



SAFETY DATA SHEET

This Safety Data Sheet meets the requirement of the United States Occupational Safety and Health Administration (OSHA)

1. Product and Company Identification

Product Identification:

Name of the substance: Lithium-Ion Battery Pack
Model Number: Z9A820-3

Issue Date: June 24, 2015
Version Number: 2
Supersede Date: November 28, 2017

Relevant identified uses of substance or mixture and uses advised against:

Identified uses: Rechargeable Lithium-ion Battery Pack
Restrictions on Use: For use as a battery-based power source designed specifically for its intended host device. Use only a charger designed for charging this battery pack. Do not rupture or expose solution inside of the cell or pack.

Manufacturer:

iTECH
9454 Waples St.
San Diego, CA 92121
TEL: 858-458-1500
FAX: 858-458-1798

2. Hazards Identification

Battery Pack is designed to withstand temperatures and pressures encountered during normal use. As a result, there is no physical danger of ignition or explosion or chemical danger of hazardous materials' leakage.

Specific hazards:

if exposed to added mechanical shocks, decomposed, added electric stress by mis-use or otherwise abused, the gas release vent of the cell will be operated. If the cell case is breached at the extreme, hazardous materials may be released. If the electrolyte contacts water, it will generate hydrogen fluoride. The electrolyte is an inflammable liquid, if heated strongly by the surrounding fire, acrid gas may be emitted.

Exposure to skin: Exposure to contents of an open or damaged cell or battery may cause irritation to the skin, eyes and mucus membranes. Symptoms include itching, burning, redness and tearing.

Environmental effects: Not classified as hazardous to the environment

3. Composition / Information on Ingredients

Substance or preparation: Preparation

This product contains cells of the following chemical nature¹:

Portion	Material Name	Chemical Name	CAS No.	Concentration range (wt%)
Positive Electrode	Lithium transition metal oxidate (Li[M] _m [O] _n) ²	LiCoO ₂ Manganese Nickel Aluminum	12190-79-3 7439-96-5 7440-02-0 7429-90-5	20 ~60
Positive Electrode's Base	Aluminum	Al	7429-90-5	1~10
Negative Electrode	Carbon	Carbon Black Or Graphite	1333-86-4 7782-42-5	10~30
Negative Electrode's Base	Copper	Cu	7440-50-8	1~15
Electrolyte and Solvents	Organic electrolyte principally involves ester carbonate	LiPF ₆ Ethylene Carbonate Propylene Carbonate Diethyl Carbonate Dimethyl Carbonate Ethyl Methyl Carbonate	21324-40-3 96-49-1 108-32-7 105-58-8 616-38-6 623-53-0	5~25
Separator	Polyvinylidenefluoride	PVDF	24937-79-9	
Outer case	Aluminum, iron, aluminum laminated plastic	Various		1~30
PCB		Various		
Other components, tapes, glues		Various		
Outer case, steel, nickel strips and inert components		Various		

¹Not every cell includes all of these materials.

²The letter M means transition metal and candidates of M are Co, Mn, Ni and Al. One compound includes one or more of these metals and one product includes one or more of the compounds. The letter m and n means the number of atoms.

4. First-aid Measures

Avoid contact with released internal battery and cell materials.

Inhalation:

Remove victim from exposed area to fresh air, Have the person blow his/her nose and gargle. Seek medical attention if necessary.

Skin contact:

Flush extraneous matter or contact region with soap and plenty of water immediately. If irritation or pain persists, seek medical attention.

Eye contact:

Do not rub one's eyes. Immediately flush contaminated eye(s) with water continuously for at least 15 minutes. Seek medical attention immediately.

Ingestion:

Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Quickly transport victim to an emergency care facility.

Protection for First Responders:

Do not enter contaminated area without a respirator or self-contained breathing apparatus. Wear adequate personal protective equipment.

Acute symptoms and effects caused by exposure:

Do not enter contaminated area without a respirator or self-contained breathing apparatus. Wear adequate personal protective equipment.

Protection for First Responders:

Do not enter contaminated area without a respirator or self-contained breathing apparatus. Wear adequate personal protective equipment.

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 a fire.

Specific methods of fire-fighting:

When the battery burns with other combustibles simultaneously, take fire-extinguishing method which correspond 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 clothing.

6. Accidental release measures

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the followings:

Precautions for human body:

Remove spilled materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.

Environmental precautions:

Prevent entry into waterways, sewers, basements or confined areas. Runoff from fire control and dilution water may be toxic and corrosive.

Method of cleaning up:

The spilled solids are put into a container. The leaked place is wiped off with dry cloth.

Prevention of secondary hazards:

Avoid re-scattering. Do not bring the collected materials close to fire.

7. Handling and Storage

Handling suggestions:

- Do not connect the positive terminal to the negative terminal with conductive material during handling.
- Avoid polarity reverse connection when installing the battery to an instrument.
- Do not wet the battery with water, seawater, drink or acid; or expose to strong oxidizer.
- Keep the battery away from heat and fire.
- Do not disassemble or reconstruct the battery; or solder to the battery or cells directly.
- Do not subject to mechanical shock, impact or deform.
- Do not use unauthorized charger or other charging method. Terminate charging when the charging process doesn't end within specified time.

Storage suggestions:

- Do not store the battery with metalware, water, seawater, strong acid or strong oxidizer.
- Store battery with charge amount >25% capacity at room temperature or less (temperature -20 to 35C) in a dry (humidity: 45~85%) place. Avoid direct sunlight, high temperature, and high humidity.
- Use insulative and adequately strong packaging material to prevent short circuit between positive and negative terminal when the packaging breaks during normal handling. Do not use conductive or easy to break packaging material.

