

WHERE VISION MEETS VOLUME:

A NEW PATH BEYOND THE MYTH OF LIQUID VS. SOLID STATE

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THE VISION FOR FUTURE ELECTRIC VEHICLES

PROLOGIUM'S MISSION FOR NEXT GENERATION SOLID STATE BATTERY

OUR OBSERVATIONS

DEMAND



Demand is still strong for EV and ESS

The need for better batteries is growing in electric cars, energy storage, and new uses

But they still need batteries that are safer, higher energy density, and charge faster

INDUSTRY DEVELOPMENT



Despite years of investments, the industry hasn't reached its full potential

There's no clear technical plan forward, and current methods can't meet the cost, scale, and performance needed

THE WAY FORWARD

PROLOGIUMS' TECHNOLOGY



ProLogium offers the way forward through the Gen4 Solid-State battery, ready to scale high performance and speed up adoption

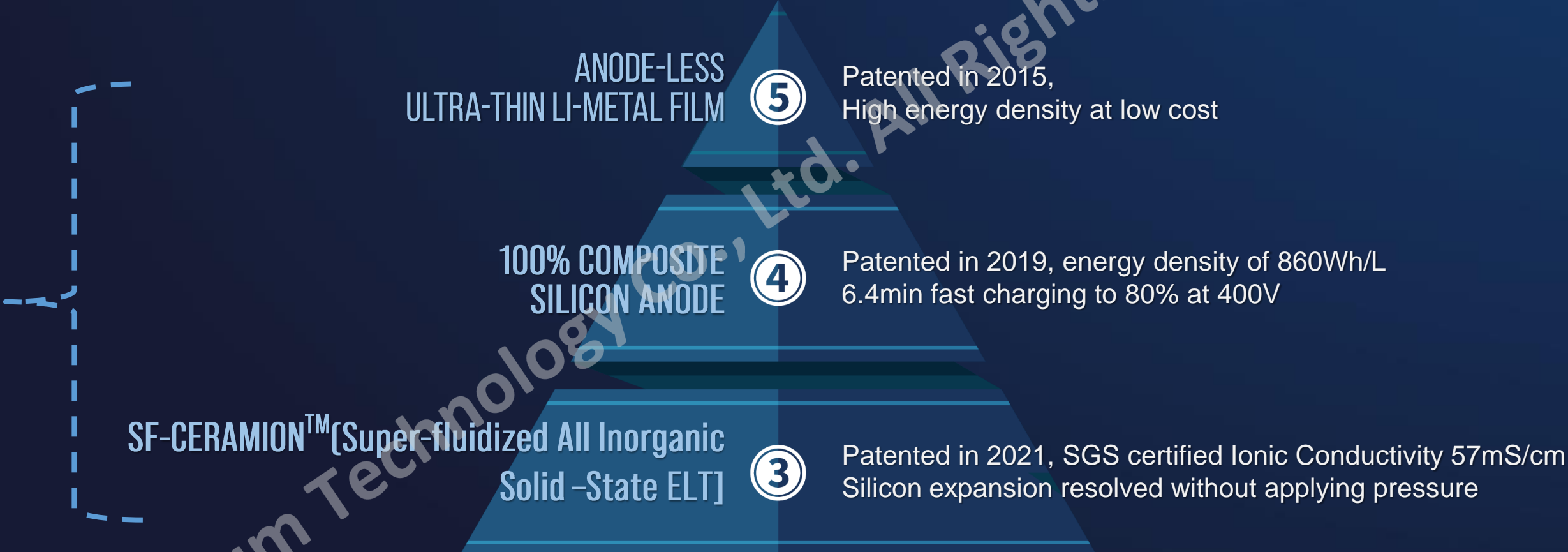
We invite partners to work with us and shape the future of energy together

PROLOGIUM'S NEXT GENERATION LCB SYSTEM

PROLOGIUM'S GEN 4 LITHIUM CERAMIC BATTERY SYSTEM AND 5 MAIN TECHNOLOGIES

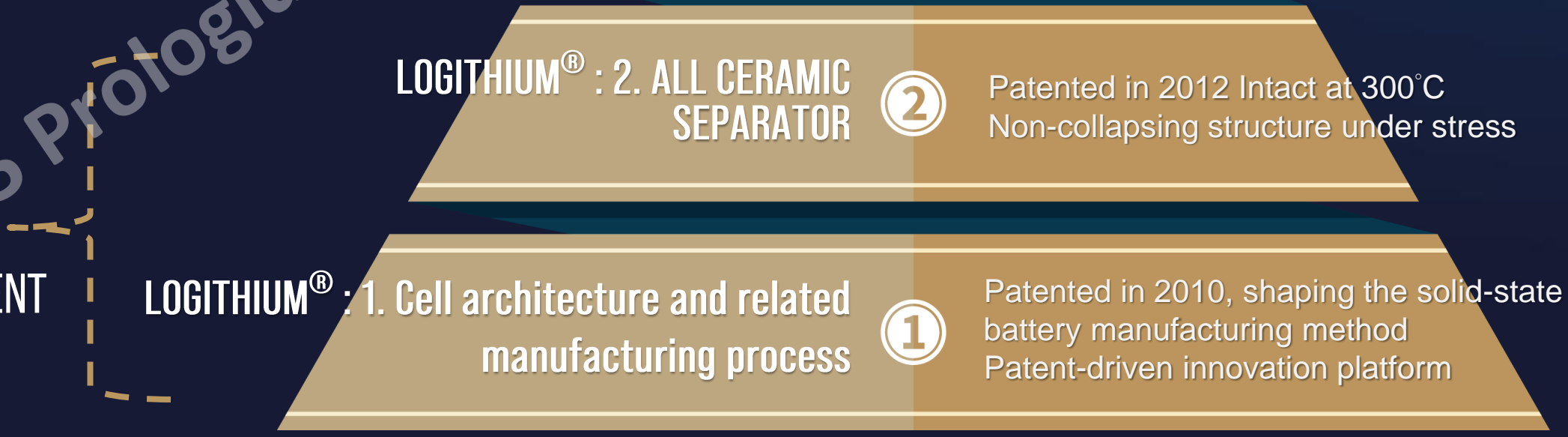
CELL CHEMICAL SYSTEM :

SF CERAMION: SUPER-FLUIDIZED ALL INORGANIC SOLID-STATE ELT (0% ORGANIC ELT)



CELL ARCHITECTURE SYSTEM :

- 1. LOGITHIUM (INNOVATION CELL STRUCTURE) +
- 2. CERAMIC SEPARATOR
- 3. RELATED MANUFACTURING PROCESS/EQUIPMENT



PROLOGIUM'S NEXT GENERATION LCB SYSTEM

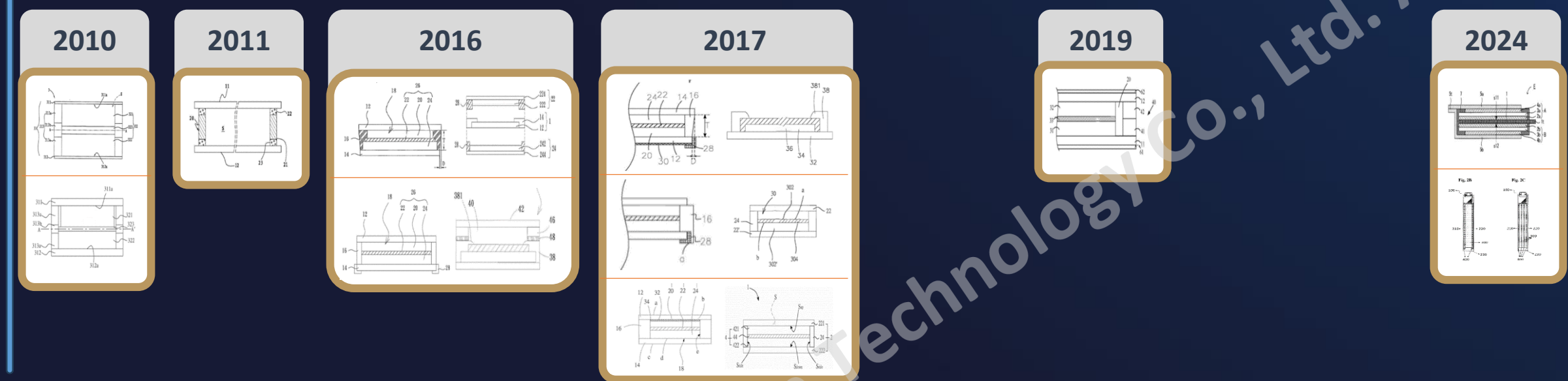
BASIC TECH LOGITHIUM IP MAP SHOW THE NEW REVOLUTION STANDARD PLATFORM – GREAT MINDS THINK ALIKE

SSB Cell Architecture IP through years between ProLogium and other players

ProLogium had 1st patent in 2010, and continues to complete IPs to 4th Gen LCB

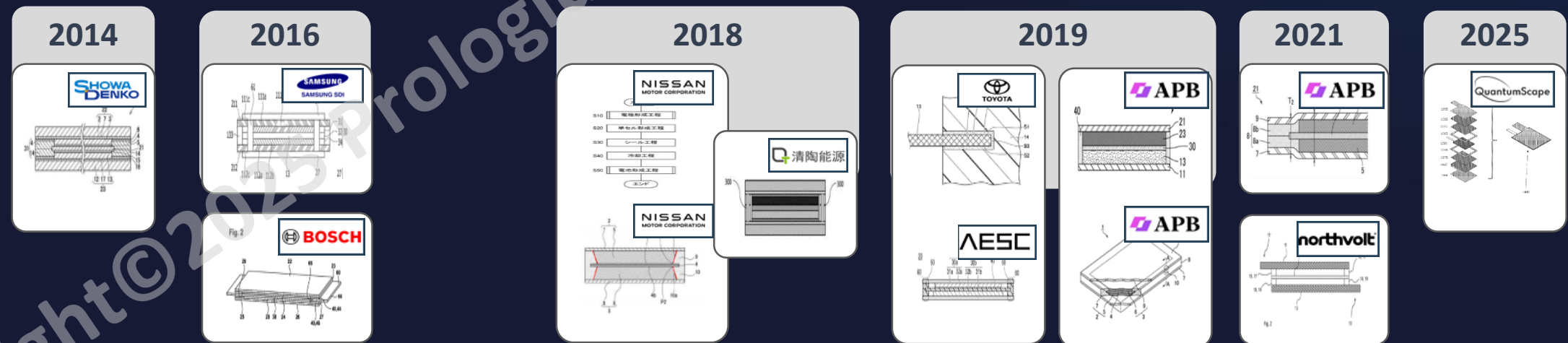
ProLogium

Cell
Architecture
IPs from
ProLogium



Cell
Architecture
IPs from
other players

Industry also comes to a similar cell architecture¹ after ProLogium

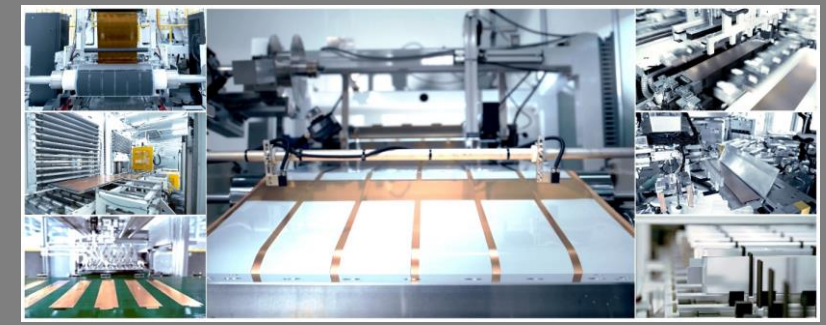


Non-ProLogium Ips are from: AESC Japan LTD +Renault / APB / Bosch / Factorial / Nissan / Northvolt / Quantumscope / Qingtao / SDI / Showa Denko / Toyota

CELL ARCHITECTURE
1. Logithium
2. Ceramic Separator



New Manufacturing technology to support Specific cell architecture: 1. Logithium[®] technology + 2. Ceramic Separator





From IP filings to cell design, the industry proves one truth: great minds think alike — and the path will converge to Prologium's standard

1. Similar to ProLogium

NEXT GEN BATTERY FOR FUTURE APPLICATIONS

6 MAIN REQUIREMENTS OF BATTERY CELL PERFORMANCE

PROLOGIUM BRINGS ALL INORGANIC SSB TO MEET HIGH-LEVEL PERFORMANCE WITH SCALABILITY AND COST TO TRADITIONAL LIQUID BATTERIES

		ProLogium				Performance at the parameter	
		Traditional Liquid		ASSB (Sulfide)		Low	Exce
Driver	Dimension				Gen 4 Solid State Lithium Ceramic Battery System		
<div>Performance</div> <div></div>	Safety					Full intrinsic safety across ELT/anode/cathode plus unmatched mechanical strength	
	Energy Density					Gen 4: 860 Wh/L, 356 Wh/kg, with minor density loss at low temperature@2025	
	Electrical Performance					80% charge at 6.4 mins Consistent performance at low temperature	
	Simple Pack Design					Not required pressure system, simplified thermal/cooling/heating design	
<div>Scalability</div> <div></div>	Scalability					IP patented mfg. technology, reduced process steps and dry room, and already in production	
	Bill of materials					Cost comparable to mainstream liquid battery, with roadmap to further reduce cost	

1. SAFETY

➤ Intrinsic Safety

- Oxide SSE (Main material of Ceramic separator)
- SF-Ceramion (Super-Fluidized All Inorganic Solid-State Electrolyte)

➤ ASM (Active Safety Mechanism)

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 1. SAFETY – INTRINSIC SAFETY

INTRINSIC SAFETY AMONG TRADITIONAL ORGANIC ELT AND DIFFERENT SOLID-STATE ELT– BURRING TEST IN DIFFERENT ELECTROLYTE

PROLOGIUM’S SOLID OXIDE ELT AND SUPER-FLUIDIZED ALL INORGANIC SOLID-STATE ELT(SF-CERAMION ELT) PASSED WITHOUT VISIBLE REACTION

SGS CERTIFIED COMBUSTION TEST REPORT

SGS

Reliability Laboratory

WITNESS TEST REPORT

Report No.: HE70049A/2025

Page: 1 of 8

Date: August 8, 2025

PROLOGIUM TECHNOLOGY CO., LTD

NO.6-1, ZIQIANG 7TH RD., ZHONGLI DIST., TAO

The following items provide relevant information reg

Item

Samples for the on-site witness test

Style/ Item No.

Quantity

On-site Witness Date

Commissioning client of the on-site witness test

On-site Witness Test Location

Solid and liquid electrolyte

LAGP
LATP
LLZO
LPSCl
LSPS
LGPS
Polymer-solid electrolyte
Commercially electrolyte
SF-Ceramion

Total 9 pieces

Jul. 31, 2025

PROLOGIUM TECHN

No.6-1, Ziqiang 7th Rd.

Criteria for samples during

Title

Combustion Test

Conclusion

An on-site witness test was carried out at the Client's designated site. Appearance and color of 9 samples were observed and record. See the summary of test results.

