## Section 1 - Product and Manufacturing Company

**MSDS Name:** Polymer Li-ion battery  
**Product model:** AEC475067  
**Manufacturer's Name:** Apower Electronics Co., Ltd.  
**Address:** Unit F1, Guoguang Industrial Park, 8 Jinghu Rd, Xinya street, Huadu District, Guangzhou, Guangdong, China  
**Postal Code:** 510800  
**Telephone No.:** +86-20-28609370  
**Website:** [www.aecbattery.com](http://www.aecbattery.com)  
**In case of emergency contact:** +86-15818896765

## Section 2 - Composition, Information on Ingredients

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>Composition Material</th>
<th>CAS No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy Value</strong></td>
<td>...</td>
<td>...</td>
<td>6.66 Wh/pcs</td>
</tr>
<tr>
<td><strong>Equivalent Max Lithium Content</strong></td>
<td>...</td>
<td>...</td>
<td>0.54 g/pcs</td>
</tr>
<tr>
<td><strong>Positive Tab</strong></td>
<td>Aluminum(Al)</td>
<td>7429-90-5</td>
<td>0.12%</td>
</tr>
<tr>
<td></td>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>0.03%</td>
</tr>
<tr>
<td><strong>Positive Slurry</strong></td>
<td>Li(NiCoMn)02</td>
<td>872-50-4</td>
<td>38.23%</td>
</tr>
<tr>
<td></td>
<td>NMP</td>
<td>872-50-4</td>
<td>1.51%</td>
</tr>
<tr>
<td><strong>Aluminum(Al)</strong></td>
<td>7429-90-5</td>
<td>4.81%</td>
<td></td>
</tr>
<tr>
<td><strong>Negative Tab</strong></td>
<td>Nickel(Ni)</td>
<td>7440-02-0</td>
<td>0.41%</td>
</tr>
<tr>
<td></td>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>0.03%</td>
</tr>
<tr>
<td><strong>Negative Slurry</strong></td>
<td>Graphite</td>
<td>7782-42-5</td>
<td>22.43%</td>
</tr>
<tr>
<td></td>
<td>Carbon black</td>
<td>1333-86-4</td>
<td>1.18%</td>
</tr>
<tr>
<td><strong>Cu</strong></td>
<td>7440-50-8</td>
<td>8.43%</td>
<td></td>
</tr>
<tr>
<td><strong>Septum (PP/PE)</strong></td>
<td>PP</td>
<td>9003-07-0</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>9002-88-4</td>
<td>3.05%</td>
</tr>
<tr>
<td><strong>Al lamination film</strong></td>
<td>Aluminum(Al)</td>
<td>7429-90-5</td>
<td>1.54%</td>
</tr>
<tr>
<td></td>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>0.58%</td>
</tr>
<tr>
<td></td>
<td>0-Ny</td>
<td>24937-16-4</td>
<td>0.96%</td>
</tr>
<tr>
<td><strong>Electrolyte</strong></td>
<td>lithium Salt</td>
<td>21324-40-3</td>
<td>2.19%</td>
</tr>
<tr>
<td></td>
<td>Solvent</td>
<td>confidential</td>
<td>14.44%</td>
</tr>
<tr>
<td><strong>Adhesive Tape</strong></td>
<td>Polyimide PI</td>
<td>60842-76-4</td>
<td>0.05%</td>
</tr>
<tr>
<td></td>
<td>Silicone</td>
<td>63148-60-7</td>
<td>0.02%</td>
</tr>
<tr>
<td><strong>Inert components</strong></td>
<td>...</td>
<td>balance</td>
<td></td>
</tr>
</tbody>
</table>

## Section 3 - Hazards Identification

- Substance or mixture in polymer Li-ion cell:  
  - Aluminum(Al)  
  - Nickel(Ni)  
  - Copper(Cu)
Li(NiCoMn)O2
Graphite
Electrolyte: Lithium hexafluorophosphate ; Solvent:
Substances above are not on the list of SVHC and are non-hazardous.

