ABOUT US

ProLogium™ Technology (PLG) is a next generational Lithium battery cell maker who invented the worldwide first ultra-thin, bendable, high capacity Li-ion battery that never leak, fire, or explode.

With its high technology content and know-how, PLG has been creating this new battery system independently from establishing on Oct 3rd, 2006. Later in 2012 Battery Japan, our first product, FLCB, was released, then mass produced and supplied for hTC in 2013.

Till September 2017, PLG has already obtained 62 issued patents and 50 filled ones all over the world, including cell material, cell design, and cell manufacturing process, even more, production equipment and unique final applications.

關於輝能

輝能科技股份有限公司（ProLogium）是發明了全球第一款超薄，可彎曲，高容量，且不漏水，起火或爆炸的次世代鋰陶瓷電池芯製造商。

從2006年10月3日成立開始，輝能科技憑藉著高技術含量，獨立研發了與眾不同的：全新「固態鋰陶瓷電池」系統，並在2012年日本電池展第一次展出“FLCB”，2013年開始量產和銷售。

截至2017年9月，輝能科技在全球共獲得62項專利，還有50項申請中，專利涵蓋電池材料，電池設計以及電池製造工藝，甚至是生產設備和獨特的終端產品應用。

Certifications / 安規認證

ProLogium Technology Co., Ltd.

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LCB (Lithium Ceramic Battery)

Solid-state LCB is the core technology of ProLogium and based on this, we can create various different products with different material. LCB adapts solid-state electrolyte, so there is No fire and No explosion even it's damaged, folded, cut, punched, penetrated, or abnormal charged. Certainly, No leakage, either.

LCB (鋰陶瓷電池)

固態鋰陶瓷電池為輝能科技的核心技術，將核心技術結合不同的封裝材料及負極材料，輝能科技可提供各種不同優勢的電池產品。鋰陶瓷電池使用固態陶瓷電解質，因此電池遇到死折、剪切、撞擊、穿刺或者是不當充電等破壞的情況下，皆不會有任何起火、爆炸或是漏液的危險。

Safety Test/ 安全測試

The following Physical Impact Tests use the bare cell without any security of protection IC or rigid frame. Experiments confirmed that LCB is intrinsically safe and still workable even after folding, hitting, penetrating, cutting, or burning.

以下的物理破壞實驗均是使用無保護IC或硬殼保護的裸電池芯，實驗證實LCB本質上超安全，甚至在死折、敲擊、穿刺、剪切或火燒後仍然可以正常放電。
Cell Electrode Level - Cell Phone Application

Energy Density of the LCB with Li ion System will be 743Wh/L in 2018, 833Wh/L in 2019 & 933Wh/L in 2020 (and will be Better than LPB system (650~680Wh/L limitation) in 2018!!!) Energy Density of the LCB with Li-Metal System will be 1010Wh/L in 2021.

LCB 鋰離子系統的體積能量密度在2018年可達743Wh/L, 2019年達833Wh/L, 2020年更達933Wh/L (2018年即可超越鋰聚合物電池的極限值(650~680Wh/L)) LCB 鋰金屬系統的體積能量密度更高，2021年可達1010Wh/L.

---

<table>
<thead>
<tr>
<th>Year</th>
<th>PLG Li-Metal</th>
<th>Note 7</th>
<th>iPhone 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>340</td>
<td>590</td>
<td>620</td>
</tr>
<tr>
<td>2016</td>
<td>476</td>
<td>700</td>
<td>650</td>
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<tr>
<td>2017</td>
<td>743</td>
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<td>2020</td>
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<td></td>
<td></td>
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<tr>
<td>2021</td>
<td></td>
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</table>

LCB High Energy Density Advantage in Mobile Phone Industry

LCB高體積能量密度優勢 手機產業
LCB High Energy Density Advantage in EV Industry

【Cell Electrode Level】- EV Application (AN system)

Energy Density of the LCB with Li ion System is 523Wh/L in the 2017 and will be Better than LPB system (350~470Wh/L)
Energy Density of the LCB with Li ion System will be 643Wh/L in the 2018 and will be Better than Cylindrical 18650 system (598~600Wh/L) around 2018!!!

