

# Material Safety Data Sheet

Description: Lithium-ion Polymer Battery Documents No.: TPLIP01-2019

## Section 1- Chemical Product and Company Identification

**Product details-**

- **Trade name:** Li-ion Polymer Battery
- **Registration number:** Not available
- **Application of the substance / the**

**Manufacturer Name:** TOPTECH BATTERY (HK) LIMITED

Add: Building 1, Launch Industrial Park, Wuhe Road North Ban Tian, Buji, Shen zhen, China

Company emergency phone: +86-755-84739528 Fax:+86-755-84739850

**Issue date :** Jan 5<sup>th</sup> 2019

## Section 2 Hazards identification

- **Hazard description:** A sealed Li-ion Polymer Battery is not hazardous in normal use on principle.
- **Information concerning particular hazards for human and environment:**  
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
- **Classification system:**  
The classification is according to the latest editions of 1907/2006/EC, EU Commission Directive 1999/45/EC,67/548/EEC, and extended by company and literature data.

## Section 3 Composition/information on ingredients

- **Description:** Although the chemical composition of the various cell manufacturers is proprietary, the following is typical of the chemistry.

| Hazardous Components<br>(Specific Chemical Identity;<br>Common Name(s)) | %          | CAS Number | LD50(mg/kg)<br>(oral-rat) | LC (mg/L) |
|---|------------|------------|---------------------------|-----------|
| Aluminum foil   | 0.1-1 w/w  | 7429-90-5  | N/AV                      | A/AV      |
| Biphenyl (BP)   | 0 -0.3 w/w | 92-52-4    | 2400                      | N/AV      |
| Copper foil   | 1 -3 w/w   | 7440-50-8  | 3.5(ipr-mouse)            | N/AV      |
| Linear and Cyclic Carbonic<br>Solvents (See other<br>information)       | 5 -17 w/w  | N/APP      | ≈11000<br>(weighted avg ) | N/AV      |
| Graphite Powder   | 12-17 w/w  | 7440-44-0  | 440<br>( ivn - mouse)     | N/AV      |
| Lithium Carbonate   | 0 -0.3 w/w | 554-13-2   | 525                       | N/APP     |

|  |           |            |      |          |
|--|-----------|------------|------|----------|
| Lithium cobaltite (LiCoO <sub>2</sub> )          | 25-33 w/w | 12190-79-3 | N/AV | N/AV     |
| Lithium hexafluorophosphate (LiPF <sub>6</sub> ) | 1-5 w/w   | 21324-40-3 | 1702 | Rat: >20 |

These chemicals and metals are contained in a sealed can.

**-Physical:**

Under normal conditions of use, electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain intact, Risk of exposure only in case of abuse, e.g. mechanical, thermal, electrical, which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage, electrode materials reaction with moisture/water of battery vent/ explosion/fire may follow depending upon circumstances.

**-Chemical:**

**Classification of dangerous Substances Contained into the Product as per Directive**

| Substance         | Chemical Symbol    | Content (%) | Melting Point °C | Indication of Danger  | Special Risk | Safety Advice                    |
|-------------------|--------------------|-------------|------------------|-----------------------|--------------|----------------------------------|
| Lithium Cobaltite | LiCoO <sub>2</sub> | 23~33       | >500             |                       | R22R43       | S2 S22<br>S24 S26 S36<br>S37 S45 |
| Carbon            | C                  | 12~17       | >1000            |                       |              |                                  |
| Organic Solvents  | EC                 | 3           | EC : 38°C        | Flammable             | R21R22       | S2 S24                           |
|                   | DMC                |             | DMC : 4°C        |                       | R41          | S26 S36                          |
|                   | DEC                |             | DEC : -43°       |                       | R42/43       | S37 S45                          |
|                   | LiPF <sub>6</sub>  |             | N/A              | Irritant<br>Corrosive | R14          | S2 S8 S22<br>S24 S26 S36         |

**1. Name of Special Risks:**

- R14/15 Reacts with water and yields flammable gases
- R21 Harmful in contact with skin
- R22 Harmful us swallowed
- R35 Causes severe burns
- R41 Risk of serious damage to the eye
- R42/43 May cause sensitization by inhalation and skin contact
- R43 May cause sensitization by skin contact

**2. Safety Advices:**

- S2 Keep out of reach from children
- S8 Keep away from moisture
- S22 Do not breathe dust
- S24 Avoid contact with skin
- S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical attention
- S36 Wear suitable protective clothing
- S37 Wear suitable gloves

### **Section 4 First aid measures**

In case of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clear out corrosive fumes/gases and pungent odors.

