Material Safety Data Sheet
材料安全数据表

Name of Goods:	Rechargeable Lithium-ion Battery Pack
物品名称:	可充式锂离子电池组
Model and Spec.:	
型号规格:	R2412-4S2P-MMBK, 14.4V 4.8Ah 69.12Wh
Applicant:	TWS Technology (Guangzhou) Limited
委托单位:	广州明美新能源股份有限公司
Effective date:	
生效日期:	2026-01-01 to 2026-12-31
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Shenzhen NTEK New Energy Technology Co., Ltd.

深 圳 市 北 测 新 能 源 技 术 有 限 公 司

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION 化学品及企业标识	
Name of Products 产品名称	Rechargeable Lithium-ion Battery Pack 可充式锂离子电池组
Model/Type 型号	R2412-4S2P-MMBK
Ratings 额定参数	14.4V 4.8Ah 69.12Wh
Applicant 委托单位	TWS Technology (Guangzhou) Limited 广州明美新能源股份有限公司
Address of Applicant 委托单位地址	1st, 2nd and 3rd Floor (can be used as a factory building), No. 39, Nanyunsan Road, Science City of Guangzhou High-tech Industrial Development Zone 广州市高新技术产业开发区科学城南云三路39号（1）栋首层、二层、三层（可作厂房使用）
Manufacturer 生产厂商	TWS Technology (Guangzhou) Limited 广州明美新能源股份有限公司
Address of manufacturer 生产厂商地址	1st, 2nd and 3rd Floor (can be used as a factory building), No. 39, Nanyunsan Road, Science City of Guangzhou High-tech Industrial Development Zone 广州市高新技术产业开发区科学城南云三路39号（1）栋首层、二层、三层（可作厂房使用）
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Reviewed by 审核人	Jason Liu 刘新波
Approved by 批准人	Jason Liu 刘新波 报告单位（盖章） Seal of NTEK

2. Hazards Identification 危险性概述	
Dangerous classification 物品危险分类	
Explosive risk 爆炸危险性	This article does not belong to the explosion dangerous goods 该物品不属于爆炸危险品
Flammable risk 易燃危险性	This article does not belong to the flammable material 该物品不属于易燃危险品
Oxidation risk 氧化危险性	This article does not belong to the oxidation of dangerous goods 该物品不属于氧化危险品
Toxic risk 毒害危险性	This article does not belong to the toxic dangerous goods 该物品不属于毒害危险品
Radioactive risk 放射危险性	This article does not belong to the radiation of dangerous goods 该物品不属于放射危险品
Mordant risk 腐蚀危险性	This article does not belong to the corrosion of dangerous goods 该物品不属于腐蚀危险品
Other risk 其他危险性	Lithium-ion batteries, The Watt-hour rating of the battery is 69.12Wh 锂离子电池，该电池额定瓦时为69.12Wh

3. COMPOSITION INFORMATION 成分/组成信息			
Chemical Composition 化学成分		**CAS No. CAS号**	**Weight (%) 重量百分比**
Lithium transition metal oxide(2)		182442-95-1	37.3
Carbon (graphite)		7782-42-5	21.0
Aluminum		7429-90-5	3.27
Copper		7440-50-8	7.69
Steel can		7439-89-6	13.53
Electrolyte	Ethylene carbonate	96-49-1	10.67
	Ethyl methyl carbonate	623-53-0	
	Dimethyl carbonate	616-38-6	
	Lithium hexafluorophosphate	21324-40-3	
Others		proprietary	6.54

4. First aid measures
急救措施

Once battery shell rupture, content contact with the human body will produce harm, once contact, should take the following emergency measures:

电池外壳破裂，内容物接触人体会产生危害，一旦发生接触，应采取以下应急措施：

Eye:

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

眼睛：

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。

Skin:

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

皮肤：

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。

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

吸入：

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。

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

食入：

饮用两杯牛奶或水。如果当事人仍然清晰可以采取催吐的方法，并且立即就医。

5. Fire-fighting measures
消防措施

Flash Point: N/A.