LCB 鋰離子系統的體積能量密度在2017年可高達 523Wh/L，並超越「鋰聚合物電池」(350~470Wh/L)
承上，2018年時更可高達 643Wh/L，甚至超越「圓柱形鋰電池18650」 (598~600Wh/L)
**Highest Energy Density of BEV Pack Level**

### BEV Energy Density (Wh/Kg)

- **Tesla Model S**: 252 Wh/kg (47%)
- **GM Spark**: 173 Wh/kg (30%)
- **BMW i3**: 122 Wh/kg (44%)
- **Nissan Leaf**: 157 Wh/kg (30%)
- **Prologium Original**: 205 Wh/kg (15%)
- **Prologium Cell Module**: 205 Wh/kg (15%)

### BEV Energy Density (Wh/L)

- **Tesla Model S**: 709 Wh/L (70%)
- **GM Spark**: 332 Wh/L (51.20%)
- **BMW i3**: 228 Wh/L (47%)
- **Nissan Leaf**: 317 Wh/L (77%)
- **Prologium Original**: 523 Wh/L (47%)
- **Prologium Cell Module**: 523 Wh/L (35%)

Legend:
- **Green**: Cell(b)
- **Red**: Pack(a)
- **Orange**: Power Loss from Cell to Pack
## Wider Operation Window

<table>
<thead>
<tr>
<th>Battery cell</th>
<th>Item</th>
<th>ProLogium LCB</th>
<th>Li Polymer Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operation Window (Charge)</td>
<td>-20~85°C</td>
<td>0~45°C</td>
</tr>
<tr>
<td></td>
<td>Operation Window (Discharge)</td>
<td>-25~90°C*</td>
<td>-20~60°C</td>
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<tr>
<td>Reliability</td>
<td>Storage Temp.</td>
<td>-65~105°C (14D)</td>
<td>-20~60°C</td>
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<tr>
<td></td>
<td>2C Discharge @105°C</td>
<td>5 Cycles</td>
<td>-</td>
</tr>
</tbody>
</table>

- **High Temperature Cycle:** 1C @ 60°C  
  - 高温循环寿命测试: 1C 循环 @ 60°C
  
  *Cell Electrical Performance*

![Retention vs Cycle Life Graph]

* criteria: 5 cycles @ RT charge and 90°C discharge*
2C Discharge @ 105°C * 5th Cycle

105°C 2C電流放電之5次循環壽命表現
LCB ACIR Improvement Roadmap

ACIR (2.8AH/SOC100%)

Quantity: 116
AVG: 0.0241
Med: 0.0237
STD: 0.0026
3RSD: 31.12%

Quantity: 166
AVG: 0.0124
Med: 0.0123
STD: 0.0008
3RSD: 19.35%

Acc. 2017-AP-05
Acc. 2017-AN-01
High C-Rate Charge Performance @ Room Temperature

ACIR (2.8AH/SOC 100%)

Ratio

93.1% 87.5%
82.1% 81.9%
72.2% 71.8%
65.5% 59.0%
59.2% 49.8%

PLG Ratio
ATL Ratio

Max. temperature at surface

32
43
45
43
46

25.9
30.2
32.8
33.4
33.8

1C (60mins) 2C (30mins) 3C (20mins) 4C (15mins) 5C (12mins)

PLG
ATL

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High/Low Operation Pressure

from under sea to outer space

$10^{-11}$ ATM
類外太空環境

- Vacuum Level: Outer Space
- Swelling < 0.5%
- No Leakage
- Dischargeable

48 ATM
水下470米

- $\Delta$mAh & $\Delta$ ACIR < 1%
- No Leakage
- Dischargeable
**Bipolar+ Technology**

**Single cell for 7.4V~24V or higher voltage, with Bipolar+ Technology**

Direct-Serial and Parallel Technology® inside cell.
Unique Ceramicion Technology® without decomposition concern at high voltage.
Simplify BMS and protection circuit
  - Increase energy density in module level.
  - Reduce module cost at same power.