In all case, seek immediate medical attention,

Eye contact: Flush with plenty of water(eyelids-held open)for at least 15 minutes

Skin contact: Remove all contaminated clothing and flush affected areas with plenty of water and sop for at least 15minutes.

Ingestion: Dilute by giving plenty of water and get immediate medical attention.

Assure that the victim does not aspirate vomited material by use of positional drainage.

Assure that mucus does not obstruct the airway.

Do not give anything by mouth to an unconscious person

Inhalation: Remove to fresh air and ventilate the contaminated area.

Give oxygen or artificial respiration if needed.

### **Section 5 Fire-fighting measures**

|                           |   |
|---------------------------|---|
| Fire and explosion hazard | The batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 90°C resulting from inappropriate use or from the environment. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire.LiPF6 salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.   |
| Extinguishing media       | Suitable : CO2,<br>Dry chemical or Foam extinguishers<br>Not to be used : Type D extinguishers  |
| Special exposure hazards: | Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment.<br>Eye contact : The electrolyte solution contained in the battery is irritant to ocular tissues.<br>Skin contact : The electrolyte solution contained in the battery causes skin irritation.<br>Ingestion : The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract.<br>Inhalation : Contents of a leaking or ruptured battery can cause respiratory |

|                   |            |  |
|-------------------|------------|--|
| Special equipment | protective | tract, mucus, membrane irritation and edema.<br>Use self-contained breathing apparatus to avoid breathing irritant fumes.<br>Wear protective clothing and equipment to prevent body contact with electrolyte solution. |
|-------------------|------------|--|

## **Section 6 Accidental release measures**

The material contained within the batteries would only be expelled under abusive conditions. Using shovel or broom, cover battery or spilled substances with dry sand or vermiculite, place in approved container (after cooling if necessary) and dispose in accordance with local regulations.

## **Section 7 Handling and storage**

**The batteries should not be opened destroyed nor incinerated since they may leak or rupture and release in the environment the ingredients they contain.**

|          |   |
|----------|---|
| Handling | Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non-conductive (i.e. plastic) trays.   |
| Storage  | Store in a cool (preferably below 30°C) and ventilated area away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 90°C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them. |
| Other    | manufacturer recommendations regarding maximum recommended currents and operating temperature range.<br>Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.   |

## **Section 8 Exposure controls/personal protection**

|                         |  |
|-------------------------|--|
| Respiratory protection: | Not necessary under normal use.<br>In case of battery rupture, use self-contained full-face respiratory equipment.<br>equipment with type ABEK filter. |
| Hand protection:        | Not necessary under normal use.<br>Use rubber gloves if handling a leaking or ruptured battery.  |
| Eye protection:         | Not necessary under normal use. Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.                            |
| Skin protection:        | Not necessary under normal use. Use rubber apron and protective working in case of handling of a ruptured battery.                                     |

## **Section 9 Physical and chemical properties**

9.1 Appearance (Physical shape and color as supplied:)

LiCoO<sub>2</sub> is a gray odorless powder; Graphite is a black or odorless powder; Organic solvent is a colorless liquid; Lithium salt is a white, crystalline and odorless powder.

9.2 Specific gravity (H<sub>2</sub>O=1)

LiCoO<sub>2</sub>: 3.80

Graphite: 2.0-2.2

9.3 Melting point

LiCoO<sub>2</sub>: 1130°C

Graphite: 3500-3900°C

## **Section 10 Stability and reactivity**

|                                  |  |
|----------------------------------|--|
| Conditions to avoid              | Heat above 90°C or incinerate. Deform, mutilate, crush, pierce, disassemble. Short circuit. Prolonged exposure to humid conditions.  |
| Materials to avoid               | N/A  |
| Hazardous decomposition products | Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of lithium (LiPF <sub>6</sub> ) with water. Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire. |

## **Section 11 Toxicological information**

|                                       |  |
|---------------------------------------|--|
| Irritation                            | Risk of irritation occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the skin, eyes and respiratory tract may occur. |
| Sensitization                         | Not Available  |
| Neurological Effects                  | Not Available  |
| Teratogenicity                        | Not Available  |
| Reproductive Toxicity                 | Not Available  |
| Mutagenicity (Genetic Effects)        | Not Available  |
| Toxicologically Synergistic Materials | Not Available  |

## **Section 12 Ecological information**

When properly used or disposed, the LITHIUM-ION batteries do not present environmental hazard

## **Section 13 Disposal considerations**

Dispose in accordance with applicable regulations which vary from country to country.