燃点：不适用

Auto-Ignition Temperature: N/A.

自燃温度：不适用

Extinguishing Media: Water, CO_2.

灭火介质：大量水（降温），二氧化碳

Special Fire-Fighting Procedures: Self-contained breathing apparatus.

特殊灭火程序：自给式呼吸器

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

异常火灾或爆炸：当电芯暴露于过热的环境中时，安全阀可能会打开。

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

燃烧产生的危险物品：一氧化碳，二氧化碳，锂氧化物烟气。

6. Accidental release measures
泄露应急处理

Steps to be Taken in case Material is Released or Spilled

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

为防止电池材料泄露或释放采取的措施

如果电池内部材料泄露，试验人员应立刻撤离试验区直到烟气消散。将通风设备打开吹散危险性气体。用抹布擦净试验区，清除溢出的液体，将泄露电池放进塑料袋中，然后放进钢制容器。避免皮肤和眼睛接触或吸入有害气体。

Waste Disposal Method

It is recommended to discharge the battery to the end, to use up the metal lithium inside the battery, and to bury the discharged battery in soil.

废弃物处置方法

建议将电池完全放电，消耗电池内部的锂金属，并且深埋于土壤中。

7. Handling and storage
操作处置和储存

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。

Precautions to be taken in handling and storing

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 longperiods.

操作处置和储存中的防范措施

禁止物理或电滥用，禁止高温储存，最好将电池储存在阴凉、干燥、通风等温度变化较小的环境中。禁止将电池接触加热设备或将电池直接暴露与阳光中。

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中。

8. Exposure controls/personal protection
接触控制/个人防护

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

呼吸防护：当电池排气阀打开时，应尽量使通风设备开至最大，避免将打开排气阀的电芯局限在某一狭窄空间内。正常操作条件下，呼吸保护是不必要的。

Ventilation: Not necessary under conditions of normal use.

通风条件：正常使用条件下不需要。

Protective Gloves: Not necessary under conditions of normal use.

防护手套：正常使用条件下不需要。

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

其他防护服装或设备：正常使用条件下不需要。

Personal Protection is recommended for venting battery: Respiratory Protection, Protective Gloves, Protective Clothing and safety glass with side shields.

电池开阀试验时应做好个人防护：呼吸防护，防护手套，防护服装和有护边的安全玻璃罩都是要准备的。

9. Physical and chemical properties
物理和化学特性

Appearance: Prismatic

外形：棱柱形

Odors: If leaking, smells of medical ether.

气味： 泄漏时，有醚的气味。

PH: Not applicable as supplied.

酸碱度：不适用

Flash Point: Not applicable unless individual components exposed.

燃点：除单个电芯暴露试验外其他不适用。

Flammability: Not applicable unless individual components exposed.

可燃性：除单个电芯暴露试验外其他不适用。

Relative density: Not applicable unless individual components exposed.

相对密度：除单个电芯暴露试验外其他不适用。

Solubility (water): Not applicable unless individual components exposed.

溶解性（水溶性）：除单个电芯暴露试验外其他不适用。

Solubility (other): Not applicable unless individual components exposed.

溶解性（其他）：除单个电芯暴露试验外其他不适用。

10. Stability and reactivity
稳定性和反应活性

Stability: Product is stable under conditions described in Section 7.

稳定性：产品在第 7 节所述的条件下稳定。

Conditions to Avoid: Heat above 70°C or incinerate, Deform, Mutilate, Crush, Disassemble, Overcharge, Short circuit, Expose over a long period to humid conditions.

应避免的条件：加热 70°C 以上或焚烧，变形，毁坏，粉碎，拆卸，过充电，短路，长时间暴露在潮湿的条件下。

Materials to avoid: Oxidising agents, alkalis, water.

应避免的材料：氧化剂，碱，水。

Hazardous Decomposition Products: Toxic Fumes, and may form peroxides.