憑藉Bipolar+技術，單電芯可達7.4V~24V以上
直接於電芯內部同時串並聯
獨家Ceramion技術，高電壓下無分解之虞
簡化BMS及保護線路
  - 大幅提升模組能量密度
  - 在相同電量下降低模組成本

---

**ProLogium™ - Cell Electrical Performance - Cycle Life**
0.5C CC/CV Charge to 100% Cut off 0.5C rest 15min
0.5C Discharge to 0.5Crest 15min

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Voltage (mV)

3S by Ratio

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Ratio

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**FPC Type - LCB**
- Li-ion with FPC substrate/package materials
- Thickness: 0.38mm
- Dynamic Bending
- Logical Battery (System on Flex)
- Injection Molding Adaptable (120°C, 60sec)
- Great High/Low Pressure Durability
- FWI Technology: 10,000 Times Bending @ R15mm
- Able to do "tubular" cell, TLCB

**Pouch Type - LCB**
- Li-ion with Al Package Material
- Low Swelling Ratio ≤ 2%
- Adopt -20°C~85°C Charge, -25°C~105°C Discharge
- Storage at -65°C~85°C for 14 days
- No Limitation to Energy Density (with Good Safety)
- Bi-Polar+ Technology Adaptable
- SC Fast charging (12 min 60%; 30min 82%); and Low ΔT

**Pouch Type - LCB**
- Li-Metal anode with Logithium Technology
- 810Wh/L, 260Wh/Kg
- Ultra-high Energy density
- Mass Production in 2019

---

**軟板型鋰陶瓷電池**
- 鋰離子系統結合軟性電路板封裝材料
- 超薄, 厚度0.38mm
- 可動態彎曲(捲芯電池)
- 電子元件可直接打在電芯芯上
- 可承受射出成型製程(120°C, 60秒)
- 高低壓耐受性強
- FWI 輔助: 15mm R角可彎曲一萬次
- 可捲成捲芯電池

**軟包鋰陶瓷電池**
- 鋰離子系統結合塑膠模封裝材料
- 低膨脹率 ≤ 2%
- -20°C~85°C充電、-25°C~105°C放電
- -65°C~105°C耐溫14天
- 能量密度無上限(基於平本安全性)
- Bi-Polar+技術
- SC快充(12min充60%; 30min充82%電量), 低溫升

**高體積能量密度鋰陶瓷電池**
- 鋰電池負極及正極獨家專利 Logithium 技術
- 810Wh/L, 260Wh/Kg
- 高能量密度
- 2019量產
FLCB

Li-ion with FPC substrate/package materials
Thickness: 0.38mm
Dynamic Bending
Logical Battery (System on Flex)
Injection Molding Adaptable (120°C, 60sec)
Great High/Low Pressure Durability
FWI Technology: 10,000 Times Bending @ R15mm
Able to do “tubular” cell, TLCB

鋰離子系統結合軟性電路板封裝材
超薄，厚度: 0.38mm
可動態彎曲
電子元件可直接打在電池芯上
可承受射出成型製程 (120°C, 60秒)
高低壓耐受性強
FWI 技術: 15mm R角可彎曲一萬次
可捲成【捲芯電池】
FLCB Advantages

FLCB (FPC Lithium Ceramic Battery) is the worldwide first Lithium battery cell which adopts FPC (Flexible Printed Circuit) as battery substrate. It has excellent flexibility including dynamic bending and furling (form into a small cylinder by rolling). FLCB is ultra-thin with the thickness of 0.38mm and is ultra-safe. With ProLogium's unique System on Flex technology, FLCB also able to integrate with different logic circuits like antenna, buttons or any passive module on battery. Even after punching, penetrating, or cutting, FLCB still no leak, no fire, and no explode because of the solid-state ceramic electrolyte.

With these features, "Ultra-thin", "Flexible", "Ultra-safe", and System on Flex technology, we create a brand new niche that wouldn't have been possible before, especially in wearable electronics and IOT application.

For example, a PVC power watch band with FLCB molded inside for smart watch; an ultra-thin flat piece of temperature sensor patch for medical; a power smart display card for payment security... etc.

What's more, ProLogium invent FWI Technology in 2017 that makes 10,000 times bending @R15 possible.

FLCB 優 勢

FLCB (軟板鈦陶瓷電池) 為世界上第一款結合 FPC 軟板基材的鋰電池，有著絕佳的動態彎曲及捲曲（捲心狀 TLCB）能力，超薄 (0.38mm)、超安全。搭配上輝能獨特的 System on Flex 技術，即可將邏輯線路如天線線路、按鍵等各式被動模組整合於電池上。因為使用了固態陶瓷電解質，FLCB 受到撞擊、穿刺或剪切等物理性破壞皆不會有漏液、起火或爆炸的安全問題。

