RivoChem

Material Safety Data Sheet (MSDS) Report

MSDS Number: RF-SDS600

Applicant: Shenzhen Xinhui Photoelectric Technology Co.,Ltd.
2nd floor, Block A, Baoyunda Logistics Center,
No.2 Qianjin Road, Bao′An District,
Shenzhen City,Guangdong, 518114
China

Sample Description:

Product Name : 18650 Lithium-Ion Battery
Nominal Voltage : 3.7V
Nominal Capacity: 3400mAh
Data Reviewed : February 24, 2017

Based on the information provided by the applicant, this Material Safety Data Sheet (MSDS) was generated in accordance with requirements of Regulation OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA HazCom 2012), for more details please refer to the following attached pages.

Authorized By:
On Behalf Of Authoring Specialist in Shanghai Ruifu Co.,Ltd.

Joey Zhang
Authoring Specialist

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier

Trade name	:	18650 Lithium-Ion Battery
Battery type/model	:	18650
Nominal voltage	:	3.7V
Nominal capacity	:	3400mAh

Recommended use of the chemical and restrictions on use

Identified uses	:	Power supply

Details of the supplier of the safety data sheet

Shenzhen Xinhui Photoelectric Technology Co.,Ltd.
2nd floor, Block A, Baoyunda Logistics Center,
No.2 Qianjin Road, Bao'An District,
Shenzhen City,Guangdong, 518114
China

Emergency telephone number

Tel: +86-755-6119 1638
or contact your local emergency center

Product Information

Tel: +86-755-6119 1638
E-mail: Service@sunwayman.com

SECTION 2. HAZARDS IDENTIFICATION

This battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Material Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use. The potential for exposure should not exist unless the battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged. If the battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as hazardous.

The following GHS hazardous classification are derived based on the internal ingredients under extreme exposure scenarios, such as breakage, leakage or being abused.

GHS-Classification

Hazard classification	:	Carcinogenicity, Category 1 May cause cancer. Reproductive toxicity, Category 2 Suspected of damaging fertility or the unborn child.

GHS-Labelling

Symbol(s) :

Signal word : Danger

Hazard statements :

H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.

Precautionary statements :

Prevention:

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P302 + P352	IF ON SKIN: Wash with plenty of water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.

Storage:

P404	Store in a closed container.
P405	Store locked up.

Disposal:

P501	Dispose of contents/ container to an approved waste disposal plant.

Other hazards

No further available information.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Manufactured article/solid

Hazardous components

Component	CAS Number	Percent of Total Weight
Lithium Cobalt Oxide	12190-79-3	30-40%
Graphite	7782-42-5	10-20%
Lithium hexafluorophosphate	21324-40-3	10-20%
Iron	7439-89-6	10-20%

Copper	7440-50-8	1-10%
Aluminum Foil	7429-90-5	1-5%
Carbon	1333-86-4	0-1%
Nickel	7440-02-0	0-0.5%

SECTION 4. FIRST AID MEASURES

Under normal conditions of battery use, internal components will not present a health hazard. The following measures are only applicable if exposure has occurred to components when battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged.

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.
Consult a physician.

If inhaled : Move to fresh air.
If breathed in, move person into fresh air.
Keep patient warm and at rest.
If unconscious place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : If on skin, rinse well with water.
Wash contaminated clothing before re-use.
If symptoms persist, call a physician.

In case of eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Continue rinsing eyes during transport to hospital.
Remove contact lenses.
Protect unharmed eye.
If symptoms persist, call a physician.

If swallowed : Get medical attention immediately.
Do NOT induce vomiting.
Rinse mouth with water.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed : Not required under normal use condition, the following information is provided for exposures that may occur during battery production or under extreme conditions such as fire or breakage.
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:
May cause cancer.
Suspected of damaging fertility or the unborn child.
Itching. Coughing and/or wheezing.

