Report No.: 0905272-231
Report Date: 2009-06-04

MSDS Report

+Material Safety Data Sheet

Section 1 – Chemical Product and Company Identification

Sample Name: Polymer Lithium Battery

Section 2 – Composition, Information on Ingredients

Chemical Name	Percent (by weight)	CAS No.	EINECS
Lithium Manganese Oxide	50%	12057-17-9	Unlisted
Graphite	10%	7782-42-5	231-955-3
Polypropylene	5%	9003-07-0	Unlisted
Poly(vinylidene fluoride)	2%	24937-79-9	Unlisted
Polythene	5%	9002-88-4	Unlisted
Sodium carboxymethylcellulose	0.5%	9004-32-4	Unlisted
Lithium hexafluorophosphate	S%	213 24-40-3	244-334-7
Ethylene Carbonate	5%	96-49-1	202-510-0
Dimethyl Carbonate	5%	616-38-6	210-478-4
Nickel	2.5%	7440-02-0	231-111-4
Copper	5%	7440-50-8	231-159-6
Aluminum	S%	7429-90-5	231-072-3

Section 3 – Hazards Identification

EMERGENCY OVERVIEW

Caution! The battery pack and enclosed cells should not be opened, disassembled, crushed, burned, or exposed to high temperatures. It is safe under normal use. If the battery pack is broken, exposure to the ingredients contained within the battery pack could be harmful under some circumstances. Do not use organic solvents or other chemical cleaners on battery. Fires involving these types of battery packs is extinguished with class D-Dry chemical power, sand is suitable, NO water use .

Target Organs: None.
Hazard Sorts: 9
Potential Health Effects:

- Eye: In normal use, no special risk. If battery is broken, it may cause severe irritation or chemical burn.
- Skin: In normal user no special risk. If battery is broken, cause skin irritation or chemical burn.
- Ingestion: Harmful if swallow. If battery is broken, it may cause severe chemical burn to mouth, esophagus and gastrointestinal system.
- Inhalation: In normal use, no special risk. If battery is broken, cause respiratory irritation, inhale fume and dust cause upper respiratory irritation and lung irritation.
- Other risk: On some bad using conditions (high over charge, inverse charge, external shout circuit...) and in case of a bad functioning, some electrolyte can be removed from the cell by the security vent. In these cases the risk is the caustic nature of electrolyte. The toxic properties of the electrode materials are hazardous only if the materials are released by damaging the cell or if exposed to fire.

Section 4 – First Aid Measures

Caution! No effect under routine handling and use. If exposure to internal materials within cell due to damaged, the following actions are recommended.

- Eyes: Rinse immediately with plenty of water during at least 15-30 minutes. Get medical aid immediately.
- Skin: In case of contact, immediately flush skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid.
- Inhalation: If inhaled, remove from exposure and move to fresh air immediately. Rinse mouth and nose with water. Get medical aid.
- Ingestion: If the injured is fully conscious: plenty of water or milk. Do not induce vomiting. Get medical aid immediately.

Section 5 – Fire Fighting Measures

General Information:
Cells can be overheated by an external source or by internal shorting. Toxic vapor may release in case of fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, and full protective gear.

Special fire fighting procedures:
If batteries are on charge, turn off power. Ventilate area well.

Extinguishing Media:
Class D-Dry chemical powder, sand is suitable. Do NOT use water.

Section 6 – Accidental Release Measures

General Information:
Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Keep unnecessary people away. Remove heat and sources of ignition. Avoid shake and physical damage. Collect, then place into a suitable container for disposal or reuses.

Section 7 – Handling and Storage

Storage:
If longtime storage, the battery must keep under 40-60% state of charge. Store in cool, dry and lee area. High temperature may damage the performance of the battery, cause leaking or rusting. Avoid contacting with open flame. Keep away from moisture.

Handling:
Avoid excessive shaking. Avoid short circuit, however, accident short circuit for a short time will not cause severe influence to the battery. Short circuit for a long time cause energy losing, producing large quantity of heat which may burn skin, even cause fire or explosion. Battery bulk container, coins, metal jewelry, metal worktable, metal belt or other equipment for assembly battery may be the source for short circuit. Use effective anti short circuit measures. Do not disassembly or decompose. Avoid damage. Transport under 10-50% state of charge. Avoid contacting with water, avoid straight sunlight.

Section 8 – Exposure controls, Personal Protection

Exposure Limit:

Composition: CAS# 12057-17-9

PEL-TWA 5 mg/m3 (OSHA, as Mn)

TLV-TWA 0.2 mg/m3 (ACGIH as dust)

Composition: CAS# 7782-42-5

PEL-TWA 5 mg/m3 (NIOSH, total)

REL-TWA 2.5 mg/m3 (NIOSH, respiration)

PEL-TWA 15 mg/m3 (OSHA)

Composition: CAS# 9003-07-0

TLV-TWA 10 mg/m3 (ACGIH, total)

PEL-TWA 15 mg/m3 (OSHA, total)

PEL-TWA 5 mg/m3 (OSHA, respiration)

Composition: CAS# 7440-02-0

TLV-TWA l.5 mg/m3 (ACGIH)

PEL-TWA l mg/m3 (OSHA)

Composition: CAS# 7440-50-8 (as Copper Powder)

PEL-TWA l mg/m3 (NIOSH)

PEL-TWA l mg/m3 (OSHA)

Composition: CAS# 7429-90-5 (as Aluminum Powder)

TLV-TWA 10 mg/m3 (NIOSH, total)

PEL-TWA 5 mg/m3 (NIOSH, respiration)

PEL-TWA 15 mg/m3 (OSHA, total)

PEL-TWA 5 mg/m3 (OSHA respiration)

Monitoring Methods: No information found.