基於超薄、超安全、可彎曲及可邏輯化的特點，輝能科技將鋰電池技術應用提升到另一個層次，特別是針對穿戴式或物聯網等產品應用。

例如: 內嵌 FLCB 的智慧手錶、錶帶、醫療用途的超薄溫度貼片或支援線上支付安全機制的智慧顯示卡。

2017年自主研發獨門之FWI技術，更讓FLCB耐彎曲能力達到R15mm 10,000次。

- Li-ion with FPC substrate/ package materials
- Thickness: 0.38mm
- Dynamic Bending
- Logical Battery (System on Flex)
- Injection Molding Adaptable (120°C, 60sec)
- Great High/Low Pressure Durability
- FWI Technology: 10,000 Times Bending @ R15mm
- Able to do “tubular”cell, TLCB
- 鋰離子系統結合軟性電路板封裝材
- 超薄, 厚度: 0.38mm
- 可動態彎曲 (捲芯電池)
- 電子元件可直接打在電池芯上
- 可承受射出成型製程 (120°C, 60秒)
- 高低壓耐受性強
- FWI 技術: 15mm R角可彎曲一萬次
- 可捲成【捲芯電池】
PLCB

Ultra safe
Wide Window Operation/ Storage Temp.
Higher Theoretical Energy Density Than LPB (no sacrifice for safety)
Adopt -20~85°C Charge, -25°C~105°C Discharge
Storage at -65°C~85°C for 14 days
Bi-Polar+ Technology
5C Fast charging and Low ΔT

超安全
操作/ 儲存溫度範圍更廣
理論能量密度高於傳統鋰離子電池 (不被安全性限制)
-20°C~85°C 充電, 25°C~105°C 放電
-65°C~105°C 儲存14天
Bi-Polar+ 技術
5C快充且不發燙
Pouch type-LCB (Lithium Ceramic Battery)

PLCB is a LCB with Al packaging foil. It is the higher capacity version of FL CB. In addition to ultra-thin & high capacity, PLCB is also ultra-safe. No leakage issue, no flammable materials inside. Even after physical impacts, it is still safe and dischargeable. PLCB is especially suitable for consumer accessories. For example, Power Jacket for smartphone is able to directly parallel the smartphone main battery to increase the usage time. What's more, as a special safety battery under severe high/low temperature environment is another main application of PLCB. Unlike LPB sacrifices energy density to maintain safety, PLCB theoretical energy density is higher than LPB and also keeps great safety. PLCB also has wider storage temperature window (-65°C~85°C, LPB: -20°C~60°C) and operation temperature window (Charge: 85°C, Discharge: 105°C, LPB Charge: 45°C, Discharge: 65°C ).

Last but not least, PLCB can 5C Fast charging with low temp raise (12min 60% power; 30min 82% power).

PLCB 優 勢

鋰陶瓷電池

PLCB為使用鋁塑模封裝的LCB，也是FLCB的高容量版本。除了超薄跟高電量兩項特點外，PLCB還非常的安全。

不會漏液、不含任何易燃物質，甚至在遭到物理破壞後還能正常放電。

PLCB特別適合用在如3C產品的配件上。

舉例來說，智慧型手機的帶電皮套可直接與手機主電池並聯，增加使用時間。且基於LCB絕對安全的基礎下，PLCB理論能量密度高於傳統鋰電池，不被安全性犧牲。

另外PLCB的儲存溫度範圍(-65°C~85°C)及操作溫度範圍(充電達85°C，放電達105°C)也遠優於LPB儲存溫度範圍(-20°C~60°C)及操作溫度範圍(充電僅45°C，放電僅60°C)。

最後，PLCB可5C快充且不發燙(12分鐘充60%電;30分鐘充82%電).

Li-ion with Al Package Material
Low Swelling Ratio ≤ 2%
Adopt -20~85°C Charge, -25°C~105°C Discharge
Storage at -65°C~85°C for 14 days
No Limitation to Energy Density (with Good Safety)
Bi-Polar+ Technology Adoptable
5C Fast charging (12min 60%; 30min 82%) and Low ΔT

鋰離子系統結合鋁塑模封裝材
低膨脹率 ≤ 2%
-20°C~85°C充電, -25°C~105°C放電
-65°C~105°C儲存14天
能量密度無上限 (基於本質安全性)
Bi-Polar+ 技術
5C快充(12min充60%電量;30min充82%電量), 低溫升
ELCB

810Wh/L, 1.2-1.5 times of current lithium battery.
Sample delivery in 2018.