Section 4 - First Aid Measures
• Inhalation: Make the victim blow his/her nose, gargle. Seek medical attention if necessary
• Skin contact: Remove contaminated clothes and shoes immediately. Immediately wash extraneous matter or contact region with soap and plenty of water.
• Eye contact: Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.
A battery cell and spilled internal cell materials
• Ingestion: Make the victim vomit. Immediately seek medical attention.

Section 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 fire.
• Specific methods of fire-fighting: When the battery burns with other combustibles simultaneously, take fire extinguishing method which corresponds 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 clothes.

Section 6 - Accidental Release Measures
Emergency Procedures
Minor Spills of Cell Materials
• Remove all ignition sources.
• Clean up all spills immediately.
• Avoid contact with skin and eyes.
• Control personal contact by using protective equipment.
• Use dry clean up procedures and avoid generating gas or volatile.
• Ventilate the storage area.
• Discharge the cell to Zero Voltage by a over 5 Ohm resistance, before place into waste container.
• Place in a suitable labeled container for waste disposal.
Major Spills of Cell Materials
• Clean up all spills immediately.
• Wear protective clothing, safety glasses, dust mask, gloves.
• Secure load if safe to do so. Collect recoverable product.
• Use dry clean up procedures and avoid generating gas or volatile.
Ventilate the storage area.
Discharge the cell to Zero Voltage by a over 5 Ohm resistance, before place into waste container.
Collect remaining material in containers with covers for disposal.
Flush spill area with water.

Protective Actions for Spill

Section 7 - Handling and Storage
Steps to be Taken in Case Material is Released or Spilled: The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.
Waste Disposal Method: Open cells should be disposed of in accordance with local regulations.
Precautions to be Taken in Handling and Storing: Avoid mechanical or electrical abuse. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.
Storage: Avoid direct sunlight, high temperature, high humidity. Store in cool place (temperature: -20~45°C, humidity: 45~85%)

Section 8 - Exposure Controls, Personal Protection
Personal protective equipment
Respiratory protection: Respirator with air cylinder, dust mask
Hand protection: Protective gloves
Eye protection: Goggle or protective glasses designed to protect against liquid splashes
Skin and body protection: Working clothes with long sleeve and long trousers

Section 9 - Physical And Chemical Properties
Appearance
Physical state: Solid,
Form: Geometric solid
Color: Metallic color
Odor: No odor
pH: NA
Specific temperatures/temperature ranges at which changes in physical state occur. There is no useful information for the product as a mixture.
Flash point: NA
Explosion properties: NA
Density: NA
Solubility, with indication of the solvent(s): Insoluble in water

Section 10 - Stability and Reactivity
Stability: Stable under normal conditions of use
Conditions to Avoid: Hazardous reactions occurring under specific conditions
• Conditions to avoid: When cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will cause 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.

Section 11 - Toxicological Information

Lithium cobalt Oxide - LiCoO2  
• Acute toxicity: No applicable data.
  Reference: cobalt: LDLo, oral - Guinea pig 20mg/kg
  • Local effects: Unknown.
  • Sensitization: The nervous system of respiratory organs may be stimulated sensitively.
  • Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
  • Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.

Manganese:
• When manganese's concentration is 0.1 mg/L in water, make BOD5 reduced
• Mainly for chronic poisoning, damage to the central nervous system especially extrapyramidal system
LD50: 9000 mg/kg (through the rats mouth), LC50: No data

Aluminum
• Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
• Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).

Copper
• Acute toxicity: 60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation. TDLo, hypodermic - Rabbit 375mg/kg
• Local effects: Coarse particulate stimulates nose and tracheal. When it goes into one’s eyes, reddening and pain may occur.
• Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.
• Reproductive toxicity: TDLo, oral - Rat 152mg/kg

Nickel
• Local effects: Through the pores and sebaceous glands penetrate into the skin, causing skin allergies inflammation. Its clinical manifestations is dermatitis and eczema

Graphite
• Acute toxicity: Unknown.
Local effects: When it goes into one’s eyes, it stimulates one’s eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.
Chronic toxicity/Long term toxicity: Long-term inhalation of high levels of graphite coarse particulate may cause lung disease or a tracheal disease.
Carcinogenicity:
Graphite is not recognized as a cause of cancer.