*HE70049/2025, dated on August 4, 2025, is hereby

SGS

Reliability Laboratory

Report No.: HE70049A/2025

Page: 8 of 8

Summary:

Sample appearance before and after test:

UUT#1-9 Before combustion test

UUT#1-9 After combustion test

UUT #	Sample name	Before combustion	During combustion	After combustion
1	LAGP	white powder	no visible reaction	white powder
2	LATP	white powder	no visible reaction	gray powder
3	LLZO	white powder	no visible reaction	white powder
4	LPSCl	white powder	A red-hot glow was observed on the surface	green powder
5	LSPS	yellow powder	A red-hot glow was observed on the surface	dark yellow powder
6	LGPS	gray powder	A red-hot glow was observed on the surface	gray powder
7	Polymer-solid electrolyte	transparent film	combustion with visible flame	The sample continuous combustion and forms a carbonized solid
8	Commercially electrolyte	transparent liquid	combustion with visible flame	The sample continuous combustion, resulting in complete carbonization with no residual matter
9	SF-Ceramion	gray colloid	no visible reaction	gray solid

The End of Test Report

ProLogium's Solid Oxide ELT

ProLogium's Superfluidized All Inorganic Solid-state ELT

Peer's Solid Sulfide ELT

Peer's Solid Polymer ELT

Peer's Commercially Liquid ELT

Safety Tests of Various Electrolytes

Ambient environment (Humidity/Baro/Tem=RT)

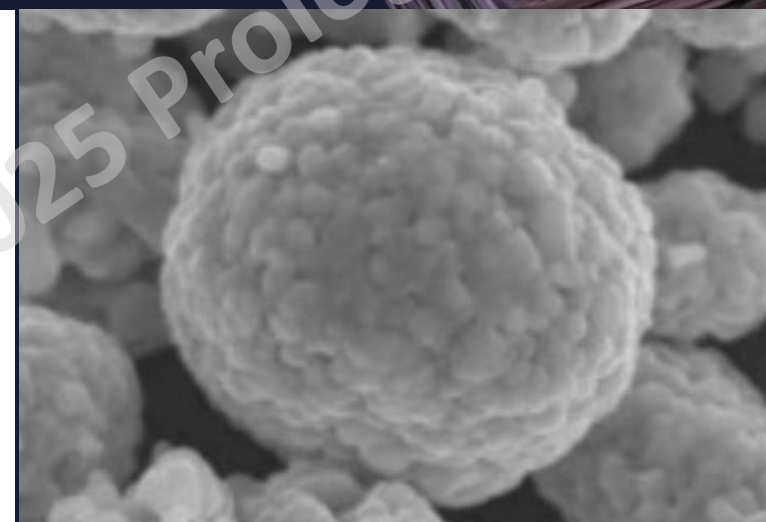
In 900-1300°C blowtorch combustion tests, only superfluidized all inorganic solid-state electrolytes and solid oxide electrolytes demonstrate intrinsic safety.

Li Metal Battery

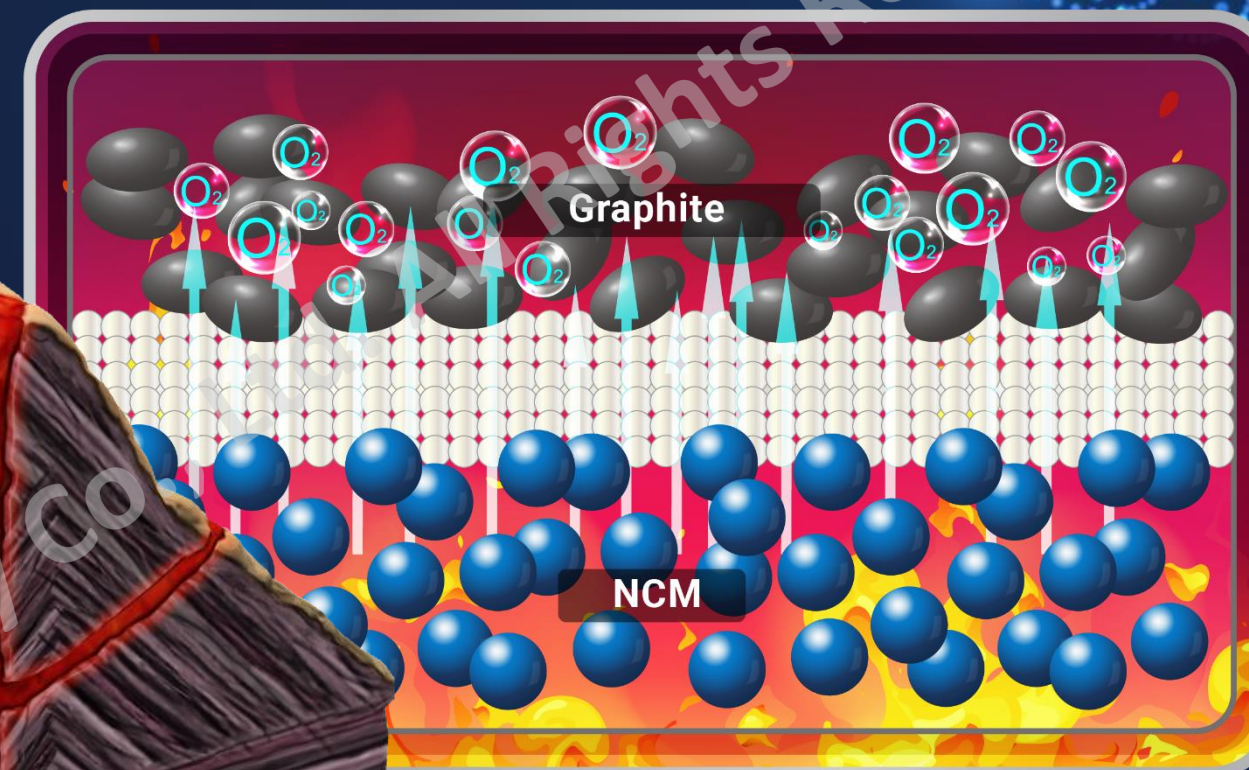


Volcano 1

Fully Charged Cathode Active Material
NCM 811/955

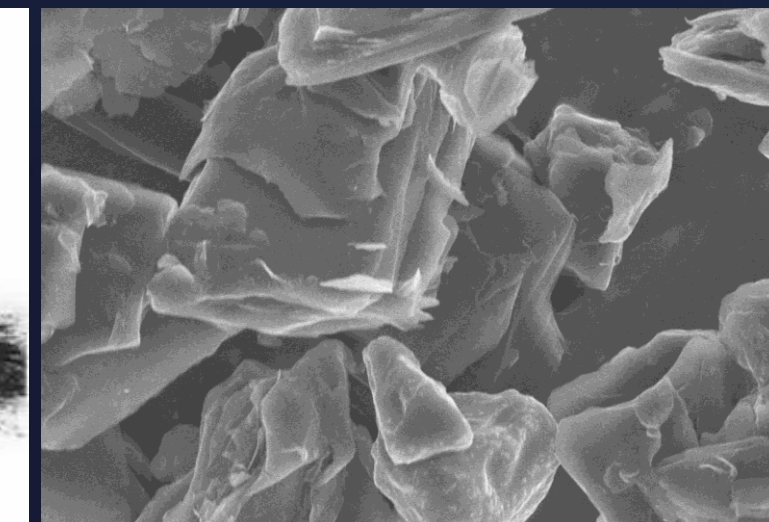


Li Ion Battery



Volcano 2

Fully Charged Anode Active Material
SCM (Si-Li Alloy)



ACTIVE SAFETY MECHANISM (ASM)

ASM

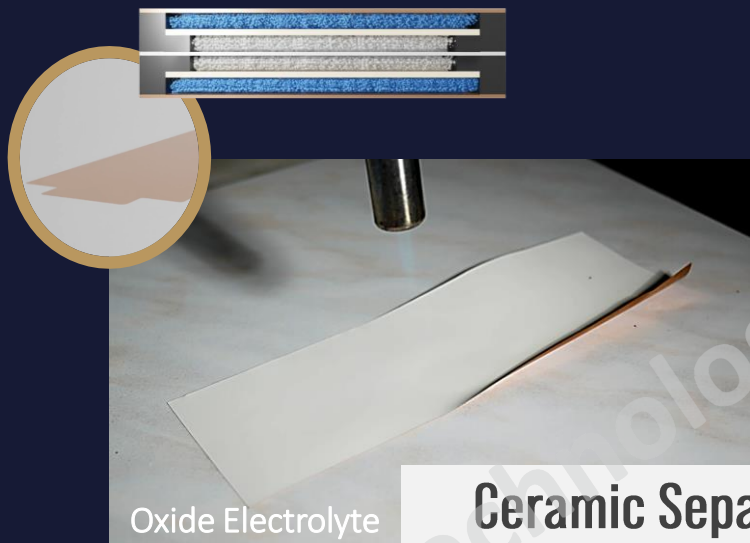
*Stabilized the cathode and
neutralized the Si-Li Alloy or
lithium metal anode,
Eliminating the key triggered of
the battery thermal runaway
and removing risk of self -
ignition or explosion*

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 1. SAFETY – CELL LEVEL ASM

ASM (ACTIVE SAFETY MECHANISM)-1: GOOD ELECTRICAL INSULATOR OF CERAMIC SEPARATOR – MECHANICAL AND THERMAL

CERAMIC SEPARATOR
WITHSTANDS HIGHER
TEMPERATURES






THERMAL RESISTANCE (BURING TEST)



CERAMIC SEPARATOR KEEPS
ELECTRONIC INSULATION
PERFORMANCE AT HIGH
TEMPERATURE

RESISTANCE ACROSS TEMPERATURES ON CERAMIC SEPARATOR

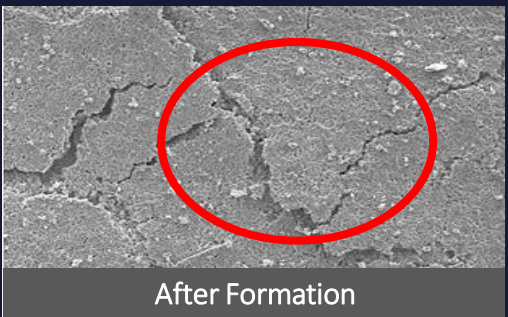
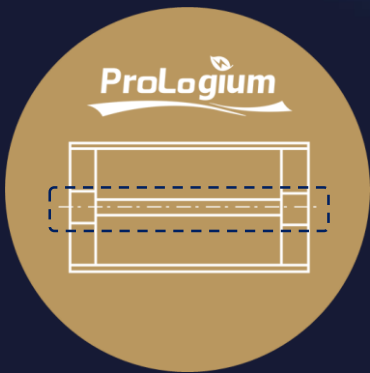


Temperature		Room Temp.	50°C	150°C	250°C	300°C
Resistance (mega ohm)		24	24.5	24.8	25.5	26
SSL	Surface change					

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 1. SAFETY – CELL LEVEL ASM

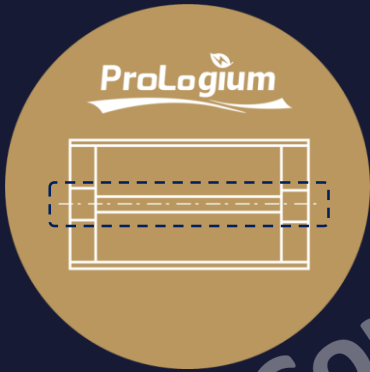
ASM (ACTIVE SAFETY MECHANISM)-1: GOOD ELECTRICAL INSULATOR OF CERAMIC SEPARATOR – MECHANICAL AND THERMAL

NO BROKEN WITH BIG INNER STRESS (VOLUME CHANGED)

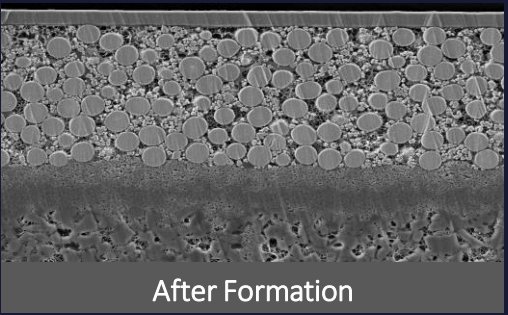
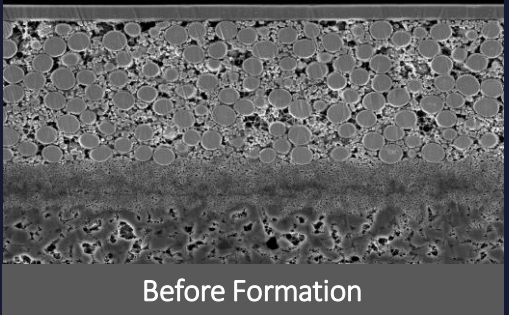


The ceramic separator delivers unmatched mechanical strength, even in cases of severe internal stress, such as with 100% Silicon anodes

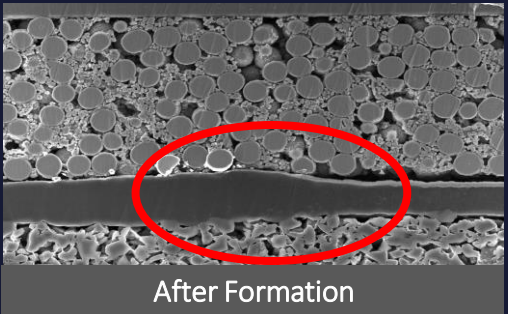
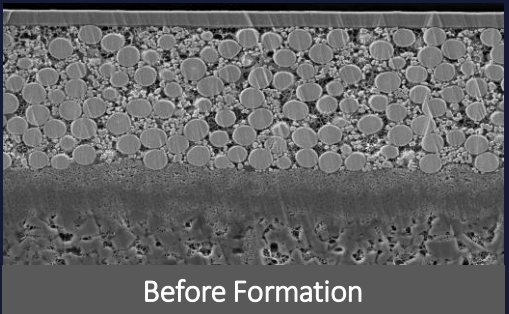
RESISTANCE TO EXTERNAL IMPACT (HAMMER TEST)



ProLogium
(Ceramic Separator)



Traditional LIB
(Polymer Separator)



The ceramic separator delivers unmatched mechanical strength, even in cases of severe outside impact, such as Hammer Pouch

SF-CERAMION ELT (SUPER-FLUIDIZED ALL INORGANIC SOLID-STATE ELT) DEVELOPMENT

ASM-2 (ACTIVE SAFETY MECHANISM): THE EVOLUTION PATH OF ASM TO SF-CERAMION



ASM (1st Stage) → ASM POWDER

2021.4 Edison Award

**ASM IN HYBRID ELECTROLYTE
(INORGANIC + ORGANIC)**

- ASM: Stabilized the cathode and neutralized the Si-Li Alloy or lithium metal anode,
- ELT: Hybrid ELT system (Organic + Inorganic ELT) - Not yet achieved intrinsic Safety

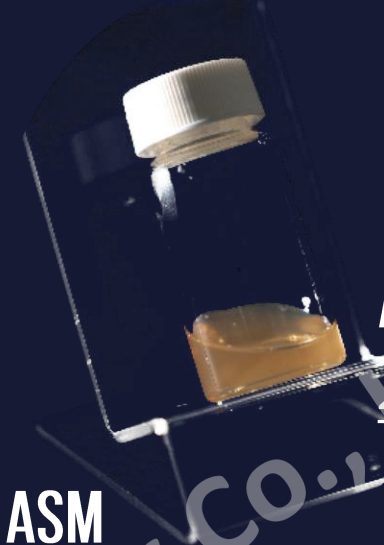


**ASM (2nd Stage) → INORGANIC ASM
Solid-state ELT POWDER**

2022-2024.2 Synthesis of Solid state ELT

**NEW SOLID-STATE ELT SYNTHESIZED BY ASM
(ASM IN ALL INORGANIC ELT SYSTEM)**

- ELT: All Inorganic ELT - Achieved Intrinsic safety
- Compromised with
 1. Low ionic conductivity and
 2. Required Additional pressurized module during operation due to interface between Active material & soft Solid Powder such as Sulfide SSE)

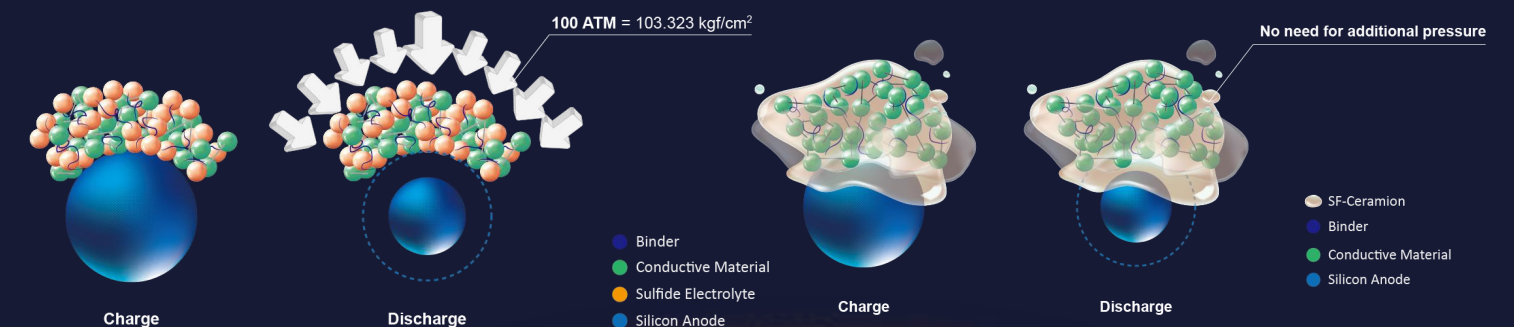


ASM (3rd Gen) → SF-Ceramion ELT

2024.9 Successful Fluidized 2nd ASM SSE

SF-CERAMION™

SUPER-FLUIDIZED ALL INORGANIC SOLID-STATE ELT



- ELT: All Inorganic ELT (intrinsic Safety)
- Ultra-high ionic conductivity at room and low temperature
- Excellent interface contact with active material without additional pressure due to super fluidized All inorganic Solid-State ELT