(In more countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through not-for-profit organizations, mandated by local governments)

or organized on a voluntary basis by professionals).

Lithium-Ion batteries should have their terminals insulated and be preferably wrapped in plastic bags prior to disposal.

13.1 Incineration : Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment. 13.2 Land filling : Leach ability regulations (mg/l)

| Component | Leach ability | EC limit | EPA | Other* |
|-----------|---------------|----------|-----|--------|
| Iron      | 100           |          |     | 5      |
| Nickel    | 500           | 2        |     | 0.5    |

## **Section 14 Transport information**

This report applies to by sea, by air and by land;

The Li-ion Polymer Battery tested according to the requirements of the UN manual of tests and Criteria, Part III, subsection 38.3;

Li-ion Polymer Battery was protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to short circuit;

The Li-ion Polymer Battery according to Section II/Section IB of PACKING INSTRUCTION 965, or Section II of PACKING INSTRUCTION 966 967 of the 2019 IATA Dangerous Goods regulations 60th DGR Manual of ITATA of special provision 188 of IMDG code (Amdt. 39-18) Edition may be transported. and applicable U.S. DOT regulations for the safe transport of Li-ion Polymer Battery

More information concerning shipping, testing, marking and aging can be obtained from label master at <http://www.labelmaster.com/>.

The packaging shall be adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design shall be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture.

The package must be handled with care and that a flammability hazard exists if the package is damaged;

Each package must be labeled with a Li-ion Polymer Battery handling label or in addition to the Class 9 hazard label. With regard to transport, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions.
- The International Air transport Association (IATA) Dangerous Goods Regulations.

UN number of Li-ion polymer battery: UN3480 or UN3481;

UN Proper shipping name/Description (technical name): Lithium ion batteries or Lithium ion batteries contained in equipment or Lithium ion batteries packed with equipment;

UN Classification (Transport hazard class): Non dangerous;

Marine pollutant(Y/N): N;

- The International Maritime Dangerous Goods (IMDG) Code.

For lithium-ion batteries by sea, provided that packaging is strong and prevent the products from short-circuit.

UN number of Li-ion polymer battery: UN3480 or UN3481; UN Proper shipping name/Description (technical name): Lithium-ion batteries or Lithium ion batteries contained in equipment or Lithium ion batteries packed with equipment;

UN Classification (Transport hazard class): Non dangerous;

Marine pollutant(Y/N): Y;

Special Provision: International maritime dangerous goods code (IMDG) 188, 230, 310, 348, 957;

- The US Hazardous Materials Regulation (HMR) pursuant to a final rule issued by RSPA

- The Office of Hazardous Materials Safety within the US Department of Transportations' (DOT) Research and Special Programs Administration (RSPA)

All Li-ion Polymer batteries with the necessary testing requirements under the UN38.3 Manual of Tests and Criteria as

1. referenced in the following transportation regulations. UN recommendations on the Transport of Dangerous Goods Model Regulations.
2. U.S Department of Transportation of Dangerous Goods Model Regulations.
3. International Civil Aviation Organization (ICAO) Technical Instructions
4. International Maritime Dangerous Goods (IMDG) code

Li-ion Polymer Battery are exempted from these regulations since they meet all UN testing requirements and contain no more than 8 grams of equivalent lithium content (see 49 CFR 173.185 of the US HMR, IATA Dangerous Goods Regulations and Special Provision 188 of the IMDG Code and UN model Regulations.

## **Section 15 Regulatory information**

The transport of rechargeable Lithium-ion batteries is regulated by various bodies (IATA, IMO, ADR, US-DOT) that follow the United Nations "Recommendations on the Transport of Dangerous Goods, Model Regulations, 15th Revised edition - Ref.ST/SG/AC.10/1 Rev. 15".

Depending on their lithium metal equivalent weight content, design, and ability to pass safety tests defined by the UN in the "Recommendations on the Transport of Dangerous Good - Manual of Tests and Criteria – 4th Revised edition - Ref.

ST/SG/AC.10/11 Rev.4 Amendment 1 «Lithium Batteries»", the Lithium-ion cells and the battery packs are not be assigned to the UN No.3480 Class-9, that is restricted for transport.

## **Section 16 Other information**

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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