Organic Electrolyte
Acute toxicity:
LD50, oral – Rat 2,000mg/kg or more HLD(half lethal dose), 2,000mg/kg or more (take orally): 60–100mg copper particles can cause stomach sicchasia and inflammation.
Local effects: Unknown.
Skin irritation study: Rabbit – Mild
Eye irritation study: Rabbit – Very severe

Section 12 - Ecological Information
Marine Pollutant: Not Determined
No data for Polymer Lithium-ion Battery.

Kindly Reminder:
• Disallow material discharge or abandon a natural environment that have no government’s permission.
• The lithium ion battery disposal must, in accordance with professional treatment; Enterprise treat hazardous waste and transport the waste must accord with the government and local government requirements. Don’t allow individuals to burn the battery.

Section 13 – Regulatory Information
OSHA hazard communication standard (29 CFR 1910.1200)
☐ Hazardous ☐ Non-hazardous

Section 14 – Disposal Information
Waste disposal must be in accordance with the applicable regulations. Disposal of the lithium ion battery/cell should be performed by permitted, professional disposal firms knowledgeable in State or Local requirements of hazardous waste treatment and hazardous waste transportation. Incineration should never be performed by battery eventually by trained professional in authorized facility with proper gas and fume but users, treatment.

Section 15 – Transport Information
When Lithium ion batteries’ containing no more than 20Wh/cell, 100Wh/battery pack and meet the package requirement of Table 965-II can be treated as “Non-dangerous goods” under the United Nations Recommendations on the Transport of Dangerous Goods, provided that packaging is strong and prevent the products from short-circuit.
With regard to air transport, the following regulations are cited and considered:
II) 2016 International Air Transport Association(IATA) Dangerous Goods Regulations(58th ed.)
package requirement: (Section II of PI965/PI966/PI967, Section I B of PI965, Section I A of PI965, Section I of PI966/PI967)
III) The US Hazardous Materials Regulation (HMR) pursuant to a final rule issued by RSPA (Part 49 CFR Sections 100-185),
IV) The Office of Hazardous Materials Safety within the US Department of Transportation’s (DOT) Research and Special Programs Administration (RSPA), and
V) According with the UN38.3 (UNDOT) (the following has detailed description)

With regard to transport by sea, the following regulations are cited and considered:
I) According The United Nations dangerous goods of the proposal
II) According the International Maritime Dangerous Goods (IMDG) Code, packaging requirement is special provision 188,
III) According with the UN38.3 (UNDOT)

Our products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1~T8) on the Transport of Dangerous Goods Model Regulations and Manual of the Testes and Criteria that can be treated as “Non-Dangerous Goods”

### Manual of Test and Criteria (38.3 Lithium battery)

<table>
<thead>
<tr>
<th>No.</th>
<th>Test Item</th>
<th>Test Results</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Altitude Simulation</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>Thermal Test</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>Vibration</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>Shock</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>T5</td>
<td>External Short Circuit</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>T6</td>
<td>Impact</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>T7</td>
<td>Overcharge</td>
<td>Passed</td>
<td>for pack only</td>
</tr>
<tr>
<td>T8</td>
<td>Forced Discharge</td>
<td>Passed</td>
<td>for cell only</td>
</tr>
</tbody>
</table>

### Section 16 - Other information

For more information please contact:
General Manager: Liao Guifang
Add: Unit F1, Guoguang Industrial Park, 8 jinghu Rd, Xinya street, Huadu District, Guangzhou, Guangdong, China
Tel: +86-20-28609370
Fax: +86-20-28609173
Mob: 15818896765
URL: www.aecbattery.com
E-mail: qc@aecbattery.com

Remark: The batteries are safe for transportation, and it is advised to use dry power powder fire extinguisher in case of explosion or inflammation