Notes to physician	:	Treat symptomatically. May cause sensitization of susceptible persons.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cold water and dry powder in large amount are applicable. Use metal fire extinction powder or dry sand if only few batteries are involved.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Burning and disassembly batteries may emit acrid smoke, irritating fumes, and toxic fumes of hazardous oxides of carbons, hydrofluoric acid and other toxic by-products. In the event of fire and/or explosion do not breathe fumes.
Hazardous combustion products	:	carbon dioxide and carbon monoxide metal oxides copper oxide fumes Polymers decompose under fire conditions. The smoke may contain polymer fragments of varying composition and unidentified toxic and/or irritating compounds. sulfur oxides Hydrogen chloride gas Phosgene
Specific extinguishing methods	:	Product is compatible with standard fire-fighting agents.
Further information	:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	As in any fire, wear self-contained breathing apparatus pressure-demand, approved full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	In the event of fire and breakage, please ensure that: Avoid contact with skin, eyes or clothing. Use personal protective equipment. Keep unauthorized personnel away. Stay upwind. Ensure adequate ventilation. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.

Environmental precautions	:	Absorb spilled material with non-reactive absorbent such as vermiculite, clay or earth. Prevent from migration into soil, sewers and natural waterways. Inform local authorities if this occurs. Prevent further leakage or spillage if safe to do so.
Methods and materials for containment and cleaning up	:	Evacuate spill area immediately and remove sources of ignition. Do NOT touch spilled material. Spills may be absorbed on non-reactive absorbents such as vermiculite. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Pick up and transfer to properly labeled containers.
Other information	:	Comply with all applicable national and local regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Improperly charging a battery may cause battery to flame or damage. Do not drop battery, puncture, or attempt to open battery case. Avoid contact with the internal components of a battery. Do not subject product to open flame or fire. For personal protection see section 8.
Conditions for safe storage	:	Store batteries in cool, dry, well-ventilated areas separated from incompatible materials and keep away from flames, spark, or heat. Store sealed batteries at ambient temperature. Observe label precautions.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters
Airborne exposures to hazardous substances are not expected when the cells or batteries are used for their intended purposes.
Exposure standards are not applicable to the sealed articles.

Engineering measures	:	Store sealed batteries at ambient temperature. Never recharge batteries in an unventilated, enclosed space. Do not subject product to open flame or fire. Avoid conditions that could cause arcing between terminals.

Personal protective equipment

Respiratory protection	:	NONE REQUIRED FOR NORMAL HANDLING OF THE

FINISHED PRODUCT.
In case electrolyte leakage from battery, protect hand with chemical resistant rubber gloves. If battery is burning, leave the area immediately. In abuse, use NIOSH approved acid gas filter mask or self-contained breathing apparatus.

Hand protection
Remarks : NONE REQUIRED FOR NORMAL HANDLING OF THE PRODUCT.
If battery case is damaged, use rubber or plastic acid-resistant gloves.
The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
If necessary to handle damage product where exposure to the organic electrolyte is a possibility, chemical splash goggles and a face shield are recommended.

Skin and body protection : NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow-length gauntlet, acid-resistant apron, clothing and boots.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Wash hands before breaks and at the end of workday.
When using do not eat or drink.
Ensure that eyewash stations and safety showers are close to the workstation location.
When using do not smoke.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	Cylindrical metallic solid
Color	:	Red
Odor	:	Odorless
pH	:	Not applicable
Melting point/freezing point	:	No data available
Boiling point/boiling range	:	No data available
Flash point	:	Not applicable
Evaporation rate	:	No data available

Flammability (solid, gas)	:	Non-flammable solid under normal use conditions
Upper explosion limit	:	Non-explosive
Lower explosion limit	:	Non-explosive
Vapour pressure	:	Not applicable
Relative vapour density	:	No data available
Relative density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Insoluble
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Thermal decomposition	:	No data available
Viscosity		
Viscosity, dynamic	:	Not applicable
Viscosity, kinematic	:	No applicable
Oxidizing properties	:	Not a oxidizer

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No decomposition if stored and applied as directed.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Product will not undergo hazardous polymerization.
Conditions to avoid		excessive heat Heat, flames and sparks. Exposure to moisture
Incompatible materials	:	None under normal operating conditions. The following incompatible materials should be segregated when battery is disintegrated or if the battery is physically or electrically abused. acetylenes Acids alkalis

	halogenated hydrocarbons Oxidizing agents strong alkalis Sulphur compounds
Hazardous decomposition products	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Not applicable under normal conditions of use.
Risk of exposure occurs only if the cell or pack is mechanically, thermally, electrically or physically abused to the point of compromising the enclosure.
If this occurs, exposure to the electrolyte solution contained within can occur by inhalation, ingestion, eye contact and skin contact.