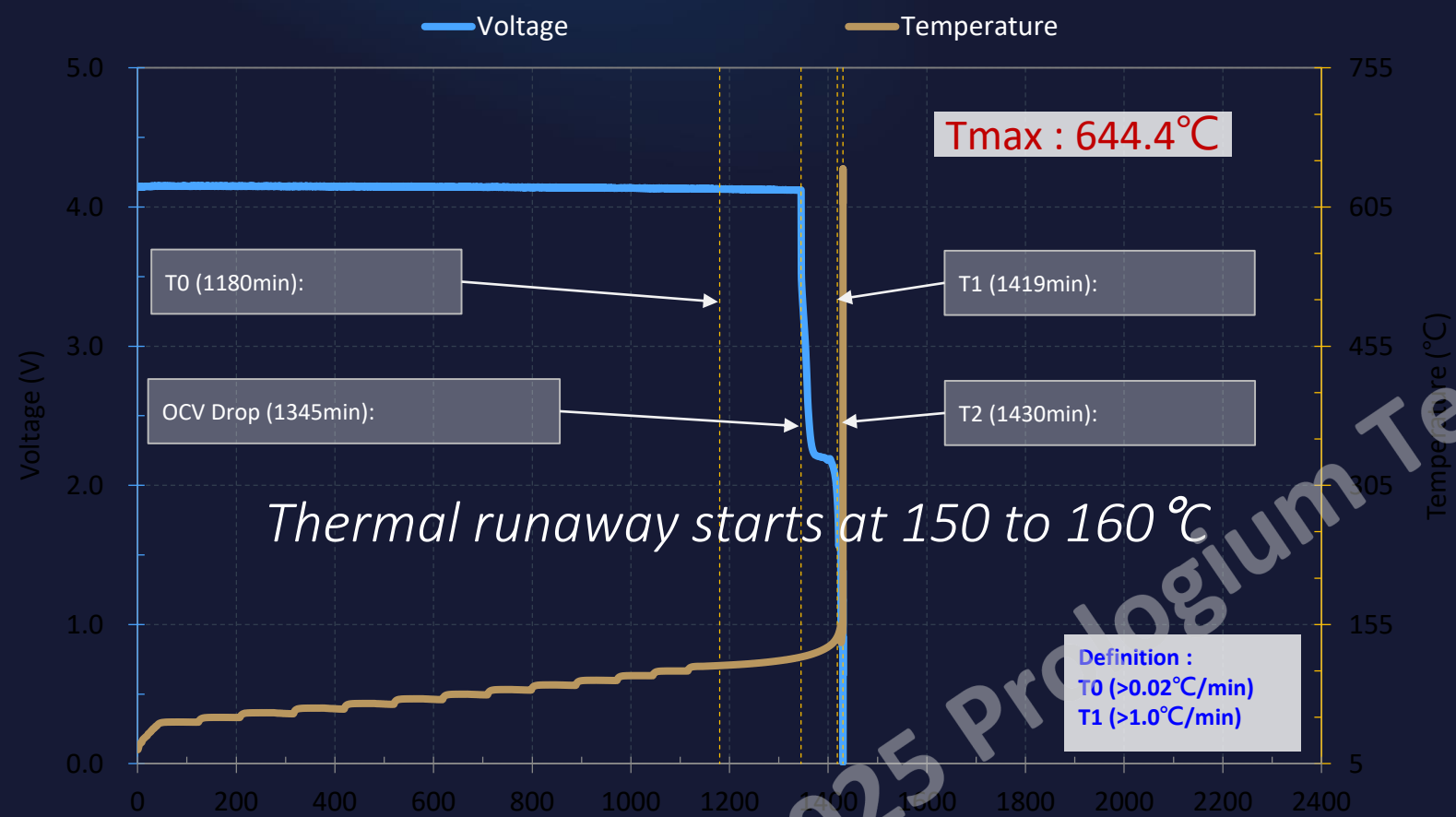
MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 1. SAFETY – CELL LEVEL ASM

ASM (ACTIVE SAFETY MECHANISM)-2: UNDER HIGH TEMP AND HIGH VOLTAGE, SF-CERAMION WILL RELEASE ASM AND STABILIZE CATHODE AND ANODE AM

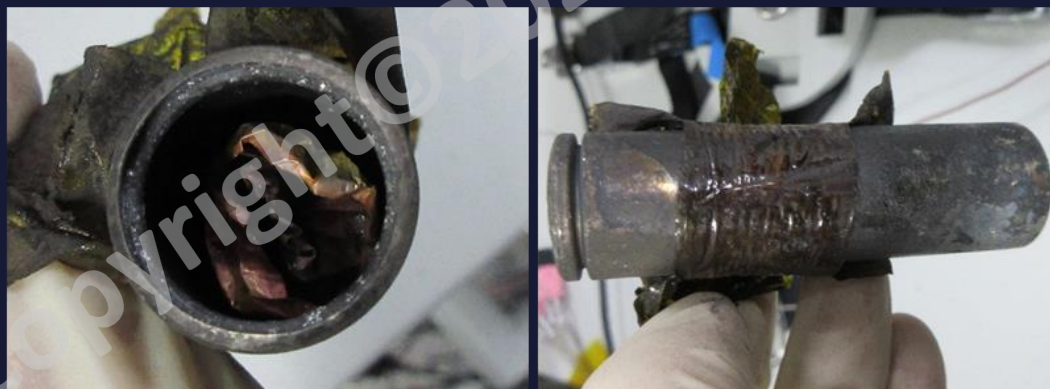
ARC TEST RESULT

TRADITIONAL LIB (, NCM811, GRAPHITE + SIOX, ORGANIC ELT, POLYMER SEPARATOR)

Thermal runaway starts very clearly at 150 to 160 °C

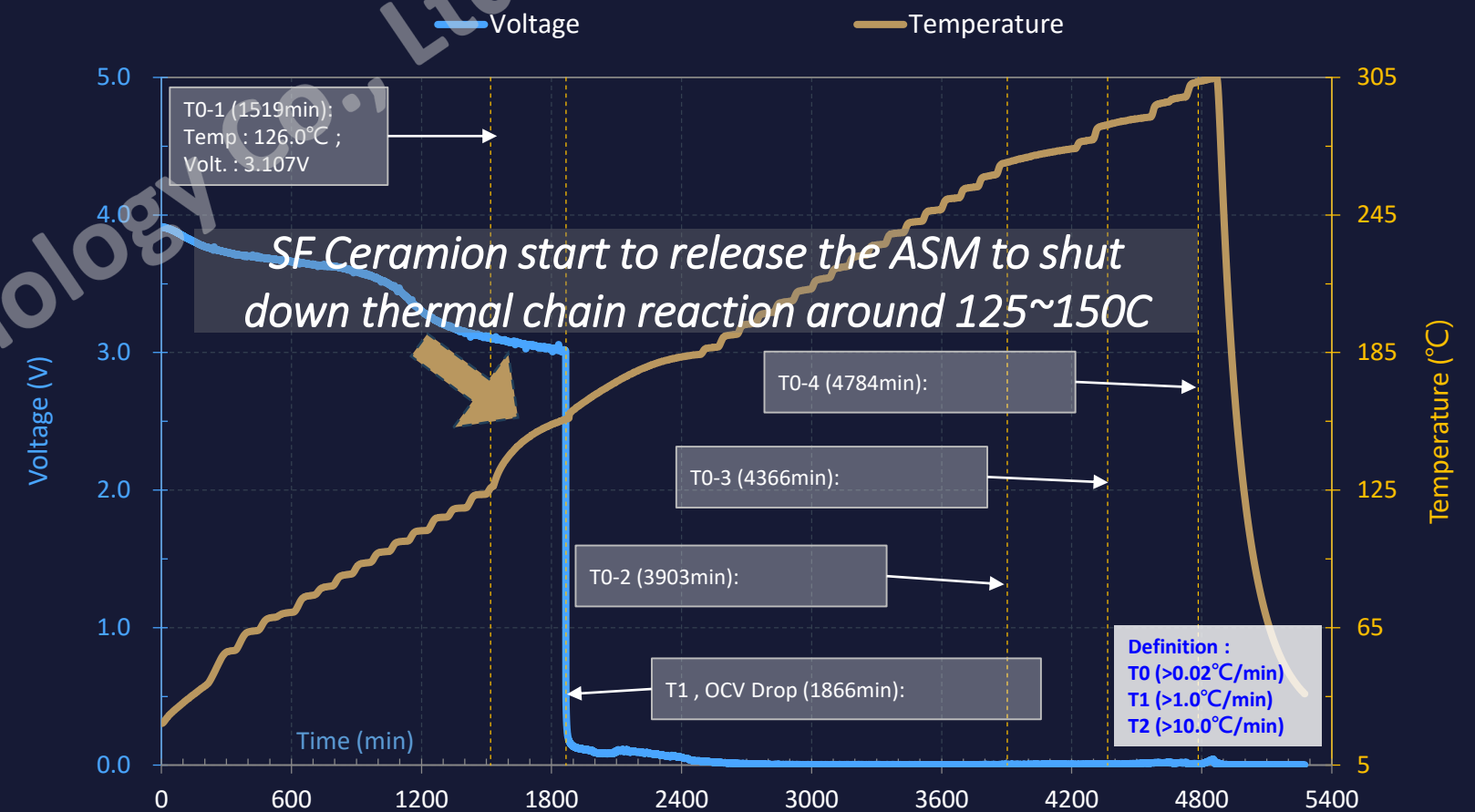


After Test
Whole Battery
Destroyed

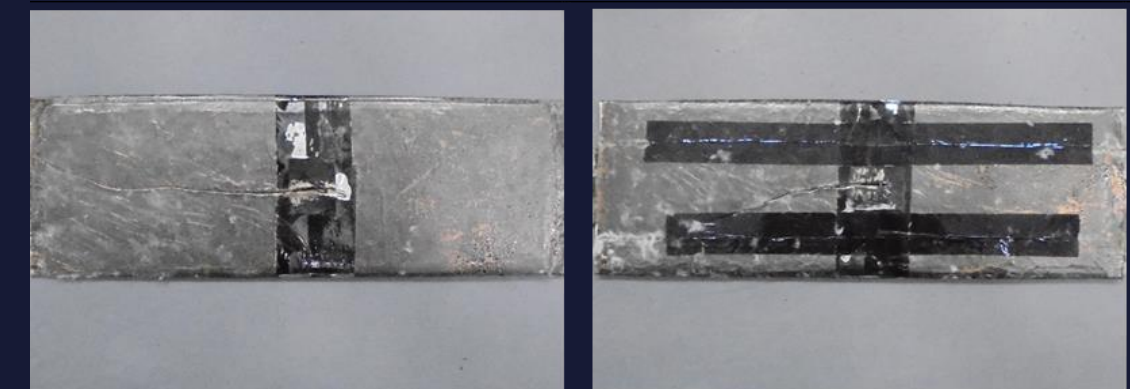


PROLOGIUM 4TH GEN LCB (NCM955, 100% SI, ALL INORGANIC ELT, CERAMIC SEPARATOR)

There was no Thermal Runaway happened from RT~300 °C, the 4th Gen LCB only shows a few percent of weight loss



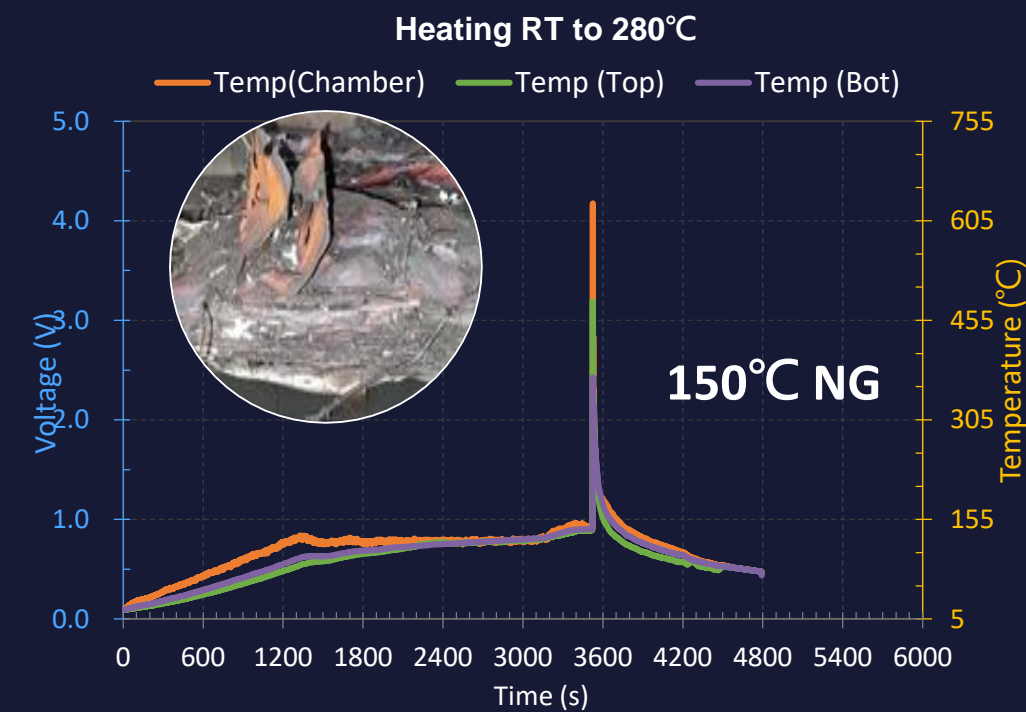
After Test
Whole Battery
Largely Intact



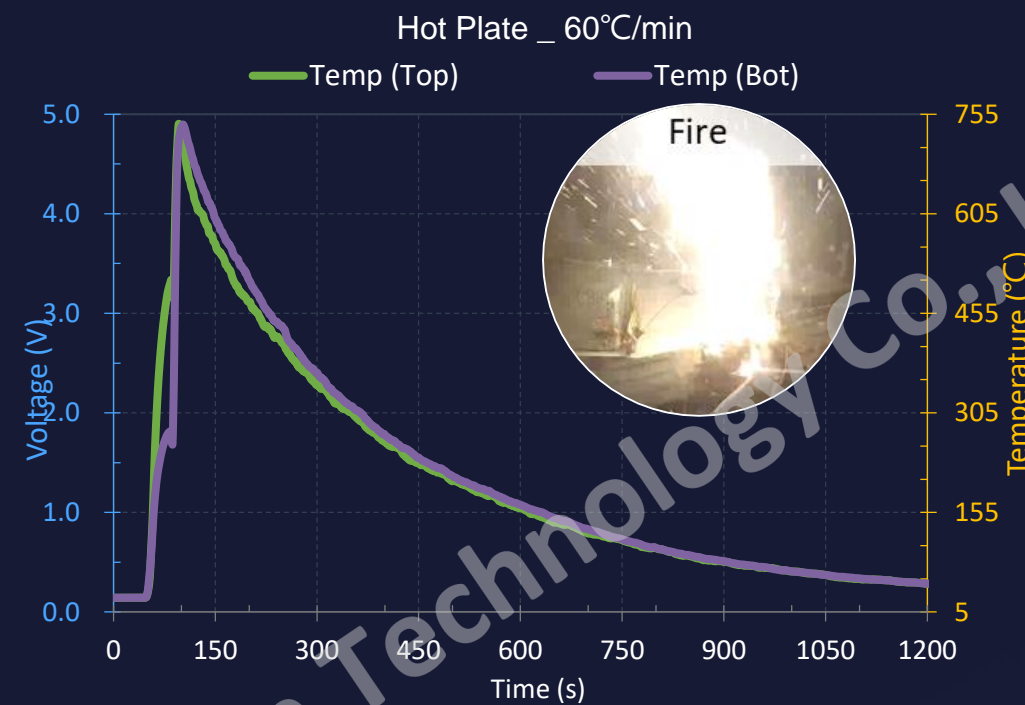
MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 1. SAFETY – CELL LEVEL ASM

