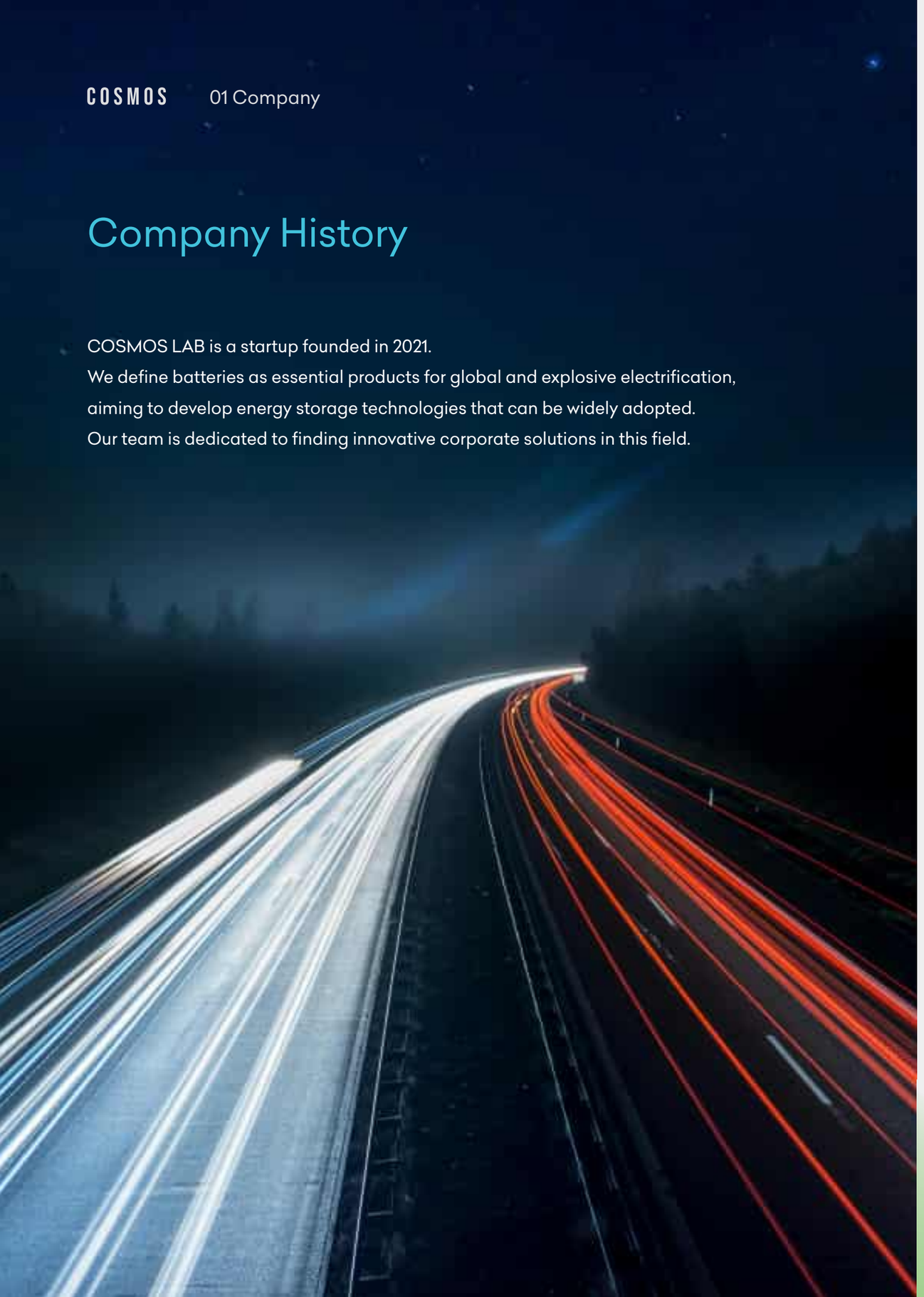
COSMOS LAB

Deep Dive, Great Impact

Contents

Company History

COSMOS LAB is a startup founded in 2021.
We define batteries as essential products for global and explosive electrification,
aiming to develop energy storage technologies that can be widely adopted.
Our team is dedicated to finding innovative corporate solutions in this field.



