SAFETY DATA SHEET

Revision Date: 20190301
Version 1.0

1. Product and Company Identification

Product name	:	LFP Lithium Ion Battery
Specifications	:	PF37 / AS0374 / H32148/US3000/H48074
Product use	:	Energy storage / telecommunication backup power supply / electric car
Manufacturer/Supplier	:	Pylon Technologies Co., Ltd.
Address	:	No. 73, Lane 887, Zu Chongzhi Road, Zhangjiang Hi-Tech Park Pudong, Shanghai 201203, China
Telephone	:	+86 21-51317697
E-mail	:	stella.mao@pylontech.com.cn
Emergency telephone number of the company	:	+86 21-51317697

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

GHS classification of the product :
Skin corrosion/irritation category 2
Eye damage/irritation category 1
specific target organ toxicity (repeated exposure) category 1
Flammable liquids category 3

Label elements

Pictogram :

Signal word : Danger

Hazard statement :
Causes skin irritation
Causes serious eye damage
Causes damage to organs through prolonged or repeated exposure
Flammable liquid and vapour

Precautionary statements

Prevention	:	Wash exposed skin thoroughly after handling. Wear protective gloves. Wear protective gloves/protective clothing/eye protection/face protection Do not breathe dust/fume/gas/mist/ vapours/spray. Do not eat, drink or smoke when using this product. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof [electrical/ventilating/lighting] equipment. Use non-sparking tools. Take action to prevent static discharges.
Response	:	IF ON SKIN: Wash with plenty water Specific treatment (see section 4 on this SDS) If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. Get medical advice/attention if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. In case of fire: Use dry chemical,fire extinguishers,carbon dioxide,fire extinguishers,foam to extinguish.
Storage	:	Store in a well-ventilated place. Keep cool.
Disposal	:	Dispose of contents/container in accordance with local/regional/national/international regulations

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Chemical nature: Mixture

Components

Chemical Name	CAS-No.	Concentration
Lithium iron phosphate	15365-14-7	40-50%
Graphite	7782-42-5	15-25%
Copper	7440-50-8	5-10%
aluminium	7429-90-5	5-10%
Poly(vinylidene fluoride)	24937-79-9	5-10%

Carbon black	1333-86-4	1-10%
（PAA）/2-PROPENOIC ACID, HOMOPOLYMER	9003-01-4	1-5%
Lithium hexafluorophosphate(1-)	21324-40-3	1-5%
nickel	7440-02-0	0.1-1.0%

4. First-Aid Measures

Description of first aid measures

Inhalation : Move person to fresh air; If symptoms persist, consult a physician.

Skin contact : Take off contaminated clothing and shoes immediately. Flush contact area with lukewarm water.If irritation persists, consult a physician.

Eye contact : If you use contact lenses, remove the lenses first.Wash affected eyes for at least 15 minutes under running water with eyelids held open. If symptoms occur, consult a physician, preferably an ophthalmologist.

Ingestion : Rinse mouth immediately and then drink plenty of water, seek medical attention.

Most important symptoms and effects, both acute and delayed : Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed

Note to physician : Treatment of exposure should be directed at the the clinical condition of the patient.

5： Fire-Fighting Measures

Suitable extinguishing media : Dry chemical fire extinguishers.Carbon dioxide fire extinguishers.Foam.

Unsuitable extinguishing media : No data available.

Special hazards arising from the substance or mixture

Hazardous combustion products : During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating

Advice for firefighters

Special protective equipment for firefighters : Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves).

6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures : Avoid breathing vapor.Avoid skin contact.Ensure adequate ventilation.

Environmental precautions : Prevent from entering into soil, ditches, sewers, waterways and/or groundwater.

Methods and materials for containment and cleaning up : Contain spilled material if possible.Collect in suitable and properly labeled containers.Then store and dispose of according to local regulations.

7 : Handling and storage

Advice on safe handling : Avoid breathing vapors.Avoid contact with the skin, eyes and clothing.Wear safety glasses with side shields.

Conditions for safe storage, including any incompatibilities : Keep container tightly closed in a cool, well-ventilated place. Keep container dry.Keep away from heat, sparks and flames.

8 : Exposure Controls/Personal Protection

Control parameters

Chemical name	Occupational Exposure Limits		Regulation
Graphite	TWA	5 mg/m3	USA - NIOSH
Graphite	TWA	15 mg/m3 total dust,5 mg/m3 respirable dust	USA - OSHA
Graphite	TWA	2mg/m3 respirable fraction	USA - ACGIH

Aluminium metal	TWA	10 mg/m3,5 mg/m3,2 mg/m3	USA - NIOSH
Aluminium metal	TWA	15 mg/m3 total dust,5 mg/m3 respirable dust	USA - OSHA
Aluminium metal	TWA	10 mg/m3 metal dust	USA - ACGIH
Carbon black	TWA	5 mg/m3	USA - NIOSH
Carbon black	TWA	3 mg/m3,5 mg/m3	USA - OSHA
Carbon black	TWA	3.5mg/m3	ACGIH TLV-TWA

Personal protective equipment

Respiratory protection : None required under normal conditions.