810Wh/L, 電容量為市面上鋰電池的1.2~1.5倍
2018年下半年可送樣品。
**Ceramion Tech**

- High Ionic Conductivity.
- Low Interface Resistance.
- Good Li-Plating Reversibility.
- Ultra-Safe.
- 高離子導電度。
- 低界面阻值。
- 良好的離子電沉積可逆性。
- 高安全性。

**E.I.C Structure/E.I.C 結構**

- Anode infrastructure integrates electrical conductivity, ion-conductivity and electric charge transmitting.
- Provide well structure strength and flexibility strength on passive film (between Li-metal and ceramion).
- Sufficient space for Li-clendrite.
- Reduce Interface Resistance.
- Simple and highly safety Li-metal anode mass production process.
- 提供良好的離子電流強度與離子電流強度於電路板 (生成於銅電解質隔隔膜之間)。
- 提供良好的離子電沉積空間。
- 降低界面阻值。
- 簡單且安全的銅金屬負極微電導入製程。
Lithium Metal anode battery was used in 1980s but disappeared and replaced by Graphite anode in 1991 because of the shortage and poor efficiency caused by dendrite and SEI.

After 37 years, ProLogium break through the bottle neck and successfully make new generation Lithium Metal anode battery samples with higher safety, higher conductivity, and higher energy density.

In 1980s, there were lithium metal anode batteries used, but they disappeared and were replaced by graphite anode in 1991 due to the shortage and poor efficiency caused by dendrite and SEI.

After 37 years, ProLogium broke through the bottleneck and successfully made new generation lithium metal anode battery samples with higher safety, higher conductivity, and higher energy density.
**Sample Delivery Schedule**

**System: BC-01**
- Model: PLCB4360105B
- Sample Making Mode: SBS line
- QTY: 60 sets

**System: BC-01**
- Model: PLCB4360105B
- Sample Making Mode: RTR line
- QTY: 100 sets

**System: BC-02**
- Model: PLCB4360105B
- Sample Making Mode: SBS line
- QTY: 30 sets

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**Performance:**
- Energy density = 810Wh/L
- 1C Rate >/= 88%
- 0.5C Cycle* 500th > 80%

**Performance:**
- Energy density = 810Wh/L
- 1C Rate >/= 90%
- 0.5C Cycle* 500th > 80%

**Performance:**
- Energy density = 900Wh/L
- 1C Rate >/= 85%
- 0.5C Cycle* 300th > 80%

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*Note: *Cycle refers to the number of cycles completed before the specified performance criteria is met.*
<table>
<thead>
<tr>
<th>LCB Applications</th>
<th>LCB 應用</th>
</tr>
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<td>電動車</td>
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<td>Industry/Medical</td>
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<td>Consumer/Wearable</td>
<td>消費性電子/穿戴式電子</td>
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<td>IOT/Card</td>
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<tr>
<td>Smartphone</td>
<td>智慧手機</td>
</tr>
</tbody>
</table>
Extremely High Safety. EUCAR Hazard Level 2-3.
High Energy Density (523Wh/L).
High Volume Utilization and Low Cost. Battery pack cost can be much lower by simplify cooling system, thermal management system, and BMS.

超安全，經EUCAR測試後，Hazard Level高達2-3級。
高能量密度(523Wh/L)
高度利用空間且節省冷卻系統、熱管理系統及BMS，大幅降低成本。

**Cell: PLG-AP4100-X0-007- 3.8V, 10.25Ah/pce**

<table>
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<tr>
<th>EUCAR</th>
<th>Nail Penetration Test @60℃</th>
<th>Overcharge Test @60℃</th>
<th>Thermal Stability</th>
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<tbody>
<tr>
<td>EUCAR測試項目</td>
<td>穩定試測@60℃</td>
<td>過充試測@60℃</td>
<td>熱穩定測試</td>
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<tr>
<td>Hazard Level</td>
<td>2-3</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Comments:
- **No Fire, No weight loss, But smoke emission**
- **No Fire, No Rupture, No Electrolyte loss**
- **No Fire, No Rupture, No weight loss**

電池反應:
- 無起火，無重量減輕，但有排煙
- 無起火，無破裂，無電解液短缺
- 無起火，無破裂，無重量減輕

*International top tier cell maker pass L4-L5.
*國際一線電池芯製造商僅通過4級或5級.
Product Roadmap of LCB_A (EV Size)
Power Exoskeletons

Disperse batteries weight averagely from back only to entire upper body.
Ultra safe, Flexible.