危险分解物：有毒烟雾，并可能形成过氧化物。

Hazardous Polymerization: N/A.

聚合危害：不适用

If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalies, 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。

11. Toxicological information
毒理学资料

Signs & symptoms: None, unless battery ruptures.

标志及症状：无，除非电池破裂。

In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.

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。

Inhalation: Lung irritant.

吸入：对肺有刺激性。

Skin contact: Skin irritant.

皮肤接触：对皮肤刺激性。

Eye contact: Eye irritant.

眼睛接触：对眼睛有刺激性。

Ingestion: Poisoning if swallowed.

食入：吞下中毒。

Medical conditions generally aggravated by exposure: In the event of exposure to internal contents, moderate to server irritation, burning and dryness of the skin may occur, Target organs nerves, liver and kidneys.

下列情况下健康状况会恶化：万一发生与电池内部材料接触的事故，轻微或严重的刺激，都可能使皮肤出现干燥和灼烧的感觉，并且损坏靶器官（肝脏，肾脏）的神经。

12. Ecological information
生态学资料

Mammalian effects: None known at present.

对哺乳动物的影响：目前未知。

Eco-toxicity: None known at present.

生态毒性：目前未知。

Bioaccumulation potential: Slowly Bio-degradable.

生物体内积累：慢慢地生物降解。

Environmental fate: None known environmental hazards at present.

环境危害：目前没有已知的环境危害。

13. Disposal consideration
废弃处置

Do not incinerate, or subject cells to temperature in excess of 70°C, Such abuse can result in loss of seal leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

不要焚烧，或使电池温度超过 70°C，这种滥用可导致泄漏和/或电池爆炸。按照相应的地方性法规处理。

14. Transport information
运输信息

UN No. and Shipping name:

UN 3480 Lithium ion batteries

UN 3481 Lithium ion batteries packed with equipment

UN 3481 Lithium ion batteries contained in equipment

UN编号及运输专有名称：

UN 3480 Lithium ion batteries

UN 3481 Lithium ion batteries packed with equipment

UN 3481 Lithium ion batteries contained in equipment

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/包装等级：N/A/不适用

EmS No./EmS 编号：F-A, S-I

Marine pollutants/海洋污染物: No/否

ICAO/IATA	Shipped by air in accordance with International Civil Aviation Organization (ICAO), TI or International Air Transport Association (IATA), DGR Packing Instructions PI 965 IB, PI 966 II, PI 967 II 根据国际民用航空组织(ICAO), TI或者国际航空协会(IATA), DGR包装说明PI 965 IB, PI 966 II, PI 967 II相关规定进行空运	DGR 67th (2026) ICAO (2025-2026 edition)
IMDG CODE	Shipped by sea in accordance with International Maritime Dangerous Code (IMDG CODE) Special Provision 188 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)

15. Regulation information
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）》

《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）》

16. Other Information
其他信息

This file is only effective to the batteries (R2412-4S2P-MMBK) provided by commissioner (TWS Technology (Guangzhou) Limited) which manufactured by TWS Technology (Guangzhou) Limited. The commissioner provides the composition information of batteries, and promises its integrity and accuracy. Users should read this file carefully, and use the batteries in correct method. Shenzhen NTEK New Energy Technology Co., Ltd. doesn't assume responsibility for any damage or loss because of misuse of batteries.

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--End of Material Safety Data Sheet 材料安全数据表结束--

Important Notice
注意事项

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2. Nobody is allowed to photocopy or partly photocopy this test report without written permission of NTEK.

   未经本试验室书面同意，不得部分地复制本报告。

3. The test report is invalid without the signatures of Approver, Reviewer and Preparer.

   本报告书无批准人、审核人及编制人签名无效。

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5. Objections to the test report must be submitted to NTEK within 15 days.

   对报告书若有异议，应于收到报告之日起15天内向本公司提出。

6. The Chinese contents in this report are only for reference.

   本报告中的中文内容仅供参考。

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