Investment Pre-A2

Accumulate

$4.6M

Patents

- PCT: 9
- Registration: 7
- Apply: 22
- Trademark: 2

40

Certified

- Certification of venture companie
- Certified as a social venture company
- ISO 9001, 14001, 45001 Certified
- Certification of a specialized material parts and equipment company
- Technical credit rating TI-2
- Innovative product certification (Public Procurement Service)
- Disaster safety product certification

Government R&D Projects

- Tech Incubator Program for Startup Korea
- Technology Innovation Energy Small and Medium Enterprises
- R&D Rediscovering Project
- Industry-Academic Cooperation R&D

Accumulate USD ($)

1.7M

Awards

- Minister of Trade, Industry and Energy Award
- Minister of Science and ICT Award
- Minister of Environment Award
- Minister of Public Administration and Security Award

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Company History

2021
Seed

- COSMOS LAB Established
- Seed investment attraction (Future Play)
- TIPS selected by the Ministry of SMEs and Startups
- Establishment of an affiliated research institute

2022~2023
Pre-A1

- Attracting Pre-A1 Investment
- Hyundai Motor's Chung Mong-Koo Foundation Fellow (H-On Dream)
- Selection of 12th LG Social Campus
- Selection of KT&G Sangsang Startup
- Small and Medium Venture Business Department Super Gap Startup Selection of 1,000+
- Participation in 2023 CES (Las Vegas)
- Participation in 2023 MWC (Barcelona)

2024
Pre-A2

- Attracting Pre-A2 Investment
- Top 100 Climate Tech Companies in India and the Pacific
- Acquiring Technical Credit Rating TI-2 Rating
- Participation in 2024 CES (Las Vegas)

Our Slogan

Deep Dive,
Great Impact

COSMOS LAB’s slogan contains the challenges and the value of innovation in sustainable energy solutions. “Deep Dive” expresses the in-depth technology of elite researchers and the authenticity of energy solutions, while “Great Impact” is positive for the global energy industry. It represents COSMOS LAB’s vision to convey its influence.

Our Story

The name ‘COSMOS LAB' embodies our vision toward a new universe of energy solutions. For a sustainable future where humanity and the environment coexist, we are going beyond traditional approaches that focus solely on efficiency and performance to create innovations in energy solutions.

With the electrification of industries and the explosive growth of the AI sector, global energy demand is rapidly increasing each year, and battery technology has become a fundamental value for future industries to ensure stable power supply. However, the lithium-ion batteries currently at the center of energy solutions have inherent limitations, including fire risks due to high flammability and environmental pollution during the production process. To fundamentally address these issues, we have developed a new energy solution based on aqueous electrolytes that improves environmental impact, efficiency, and economic viability

Our excellence lies in our members, the 'Deep Divers'
We are tenacious engineers who solve problems in the optimal way, and creative innovators who boldly challenge existing limitations.
To create positive changes for the environment and our daily lives, and to build a safer, more prosperous tomorrow, we never stop innovating and pushing boundaries.
We lead the innovation of energy solutions until our solutions seamlessly integrate into everyday life.

COSMOS LAB

COSMOS

Our Vision

Efficiency in the way energy is used worldwide

Our Mission

We seek and deliver optimal battery technologies that empower humanity to choose lifestyles that harmoniously coexist with nature.

Versatile Battery : Harmony of Diverse Values

Rejuvenating the Water Battery

01 **Safety** Water Electrolyte enabling 100%

It is completely **non-flammable** with zero fire risk.It uses water as an electrolyte and does not utilize any lithium minerals.

02 **Ecological Friendly**

We use **wood waste** and **low-carbon processes**.

03 **Temperature Tolerance**

It is designed to remain non-flammable and maintain consistent discharge energy even with temperature fluctuations.It aims to function as a **stand-alone battery cell** in various environments.