Acute toxicity
Not classified based on available information.
Components:
GRAPHITE**:**
Acute oral toxicity : LD 50 (Rat): > 2,000 mg/kg

Acute inhalation toxicity : Assessment: The substance or mixture has no acute inhalation toxicity

CARBON BLACK**:**
Acute oral toxicity : LD 50 (Rat): > 10,000 mg/kg

Acute dermal toxicity : LD 50 (Rabbit): > 3 g/kg

NICKEL**:**
Acute oral toxicity : LD 50 (Rat): 5 g/kg

Skin corrosion/irritation
Not classified based on available information.
Components:
GRAPHITE**:**
Result: Not irritating to skin

IRON**:**
Result: Not irritating to skin

COPPER**:**
Result: Not irritating to skin

ALUMINUM**:**
Result: Not irritating to skin

CARBON BLACK**:**

Result: Not irritating to skin

Serious eye damage/eye irritation
Not classified based on available information.
Components:
GRAPHITE**:**
Result: Not irritating to eyes

IRON**:**
Result: Not irritating to eyes

COPPER**:**
Result: Slightly irritating to eyes

ALUMINUM**:**
Result: Mildly irritating to eyes

CARBON BLACK**:**
Result: Slightly irritating to eyes

Respiratory or skin sensitisation
Skin sensitisation: May cause an allergic skin reaction.
Respiratory sensitisation: Not classified based on available information.
Components:
GRAPHITE**:**
Species: Mouse
Method: Local lymph node assay
Result: Did not cause sensitisation on laboratory animals.

NICKEL**:**
Assessment: May cause sensitization by skin contact.

Germ cell mutagenicity
Not classified based on available information.
Carcinogenicity
May cause cancer.
Product:

Carcinogenicity - Assessment	:	Possible human carcinogen

Components:
CARBON BLACK**:**

Carcinogenicity - Assessment	:	Limited evidence of carcinogenicity in inhalation studies with animals.

Reproductive toxicity
Suspected of damaging fertility or the unborn child.
Product:

Reproductive toxicity - Assessment	:	Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Components:
GRAPHITE**:**

Effects on fertility	:	Species: Rat

Application Route: Oral
Symptoms: No effects on reproduction parameters

Effects on foetal development : Species: Rat
Application Route: Oral
Symptoms: No specific developmental abnormalities
Method: OECD Test Guideline 422

STOT - single exposure
Not classified based on available information.
STOT - repeated exposure
Not classified based on available information.
Aspiration toxicity
Not classified based on available information.
Further information
Product:
Remarks: No data available

Carcinogenicity:

IARC	Group 2B: Possibly carcinogenic to humans	
	CARBON BLACK	1333-86-4
	NICKEL	7440-02-0
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.	
NTP	Reasonably anticipated to be a human carcinogen	
	NICKEL	7440-02-0

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

When properly used or disposed, the batteries do not present environmental hazards.
Avoid release to waterways, wastewater or groundwater.

Product:

Ecotoxicology Assessment
Acute aquatic toxicity : Not classified based on available information.

Chronic aquatic toxicity : Not classified based on available information.

Components:

GRAPHITE**:**
Toxicity to fish : LC 50 (Danio rerio (zebra fish)): > 100 mg/l
Exposure time: 96 h
Test Type: semi-static test

Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates	:	EC 50 (Daphnia (water flea)): > 100 mg/l Exposure time: 48 h Test Type: static test Method: OECD Test Guideline 202
Toxicity to algae	:	NOEC (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Test Type: static test

Mobility in soil

Components:
No data available

Other adverse effects

No data available

Product:

Additional ecological information	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

General advice	:	Material should be recycled if possible. This material must be disposed of in a safe manner. The product should not be allowed to enter drains, water courses or the soil. Dispose of in accordance with all applicable local and national regulations. The battery 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.
Contaminated packaging	:	Dispose of in accordance with all applicable local and national regulations.