ASM (ACTIVE SAFETY MECHANISM)-2: UNDER HIGH TEMP AND HIGH VOLTAGE, SF-CERAMION ELT WILL RELEASE ASM AND STABILIZE CATHODE AND ANODE AM

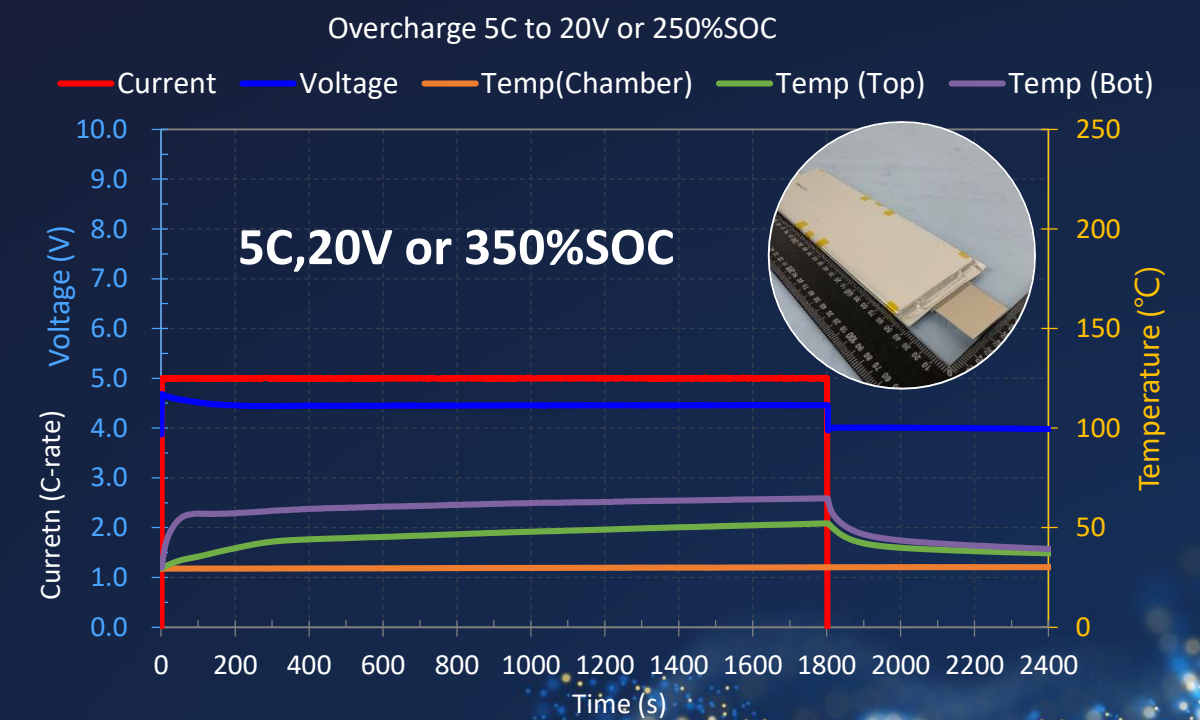
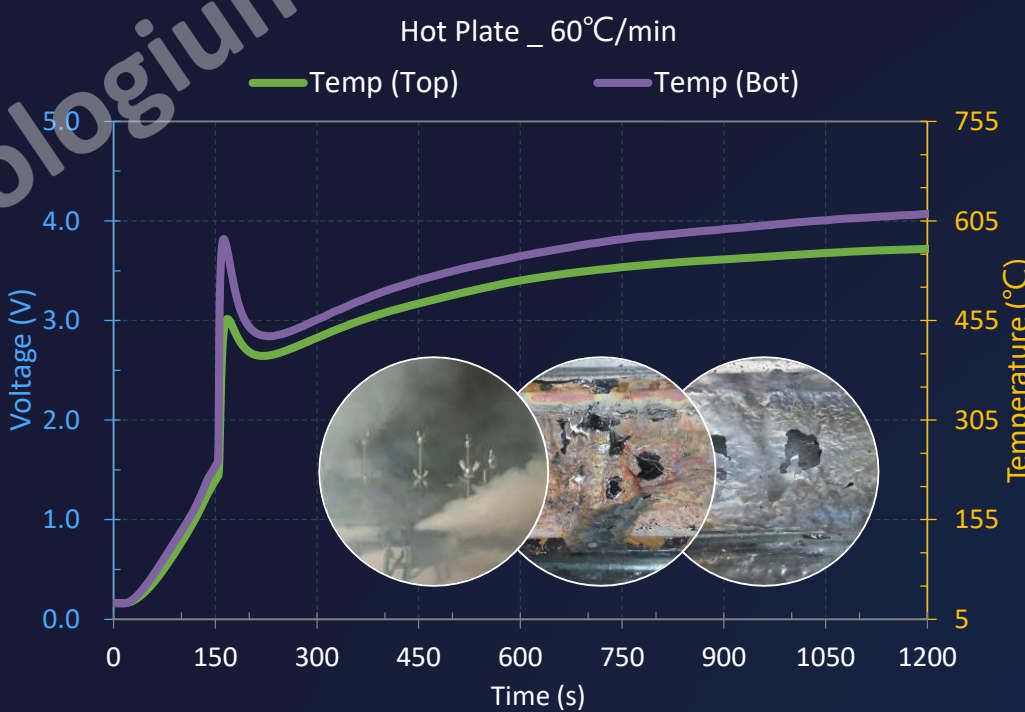
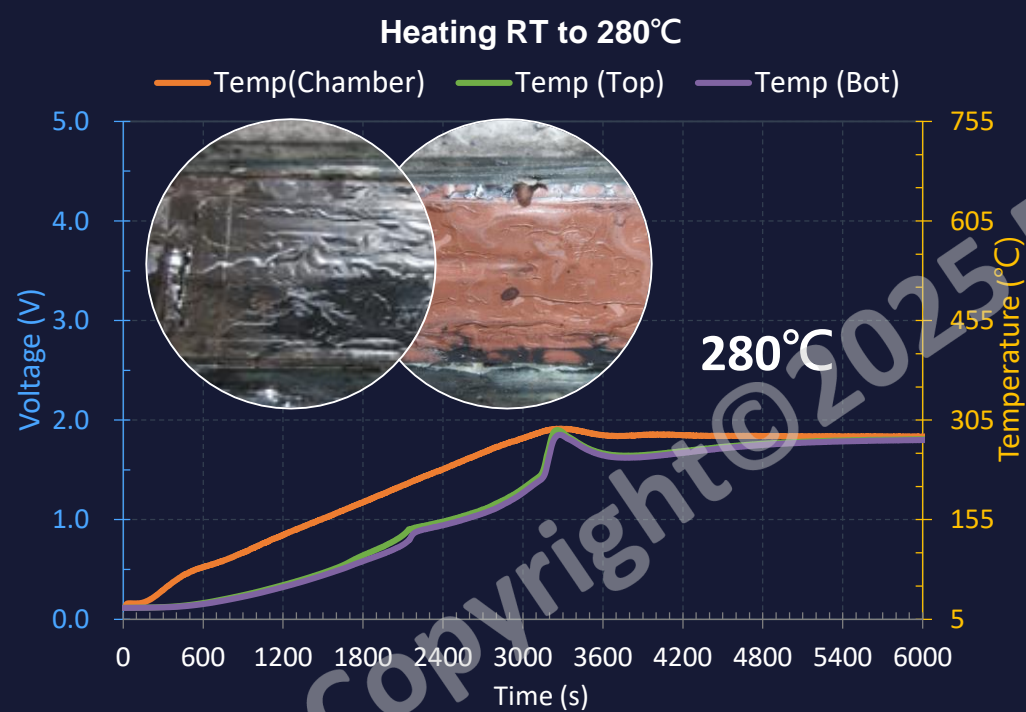
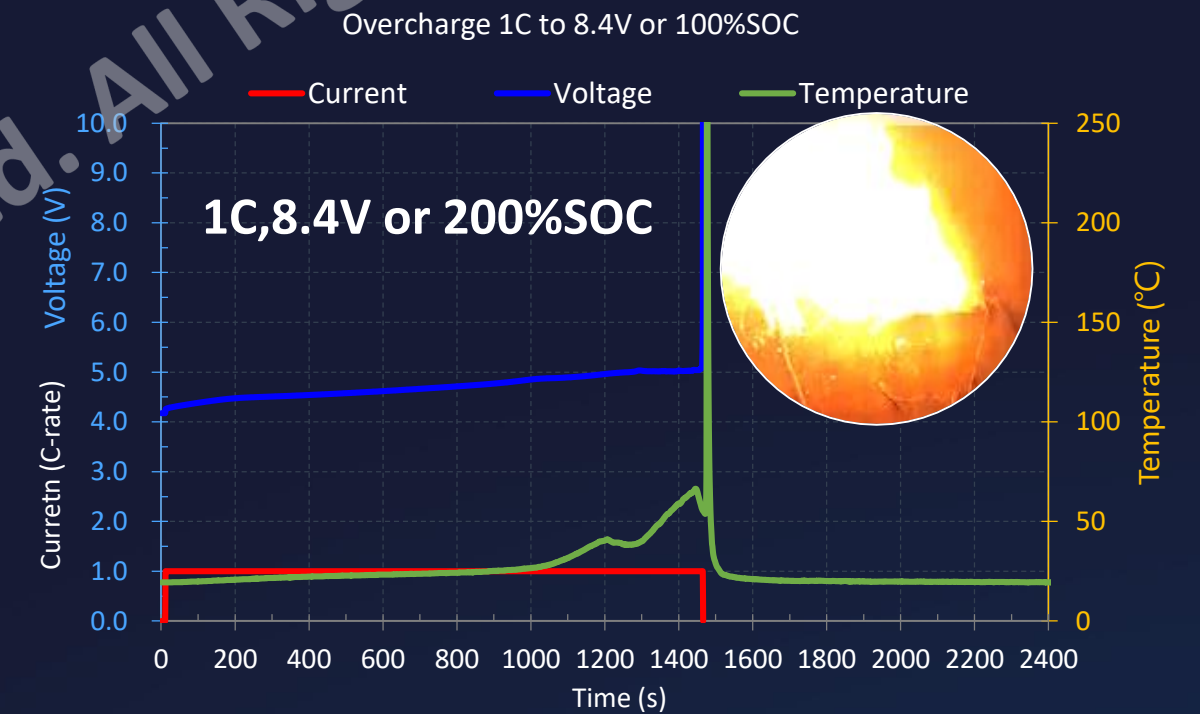
Heating (5°C/min)



Hot Plate (60°C/min)(Thermal Propagation)



Overcharge



2. EXTREME ELECTRICAL PERFORMANCE

- Fast Charging capability
- Consistence electrical performance no matter for the low and RT temp and High speed and Normal speed.

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 2. EXTREME ELECTRICAL PERFORMANCE

CHARACTERISTICS COMPARISON BETWEEN TRADITIONAL ORGANIC ELT AND NEXT GENERATION ELT: IONIC CONDUCTIVITY UNDER DIFFERENT TEMPERATURE.

SGS certified
conductivity test

SGS
SGS
Witness Report
REPORT NO.: DMS25700363
PROLOGIUM TECHNOLOGY CO., LTD.
NO. 6-1, ZIJIANG 7TH RD., ZONGSI DIST., TAOYUAN CITY 32063, TAIWAN (R. O. C.)
Date: 2025/07/23
Page: 2 of 2

Test Results:

Test Item	Test Method	Test Results	LOQ/ LOD	Unit
Conductivity(6°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	20.76	---	mS/cm
Conductivity(0°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	28.08	---	mS/cm
Conductivity(5°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	31.87	---	mS/cm
Conductivity(10°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	38.04	---	mS/cm
Conductivity(15°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	44.47	---	mS/cm
Conductivity(20°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	51.06	---	mS/cm
Conductivity(25°C) (on-line)	With reference to the client's SIP method. Analysis was performed by Conductivity meter.	57.36	---	mS/cm