04 **Extremely Affordable**

We provide economical battery cells at less than $50 per kWh.

05 **Considering Globally, Producing Locally**

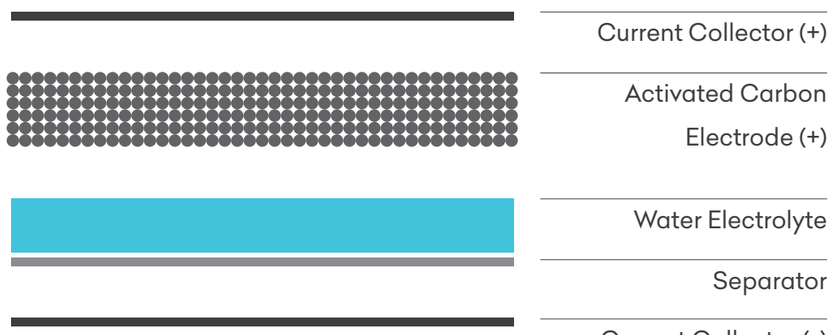
We use **zinc** and **bromine** as active materials.Our raw materials can be locally sourced and independently produced in each country.We aim for **glocalization** in battery production.

Solutions

Rejuvenating the Water Battery

- **Technology 1: Anode-less Zn Anode**
  High energy density Anodeless operation technology using current collector interface technology
- **Technology 2: Dry Electrode Technology**
  High Performance Cathode Manufacturing Technology with Improved Non-Energy in Dry State
- **Technology 3: Janus Separator**
  Application of Janus-type separator that improves the life of cathode and anode at the same time

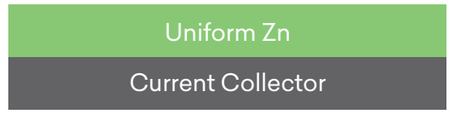
Water Battery Structure



Technology 1.

Anode-less Zn Anode

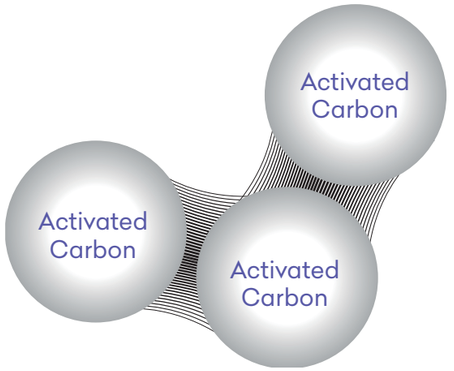
- Zinc anode operation technology functioning in an anode-free state.
- World-class anode interface design for enhanced energy density.



Technology 2.

Dry Electrode Technology

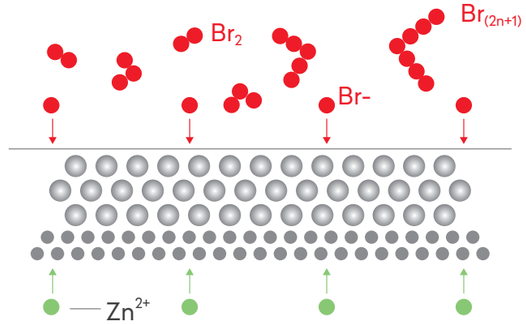
- High-capacity cathode technology that simultaneously implements capacitor and battery capacity
- Eco-friendly cathode active layer manufactured in a dry state



Technology 3.