Hand protection : None required under normal conditions. Wear safety glasses if handling a damaged battery.

Eye protection : Not required under normal conditions. If battery case is damaged, wear chemical goggles or face shield.

Skin and body protection : Where there is potential for skin contact, have available and wear as appropriate, impervious gloves, apron, pants, jacket, hood and boots.

9 : Physical and chemical properties

Form : solid

Colour : silver, black

Odour : none

pH : not applicable

Melting point : no data available

Boiling point : no data available

Flash point : 33℃

Thermal decomposition temperature : no data available

Density : no data available

Water solubility : insoluble

Viscosity, dynamic	:	not applicable

10 : Stability and Reactivity

Reactivity	:	No hazardous reactions if stored and handled as prescribed/indicated.
Chemical stability	:	The product is stable if stored and handled as prescribed/indicated.
Possibility of hazardous reactions	:	This product is considered stable.However, avoid contact with ignition sources (e.g. sparks, open flame, heated surfaces).
Conditions to avoid	:	Avoid all sources of ignition: heat, sparks, open flame.
Incompatible materials	:	Strong oxidizers.
Hazardous decomposition products	:	No hazardous decomposition products if stored and handled as prescribed/indicated.

11 : Toxicological information

Information on toxicological effects

Acute toxicity

Acute Toxicity: oral

Nickel
LD50/rat:> 9 000 mg/kg bw

Lithium hexafluorophosphate(1-)
LD50/rat:50 - 300 mg/kg bw

Graphite
LD50/rat:> 2 000 mg/kg bw

Ethylene carbonate
LD50/rat:10 400 mg/kg bw

Dimethyl carbonate
LD50/rat:> 5 000 mg/kg bw

Copper
LD50/rat:300 - 500 mg/kg bw

Carbon black
LD50/rat:> 8 000 mg/kg bw

Aluminium
LD50/rat:> 15 900 mg/kg bw

Acute Toxicity: inhalation

Nickel
NOAEC/66 min/rat:>= 10.2 mg/L air

Graphite
LC50/4 h/rat:> 2 000 mg/m3; air

Ethylene carbonate
LC0/8 h/rat:730 mg/m3; air

Dimethyl carbonate
LC50/4 h/rat:> 5.36 mg/L air (analytical)

Copper
LC50/4 h/rat:> 5.11 mg/L air

Aluminium
LC0/4 h/rat:0.888 mg/L air (analytical)

Acute Toxicity: dermal

Ethylene carbonate
LD50/rat:> 2 000 mg/kg bw

Dimethyl carbonate
LD50/rabbit:> 2 000 mg/kg bw

Copper
LD50/rat:> 2 000 mg/kg bw

Skin irritation/corrosion

Nickel
rabbit
not irritating

Lithium hexafluorophosphate(1-)
human
corrosive

Graphite
rabbit
not irritating

Ethylene carbonate
rabbit
not irritating

Dimethyl carbonate
rabbit
not irritating

Copper
rabbit
not irritating

Aluminium
rabbit
not irritating

Serious eye damage/irritation

Nickel
rabbit
not irritating

Lithium hexafluorophosphate(1-)
Fresh, fertilised brown leghorn chicken eggs
severe irritant

Graphite
rabbit
not irritating

Ethylene carbonate
rabbit
Category 2 (irritating to eyes) based on GHS criteria

Dimethyl carbonate
rabbit
not irritating

Copper
rabbit
slightly irritating

Carbon black
rabbit
not irritating

Aluminium
rabbit
not irritating

Respiratory or skin sensitisation

Lithium hexafluorophosphate(1-)
mouse
not sensitising

Graphite
mouse
not sensitising

Ethylene carbonate
guinea pig
non-sensitizer

Dimethyl carbonate
guinea pig
not sensitising

Copper
guinea pig
not sensitising

Carbon black
guinea pig
not sensitising

Aluminium
guinea pig
not sensitising

Germ cell mutagenicity: in vitro

Lithium hexafluorophosphate(1-)
negative

Graphite
negative

Ethylene carbonate
negative

Dimethyl carbonate
negative

Copper
negative

Carbon black
negative

Aluminium
negative

Germ cell mutagenicity: in vivo

Lithium hexafluorophosphate(1-)
negative

Dimethyl carbonate
negative

Copper
negative

Carbon black
negative

Aluminium
negative

Carcinogenicity

Nickel
Suspected of causing cancer.

