professional disposal Page, firms knowledgeable in State or Local requirements of hazardous waste treatment and hazardous waste transportation. Incineration should never be performed by battery eventually by trained professional in authorized facility with proper gas and fume but users, treatment.

废物处理必须符合适用法规。锂离子电池/电池的处置应由许可的专业处置机构进行，了解州或地方危险废物处理和危险废物运输要求的公司。焚烧最终不得由经过培训的专业人员在具有适当气体和烟雾的授权设施中使用电池进行，但应由用户进行处理。

Section 14 - Transport Information
第十四节-运输信息

UN No. and Shipping name：UN 3480 Lithium ion batteries.
UN编号及运输专有名称：UN 3480锂离子电池
UN 3481 Lithium ion batteries packed with equipment.
UN 3481与设备包装在一起的锂离子电池
UN 3481 Lithium ion batteries contained in equipment
UN 3481锂离子电池包括锂聚合物电池
Label for conveyance:Battery Mark, class 9 lithium battery or sodium ion battery hazard label (Only for UN3480), Cargo Aircraft Only Label (Only for UN3480)

运输标签：电池标记，第 9 类锂电池或钠离子电池危险品标签 只适用UN3480 ，仅限货机标签 只适用 UN3480
Packaging Group:N/A
包装等级：不适用
EmS No./EmS:F-A, S-I
Marine pollutants: No
海洋污染物：无

运输方式： 陆运

ICAO/IATA	根据国际民用航空组织(ICAO),国际航空协会(IATA), DGR包装说明PI 965 IB, PI 966 II, PI 967 II相关规定进行空运。 Airfreight in accordance with the International Civil Aviation Organisation (ICAO), International Air Transport Association (IATA), DGR packing instructions PI 965 IB, PI 966 II, PI 967 II.	DGR 66 th (2025)ICAO (2025-2026 edition)
IMDG CODE	When the battery is less than 20Wh, it is transported according to the relevant provisions of the International Maritime Dangerous Goods Code (IMDG CODE) Special Provision 188.当电池小于20Wh，根据《国际海运危险货物规则》(IMDG CODE)特殊规定188条款相关规定运输。	IMDG CODE (Amdt. 42-24)

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"

我们的产品根据所有适用的国际和国家政府法规 不限于上述规定 进行了适当的分类、描述、包装、标记和标签，并处于适当的运输状态。我们进一步证明，所附产品已根据联合国关于危险货物运输模式的建议 T1~T8 进行测试，并满足要求和条件可被视为“非危险品”的试验法规和手册以及标准。

Manual of Test and Criteria(38.3 Lithium battery) 测试和标准手册 38.3锂电池			
No.	Test Item 测试项目	Test Results 测试结果	Remark 备注
T1	Altitude Simulation 高空模拟	Passed 通过	
T2	Thermal Test 热试验	Passed 通过	
T3	Vibration 振动	Passed 通过	
T4	Shock 震动	Passed 通过	
T5	External Short Circuit 外部短路	Passed 通过	
T6	Impact/Crush 冲击/挤压	Passed 通过	for cell only 只针对电池
T7	Overcharge 过充测试	Passed 通过	for pack only 只针对包装
T8	Forced Discharge 强制放电	Passed 通过	for cell only 只针对电池

Section 15 - Regulatory information
第十五节-法规信息

Law information
法律信息
《Dangerous Goods Regulations》
《危险品规则》
《Recommendations on the Transport of Dangerous Goods Model Regulations》
《关于危险货物运输的建议书 规章范本》
《International Maritime Dangerous Goods Code》
《国际海运危险货物规则》
《Technical Instructions for the Safe Transport of Dangerous Goods》
《危险品安全运输技术指令》

《Safety data sheet for chemical products -Content and order of sections》

《化学品安全技术说明书 内容和项目顺序》
《Guidance on the compilation of safety data sheet for chemical products》
《化学品安全技术说明书编写指南》
《List of Dangerous Chemical Substances 2015》
《危险化学品目录 2015 》
《Safety data sheet for chemical products-Content and order of sections》
《化学品安全技术说明书 内容和项目顺序》
《Globally Harmonized System of Classification and Labeling of Chemicals (GHS)》
《全球化学品统一分类和标签制度 全球统一制度 》

Section 16 - Other information
第十六节-其他信息

For more information please contact:
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Web网站： www.gdvdl.com

Remark: The batteries are safe for transportation, and it is advised to use dry powder fire extinguisher in case of explosion or inflammation.
备注：电池运输安全，建议使用干粉灭火器，以防爆炸或燃烧。

Production Department: Quality Department, Process Department, Safety and Environment Department

制作部门：品质部、工艺部、安环部

Producers:制作人:陈纯

reviewer:审核人:[illegible]

Approver:批准人:陈[illegible]