Janus Separator

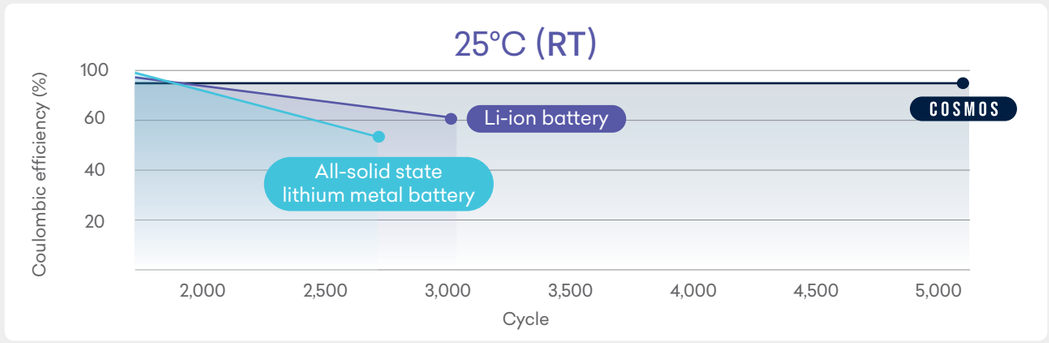
- Improving the simultaneous reversibility of zinc and bromine electrodes through **dual-structure separators.**

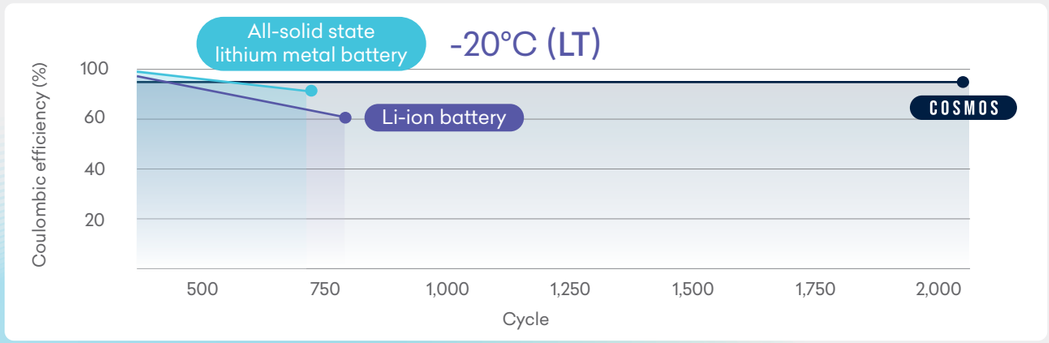


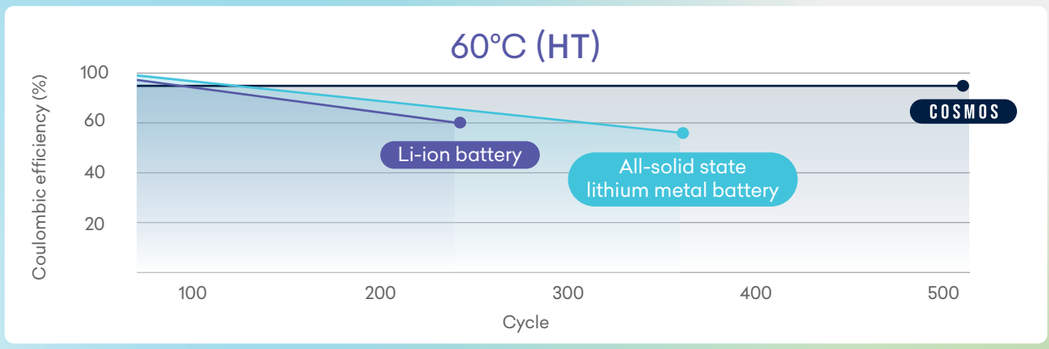
Solutions

Battery Performance Comparison

- It provides high safety and reversibility even in various temperature environments.
- Safety and performance are maintained even under extreme temperatures.







