Safety Data Sheet (SDS)

The content and format of this SDS is accordant with 29 CFR 1910.1200 (OSHA standard)

1. Identification of the substance/preparation and of the company/undertaking

Product details

Product name: Li-ion Battery

Recommended use of the chemical and restrictions on use: Power supply. Restrictions on use: Do NOT use it in an application which may contaminate food or do harm to human health.

Manufacturer/Supplier: SHENZHNE ZONYOU POWER CO., LTD.

Address: 3rd Floor D, ChaXiSanWei Second Industrial Zone, Port Channel, XiXiang Street, Bao'an District Shenzhen

Postal code: 518000

Tel.: +86-755-29236421

Fax: +86-755-29236421

Further information obtainable from: SHENZHNE ZONYOU POWER CO., LTD.

Information in case of emergency: +86-755-29236421

2. Hazards identification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

*(for contact with leakage from rupture)***:**

Physical hazards:	Not classified	
Health hazards:	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Skin sensitizer	Category 1
	Carcinogenicity	Category 2
	Reproductive Toxicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 1 (bones, teeth, respiratory) Category 2 (respiratory)
Environmental hazards:	Not classified	

Signal Word: Danger

Symbol:

Note: This product is generally not hazardous under normal conditions. But like any sealed container, battery may rupture when exposed to excessive heat and this could result in the release of hazardous materials. The information below is given to minimize any possible hazard during handling, storage and disposal.

Hazard Statements *(for contact with leakage from rupture)***:**

H314: Causes severe skin burns and eye damage.

H318: Causes serious eye damage.

H317: May cause an allergic skin reaction.
H351: Suspected of causing cancer.
H361: Suspected of damaging fertility or the unborn child.
H372: Cause damage to organs (bones, teeth) through prolonged or repeated exposure.
H373: May cause damage to organs (respiratory) through prolonged or repeated exposure.

Precautionary Statements *(for contact with leakage from rupture)***:**

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/vapours/spray.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P272: Contaminated work clothing should not be allowed out of the workplace.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P281: Use personal protective equipment as required.

Response Precautionary Statements *(for contact with leakage from rupture)***:**

P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT inducevomiting.
P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P363: Wash contaminated clothing before reuse.
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310: Immediately call a POISON CENTER or doctor/physician.
P321: Specific treatment (Please see the specific measures for accident that included in the label, or go to hospital for treatment.)
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333 + P313: If skin irritation or rash occurs: Get medical advice/attention.
P308 + P313: IF exposed or concerned: Get medical advice/attention.
P314: Get medical advice/attention if you feel unwell.

Storage precautionary statements *(for contact with leakage from rupture)***:**

P405: Store locked up.

Disposal precautionary statements *(for contact with leakage from rupture)***:**

P501: Dispose of contents/container according to relevant local and national regulations. (It is recommended to use landfill method to dispose of waste.)

3. Composition/information on ingredients

Product description: substance ( ); preparation/mixture (√)

Ingredient (s)	CAS No.	EC No.	% by weight
Lithium Cobalt Oxide ($LiCoO_2$)	12190-79-3	235-362-0	33%
Graphite (C)	7782-42-5	231-955-3	24%
Lithium Hexafluorophosphate ($LiPF_6$)	21324-40-3	244-334-7	24%
Copper (Cu)	7440-50-8	231-159-6	10%

Aluminum foil (Al)	7429-90-5	231-072-3	7%
Nickel (Ni)	7440-02-0	231-111-4	2%

4. First aid measures

As a general rule, in case of doubt of if symptoms persist, always call a doctor *(for contact with leakage from rupture)***:**

In the event of splashes or contact with eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

In the event of splashes or contact with skin: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or doctor/physician.

In the event of exposure by inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

In the event of swallowing: Rinse mouth. Do not induce vomiting without doctor's instruction. Immediately call a POISON CENTER or doctor/physician.

Acute effect and delayed effect:

Acute effect: Causes severe skin burns and eye damage. May cause an allergic skin reaction.

Delayed effect: Suspected of causing cancer. Suspected of damaging fertility or the unborn child. Cause damage to organs (bones, teeth) through prolonged or repeated exposure. May cause damage to organs (respiratory) through prolonged or repeated exposure.

Personal protective equipment: Wear protective gloves/protective clothing/eye protection/face protection when necessary.

Indication of immediate medical attention and treatment needed, if necessary: Treat according to symptoms and exposure Dose.