Portable Inspection Device

Ultra safe.
High Energy Density.
Wide Temperature Operation Window.

Anesthesia Machine
Infusion Pump
Defibrillators machine
Rugged Table / IOV

- Ultra-safe
- Higher Energy Density compared to NiMH battery
- -20°C~85°C Charge, -25°C~90°C Discharge
- Storage 14 days at 105°C
- 2C discharge at 105°C for 5 cycles

强固型平板/車聯網

- 超安全
- 體積能量密度高於鎳氫電池
- -20~85°C 充電-25°C~105°C 放電
- -65°C~85°C 儲存14天
- 105°C 可用2C 放電達5次循環

ABOUT
TELEMATICS

GPS
DATA
ONLINE
E-MAIL
HMI
CELLULAR
WIFI
Temperature Sensor, Smoke/CO Alarm,
Ultra-safe,
Tubular,
ultra-thin,
Wider operation window (105°C discharge)
Survived at extreme vacuum environment (10^{-11} ATM)

溫度監測，煙霧，二氧化碳警示器
超安全
超薄、捲芯電池
操作溫度範圍廣（105°C 放電）
可在真空環境使用（10^{-11} ATM）
Power Vest 帶電背心

Wearable power bank
Ultra-Safe
Flexible: >3000 cycles with R50
Disperse the battery weight averagely.
Hands free.

Power supply for life jacket functions like lighting and GPS tracking.
Foldable and can be put on aircraft.
Good durability of high altitude. IPX7 Level

Life Jacket 救生衣

Power supply for life jacket functions like lighting and GPS tracking.
Foldable and can be put on aircraft.
Good durability of high altitude. IPX7 Level

救生衣上發光或GPS訊號之電力供應
電池可藏於救生衣內並折疊放置於飛機上
良好的高空耐受性。IPX7 Level

FLCB PLCB
Disperse the battery weight averagely. No smoke, No fire, and No explosion even after crush or impact.
Good Thermal Stability.
Wide Temperature Operation Window.

Ultra-Safe.
High Energy/Power Density
Good Thermal Stability
Wide Temperature Operation Window

超安全。
高能量密度/熱穩定度高。
操作温度廣。
**Power Jacket/Case**

More than enough juice for single day use.
Extend more 50% using time of smartphone.
No need power bank anymore.
Able to integrate wireless charge module

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**Power Flip Case**

More than enough juice for single day use.
Extend more 50% using time of smartphone.
No need power bank anymore.
可提供足以使用一天以上的電量，增加智慧型手機50%的使用時間。
不再需要行動電源。

FPC, battery substrate, is extended as connector soft cable.
FLCB power 100% offer to device, no power loss.
電池芯基材FPC可延伸出來做軟排之用。FLCB電力可100%傳輸給手機主電池，沒有任何損耗。
Power Leaf  帶電行李掛牌

Ultra Thin, Flexible
700 mAh Capacity for Emergency Use
超薄、可彎曲
700 mAh 電量可供緊急情況使用

Flexible Power Bank  可彎曲行動電源

Flexible, ultra-thin that fit all women expensive handbags and not change the bag’s shape.
柔軟、可彎曲、超薄。優雅風格設計，適用於放置名牌包，不會改變名牌包形狀外觀。

FLCB Inside
內藏FLCB
FLCB 內藏

FLCB Inside
內藏FLCB
FLCB 內藏

FLCB Inside
內藏FLCB
FLCB 內藏

FLCB Inside
內藏FLCB
FLCB 內藏
**Smart Helmet**

HUD, rear-facing camera, GPS, navigator, temp./humidity sensors, sync with smartphone..., etc.

**Power Backpack**

Invisible battery inside the backpack for power bank use, emergency backup power use, or outdoor activity use..., etc.