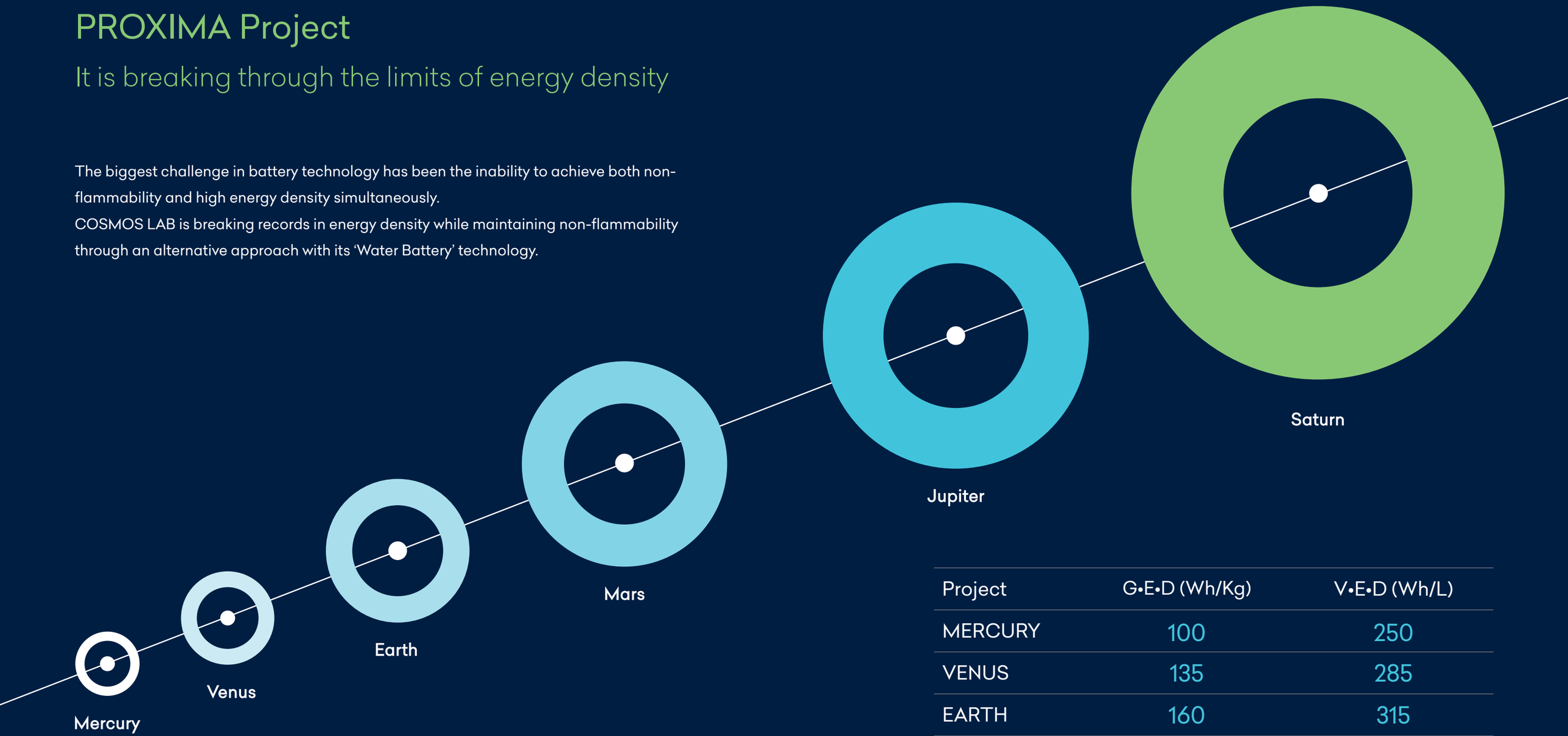
Manufacturing process free from carbon dioxide

COSMOS LAB's 'COEXIST' project aims to develop innovative battery production technologies focused on reducing carbon emissions.

PROXIMA Project

It is breaking through the limits of energy density

The biggest challenge in battery technology has been the inability to achieve both non-flammability and high energy density simultaneously.
COSMOS LAB is breaking records in energy density while maintaining non-flammability through an alternative approach with its ‘Water Battery’ technology.



