Material Safety Data Sheet

No.: 20230101104 Date: 2023-01-01 Version: E01

Ni wenSection 1 - Chemical Product and Company Identification
Product Name: Rechargeable Li-ion Battery Model: 831536PF4 Nominal Voltage: 3.85V Minimal Capacity: 485mAh Watt-hour: 1.867Wh Manufacturer's Name: Chongqing VDL Electronics Co., Ltd. Address: Building 1-4, Puli Industrial New Area, Zhaojia Street, Kaizhou District, Chongqing, China Postal Code: 405401 Telephone: +86-23-52977888 E-mail: vdl@gdvdl.com Web: www.gdvdl.com In case of emergency contact: +86-23-52977888 Referenced documents: ISO 11014:2009 Safety data sheet for chemical products

Section 2 - Hazard(s) Identification
·Substance or mixture in Rechargeable Li-ion Battery cell: Aluminum Nickel Copper Lithium cobalt oxide Graphite Electrolyte ： Lithium hexafluorophate and Solvent Substances above are not on the list of SVHC and are non-hazardous.

Section 3 - Composition / Information on Ingredients		
Ingredient Name	Concentration	CAS No.
Lithium Cobalt Oxide	30%~50%	12190-79-3
Carbon Black	0.5%~1%	1333-86-4
Polyvinylidene Fluoride	0.5%~1%	24937-79-9
Aluminium	5%~10%	7429-90-5
Graphite	15%~25%	7782-42-5
Styrene-Butadiene Rubber	0.2%~1%	9003-55-8
Carboxymethyl cellulose	0.2%~1%	9004-32-4
Copper	5%~15%	7440-50-8
Nickel	0.5%~1.5%	7440-02-0
Lithium Hexafluorophosphate	15%~25%	21324-40-3
Ethylene carbonate		96-49-1
Ethyl Methyl carbonate		623-53-0
Diethyl carbonate		105-58-8
Polyethylene	1%~5%	9002-88-4

Nylon	0.5%~1%	24937-16-4
Other	0.5-5%	--

Section 4 - First Aid Measures

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

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

· Eye contact: Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.
A battery cell and spilled internal cell materials

· 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. Have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

Section 5 - Fire Fighting Measures

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

·Specific hazards: Corrosive gas may be emitted during fire.

· 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.

·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.

Section 6 - Accidental Release Measures

Emergency Procedures
Minor Spills of Cell Materials

·Remove all ignition sources.

·Clean up all spills immediately.

·Avoid contact with skin and eyes.

·Control personal contact by using protective equipment.

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

·Ventilate the storage area.

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

·Place in a suitable labeled container for waste disposal.

Major Spills of Cell Materials

·Clean up all spills immediately.

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

·Secure load if safe to do so. Collect recoverable product.

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

·Ventilate the storage area.

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

·Collect remaining material in containers with covers for disposal.

·Flush spill area with water.

Protective Actions for Spill

Section 7 - Handling and Storage

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

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

Precautions to be Taken in Handling and Storing: Avoid mechanical or electrical abuse.

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

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

Section 8 - Exposure Controls, Personal Protection

Personal protective equipment
Respiratory protection: Respirator with air cylinder, dust mask
Hand protection: Protective gloves
Eye protection:Goggle or protective glasses designed to protect against liquid splashes
Skin and body protection: Working clothes with long sleeve and long trousers

Section 9 - Physical And Chemical Properties

Appearance
Physical state ： Solid,
Form: Geometric solid
Color: Silvery
Odor: Odorless
• pH: NA
• Specific temperatures/temperature ranges at which changes in physical state occur. There is no useful information for the product as a mixture.
• Flash point: NA
• Explosion properties: NA
• Density: NA
• Solubility, with indication of the solvent(s): Insoluble in water

Section 10 - Stability and Reactivity

Stability:Stable under normal conditions of use
• Conditions to avoid: Hazardous reactions occurring under specific conditions
• 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.
• Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.
• Hazardous decomposition products: Acrid or harmful gas is emitted during fire.

Section 11 - Toxicological Information

Lithium cobalt Oxide - LiCoO2

·Acute toxicity: No applicable data.

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

·Local effects: Unknown.

·Sensitization: The nervous system of respiratory organs may be stimulated sensitively.

·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.

·Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.

Manganese:

·When manganese's concentration is 0.1 mg/L in water, make BOD5 reduced

·Mainly for chronic poisoning,damage to the central nervous system especially

Extrapyramidal system
LD50：9000 mg/kg(through the rats mouth),LC50：No data
Aluminum

·Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.

·Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).
Copper

·Acute toxicity: 60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.

TDLo, hypodermic - Rabbit 375mg/kg

·Local effects:

Coarse particulate stimulates nose and tracheal. When it goes into one's eyes, reddening and pain may occur.

·Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.

·Reproductive toxicity: TDLo, oral - Rat 152mg/kg

Nickel

·Local effects: Through the pores and sebaceous glands penetrate into the skin，causing skin allergies inflammation，Its clinical manifestations is dermatitis and eczema
Graphite

·Acute toxicity: Unknown.

·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.

·Chronic toxicity/Long term toxicity: Long-term inhalation of high levels of graphite coarse particulate may cause lung disease or a tracheal disease.
Carcinogenicity:
Graphite is not recognized as a cause of cancer.
Organic Electrolyte
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.

·Local effects: Unknown.

·Skin irritation study: Rabbit – Mild

·Eye irritation study: Rabbit - Very severe

Section 12 - Ecological Information

Marine Pollutant: Not Determined

No data for Polymer Lithium-ion Battery.

Kindly Reminder：

• Disallow material discharge or abandon a natural environment that have no government's permission .

• 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.

Section 13 - Disposal Consideration

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.

Section 14 - Transport Information

When Lithium ion batteries' containing no more than 20Wh/cell, 100Wh/battery pack and meet the package requirement of PI 965 Section IB, PI 966/967 Section 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. With regard to air transport, the following regulations are cited and considered:

I)The International Civil Aviation Organization(ICAO)Technical Instructions(2021-2022 edition)

II)International Air Transport Association(IATA)Dangerous Goods Regulations(64rd edition),package requirement: Section IB of PI965 and Section II of PI966~967

III)The US Hazardous Materials Regulation(HMR)pursuant to a final rule issued by RSPA (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).

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

VI)The UN classification number: Class 9 3480/ Class 9 3481

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

I)According The United Nations dangerous goods of the proposal

II)According to the International Maritime Dangerous Goods IMDG CODE(Amdt. 40-20)2020 Edition, packaging requirement is special provision 188.

III)According with the UN38.3（UNDOT）

IV)The UN classification number: Class 9 3480/ Class 9 3481

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"

Manual of Test and Criteria(38.3 Lithium battery)			
No.	Test Item	Test Results	Remark
T1	Altitude Simulation	Passed	
T2	Thermal Test	Passed	
T3	Vibration	Passed	
T4	Shock	Passed	
T5	External Short Circuit	Passed	
T6	Impact/Crush	Passed	for cell only
T7	Overcharge	Passed	for pack only
T8	Forced Discharge	Passed	for cell only

Section 15 - Regulatory information

OSHA hazard communication standard (29 CFR 1910.1200)

□Hazardous ■Non- hazardous

Section 16 - Other information

For more information please contact:

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

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