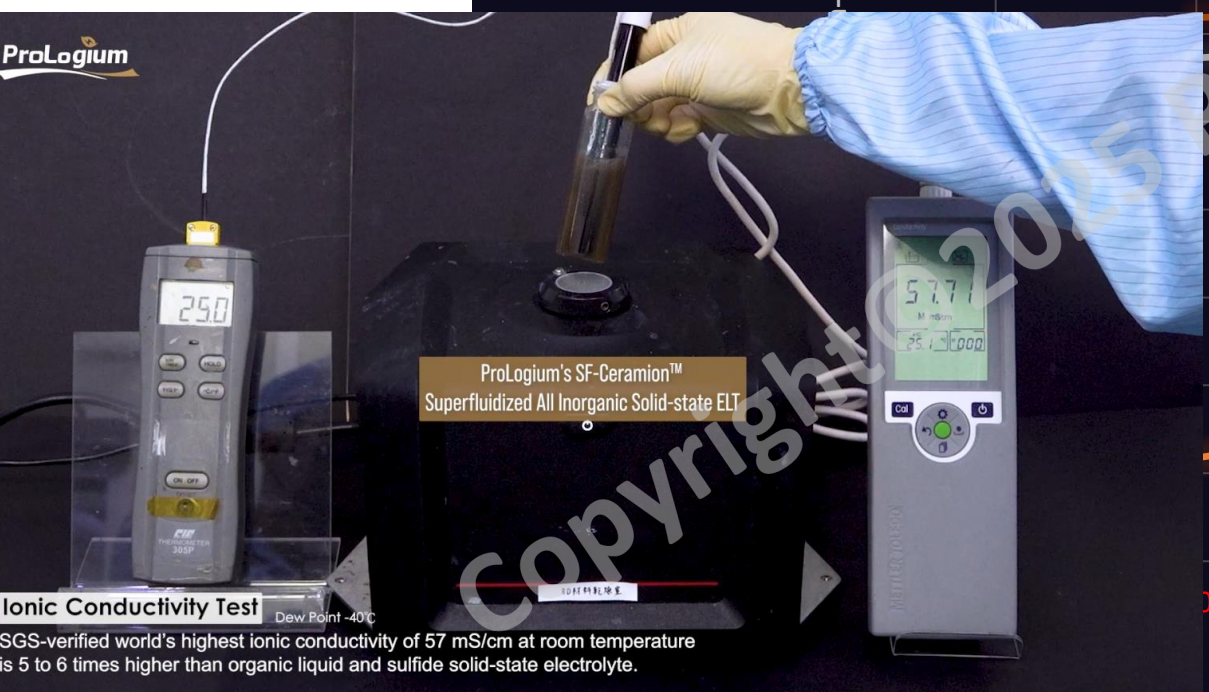
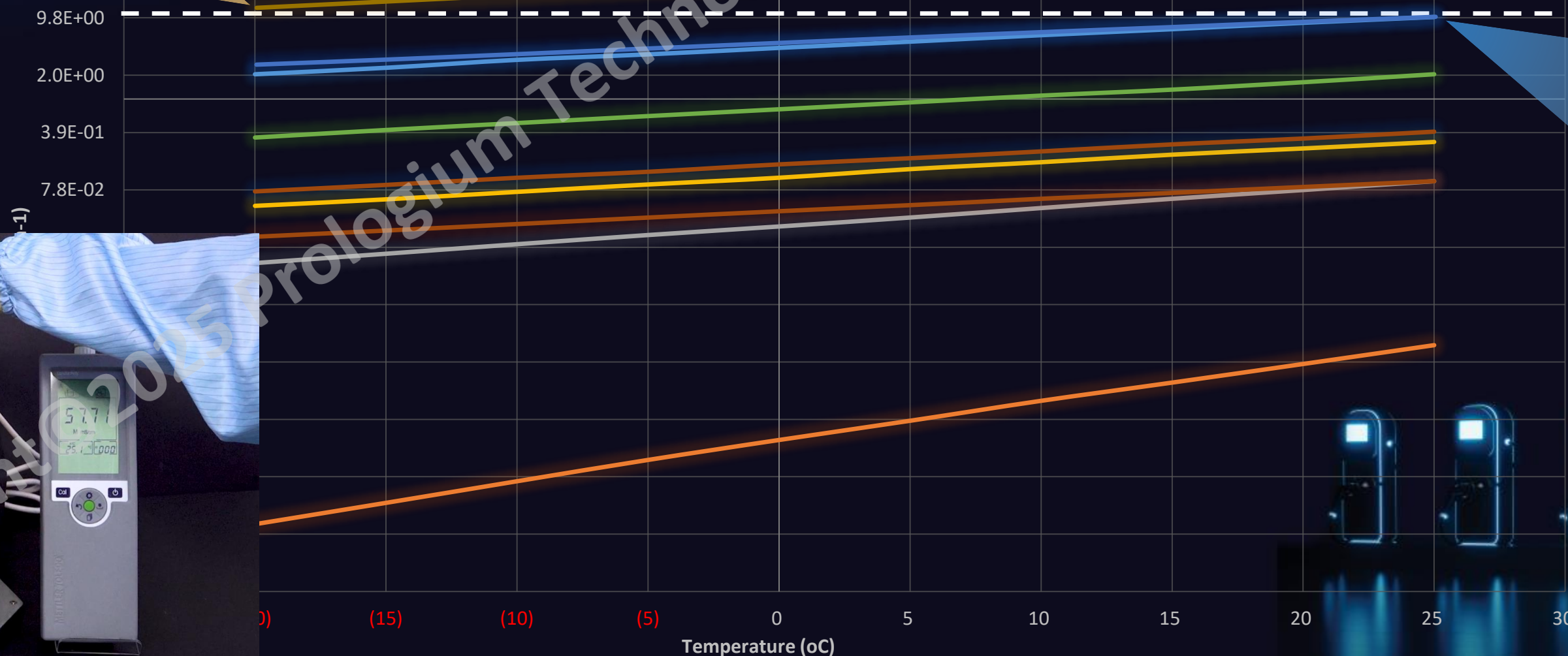
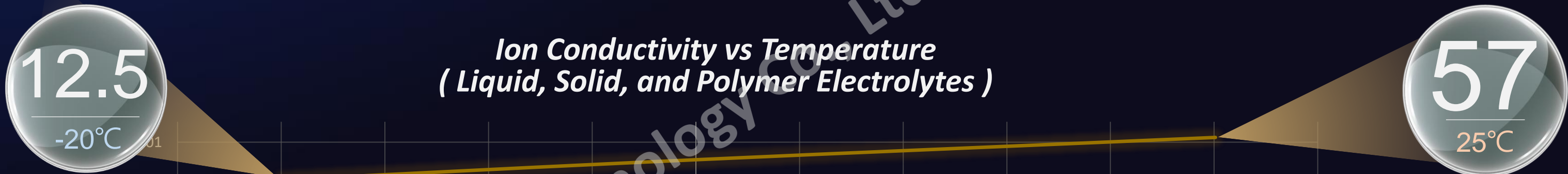
NOTE:
1.The test report merely reflects the test results of the consigned matters. of the client and is not a certification of the legitimacy of the related products.
2.The content of this report is invalid if it is not presented as the entire report.
3.If the testing item belongs to qualitative analysis then this column describes Limit of Quantification(LOQ); If the testing item belongs to qualitative analysis then this column describes Limit of Detection(LOD).
4.Result reported as "N.D." or "Negative" denotes value lower than LOQ/LOD, and "LOQ" in microbiological test denotes value lower than the LOQ.

SGS
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Test Results:

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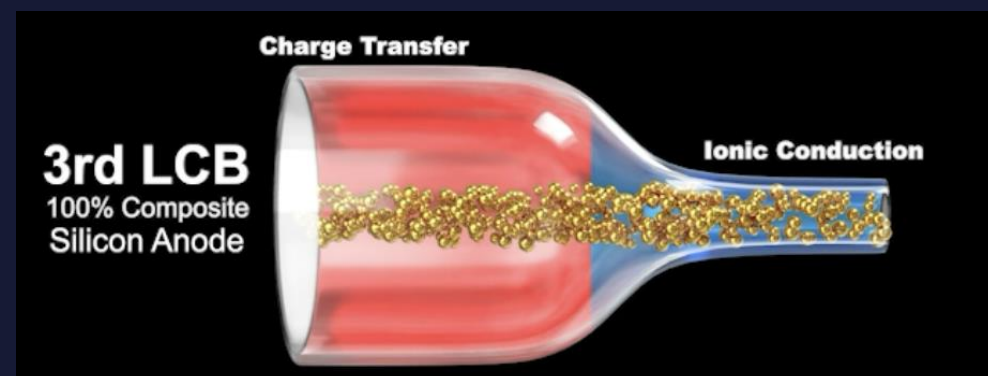
- SF-Ceramion (57 mS/cm)
- LGPS (10 mS/cm)
- LPSCI (2 mS/cm)
- 1 M LiPF₆ in EC:DMC (10 mS/cm)
- Gel ELT (0.1 mS/cm)
- PEO + LiFSI (0.001 mS/cm)
- LLZO (0.4 mS/cm)
- Composite ELT(0.3 mS/cm)
- LATP (0.1 mS/cm)



MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 2. EXTREME PERFORMANCE

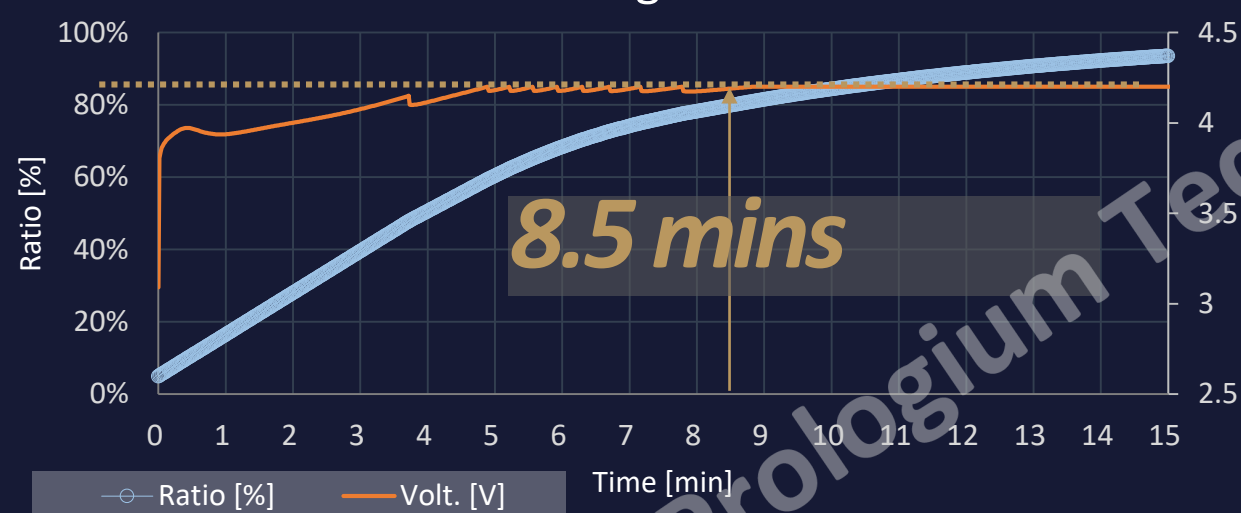
FAST CHARGING CAPABILITY & LOW TEMPERATURE DISCHARGING PERFORMANCE

3RD GEN. LCB SN-08 (HYNRID ELT)

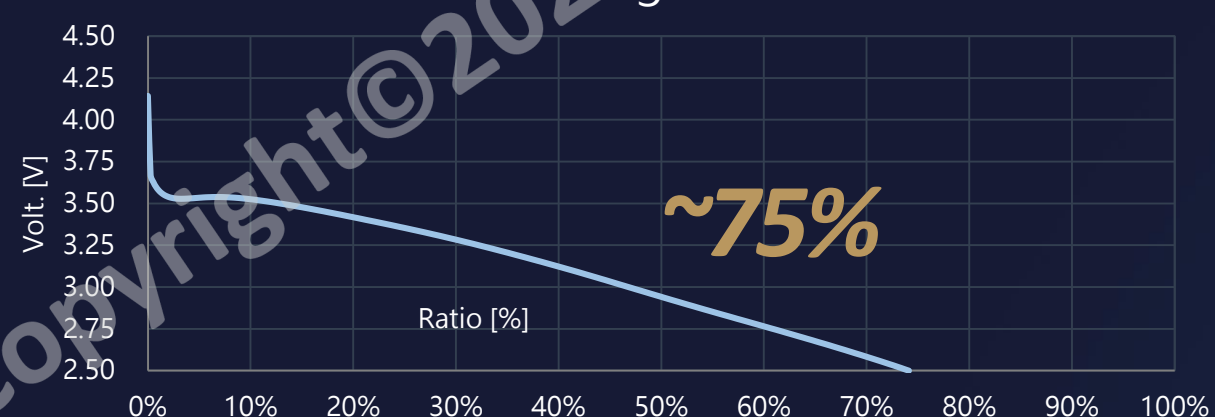


100% composite Si Anode enables fast charge transfer

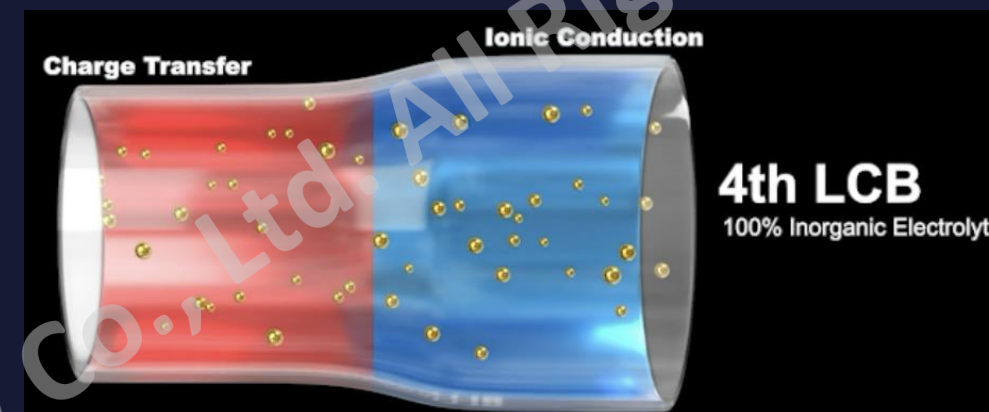
SN-08 Fast Charge Performance



SN08 0.33C Discharge Profile @ -20°C

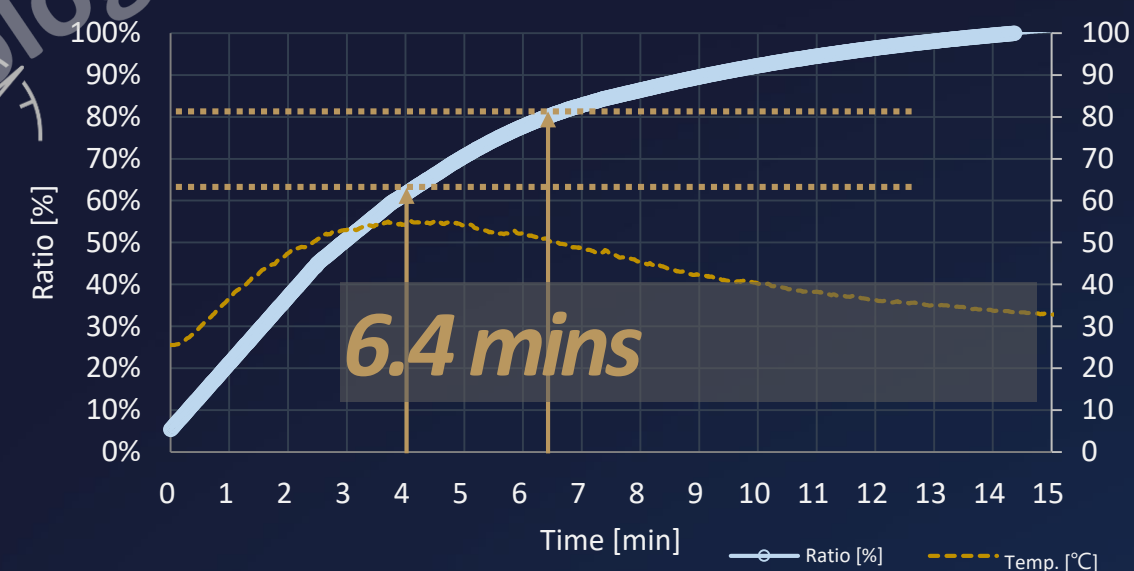


4TH GEN. LCB SN-10 (SF-CERAMION ELT)



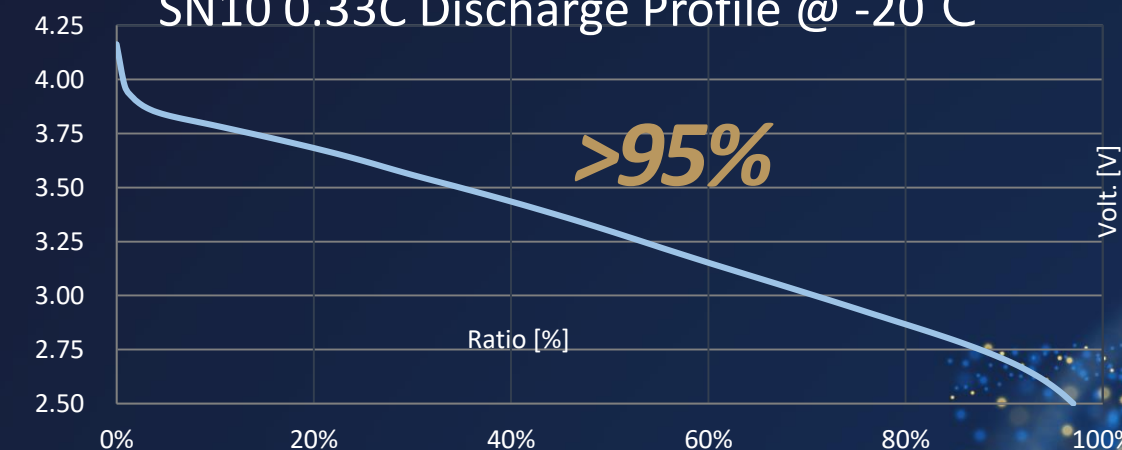
Super-Fluidized electrolyte further enables ion conduction

SN10 Fast Charge Performance



Charge speed increase by +32%

SN10 0.33C Discharge Profile @ -20°C



Battery capacity increase +26% at -20°C

CHEMICAL SYSTEM OF BATTERY

FAST CHARGING TESTING (5~80%)

LOW TEMP. DISCHARGE TESTING AT -20°C

3. SIMPLIFY PACK DESIGN FOR OPERATION

- Fireproof and Thermal Insulation mechanism should be simplified
- Cooling systems should be simplified,
- Heating modules should be simplified,
- High-voltage 1000~1500V BMS requirements are not necessary,
- No additional pressure module is needed.