Project	G•E•D (Wh/Kg)	V•E•D (Wh/L)
MERCURY	100	250
VENUS	135	285
EARTH	160	315
MARS	175	350
JUPITER	250	640
SATURN	Optimizing Energy Utilization Worldwide	

COEXIST Project

Low Carbon Manufacturing Program

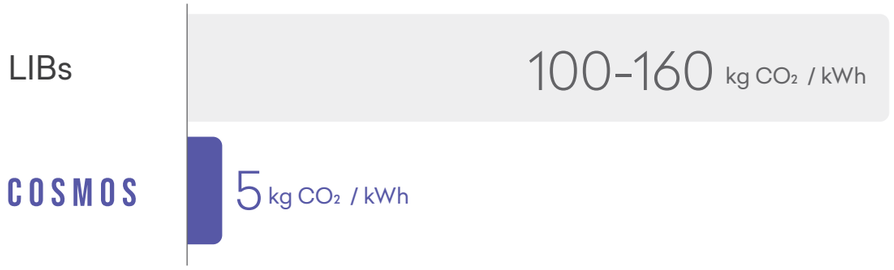
· We pursue technology that minimizes carbon emissions by over 90% compared to lithium-ion battery manufacturing processes (LCMP*).

*Low Carbon Manufacturing Program.

· Reduction of energy consumption and carbon emissions through process simplification.

· Internalization of dry electrode manufacturing equipment and technology.

Comparison of Carbon Dioxide Emissions in Manufacturing Processes



CO_2 Reduction

95%

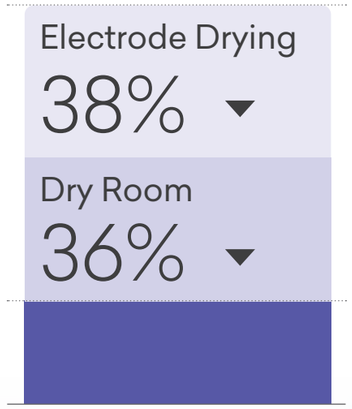
COEXIST Project

Dry Electrode Technology

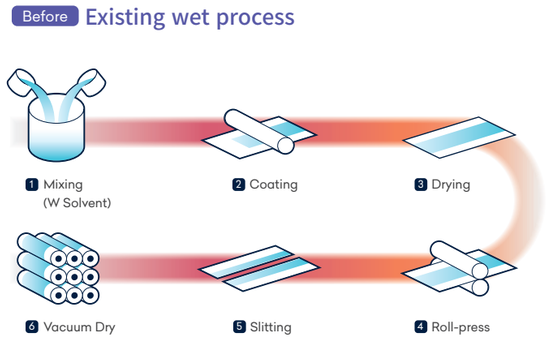
· We have minimized the use of dry rooms, electrode drying processes, and formation processes.

· By maximizing the unique advantages of water-based batteries and internalizing solvent-free dry electrode technology, we are expanding eco-friendly manufacturing techniques.

Energy Consumption (CO_2 Emission)



Lithium-ion Battery Contrast COSMOS Lab's Electrode Process Technology with Reduced Carbon Emission



COEXIST Project

Glocalization

- We manufacture batteries using only minerals that enable glocalization.
- By utilizing activated carbon derived from waste wood, we are transforming it into a high-value resource as a key material for electrodes.

Water Battery (COSMOS LAB)

4 Types

Zn	Br	C	Etc
30%	30%	30%	10%

- It is mined only in limited regions, causing environmental destruction and social conflicts due to excessive mining.
- Containing various chemicals, it has a low recycling rate and generates harmful substances during the disposal process.

Lithium-ion Battery

11 Types

Li	Ni	Mn	Co	Cu	Al
P	C	Cu	Si	Fe	

Insight

Only batteries designed with aqueous electrolytes can guarantee safety.