Engineering Controls:

General room ventilation is sufficient during normal use and handing. Do not install these batteries in sealed, unventilated areas. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Work/Hygienic Practices:

Remove jewelry, rings, watches and any other metallic objects while working on battery. All tools should insulate to avoid the possibility of shorting connections. DO NOT lay tools on top of the battery. Be sure to electricity from tools and individual person by touching a grounded surface in the vicinity of the battery, but are heavy. Serious injury can result from improper lifting or installation. DO KEEP a fire extinguisher and emergency communications the work area.

Personal Protective Equipment:

- Eye: Under normal condition of use and handing no special protection is required for sealed battery.
- Skin: Under normal condition of use and handing no special protection is required for sealed battery.
- Clothing: Under normal condition of use and handing no special protection is

required for sealed battery.

- Respirators: Under normal condition of use and handing no special protection is required for sealed battery.

Personal Protective Equipment (In the Event of Battery Case Breakage):

Always wear appropriate safety glasses with side shields or full face shield. Use appropriate gloves. Wear appropriate boots, apron or clothing. Use appropriate respirator.

Other Protection:

No smoking or eating scene work. To maintain good health habits. Wash hands thoroughly after working with battery and before eating, drinking or smoking.

Section 9 – Physical and Chemical Properties

Physical State: White solid
Odor: Odorless
Voltage: 2.75-48 V
Capacitance: 100-40000 mAh
Weight: 10-4000 g
Chemical Uses: Electrical source

Section 10 – Stability and reactivity

Chemical Stability: Stable under normal use.

Conditions to Avoid:

When a battery cell is exposed to an external short-circuit, crushed, modification, high temperature above 100 'C, low temperature -10 'C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.

Incompatibilities with Other Materials:

Conductive materials, water, seawater, strong oxidizers and acids. Hazardous Decomposition Products: Harmful gas is emitted during fire.

Hazardous Polymerization: Will not occur.

Section 11 – Toxicological Information

Toxicological Information:
Composition: CAS# 12057-17-9

- RTECS# Unlisted
- LD50: 9000 mg/kg (Oral, Guinea pig, as Mn)

Composition: CAS# 7782-42-5

- RTECS# MD9659600

- LD50r LC50: Unlisted

Composition: CAS# 9003-07-0

- RTECS# UD1842000
- LD50:>110 mg/kg (Intraperitoneal, rat)
- LD50:>99 mg/kg (Intravenous, rat)

Composition: CAS# 24937-79-9

RTECS# Unlisted

- LD50, LC50: Unlisted

Composition: CAS# 9002-88-4

- RTECS# KX3270000 TQ3325000
- LD50: >2000 mg/kg (Oral, rat)
- LC50: 12 g/m3/30M (Inhalation, mouse)

Composition: CAS# 9004-32-4

- RTECS# FJ5950000
- LC50:≥5800 mg/m3/4h (Inhalation, rat)
- LD50: 27000 mg/kg (Oral, rat)
- LD50:≥27 g/kg (Oral, mouse)
- LD50:≥27 g/kg (Oral, rabbit)
- LD50:≥2 g/kg (Skin, rabbit)

Composition: CAS# 21324-40-3

- RTECS# Unlisted
- LD50: >1702 mg/kg (Oral, rat)

Composition: CAS# 96-49-1

- RTECS# FF9550000
- LD50: >10000 mg/kg (Oral, rat)
- LD50: >3000 mg/kg (Skin, rabbit)

Composition: CAS# 616-38-6

- RTECS# FG0450000
- LD50: >6000 mg/kg (Oral, mouse)
- LD50: >13000 mg/kg (Oral, rat)
- LD50: ; 5 g/kg (Skin, rabbit)

Composition: CAS# 7440-02-0

- RTECS# QR5950000 QR6126100 QR6555000 QR7120000
- LD50: >2 g/kg (Skin, rabbit)

Composition: CAS# 7440-50-8

- RTECS# GL5325000 GL440000 GL7590000
- LD50: >1124 mg/kg (Oral, rat)
- LD50: >2058 mg/kg (Oral, rabbit)
- LC50: 1303 mg/m3 (Inhalation, rabbit)

Composition: CAS# 7429-90-5

- RTECS# BD0330000 BD1020000
- LD50, LC50: Unlisted

Carcinogenicity:

Composition: CAS# 9003-07-0

- IARC: Group 3-Not classifiable as to carcinogenicity to humans.