8. Exposure controls / personal protection

Control parameters:

No hazardous substances are expected when batteries and cells are used for their intended purpose

- Exposure Limit Values: None
- Biological Monitoring: N/A
- Control Banding: N/A
- Recommended monitoring procedures: Follow standard monitoring procedures
- Derived no-effect level (DNEL): N/A
- Derived minimal effect level (DMEL): N/A
- Predicted no-effect concentrations (PNECs): N/A

Personal protective equipment:

- Respiratory protection: Not required under normal use. Use an approved inorganic vapor and gas/acid/particulate respirator if dealing with an electrolyte leakage and irritating vapors are generated.
- Hand protection: Not required under normal use. Use chemical resistant protective gloves when handling a ruptured and leaking battery.
- Eye protection: Not required under normal use. Use chemical resistant safety goggle or protective glasses designed to protect against liquid splashes when handling a ruptured and leaking battery.
- Skin and body protection: Not required under normal use. Wear working clothes with long sleeve and long trousers to avoid skin contact if handling a ruptured and leaking battery.

9. Physical and chemical properties

Physical State:	Solid, Sealed Unit	Vapor Pressure:	N/A
Appearance:	Battery Pack	Vapor Density:	N/A
pH:	N/A	Solubility in Water:	Insoluble
Relative Density:	N/A	Water/Oil distribution coefficient:	N/A
Boiling Point:	N/A	Odor Type:	Odorless
Melting Point:	N/A	Odor Threshold:	N/A
Viscosity:	N/A	Evaporation Rate:	N/A
Oxidizing Properties:	N/A	Auto Ignition Temperature:	N/A
Flash Point and Method:	N/A	Flammability Limits:	N/A
Octano/Water Partition Coefficient:	N/A	Decomposition Temperature:	90°C

10. Stability and reactivity

Stability:

Stable under normal use

Hazardous reactions occurring under specific conditions:

Conditions to avoid:

If a battery or cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100° C, there will be the potential for 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. May decompose to product hydrogen fluoride, phosphorus oxides, sulfur oxides, sulfuric acid, lithium hydroxide, carbon monoxide and carbon dioxide.

11. Toxicology information

Under normal use, the hazardous materials are contained within the sealed cell. Used in the recommended conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell within the battery remains sealed. The potential for exposure does not exist unless the cell leaks, is exposed to high temperature or is mechanically, electrically or physically damaged or abused. If the cell were to leak through the battery the following toxicology data applies.

Components	ACGIH
lithium cobalt dioxide (LiCoO_2)	0.02mg/m ³ as Co
Lithium hexafluorophosphate (LiPF_6)	2.5mg/m ³ as F
Ethylene carbonate ($\text{C}_3\text{H}_4\text{O}_3$)	Not Established
Chain Carbonate	Not Established
Graphite (C)	2mg/m ³ as dust

In case if internal gas released or electrolyte spilled: Electrolyte containing LiPF_6 and organic solvents has a small amount of toxicity and may cause irritation of the skin or eyes. Released gas may also cause irritation of skin or eyes.

12. Ecological information

Lithium-ion batteries and cells should be disposed of in accordance with appropriate federal, state and local regulations. However, recycling is highly recommended.

Ecotoxicity:	The sealed battery under normal use does not pose an ecotoxicity hazard. If damaged or abused, the leakage of electrolyte may cause damage if not disposed of properly.
Persistence and degradability:	No current data available
Bio accumulative potential:	No current data available
Partition coefficient	N/A
Bio concentration factor	Not available
Mobility in soil	No current data available
PBT and vPvB assessment	None
Other adverse effects	Solid batteries and cells released into the natural environment will slowly degrade and may release harmful or toxic substances. Batteries and cells are not intended to be released into water or on land but should be disposed or recycled according to local regulations.

13. Disposal considerations

Do not incinerate or expose batteries to temperatures in excess of 100° C. Such handling may cause heat generation, explosion or fire. It is highly recommended that batteries are recycled per local regulations. Exposed terminals should be covered for disposal. Damaged batteries may be considered hazardous waste and must be disposed of in accordance to local and federal laws and regulations.

Packaging materials are not contaminated during normal use. If packaging materials are contaminated by battery cell leakage, dispose of as industrial waste subject to local hazardous waste rules and regulations.

14. Transport information

Lithium-ion batteries are regulated for land, sea and air transportation. Batteries must be packaged properly to protect against short-circuiting or accidental activation during transport. Special provisions are available depending for transport as "Non Dangerous Goods" in some cases if the size and packing requirements are met.

Shipping Name (UN number): Lithium ion batteries (UN3480)

Transport Hazard Classes: 9

Packing Group: PI 965 Sections IB or II (Lithium-ion)

Organizations

Organization	Area	Method	Special Provision
IATA, ICAO	International	Air	PI 965, PI 968
IMO	International	Marine	SP188
DOT	USA	Air, Rail, Road, Marine	49CFR173.185

15. Regulatory information

- UN Model Regulations: United Nations UN/ST/SG/AC.10/1/Rev.17, Recommendations on the Transport of Dangerous Goods, 17th revised edition
- The International Civil Aviation Organization (ICAO): Technical Instructions for Safety Transport of Dangerous Goods by Air, 2015/2016 Edition
- The International Air Transport Association (IATA): Dangerous Goods Regulations, 59th edition
- International Maritime Organization (IMO): International Maritime Dangerous Goods (IMDG) Code, 2014-2016 37th Edition
- US Department of Transportation 49 Code of Federal Regulations

16. Other information

First Edition: June 24, 2015
 Revision: 2nd release

For further information, please contact iTECH 1-858-458-1500