5. Fire-fighting measures

Extinguishing Media: Use dry chemical, CO_2 for extinction. Do not use direct water stream. Discharging cylinder shape water from fire hose may lead to spread fire to the surroundings.

Unsuitable Extinguishing Media: High volume water jet. Discharging cylinder shape water from fire hose may lead to spread fire to the surroundings.

Special Fire Fighting Procedures: Structural firefighters must wear self-contained breathing apparatus and full protective equipment.

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

Special Fire-Fighting Method (This is for fire caused by other ignition sources):

Fire-fighters must wear self-contained breathing apparatus and full protective equipment (e.g. fire-retardant clothing).

For initial fire, use dry powder, carbon dioxide, etc.

For large fire, it is effective to use fire foam, etc. to shut off air supply.

Deny unnecessary entry to the place around the fire.

Remove containers from fire area if it can be done without risk.

Cool surrounding facilities, etc. with water spray.

Extinguish fire from upwind, and the fire extinguishing method should be appropriate to the situation in the surroundings.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Use proper personal protective equipment as indicated in Section 8.

Environmental precautions: Keep cleaning run-offs out of municipal sewers and open bodies of water. Comply with local and national laws and regulations.

Methods and material for containment and cleaning up:

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.

7. Handling and storage

Precautions for safe handling:

Handling: *(for contact with leakage from rupture)*

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust/fume/gas/mist/vapours/spray.

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Contaminated work clothing should not be allowed out of the workplace.

Wear protective gloves/protective clothing/eye protection/face protection.

Use personal protective equipment as required.

Conditions for safe storage, including any incompatibilities:

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 beavoided. Do not place the batterynear heating equipment, nor expose to direct sunlight forlong periods.

Incompatible substances or mixtures: No relevant information.

Packing material: No relevant information.

8. Exposure controls/personal protection

Control parameters:

Ingredients	OSHA PEL-TWA	ACGIH TLV-TWA
Graphite (CAS: 7782-42-5)	15 mg/m^3(Total dust) 5 mg/m^3(Respirable fraction)	2 mg/m^3
Copper (CAS: 7440-50-8)	1 mg/m^3 (Dusts and mists) 0.1 mg/m^3 (Fume)	1 mg/m^3 (Dusts and mists) 0.2 mg/m^3 (Fume)
Aluminum (CAS: 7429-90-5)	15 mg/m^3 (Total dust) 5 mg/m^3 (Respirable fraction)	1 mg/m^3 (Respirable fraction)
Nickel (CAS: 7440-02-0)	Metal 0.5 mg/m^3 insoluble 0.1 mg/m^3	1.5 mg/m^3

Engineering Control:

Use this product only in closed systems fully or with local exhaust ventilation.

Install washer eyes and safety showers near to the handling and storage area.

Shows the location of these facilities, with a clear and prominent warning board.

Personal Protective Equipment (for workers):

Protection of Hands:

Not necessary under conditions of normal use.

Recommend wearing protective gloves for industrial hygienic purpose *(for contact with leakage from rupture)*.

Protection of Eyes:

Not necessary under conditions of normal use.

Wear safety glasses when working in a dusty environment or liquid may splash *(for contact with leakage from rupture)*.

Respiratory Protection:

Not necessary under conditions of normal use.

Wear appropriate respirators when vapour or fume is generated from processing *(for contact with leakage from rupture)*.

Protection of Body:

Recommend wearing general working clothing.

General protective and hygienic measures:

Keep away from foodstuffs, beverages and feed.

Wash hands before breaks and at the end of work.

Avoid contact with eyes and broken skin.

9. Physical and chemical properties

General Information	
Form	Solid
Color	Silvery
Odor	Odorless
Nominal voltage	No data available
Odor threshold	No data available

pH	Not applicable
Melting point/freezing point	No data available
Initial boiling point and boiling range	No data available
Flash point	Not applicable
Evaporation rate	No data available
Flammability (solid, gas, etc.)	Non-flammable
Upper/lower flammability or explosive limits	No data available
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	No data available
Solubility (ies)	Not applicable
Partition coefficient: n-octanol/Water	Not applicable
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	Not applicable

10. Stability and reactivity

Chemical stability: Stable under normal temperatures and pressures.

Possibility of hazardous reactions: If leaked, the electrolyte may react violently with strong oxidizers, mineral acids, strong alkalis, halogenated hydrocarbons.