SECTION 14. TRANSPORT INFORMATION

International transport regulations

Lithium-ion battery contained in equipment are subject to the following transport rules:

Method	Technical Guidelines	Packing Instruction and Special Provisions
Air	ICAO TI (2015-2016) or IATA Dangerous Goods Regulations 2017 (58th Edition)	Packing Instruction 967(PI967, section II)
Marine	IMDG Code 2015	Special Provision 188

Provisions for the international transportation (pursuant to ICAO-TI/IATA-DGR, IMDG Code):

UN-No. UN 3481
Proper Shipping Name: Lithium Ion Batteries contained in equipment

IMDG

UN Number	UN3481
UN Proper shipping name	lithium ion batteries contained in equipment.
Transport hazard class(es)	9
Packing Group	N/A

IATA

UN no	UN3481
UN Proper shipping name	lithium ion batteries contained in equipment.
Hazard Class	9
Packing Group	N/A

Lithium-ion batteries with a watt-hour ratting of 20wh/cell or less and 100wh/battery pack or less can be treated as “Non-dangerous goods “under the United Nations Recommendations on the Transport of Dangerous Goods, Special provision A88, provided that packaging is strong and prevents the product from short-circuit. Lithium batteries meet the requirements of UN38.3 (UN Manual of Tests and Criteria, Part III, Subsection 38.3.)

SECTION 15. REGULATORY INFORMATION

This product is an article pursuant to 29 CFR 1910.1200 (OSHA Hazard Communication Standard). The information on this SDS is supplied at customer’s request for information only.

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
NICKEL	7440-02-0	100	9090.909091
COPPER	7440-50-8	5000	50000

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard
Reactivity Hazard

SARA 313 Component(s)

COPPER	7440-50-8	13.90 %
ALUMINUM	7429-90-5	8.50 %
NICKEL	7440-02-0	1.10 %

California Prop. 65 WARNING! This product contains a chemical known to the

State of California to cause cancer.
Carbon black 1333-86-4

The components of this product are reported in the following inventories:

TSCA	:	On TSCA Inventory
DSL	:	This product contains one or more components that are not on the Canadian DSL and have annual quantity limits.
AUSTR	:	On the inventory, or in compliance with the inventory
ENCS	:	Not in compliance with the inventory
KECL	:	On the inventory, or in compliance with the inventory
PHIL	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

Inventories
AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Revision Date: 02/22/2017

Disclaimer

This MSDS is intended to provide a brief summary of our knowledge and guidance regarding the use of this material. The information contained here has been compiled from sources considered by us to be dependable and is accurate to the best of our knowledge. It is not meant to be an all-inclusive document on worldwide hazard communication regulations.

This information is offered in good faith. Each user of this material needs to evaluate the conditions of use and design the appropriate protective mechanisms to prevent employee exposures, property damage or release to the environment. We assumed no responsibility for injury to the recipient or third persons, or for any damage to any property resulting from misuse of the product.

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet :

ACGIH : American Conference of Industrial Hygienists
BEI : Biological Exposure Index
CAS : Chemical Abstracts Service (Division of the American Chemical Society).
CMR : Carcinogenic, Mutagenic or Toxic for Reproduction
FG : Food grade
GHS : Globally Harmonized System of Classification and Labeling of Chemicals.
H-statement : Hazard Statement
IATA : International Air Transport Association.
IATA-DGR : Dangerous Goods Regulation by the “International Air Transport Association” (IATA).
ICAO : International Civil Aviation Organization
ICAO-TI (ICAO) : Technical Instructions by the “International Civil Aviation Organization”

IMDG : International Maritime Code for Dangerous Goods
ISO : International Organization for Standardization
logPow : octanol-water partition coefficient
LCxx : Lethal Concentration, for xx percent of test population
LDxx : Lethal Dose, for xx percent of test population.
ICxx : Inhibitory Concentration for xx of a substance
Ecxx : Effective Concentration of xx
N.O.S.: Not Otherwise Specified
OECD : Organization for Economic Co-operation and Development
OEL : Occupational Exposure Limit
P-Statement : Precautionary Statement
PBT : Persistent , Bioaccumulative and Toxic
PPE : Personal Protective Equipment
STEL : Short-term exposure limit
STOT : Specific Target Organ Toxicity
TLV : Threshold Limit Value
TWA : Time-weighted average
vPvB : Very Persistent and Very Bioaccumulative