材料安全数据表
Material Safety Data Sheet

样品名称：可充锂离子电池组 R2416-4S2P-XDEV 14.4V 5.8Ah

Samples Name: Rechargeable Li-ion Battery R2416-4S2P-XDEV 14.4V 5.8Ah

供应商名称：浙江欣动能源科技有限公司

Supplier Unit: De.power Technology Limited

供应商地址：浙江省金华市兰溪市兰江街道鸿运路 16 号

Supplier Address: No.16 Hongyun Road, Lanjiang Street, Lanxi City, Jinhua City, Zhejiang Province, China

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第 1 部分 -化学产品和公司的标识

Section 1 – Chemical Product and Company Identification

样品名称：Rechargeable Li-ion Battery

Sample Model： **R2416-4S2P-XDEV**

制造商：浙江欣动能源科技有限公司

Manufacturer: De.power Technology Limited

生产商：惠州市欣动能源科技有限公司

Factory：De.power Technology Limited

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第 2 部分 -成份/成份信息

Section 2 – Composition/Information on Ingredient

组分 Ingredient	CAS No.	浓度 Concentration %
钴锂锰镍氧化物 Lithium nickel manganese cobalt (LiNixCoyMn1-x-yO2)	346417-97-8	49%~52%
石墨 Graphite	7782-42-5	24%~32%
聚偏氟乙烯树脂 Poly Vnylidene Fluoride (PVDF)	24937-79-9	<2%
碳酸乙烯酯 Ethylene carbonate	96-49-1	4~7%
碳酸二甲酯 Dimethyl carbonate	616-38-6	6~8%
六氟磷酸锂 Lithium hexafluorophosphate (LiPF6)	21324-40-3	1%~4%

第 3 部分 –主要危险性识别

Section 3 –Hazards Identification

健康危害(急性和慢性)

Health Hazards (Acute and Chronic)

化学物质包裹在密封的容器中，只有在受到机械应力或者电力滥用时才会发生化学品暴露风险。应避免

皮肤和眼睛接触电解液或锂电池挤出物。

These chemicals are contained in a sealed can .Risk of exposure occurs only if the battery is mechanically or electrically abused. Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

暴露的迹象/症状

Sign/Symptoms of Exposure

短路的锂电池与皮肤接触会导致热和化学灼伤，可能还会引起生殖危害。

A shorted lithium battery can cause thermal and chemical burns upon contact with the skin. May be a reproductive hazardous.

第 4 部分–急救措施

Section 4 – First Aid Measures

眼睛/Eyes

用大量的水冲洗眼睛至少 15 分钟，偶尔抬起上下眼睑。获得医疗援助。

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

皮肤/Skin

除去被污染的衣服，用大量的水冲洗皮肤 15 分钟的淋浴。获得医疗援助。

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

吸入/Inhalation

立即离开暴露的地方，并转移到新鲜空气中。如果可用，请使用氧气。

Remove from exposure and move to fresh air immediately. Use oxygen if available.

摄入/Ingestion

至少服用 2 杯牛奶或清水。持续呕吐，除非病人是失去意识。立即送医。

Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician.

第 5 部分 -消防措施

Section 5 – Fire Fighting Measures

闪点/Flash Point: 不涉及 N/A

自燃温度/Auto-Ignition Temperature: 不涉及 N/A

灭火介质/Extinguishing Media：干粉，二氧化碳 Dry powder， CO_2

不寻常的火灾和爆炸危险：当电池内部过热时，电池可能会排出气体。

Unusual Fire and Explosion Hazards: Cell may vent when subjected to excessive heat-exposing battery contents.

有害燃烧产物：一氧化碳、二氧化碳、氧化锂烟雾。

Hazardous Combustion Products: Carbon monoxide, carbon dioxide, lithium oxide fumes.

第 6 部份-意外释放的应急措施

Section 6 – Accidental Release Measures

材料泄露时用采取的措施 Steps to be taken in case Material is Released of Spilled

如果电池材料泄露时，撤离该区域人员，直到烟雾消散。尽可能增大通风量以清除有害气体。随后使用抹布擦拭干净，脏污的抹布用塑料袋装好并放进铁制容器中。

If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can.

第一反应就是离开泄露区，让电池冷却和蒸汽消散。尽最大可能通风。避免皮肤和眼睛接触或吸入蒸汽。使用吸收剂或者焚烧方式清除溢出的液体。

The preferred response is to leave the area and allow the batteries to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eyes contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

废物处理方法/Waste Disposal Method

建议在电池放电完成、寿命结束后，统一将废旧电池交给相关部门按照当地、州和联邦政府的要求处理。咨询当地环境保护局和/或联邦环保局。

It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental protection agency and/or federal EPA.