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 3. SIMPLIFY THE PACK DESIGN

PACK ASSEMBLY UTILITY DUE TO THE GOOD CELL INTRINSIC PERFORMANCE

Gen 4 LCB not only provides supreme battery performance in energy density, charge speed and safety, it also reduces the complexity in system design in cooling, pressuring and heating

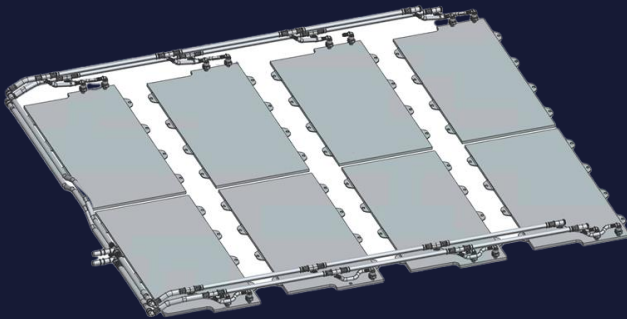
	Cell	Simplified thermal mechanism	400v fast charging	Simplified cooling system	Heating-free at low temperature	Additional pressure-free	PACK ASSEMBLY UTILITY
ProLogium SF-IBS	Energy Density: 860~940Wh/L Specific Energy : 360~400Wh/kg	○	○	○	○	○	CTP: 65% (540Wh/L) Module:55% (450Wh/l)
Traditional liquid (LFP)	Energy Density: 380~420Wh/L Specific Energy : 180~200Wh/kg	✗ Complicated design	✗ 1000V / 1500V	✗ Complicated design	✗ Heating system needed	○	CTP: 60% (240~252Wh/L) Module: X (too low)
ASSB (sulfide)	Energy Density: 800~900Wh/L Specific Energy : 350~400Wh/kg	✗ Complicated design	○	○	○	✗ 100-200 ATM	CTP: X (additional Pressure issue) Module: 30% (255~270Wh/L)



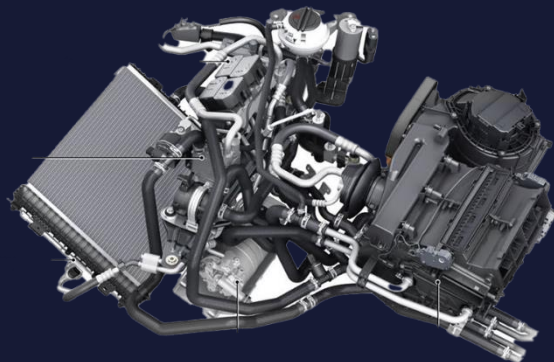
Simplified Thermal insulation module
Cell Level Safety



No Need 1000V / 1500V BMS (Fast Charging)
Cell Level Fast-charging



Simplified Cooling System
Cell Level Efficiency



No Need Heat Pump System
Cell Level Low Temp. Performance

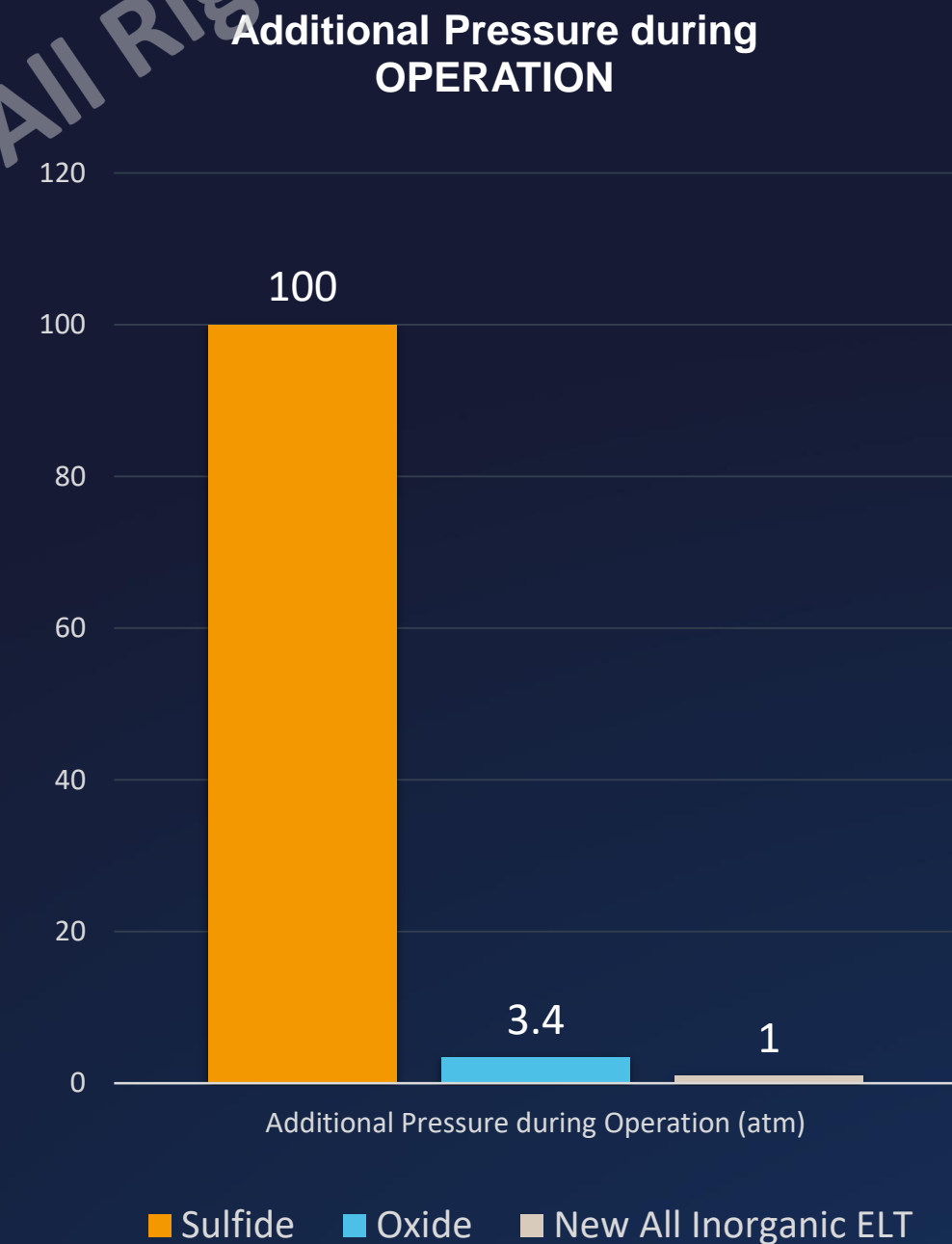
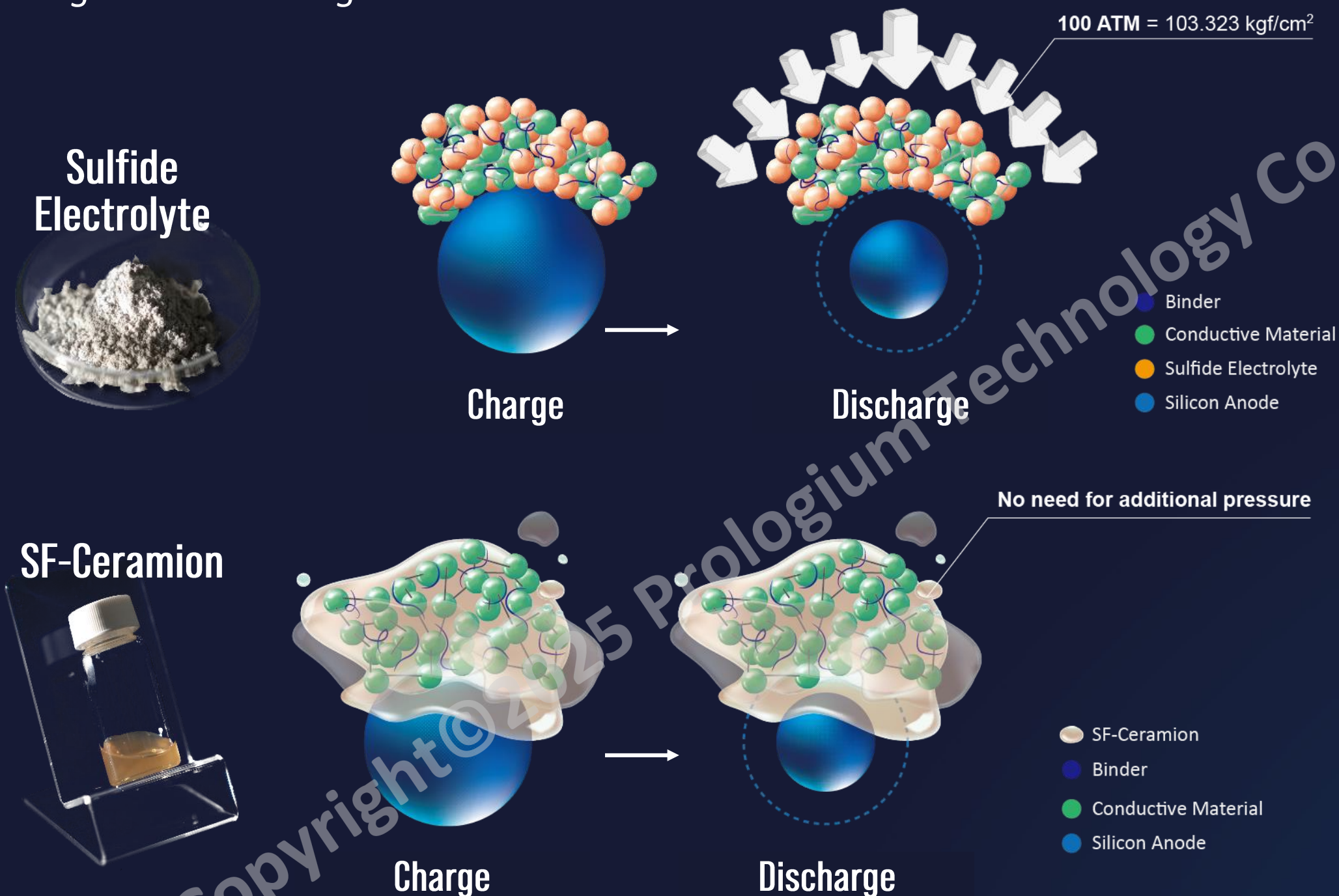


No Need Additional Pressure Mechanism
Cell Level Interface Performance

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 3. SIMPLIFY THE PACK DESIGN

ADDITIONAL PRESSURE DURING OPERATION OF ASSB IS BIG PROBLEM FOR PACK ENERGY DENSITY AND COST

Super-fluidized All Inorganic Solid –State ELT solves the problems in covering the interface between the electrolyte and the active material, especially under the Large volume change

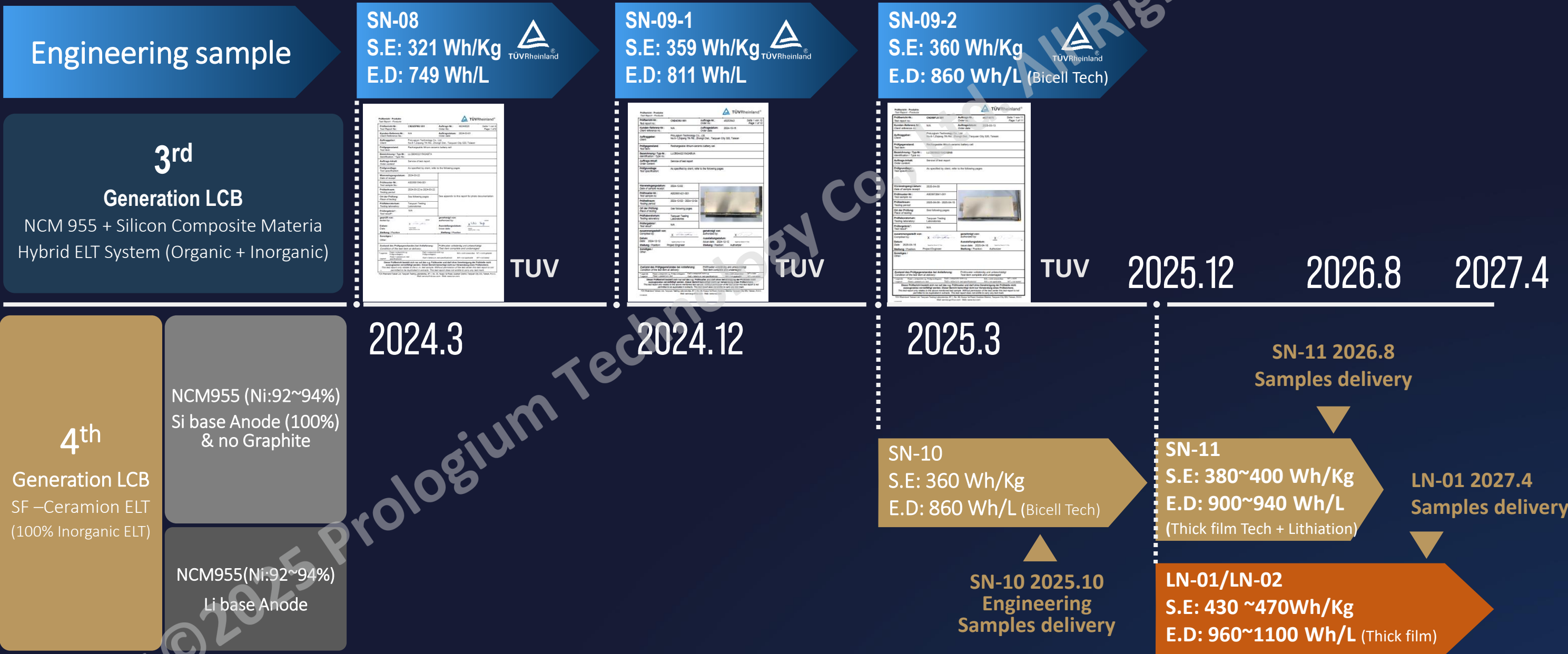


4. HIGH ENERGY DENSITY

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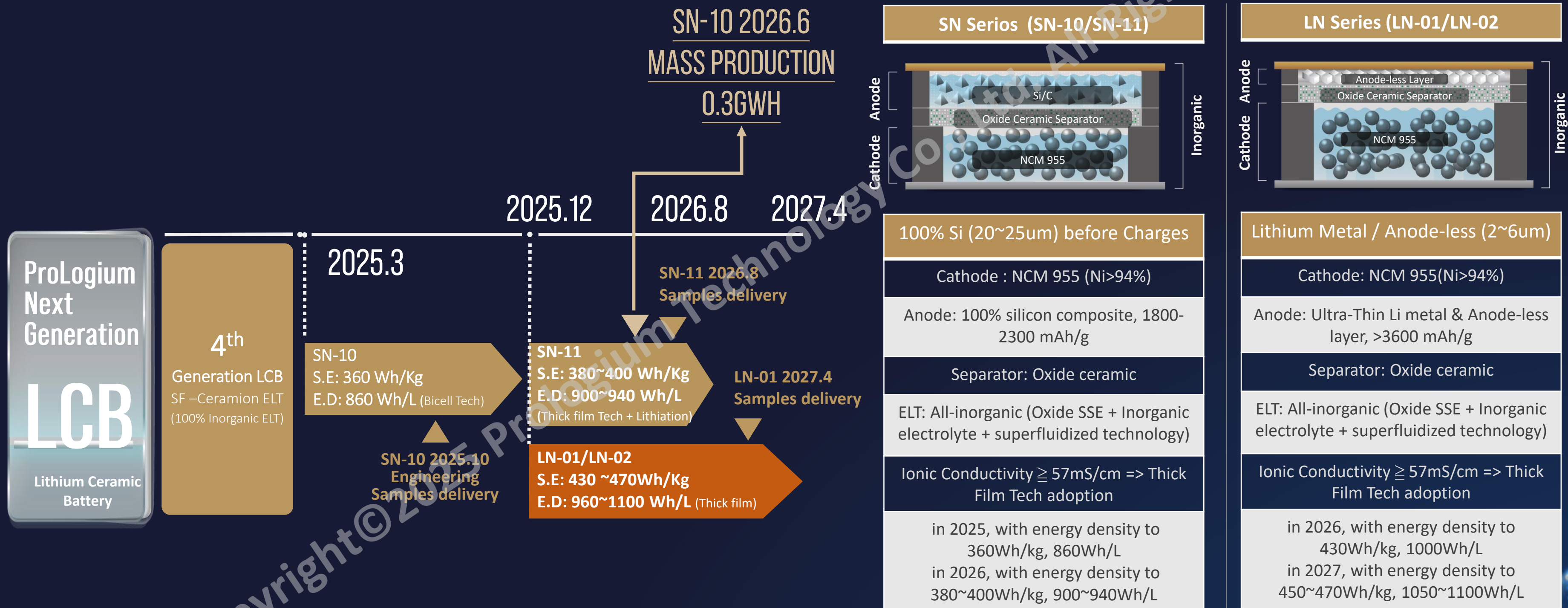
MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 4. HIGH ENERGY DENSITY