Ethylene carbonate
No evidence of carcinogenicity in the study animals was observed.

Carbon black
No evidence of carcinogenicity in the study animals was observed.

Aluminium
No evidence of carcinogenicity in the study animals was observed.

Reproductive toxicity

Lithium hexafluorophosphate(1-)
Animal tests showed no developmental toxicity

Graphite
Animal tests showed no developmental toxicity

Ethylene carbonate
Animal tests showed no developmental toxicity

Dimethyl carbonate
Animal tests showed no developmental toxicity

Copper

Animal tests showed no developmental toxicity

Carbon black
Animal tests showed no developmental toxicity

Aluminium
Animal tests showed no developmental toxicity

STOT-single exposure

No information available

STOT-repeated exposure

No information available

Aspiration hazard

No information available

12 : Ecological information

Toxicity

Short-term toxicity to fish

Nickel
LC50/96 h/Oncorhynchus mykiss (previous name: Salmo gairdneri):15.3 mg/L

Lithium hexafluorophosphate(1-)
EC50/96 h/other: Oncorhynchus mykiss, Salmo Trutta:51 mg/L

Graphite
LC50/96 h/Danio rerio (previous name: Brachydanio rerio):> 100 mg/L

Carbon black
LC0/96 h/Danio rerio (previous name: Brachydanio rerio):1 000 mg/L

Aluminium
LC50/96 h/Pimephales promelas:1.16 mg/L

Long-term toxicity to fish

Nickel
NOEC/32 d/Pimephales promelas:0.057 mg/L

Lithium hexafluorophosphate(1-)
LC50/20 d/other: Rainbow trout (Neuhold and Sigler, 1960). Rainbow and brown trout (Camargo, 1966). Mullet (Hemens et al, 1975).:>= 2.7 - mg/L

Aluminium
NOEC/7 d/Pimephales promelas:0.4 mg/L

Short-term toxicity to aquatic invertebrates

Nickel
LC50/48 h/Ceriodaphnia dubia:276 µg/L

Lithium hexafluorophosphate(1-)
LC50/48 h/Daphnia magna:> 100 mg/L

Graphite
NOEC/48 h/Daphnia magna:>= 100 mg/L

Carbon black
EC100/24 h/Daphnia magna:10 000 mg/L

Aluminium
LC50/48 h/Ceriodaphnia dubia:0.72 mg/L

Long-term toxicity to aquatic invertebrates

Nickel
EC10/10 d/other: Chironomus tentans (now known as Chironomus dilutus):404.3 µg/L

Lithium hexafluorophosphate(1-)
NOEC/21 d/Daphnia magna:3.7 mg/L

Aluminium
NOEC/6 d/Ceriodaphnia dubia:1.02 mg/L

Toxicity to microorganisms

Nickel
EC50/30 min/activated sludge:33 mg/L

Lithium hexafluorophosphate(1-)
EC50/3 h/activated sludge of a predominantly domestic sewage:> 1 000 mg/L

Graphite
EC20/3 h/activated sludge of a predominantly domestic sewage:> 1 012.5 mg/L

Carbon black
EC10/3 h/activated sludge, domestic:ca. 800 mg/L

Persistence and degradability

Lithium hexafluorophosphate(1-)
Rapid reaction with water releases HF and LiF, leading to production of dissolved F- ions; subsequently, release of Li+ and PO4(3-) ions will follow.

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

13 : Disposal considerations

Product	:	Observe national and local legal requirements.
Contaminated packaging	:	Uncontaminated packaging can be re-used.

14 : Transport Information

Land transport

ADR

UN number	:	3480
UN proper shipping name :	:	LITHIUM ION BATTERIES
Transport hazard class(es) :	:	9
Packing group	:	II

Sea transport

IMDG

UN number	:	3480
UN proper shipping name :	:	LITHIUM ION BATTERIES
Transport hazard class(es) :	:	9
Packing group	:	II

Air transport

IATA/ICAO

UN number	:	3480
UN proper shipping name :	:	LITHIUM ION BATTERIES
Transport hazard class(es) :	:	9
Packing group	:	II

15 : Regulatory information

Federal Regulations

Registration status:
Chemical TSCA, US released / listed

EPCRA 311/312 (Hazard categories):
Immediate (acute) health hazard
Fire hazard

CERCLA Section 103
7440–50–8 Copper 5000 lbs
7440–02–0 Nickel 100 lbs

CA Prop. 65:
1333-86-4 Carbon black (airborne, unbound particles of respirable size) cancer
7440-02-0 Nickel (Metallic) cancer

NFPA Hazard codes:
Health : 1 Fire: 1 Reactivity: 0 Special:

HMIS III rating
Health: 1 Flammability: 1 Physical hazard: 0

16 : Other information

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SDS Prepared on: 20170515

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