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

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

Hazardous decomposition products: It may release hazardous fume (e.g. Carbon monoxide, carbon dioxide, lithium oxide fumes) from thermal decomposition.

11. Toxicological information

Product Toxicity Data:

Ingredients	**CAS No.**	**LD $_{50}$/ LC$_{50}$**
Lithium Cobalt Oxide	12190-79-3	Acute toxicity (Oral) LD_{50}＞5,000mg/kg (rat) Data source: ECHA
Aluminum	7429-90-5	Acute toxicity (Oral) LD_{50}＞10,000mg/kg (rat) Data source: ECHA Acute toxicity(Dermal) LD_{50}＞2,000mg/kg (Rabbit) Data source: ECHA
Copper	7440-50-8	Acute toxicity (Oral) LD_{50}＞2,500mg/kg (rat) Data source: ECHA Acute toxicity(Dermal) LD_{50}＞2,000mg/kg (Rabbit) Data source: ECHA
Lithium Hexafluorophosphate	21324-40-3	Acute toxicity (Oral) LD_{50}:50 mg/kg -300mg/kg (rat) Data source: ECHA

Nickel	7440-02-0	Acute toxicity (Oral) LD_{50}＞9,000mg/kg (rat) Data source: ECHA Acute toxicity(Inhalation) LC_{50}＞10.2mg/L (rat) Data source: ECHA
Classification of the whole product:		Not classified

Skin corrosion/irritation *(for contact with leakage from rupture)***:** Lithium Hexafluorophosphate (CAS: 21324-40-3): Category 1 (Data source: ECHA)
Classification of the whole product: Category 1

Serious eye damage/eye irritation *(for contact with leakage from rupture)***:** Lithium Hexafluorophosphate (CAS: 21324-40-3): Category 1 (Data source: ECHA)
Classification of the whole product: Category 1

Respiratory sensitizer *(for contact with leakage from rupture)***:** No classification for this product.

Skin sensitizer *(for contact with leakage from rupture)***:** Nickel (CAS: 7440-02-0): Category 1 (Data source: ECHA, EU CLP)
Classification of the whole product: Category 1

Germ cell mutagenicity *(for contact with leakage from rupture)***:** No classification for this product.

Carcinogenicity *(for contact with leakage from rupture)***:** Nickel (CAS: 7440-02-0): Category 2 (Data source: ECHA, EU CLP)
Classification of the whole product: Category 2

Reproductive Toxicity *(for contact with leakage from rupture)***:** Lithium Cobalt Oxide (CAS: 12190-79-3): Category 2 (Data source: ECHA)
Classification of the whole product: Category 2

Specific target organ toxicity, single exposure *(for contact with leakage from rupture)***:** No classification for this product.

Specific target organ toxicity, repeated exposure *(for contact with leakage from rupture)***:** Lithium Hexafluorophosphate (CAS: 21324-40-3): Category 1 (bones, teeth) (Data source: ECHA)
Nickel (CAS: 7440-02-0): Category 1 (respiratory) (Data source: ECHA, EU CLP)
Classification of the whole product: Category 1 (bones, teeth), Category 2 (respiratory)

Aspiration hazard *(for contact with leakage from rupture)***:** No classification for this product.

Effects on or via lactation *(for contact with leakage from rupture)***:** No classification for this product.

12. Ecological information

Ecotoxicity: As for the whole product, there is no relevant data. The data shown below is of the ingredient.

Copper (CAS: 7440-50-8):

96h-LC_{50}: 0.460mg/L Fish

Data source: ECHA

Aluminum (CAS: 7429-90-5):

48h-LC_{50}: 11.5mg/L Fish

Data source: ECHA

Lithium Hexafluorophosphate (CAS: 21324-40-3):

96h-LC_{50}: 51mg/L Fish

48h-LC_{50}＞100mg/L Crustaceans

72h-EC_{50}: 290mg/L Algae

Data source: ECHA

Classification of the whole product: Not classified

Persistence and Degradability: No data available.

Bioaccumulative Potential: No information available.

Mobility in Soil: No information available.

Results of PBT and vPvB Assessment: No information available.

General Notes:

Do not throw used product into ground water, water course or sewage system.

Do not allow material to be released to the environment without proper governmental permits.

13. Disposal considerations

It is recommended to use landfill method to dispose of waste.