第 7 部份-处理和存储

Section 7 –Handling and Storage

电池不应被打开，损毁或焚烧，因为它们的内容物可能会从破裂的密封容器中泄漏并释放到环境。

切勿让电池线路短路、过度充电、强制放电、丢进火中。切勿挤压或刺穿电池，或浸泡在液体中。

The batteries 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.

处理和存储防护措施

Precautions to be taken in handling and storing

避免机械或电气滥用。存储在阴凉、干燥和通风的环境，避免温度骤变。应避免在高温下存放电池。请勿将电池放置在靠近加热设备旁边，避免在长时间在阳光下直射。

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change .Storage at high temperatures should be avoided. Do not place the battery near heating

equipment, nor expose to direct sunlight for long periods.

其他预防措施/Other Precautions

拆卸、碾碎电池或者将电池置于火中或高温情况，电池可能会爆炸甚至造成烧伤。请勿短路电池或极性安装错误。

Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

第 8 部分-暴露控制，个人防护

Section 8 –Exposure Controls, Personal Protection

呼吸防护：在电池排气的情况下，尽可能提供尽可能的通风环境。避免与正在排气的电池在封闭区域。在正常情况下不需要使用呼吸防护用品。

Respiratory Protection： In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting batteries. Respiratory Protection is not necessary under conditions of normal use.

通风系统：在正常使用情况下不需要。

Ventilation: Not necessary under conditions of normal use.

防护手套：在正常使用情况下不需要。

Protective Gloves: Not necessary under conditions of normal use.

其他防护服或设备：在正常使用情况下不需要使用防护用品、防护手套、防护服和带侧护罩的安全玻璃等。

Other Protective Clothing or Equipment: Not necessary under conditions of normal use.

Protection, Protective Gloves, Protective Clothing and safety glass with side shield.

第 9 部分-理化特性

Section 9 –Physical and Chemical Properties

额定电压/Nominal Voltage: 14.4V

额定容量/Rated Capacity: 5.8Ah

总能量/Total Energy: 83.52Wh

外观特征: 无味、固体/**Appearance characters:** Odorless, solid

第 10 部分-稳定性和反应活性

Section 10 –Stability and Reactivity

稳定性：稳定/Stability：Stable

避免接触的条件：加热、机械滥用和电气滥用

Conditions to Avoid ： Heating, mechanical abuse and electrical abuse.

产品分解危害：不涉及

Hazardous Decomposition Products： N/A.

聚合危害：不涉及

Hazardous Polymerization：N/A.

如果泄露，禁止与强氧化剂接触，无机酸、强碱金属卤化碳氢化合物

If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalis, halogenated hydrocarbons.

第 11 部分-毒理性资料

Section 11 –Toxicological Information

电池内部被打开，可能会出现吸入、皮肤接触和眼神接触；

暴露在电池内容物环境，腐蚀性气体将严重刺激皮肤，眼睛和粘膜；过度暴露可导致非纤维化肺损伤和粘膜刺激症状。

Inhalation, skin contact and eye contact are possible when the battery is opened.

Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrosis lung injury and membrane irritation.

第 12 部分-生态学信息

Section 12 –Ecological Information

正常使用或处置电池不存在环境风险。处置电池时应避免投至水、雨和雪中。

When promptly used or disposed the battery does not present environmental hazard. When disposed, keep away from water, rain and snow.

第 13 部分-废弃处理

Section 13 –Disposal Considerations

物质和废弃物处理方式

如果电池仍然被完全充电或者只是部分放电，这些电池可以被认为是被动危险废物，主要因为这些废弃电池中还存留有大量未耗尽的锂电。这些电池在被当作危险废物处置之前，必须通过被认可的二次处理设施进行中和。电池回收可以寻找有处理废弃物资质的授权机构进行处理。

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARTION

If batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of not creation, or unconsumed lithium remaining in the spent battery. The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste. Recycling of battery can be done in authorized facility, through licensed waste carrier.

第 14 部分-运输信息

Section 14 –Transport Information

所列的电池模型不得超过100 Wh，符合运输货物不包含项列在国际航空运输协会DGR A154中的特定规定中认为有安全缺陷的锂电池或者出现破损会造成潜在受热、火灾或短路的电池；符合联合国危险货物运输《试验和标准手册》第三部分第38.3小节中的要求，即UN 38.3。

The battery models listed have a Watt-hour rating of no more than 100Wh. And shipment contains no item listed under IATA DGR Special Provision A154 and meets all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3.