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Flexible Power Band  可彎曲帶電錶帶

Embedded flexible FLCB inside the band by injection molding as watch main power or extended power.
將可彎曲的FLCB經由射出成型製程嵌進錶帶內可作為手錶主電源，亦可作手錶的擴充電池，延長智慧手錶續航力。

Power Belt  帶電皮帶

Soft and flexible features can be embedded in the leather and other different materials within the layer, as a wearable power bank, multi-purpose and easy to carry.
柔軟可彎曲的特性，可嵌進皮革等異材質內層，作為穿戴式的備用行動電源，具備攜帶方便的多樣化便利性。
**Bluetooth headset**

TLCB is formed into a small cylinder by rolling.
Ultra Safe. No leakage, no fire, no explosion even damaged accidentally.
Low-Priced. Compare to international top tier cell maker, TLCB price can be 20%-50% lower.

**Headset**

Flexible, comfortable, ultra-thin and disperse the battery weight averagely.
LCB parallel with original battery of devices to increase capacity and usage time.
超薄、可彎曲特性提供了耳機更多的電池放置空間，取代鋰聚合物電池並使設備輕薄化。
亦可與原本電池直接並聯，增加電量及使用時間。
Multiple applications like monitoring status of human body.
Ultra safe and no leakage. No fire or explosion after punching, hitting or trampling.
Flexible.
可作為智慧衣內身體機能監測及加熱保鮮功能。
超安全且不會漏液。擠壓、撞擊或踩踏後均不會起火爆炸。
可彎曲。

Insole bending (15mm) pass 1,000,000 times.
Insole bending (30mm) pass 400,000 times.
**Thermometer**

Ultra-safe
Tubular, ultra-thin
Discharge at 105°C

**Stylus**

TLCB inside.
內含TLCB

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TLCB Inside
內藏TLCB
TLCB 內藏
Finger Print Card  指紋辨識卡

Imbedded ultra-thin FLCB inside of fingerprint card for bank, identification, government and access control
Ultra thin and rechargeable
內建指紋辨識功能的智慧卡供銀行、身分識別系統、政府及門禁使用
超薄、可充電。
A screen, keypad and wireless charge BLE card for credit card/ transaction/ traffic/ parking/ member card……
將螢幕、按鍵及無線充電結合於一張藍芽智慧卡內，可應用於金融信用卡、交通卡、停車場及會員卡等.
Wireless Thermometer/ Temp. Sensing Patch/ Tag/ ECG

Ultra Safe
Ultra thin. 0.4mm/cell
Logic Circuit build-in (System on Flex)
Body temperature/ Cardiac rate/ Blood Pressure/ Blood Sugar/ Blood Oxygen monitoring

無線溫度計/溫度貼片/心電圖貼片/感測標籤

超安全、超薄，厚度僅0.4mm
可內建邏輯線路(System on Flex)
體溫/心率/血壓/血糖/血氧偵測
PLCB is available before 2020, ELCB after 2020.

2020年之前適用PLCB, 2020年之後適用ELCB。
IP Map/全球專利

ProLogium owned 100% IP worldwide including Taiwan, China, USA, EP (Germany, France), UK, Japan and South Korea.

輝能科技在全球擁有100%獨家專利，包括有：台灣、中國、美國、歐盟(德、法)、英國、日本和南韓。
<table>
<thead>
<tr>
<th>Product</th>
<th>FLCBxxxxxxxAAAA</th>
<th>PLCB</th>
<th>TLCB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>027038</td>
<td>046046</td>
<td>051076</td>
</tr>
<tr>
<td>Dimension (mm) w/o terminal 尺寸-不含端點區域 (W<em>L)(mm</em>mm)</td>
<td>27*38</td>
<td>46*46</td>
<td>51*76</td>
</tr>
<tr>
<td>Nominal Voltage (V) 額定電壓 (V)</td>
<td>3.75</td>
<td>3.75</td>
<td>3.8</td>
</tr>
<tr>
<td>Max Voltage (V) 最大電壓 (V)</td>
<td>4.35</td>
<td>4.35</td>
<td>4.4</td>
</tr>
<tr>
<td>Nominal Capacity (mAh) 額定電容量 (mAh)</td>
<td>17</td>
<td>45</td>
<td>100</td>
</tr>
<tr>
<td>Thickness (mm) 厚度 (mm)</td>
<td>0.43</td>
<td>0.43</td>
<td>0.43</td>
</tr>
</tbody>
</table>

*Specifications are subject to change without notice.

*產品規格如有變更，恕不另行通知
Contents in this brochure serves as reference only.
Subject to change without prior notice.
Please contact with our salesperson for full spec. based on specific product.

本型錄內容僅供參考用
規格變更恕不另行通知
最終產品規格請洽業務人員