Any disposal practice must be in compliance with country, local, state, and federal laws and regulations.

After contents are completely removed, dispose of its container at hazardous or special waste collection point.

Paste a label on the container indicating the possible hazards of the waste.

14. Transport Information

DOT/ Air-Transportation- IATA/ICAO/Sea-Transportation-IMO/IMDG.:

Area	Method	Organization	Special Provision
International	**Air**	**IATA, ICAO**	**Packing Instruction 967-Section Ⅱ (regulated under the current 2019 Edition of the ICAO Technical Instruction for the Safe Transport of Dangerous Goods by Air and the 60th Edition of IATA DGR)** **IMP: ELI** **Limit per Package:** **Pax A/C = 5 kg** **CAO = 5 kg** **A182**
Europe	**Road and Rail**	**ADR/RID**	**SP 188**

International	**Marine**	**IMDG**	**SP 188**
U.S.A	**Rail, Road, Marine**	**DOT**	**DOT 49 CFR 173.185**

Proper Shipping Name: LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT
UN Number: UN 3481
Hazard Classification: Class 9

Shipping Requirements:
DOT: Lithium batteries and cells are subject to shipping requirements exceptions under 49 CFR 173.185.
IATA: This product is not classified as dangerous under the current 60nd (2019) Edition of the IATA-DGR and the packing is in accordance with Section IB packing requirements (PI 967).
We further hereby certify that the consignment have already carried on UN38.8 Test in accordance to IATA-DGR.

Special precautions for user:
Check whether the package is completed or sealed before transporting; make sure no damage of packages and prevent goods from falling down during transporting; the transport vehicle should be equipped with facilities for fire-fighting and accidental release handling; do NOT transport this product together with incompatible substances; stay away from fire and areas of high temperature during stopovers.

15. Regulatory information

United States:
Section 355 (extremely hazardous substances): Not listed.
SARA 313: Aluminum (CAS: 7429-90-5) (fume or dust), copper (CAS: 7440-50-8) and nickel (CAS: 7440-02-0) are listed in SARA 313 Toxic Release Chemicals.
Toxic Substances Control Act (TSCA): All ingredients are listed in the U.S. Toxic Substances Control Act Chemical Substance Inventory List.
Clean Water Act:

Chemical Name	Reportable Quantities	Hazardous Substances	Priority Pollutants	Toxic Pollutants
Copper (CAS: 7440-50-8)	2270 Kg	Listed	Listed	Listed
Nickel (CAS: 7440-02-0)	45.4 Kg	Listed	Listed	Listed

Carcinogenicity categories: Nickel (CAS: 7440-02-0): IARC-2B, NTP-1, CP65.

Other relevant laws and regulations:
Candidate List of Substances of very high concern (SVHC) according to ECHA: Not listed.
REACH Regulation Annex XVII Regulation List: Not listed.
REACH Regulation Annex XIV Authorization List: Not listed.
Germany – WGK: WGK-1.
(EC) 1272/2008 Annex VI Table 3.1:

Ingredient (s)	CAS No.	EC No. 1272/2008 Classification	
		CLASS. CODE	HAZARD CODE

Aluminum	7429-90-5	Pyr. Sol. 1 Water-react. 2	H250 H261
Nickel	7440-02-0	Carc. 2 STOT RE 1 Skin Sens. 1	H351 H372 ** H317

Chemical Safety Assessment: A Chemical Safety Assessment has not been carried out.

16. Other information

DISCLAIMER:

All the information of this SDS is true and effective, and only for reference. Our company will not control the way how people use it, neither will we be responsible for any consequence. The users shall decide how to properly use the product or adopt certain production way for some special purpose. The above mentioned precautionary measures are helpful to avoid damage to the property or life safety during the operation or use of this product.

References:

GHS Annex II
GHS SDS Instruction
ANSI Z400.1/Z129.1-2010
OSHA Hazard Communication Standard (HCS) 2012

Full description of some acronyms:

CAS-Chemical Abstracts Service
EINECS-European Inventory of Existing Commercial Chemical Substances
IMO-International Maritime Organization
IMDG-International Maritime Dangerous Goods
IATA-International Air Transport Association
ICAO-International Civil Aviation Organization
TSCA-Toxic Substance Control Act
OSHA-Occupational Safety and Health Administration
ACGIH- American Conference of Governmental Industrial Hygienists
ECHA- European Chemicals Agency

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**********The End**********