- Not listed by ACGIH, NTP, or CA Prop 65.

Composition: CAS# 9002-88-4

- IARC: Group 3-Not classifiable as to carcinogenicity to humans.
- Not listed by ACGIH, NTP, or CA Prop 65.

Composition: CAS# 7440-02-0

- ACGIH: A5-Not suspected as a human carcinogen.
- California: carcinogen; initial date 10/1/89.
- OSHA: Possible Select carcinogen
- IARC: Group 28 carcinogen-Possibly carcinogenic to humans
- NTP: Listed as Nickel Compounds and Metallic Nickel

Other compositions of this product are not listed by ACGIH, IARC, NTP, or CA Prop 65.

Sensitization Rate: Not available.

Teratogenicity: Not available.

Section 12 – Ecological Information

Ecological Toxicity: Not available.

Ecological Degradation: Not available.

Biology Degradation: Not available.

Other Information: If the battery is discarded into the environment, the harmful contents inside may be dangerous.

Section 13 – Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 – transport Information

The goods are not subject to DGR.

The goods are packaged according to the packaging instruction 965 of DGR.

Section 15 – Regulatory Information

Regulatory Information:

Reference to the local, national, US and EU / international regulations.

TSCA: All of the chemicals in this product are listed.
DSL or NDSL: All of the chemicals in this product are listed Except CAS#12057-17-9.
OSHA: CAS# 7440-02-0 is listed.
CAS# 7440-50-8 is listed.
CAS# 7429-90-5 is listed.
California Prop 65: CAS# 7440-02-0 is listed.

Chemical Name	CAS No.	Hazard Symbols	Risk Description	Safety Description
Lithium Manganese Oxide	12057-17-9	Xi	R 36/37	S22
Graphite	7782-42-5	Xi	R 36/37	s 22-26-37/39.
Polypropylene	9003-07-0	N/A	N/A	S 24/25
Poly(vinylidene fluoride)	24937-79-9	N/A	N/A	S 22-24/25
Polythene	9002-88-4	N/A	N/A	S 24/25-28A-37-45

(Continued)

Chemical Name	CAS No.	Hazard Symbols	Risk Description	Safety Description
Sodium carboxymethylcellulose	9004-32-4	N/A	N/A	N/A
Lithium hexafluorophosphate	21324-40-3	C，Xn	R 20/21/22 -24-34	S 22-26 -27-28A -36/37/39 -45
Ethylene Carbonate	96-49 — i	Xi	R 36/37/38 -41	S 26-36/39
Dimethyl Carbonate	616-38-6	F	R 11	S 2-9-16
Nickel	7440-02-0	F (Powder) Xn	R 10-17 -36/37/38 -40-42-43	s 16-22-26-36
Copper	7440-50-8	F (Powder)	R11	S16
Aluminum	7429-90-5	F (Powder)	R 15-17	S 7/8-43

Hazard Symbols:
F: Flammable.
Xi: Irritant.
Xn: Harmful.

C: Corrosive.

Risk Description:

R 10: Flammable.
R 11: Highly flammable.
R 15: Contact with water liberates extremely flammable gases.
R 17: Spontaneously flammable in air.
R 20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
R 24: Toxic in contact with skin.
R 34: Causes burns.
R 36/37/38: Irritating to eyes, respiratory system and skin.
R 40: Limited evidence of a carcinogenic effect.
R 41: Risk of serious damage to eyes.
R 42: May cause sensitization by inhalation.
R 43: May cause sensitization by skin contact.

Safety Description:

S 2: Keep out of reach of children.
S 7/8: Keep container tightly closed and dry.
S 9: Keep container in a well-ventilated place.
S 16: Keep away from sources of ignition - No smoking.
S 22: Do not breathe dust.
S 24/25: Avoid contact with skin and eyes.
S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 27: Take off immediately all contaminated clothing.
S 28A: After contact with skin, wash immediately with plenty of water.
S 36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
S 43: In case of fire, use: foam dry powder, carbon dioxide (CO_2), sand to extinguish. (Do NOT use water).
S 45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Section 16 – Additional Information

Issue Time: 2009-06-04
Issue Department: Technical department
Data review unit:
Modification record:
Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although

certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Other Information:
ACGIH: (American Conference of Governmental Industrial Hygienists); CAS: (Chemical Abstracts Service); DOT: (Department of Transportation); DSL: (Domestic Substances List); EINECS: (European Inventory of Existing Commercial Substances); IATA: (International Air Transport Association); IMDG: (International Maritime Dangerous Goads); LD50: (.Lethal dose, 50 percent kill); NIOSH: (National Institute for Occupational Safety and Health); NTP: (National Toxicology Program); OSHA: (Occupational Safety and Health); PEL: (Permissible Exposure Level); REL: (Recommended Exposure Limit); STEL: (Short Term Exposure Limit); TDG: (Transportation of Dangerous Goods);TSCA: (Toxic Substances Control Act); TWA: (Time Weighted Average); TLV: (Threshold Limit Value)

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