序号 No.	测试项目 ITEMS	结果 RESULT	备注 REMARKS
1	高度模拟 Altitude simulation	Pass	测试项目 1~5 必须按照顺序依次在同一个电芯或电池上进行。Test1 to 5 must be conducted in sequence on the same cell or battery
2	热测试 Thermal test	Pass	
3	振动 Vibration	Pass	
4	冲击 Shock	Pass	
5	外部短路 External short circuit	Pass	
6	撞击 Impact	Pass	
7	过度充电 Overcharge	Pass	仅电池需要做此项测试。 Only battery do need this test item
8	强制放电 Forced discharge	Pass	

每个包装物能够承受任何一个方向的1.2米跌落试验而不会损坏其中的电池或电池中内的物质，不会出现电池移动而引起电池间的相互接触并释放出电池内的物质。

Each package is capable of withstanding a 1.2m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents.

空运，依据IATA-DGR第66版(2025.1.1生效)的手册要求

Air transportation, according to IATA-DGR 66th Edition (Effective 1 January 2025)

包装需符合第IB部分的包装指令965中关于国际航空运输协IATA-DGR会的第66版的手册要求。

Packaging complies with the requirements of section IB of Packing Instructions 965 of 66th DGR Manual of IATA.

危险等级：第九类危险品。只能使用货机空运，禁止客机空运，空运过程中电池容量不超过30%。包装总质量不超过10公斤。

Hazard Class: Class 9。

For Cargo aircraft only，Forbidden in passenger aircraft, via air shipment SOC no more than 30%. Package

does not exceed 10kg gross mass.

海运，依据IMO IMDG CODE (AMEND 41-22)
Sea transportation, according to IMO IMDG CODE (AMEND 41-22)
UN 3480 锂离子电子
UN 3480, LITHIUM ION BATTERIES
危险等级：根据特殊条款188，危险等级不受限制，包件毛重不得超过30公斤。
The article is not restricted to IMO IMDG (41-22) Code according to special provision 188。Package does not exceed 30kg gross mass.
本文并不局限于IMO IMDG (41-22) (国际海事组织《国际海运危险品法规》)特殊条款188。
更多关于行运、测试、标签和包装的信息请登陆以下网址：http://www.labelmaster.com.
More information concerning shipping, testing, marking and packaging can be obtained Label master at http://www.labelmaster.com.
单独的电池在运输过程中需防止短路，需用坚固的包装进行打包以满足其在运输过程需求，确保货物不会倒塌、滑落，保护货物以防塌陷和淋湿。
Separate battery when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles and wet by rain.

公路运输，根据ADR-2023
Road transportation, according to ADR-2023
UN编号+运输专用名 UN 3480
UN Number + PSN: UN 3480, LITHIUM ION BATTERIES
危险等级：不受限制，根据特殊条款188
Hazard Class: Not restricted, according to sp188
包装说明：坚固包装，按照sp188相应要求进行包装。包件毛重不得超过30公斤。
Package instruction：Strong package, Packaging in accordance to corresponding requirements of sp188.
Package does not exceed 30kg gross mass.
单独的电池在运输过程中需防止短路，需用坚固的包装进行打包以满足其在运输过程需求，确保货物不会倒塌、滑落，保护货物以防塌陷和淋湿。
Separate battery when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles and wet by rain.

货物运输方式：空运/海运/陆运
Transport Fashion: Air transportation/ Sea transportation /Land transportation

第 15 部分-法规信息

Section 15 –Regulatory Information

Law Information

《Dangerous Goods Regulation》
《Recommendations on the Transport of Dangerous Goods Model Regulations》
《International Maritime Dangerous Goods》
《Technical Instructions for the Safe Transport of Dangerous Goods》
《Classification and code of dangerous goods》
《Occupational Safety and Health Act》(OSHA)
《Toxic Substances Control Act》(TSCA)
《Consumer Product Safety Act》(CPSA)
《Federal Environmental Pollution Control Act》(FEPCA)
《The Oil Pollution Act》(OPA)
《Superfund Amendments and Reauthorization Act Title III (302/311/312/313)》(SARA)
《Resource Conservation and Recovery Act》(RCRA)
《Safety Drinking Water Act》(CWA)
《California Proposition 65》
《Code of Federal Regulations》(CFR)

In accordance with all Federal, State and Local law.

第 16 部分-其他信息

Section 16 –Additional Information

上面的信息是基于我们所知道被认为正确的数据。由于该信息可能在我们无法控制的情况下使用，且可能是我们不熟悉的情况，对可能建议修改的信息，因此我们对其使用结果不承担任何责任。提供此信息的条件是，接收该信息的人应自行确定其特定用途的材料是否合适。

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material of his particular purpose.