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: Lithium manganese button 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: LIYUAN BATTERY TECHNOLOGY（SHEN ZHEN）CO., LTD.

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Information in case of emergency: Tel.: +86-755-29887011

2. Hazards identification

.GHS classification *(for contact with leakage from rupture)***:**

Physical hazards	Not classified
Health hazards	Reproductive Toxicity - Category 1B
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)***:**

H360: May damage fertility or the unborn child.

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.

P281: Use personal protective equipment as required.

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

P308 + P313: IF exposed or concerned: Get medical advice/attention.

Storage precautionary statements:

P405: Store locked up.

Disposal precautionary statements:

P501: Dispose of contents/container according to relevant local and national regulations. (It is recommended to recycle and reuse it.)

3. Composition/information on ingredients

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

Ingredient (s)	CAS No.	EC No.	% by weight
Stainless steel	12597-68-1	--	50.3
Manganese dioxide	1313-13-9	215-202-6	41
Graphite powder	7782-42-5	231-955-3	5
Carbon black	1333-86-4	215-609-9	1.7
Lithium	7439-93-2	231-102-5	0.5
Diaphrajm	9003-07-0	618-352-4	0.4
Dimethoxyethane	110-71-4	203-794-9	0.34
Lithium perchlorate	7791-03-9	232-237-2	0.33
Propylene carbonate	108-32-7	203-572-1	0.33
Polytetrachloroethylene	9002-84-0	618-337-2	0.1

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. If eye irritation persists: Get medical advice/attention.

In the event of splashes or contact with skin: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

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

In the event of swallowing: Rinse mouth. Do not induce vomiting without professional instruction. Get medical attention if discomfort occurs.

Acute effect and delayed effect: Acute effect: Not found. Delayed effect: May damage fertility or the unborn child.

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:

Do not breathe vapors or fumes that may be evolved during processing.

Do not disassemble or burn batteries.

Do not squeeze or pierce batteries.

Do not put batteries into water.

Workers must wear proper protective equipment and must operate strictly according to relative rules.

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 be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

Incompatible substances or mixtures: No special requirement for this product. (Avoid contact of strong oxidizing agent, acids, alkalis and halogens if batteries rupture.)

Packing material: Contained in the equipment.

8. Exposure controls/personal protection

Control parameters:

Ingredients	OSHA PEL-TWA	ACGIH TLV-TWA
Graphite powder (CAS: 7782-42-5)	15 mg/m^3 (Total dust) 5 mg/m^3 (Respirable fraction)	2 mg/m^3
Carbon black (CAS: 1333-86-4)	3.5 mg/m^3	3 mg/m^3 (IHL)

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:

Recommend wearing protective gloves for industrial hygienic purpose.

Protection of Eyes:

No special requirements under normal conditions. Wear safety glasses when working in a dusty environment.

Respiratory Protection:

No special requirements under normal conditions. Use an approved respirator if exposure limit is exceeded or if irritation or other symptoms occur.

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.

9. Physical and chemical properties

General Information	
Form	Solid
Color	No data available
Odor	No data available
Odor threshold	No data available
pH	No data available
Melting point/freezing point	No data available
Initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas, etc.)	This product is not classified as flammable solid.
Upper/lower flammability or explosive limits	No data available
Vapor pressure	No data available
Vapor density	No data available
Relative density	No data available
Solubility (ies)	No data available
Partition coefficient: n-octanol/Water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available

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: Heating, mechanical abuse and electrical abuse.