ENERGY DENSITY ROADMAP 2024~2027 (3RD LCB VS 4TH LCB + SILICON VS LI METAL)



MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 4. HIGH ENERGY DENSITY

DETAILED 4TH GENERATION LCB DESIGN (100% SILICON VS LI METAL)



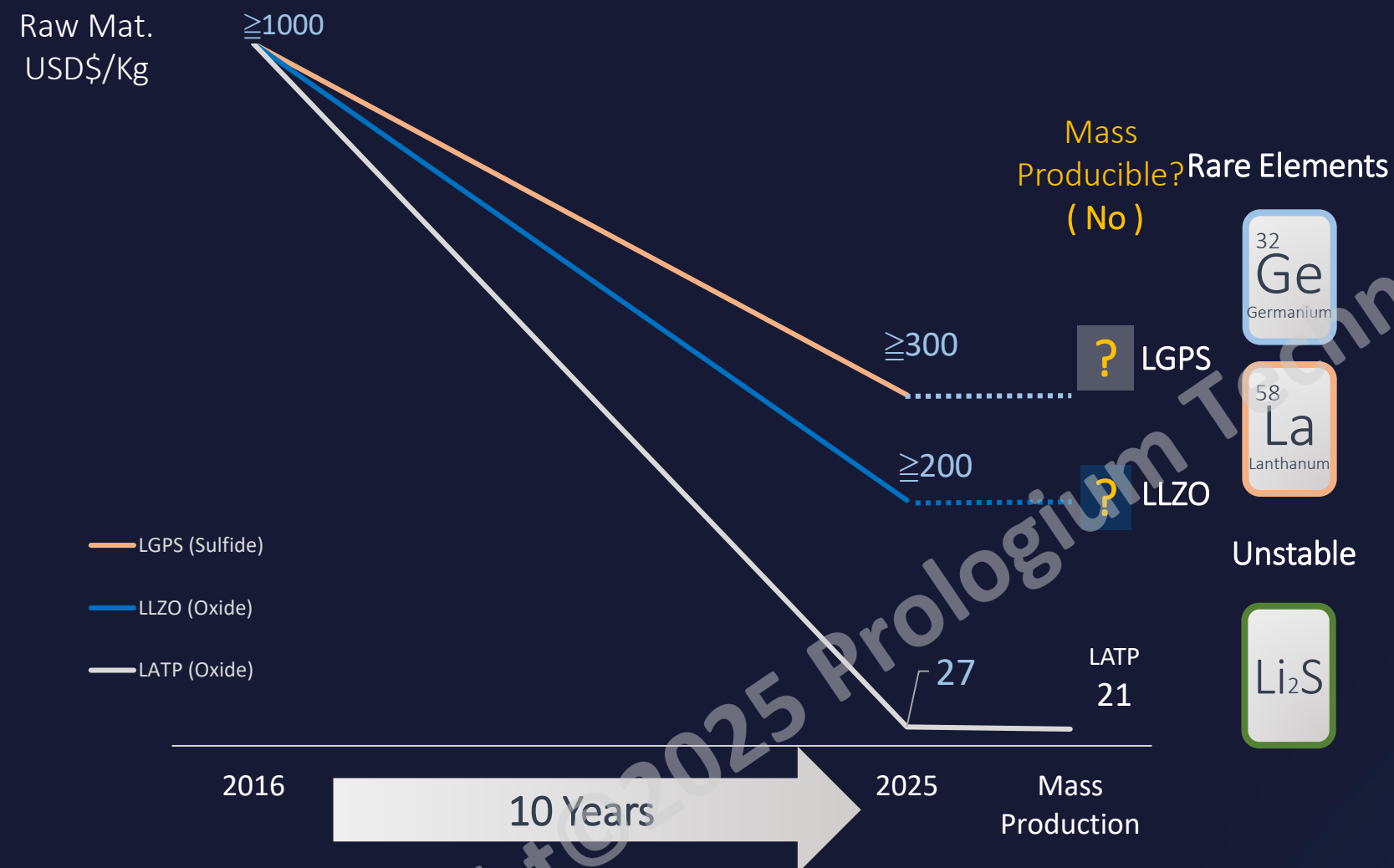
5. COMPETITIVE BOM COST

- Good BOM Cost Due to the Good Cost of SCM(Si Composite Material) & SF-Ceramion with Scaling-Up

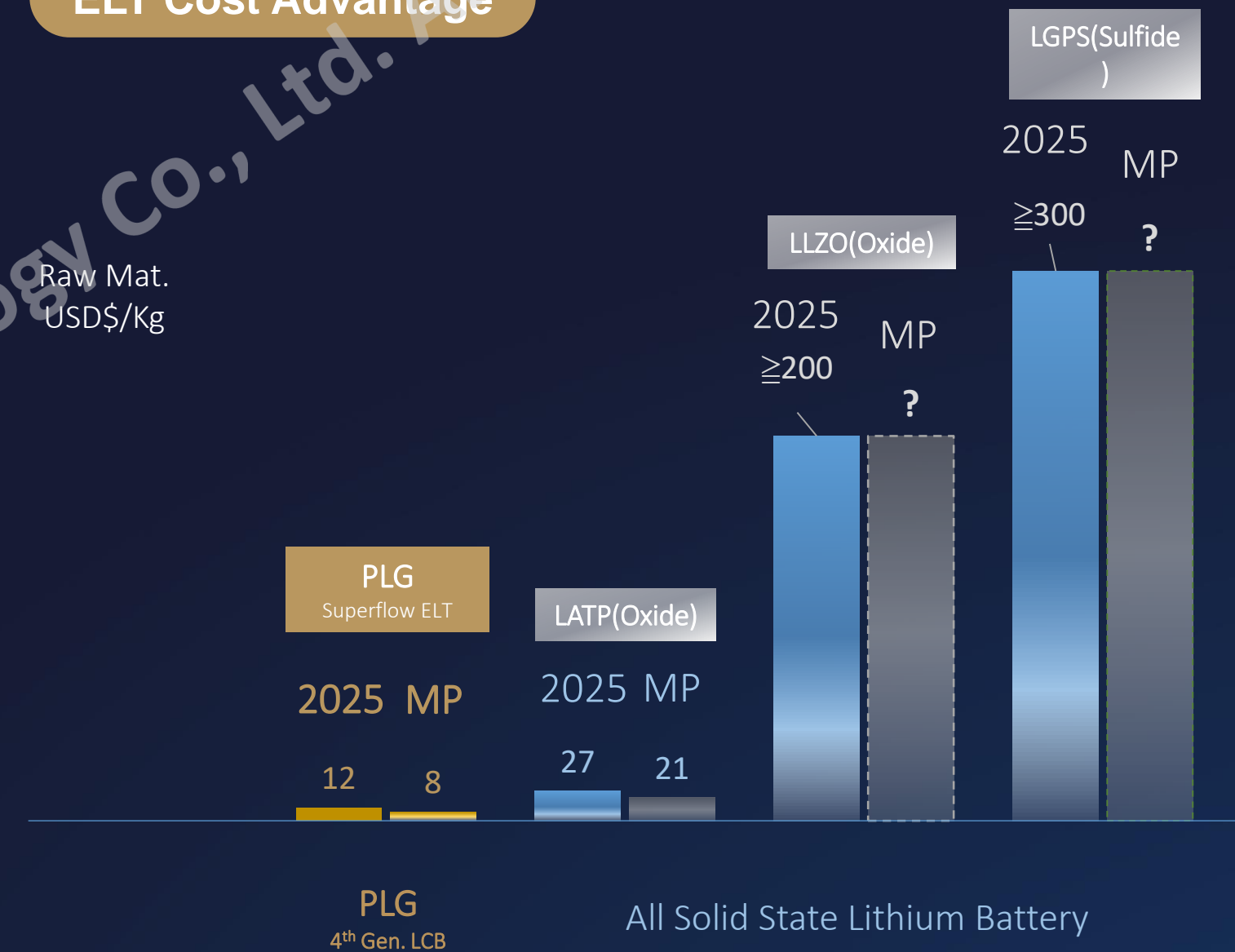
MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 5. COMPETITIVE BOM COST

COST ANALYSIS OF NEXT GENERATION ELT WITH SCALING-UP

All Solid-State Electrolyte



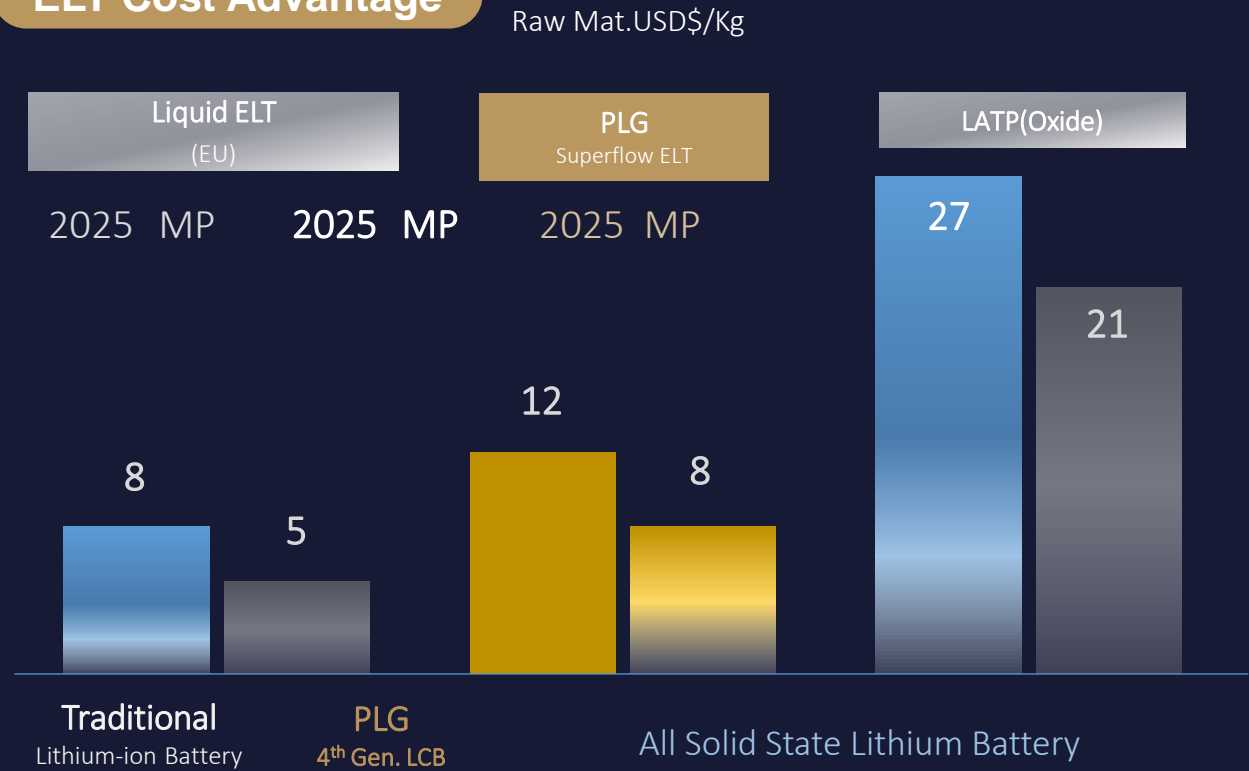
ELT Cost Advantage



MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 5. COMPETITIVE BOM COST

COMPETITIVE COST OF GEN 4 LCB (SN 10) VS TRADITIONAL LIB (NCM)

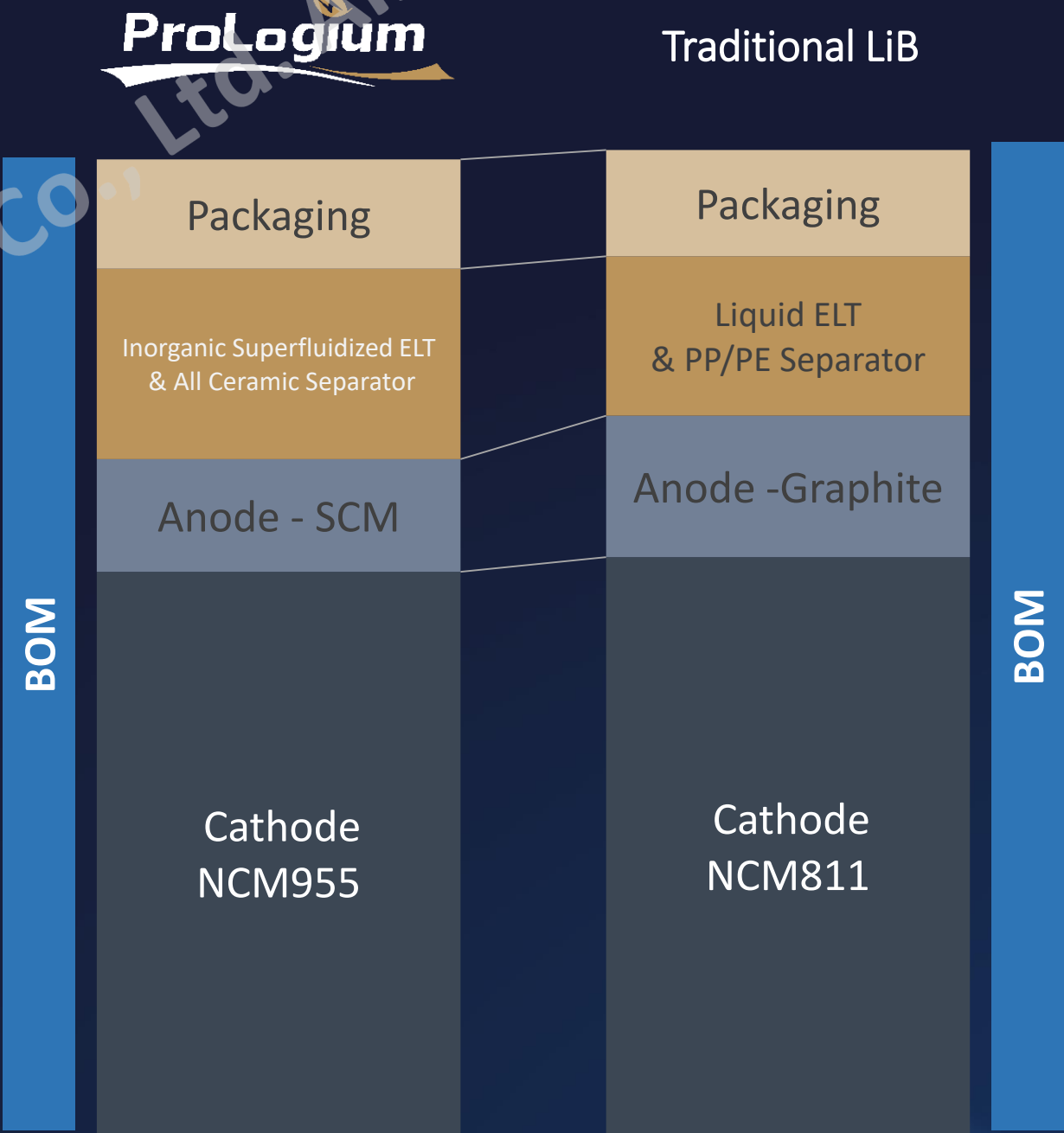
ELT Cost Advantage



Anode Cost Advantage

	PLG 4 th Gen. LCB	Traditional Lithium-ion Battery	Lithium Metal Battery
Material	Si Composite	Graphite	Li-Metal
Utilization	(now) 2300mAh/g (theoretical) 4000mAh/g	(now) 360mAh/g (theoretical) 372mAh/g	(theoretical) 3680mAh/g
Price	US\$ 40~50/Kg	US\$ 8~10/Kg	US\$ 4,146 /Kg Not Ready for MP
Cost/KWh	US\$ 4~4.5 /KWh	US\$ 6-8/KWh	>US\$ 300/KWh
Cost	1x	1.5 x	75 x