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

Ingredients	**CAS No.**	**LD $_{50}$/ LC$_{50}$**
Manganese dioxide	1313-13-9	Acute toxicity (Oral) LD_{50}＞3,480mg/kg (rat) Data source: ECHA Acute toxicity(inhalation: Dust/mist) LC_{50}＞1.5mg/L (rat) Data source: SIDS (2012)
Dimethoxyethane	110-71-4	Acute toxicity (Oral) LD_{50}: 5,370mg/kg (rat) Data source: ECHA

		Acute toxicity (Dermal) LD_{50}＞5,000 mg/kg (rabbit) Data source: ECHA Acute toxicity (inhalation: Vapours) LC_{50}: 20-63mg/L (rat) Data source: ECHA
Lithium perchlorate	7791-03-9	Acute toxicity (Oral) LD_{50}: 300-2,000mg/kg (rat) Data source: ECHA
Propylene carbonate	108-32-7	Acute toxicity (Oral) LD_{50}: 5,000mg/kg (rat) Data source: ECHA
Classification of the whole product:		Not classified

Skin corrosion/irritation *(for contact with leakage from rupture)***:** Lithium perchlorate (CAS: 7791-03-9): Category 1 (Data source: ECHA)
Lithium (CAS: 7439-93-2): Category 1B (Data source: CLP)
Classification of the whole product: Not classified

Serious eye damage/eye irritation *(for contact with leakage from rupture)***:** Lithium perchlorate (CAS: 7791-03-9): Category 1 (Data source: ECHA)
Propylene carbonate (CAS: 108-32-7): Category 2 (Data source: CLP)
Lithium (CAS: 7439-93-2): Category 1 (Data source: CLP)
Classification of the whole product: Not classified

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

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

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

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

Reproductive Toxicity *(for contact with leakage from rupture)***:** Dimethoxyethane (CAS: 110-71-4): Category 1B (Data source: CLP)
Classification of the whole product: Category 1B

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)***:** No classification for this product.

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

Manganese dioxide (CAS: 1313-13-9):

96h-LC_{50}＞100 mg/L Fish

Data source: ECHA

Dimethoxyethane (CAS: 110-71-4):

96h-LC_{50}＞5,000 mg/L Fish
Data source: ECHA
Lithium perchlorate (CAS: 7791-03-9):
48h-EC_{50}＞100mg/L Invertebrates
Data source: ECHA
Propylene carbonate (CAS: 108-32-7):
96h-LC_{50}＞1,000 mg/L Fish
Data source: ECHA
Lithium (CAS: 7439-93-2):
96h-LC_{50}: 109 mg/L Fish
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 recycle and reuse it.
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 970-Section I (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: RLM** **Limit per Package:** **Pax A/C = 5 kg** **CAO = 35 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 Metal Batteries Contained in Equipment
UN Number: UN 3091
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 I packing requirements (PI 970).
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: Not listed.
Toxic Substances Control Act (TSCA): Except stainless steel (CAS: 12597-68-1) the other ingredients are listed in the TSCA inventory list.
Clean Water Act:

Chemical Name	CWA - Reportable Quantities	CWA - Hazardous Substances	CWA - Priority Pollutants	CWA - Toxic Pollutants
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Carcinogenicity categories: Not classified.

Other relevant laws and regulations:
Candidate List of Substances of very high concern (SVHC) according to ECHA: Dimethoxyethane (CAS: 110-71-4) is listed.
REACH Regulation Annex XVII Regulation List: Not listed.
REACH Regulation Annex XIV Authorization List: Not listed.
Germany – WGK: Not classified.
(EC) 1272/2008 Annex VI Table 3.1:

Ingredient (s)	EC No. 1272/2008 Classification	
	CLASS. CODE	HAZARD CODE
Manganese dioxide (CAS: 1313-13-9)	Acute Tox. 4 * Acute Tox. 4 *	H332 H302
Dimethoxyethane (CAS: 110-71-4)	Flam. Liq. 2 Repr. 1B Acute Tox. 4 *	H225 H360FD H332
Propylene carbonate (CAS: 108-32-7)	Eye Irrit. 2	H319

Lithium (CAS: 7439-93-2)	Water-react. 1 Skin Corr. 1B	H260 H314

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

16. Other information

DISCLAIMER: Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

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 Substances Control Act
OSHA-Occupational Safety and Health Administration
ACGIH- American Conference of Governmental Industrial Hygienists
ECHA- European Chemicals Agency

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