Cost Structure



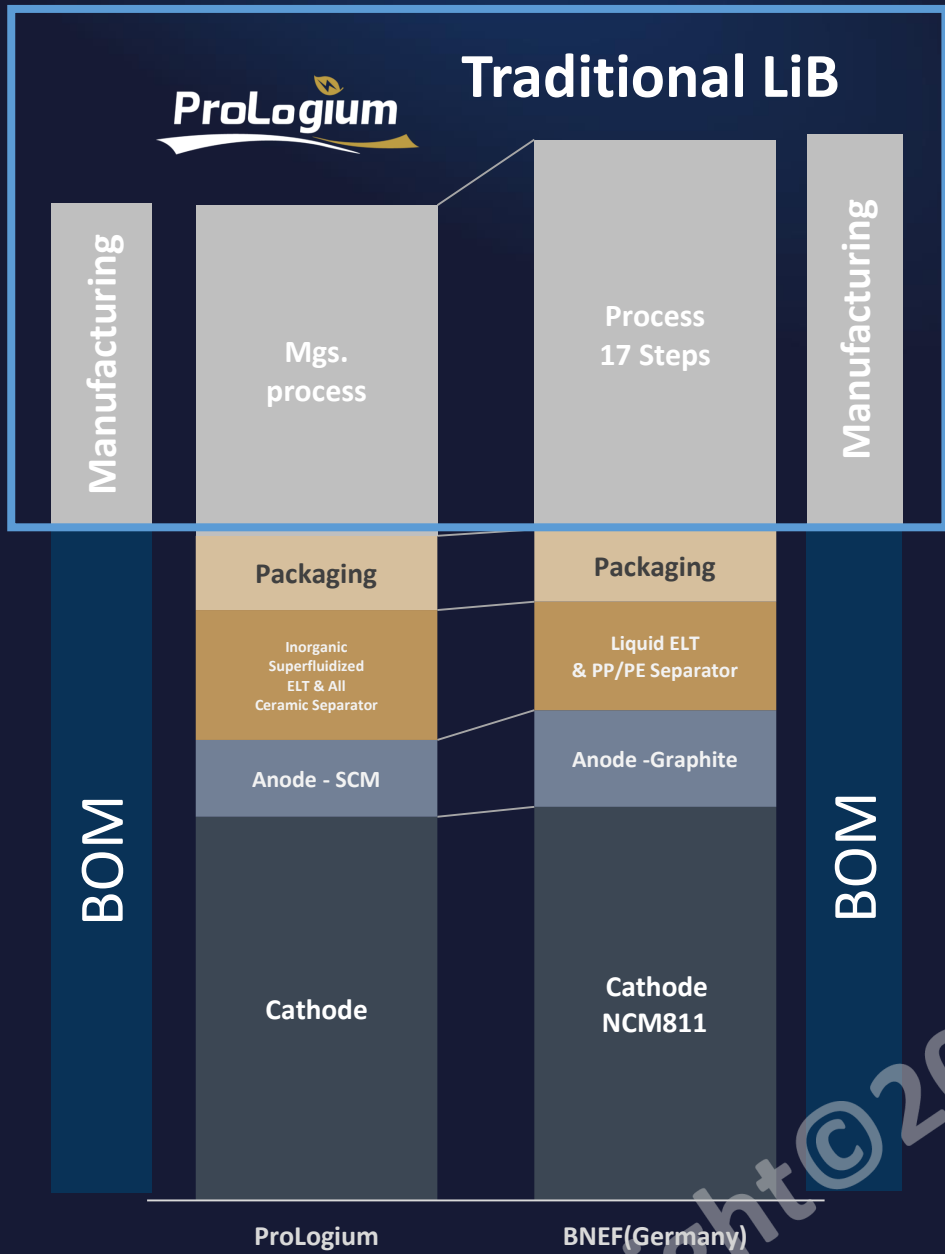
6. PRODUCIBILITY (LOW MANUFACTURING COST)

- Simple Is the Best for the Manufacturing cost
 - Simple process (Less Amount of Process)
 - Simple Environmental requirement (Lower requirement of Dry room)

MAIN REQUIREMENT OF NEXT GENERATION BATTERY – 6. PRODUCIBILITY

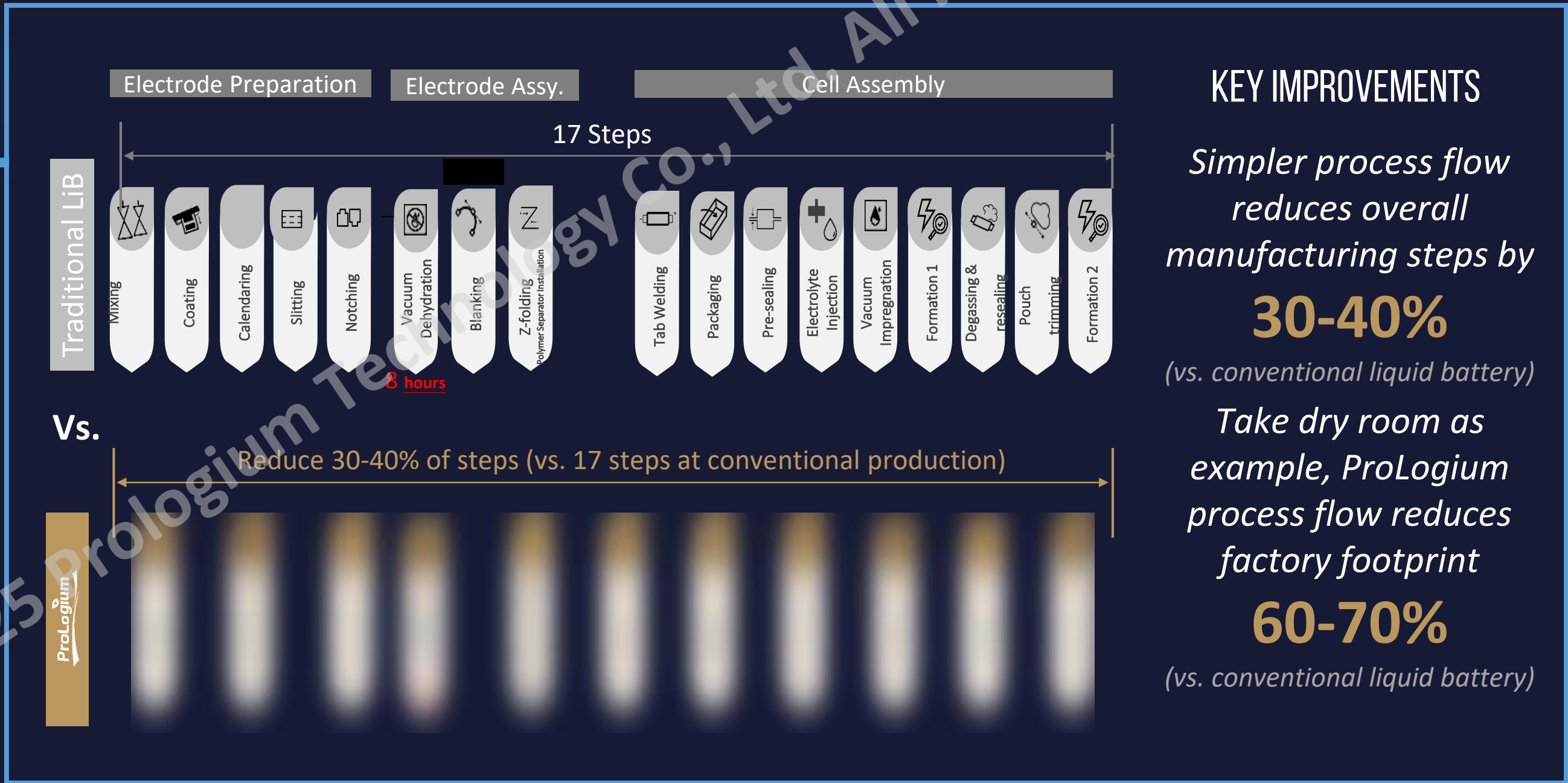
SIMPLE AND SCALABLE MANUFACTURING PROCESS ACHIEVES LOW COST AT SCALE

Battery Cell Cost Structure



※Refer to BNEF(Germany)

Manufacturing Process Comparison



KEY IMPROVEMENTS

Simpler process flow reduces overall manufacturing steps by

30-40%

(vs. conventional liquid battery)

Take dry room as example, ProLogium process flow reduces factory footprint

60-70%

(vs. conventional liquid battery)

“PRODUCEABLE TECH”

OUR MASS PRODUCTION LINES

Open a new chapter in lithium battery manufacturing @2024/Q3

*ProLogium Total
Shipped more than*

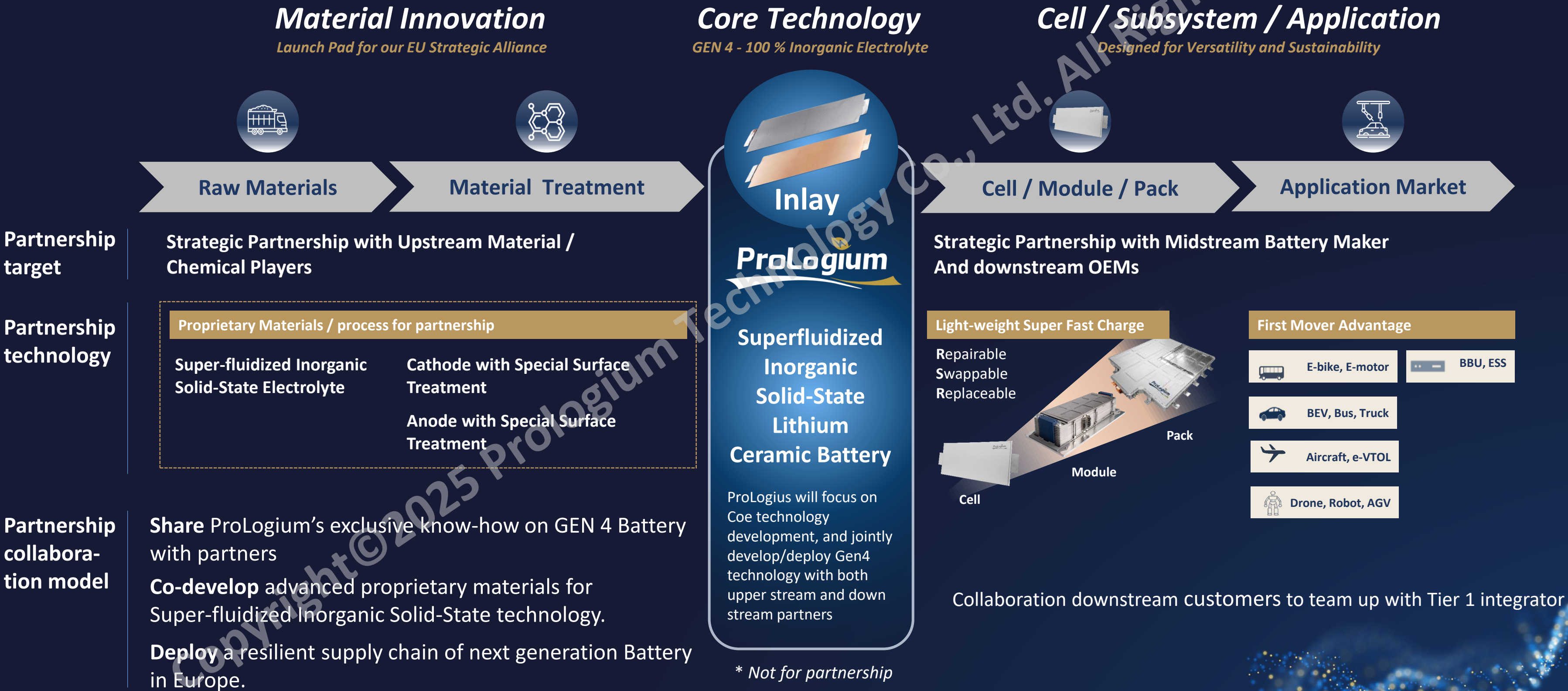
2.4M Cells to market

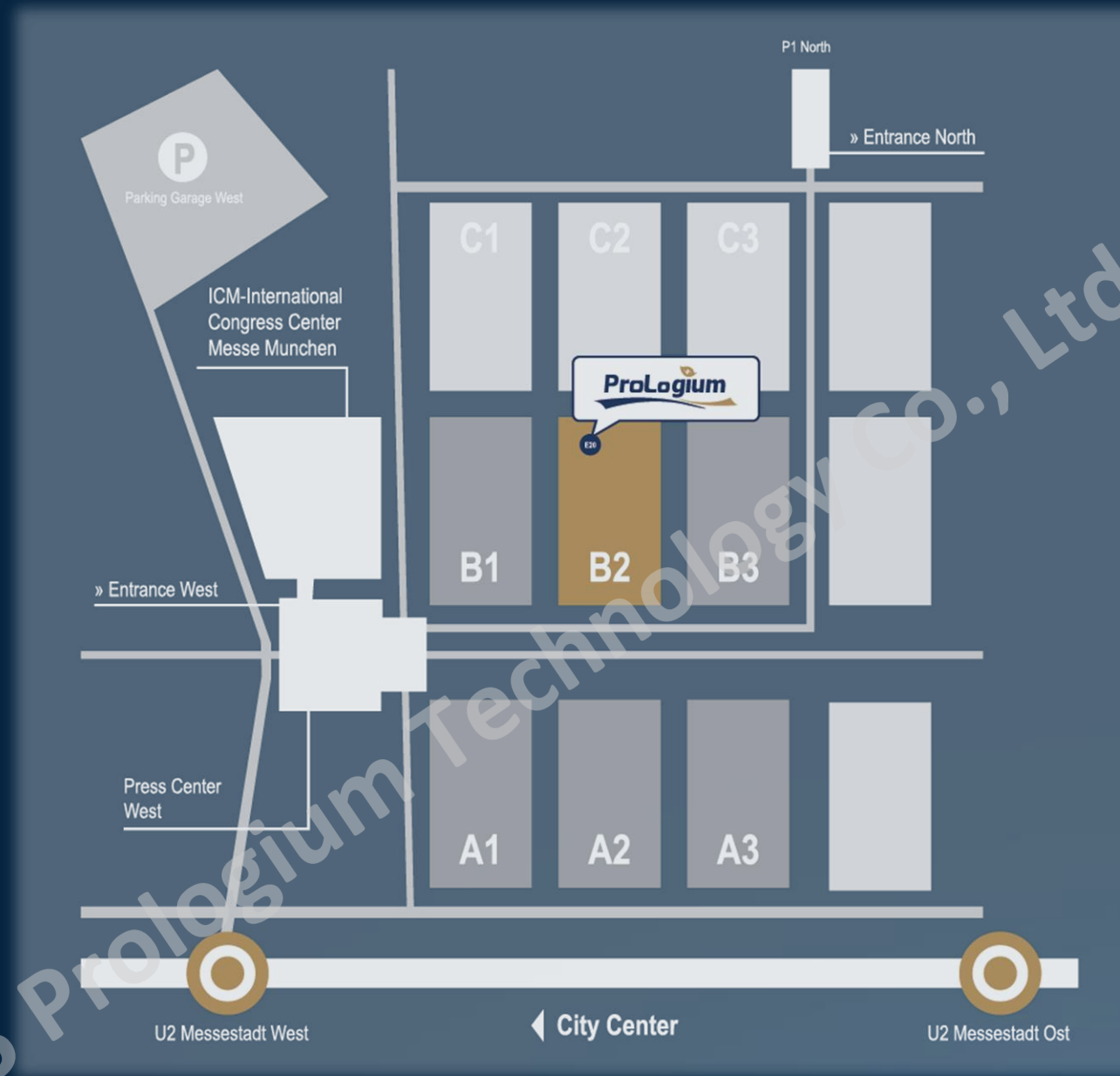
*We are shipping next-gen batteries right now
New Gwh Level Production line (G2) had already shipped 580k Cells from 2024/Q3 to 2025/Q2*

CREATING A NEW VALUE CHAIN IN EUROPE THROUGH A STRATEGIC ALLIANCE

PROLOGIUM IS BUILDING TECHNOLOGY PARTNERSHIP THROUGH UPPER AND LOWER STREAM IN VALUE CHAIN

Targeted partnership model





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