Non-Flammable

0% Fire, 100% Safety

A Safe Outcome

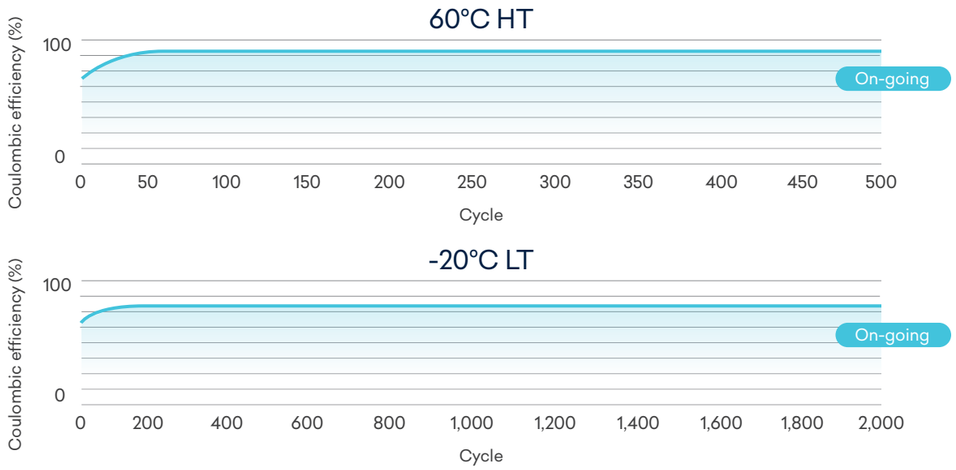
- No catastrophic battery of function loss.
- No failure hazards.
- No thermal runaway.
- No fire propagation or Battery ignition.
- The electrolyte actively suppresses fire during a rupture.
- Low risk for subsequent handling and disposal.

Performance

Differentiated Water Battery Performance

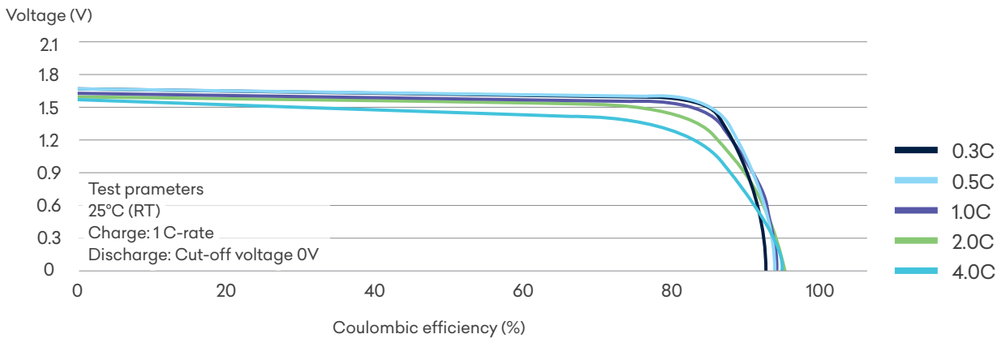
Data 1 Temperature-Tolerance

· No need for sophisticated pack design to maintain temperature.
· Non-flammability properties are preserved regardless of temperature.



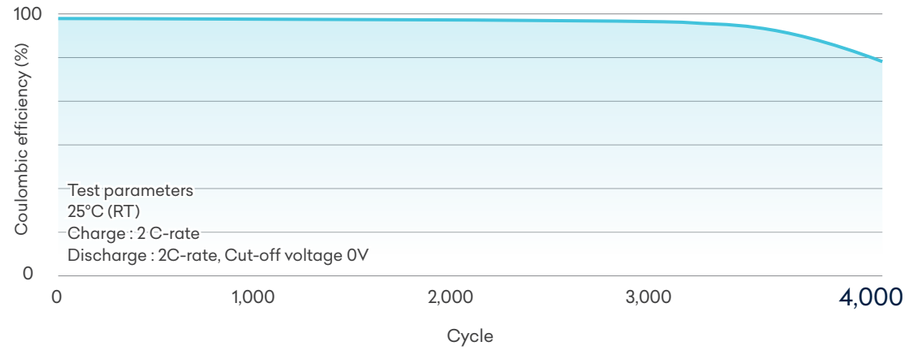
Data 2 Wide C-rate Capability

· Meets the power demands of diverse applications



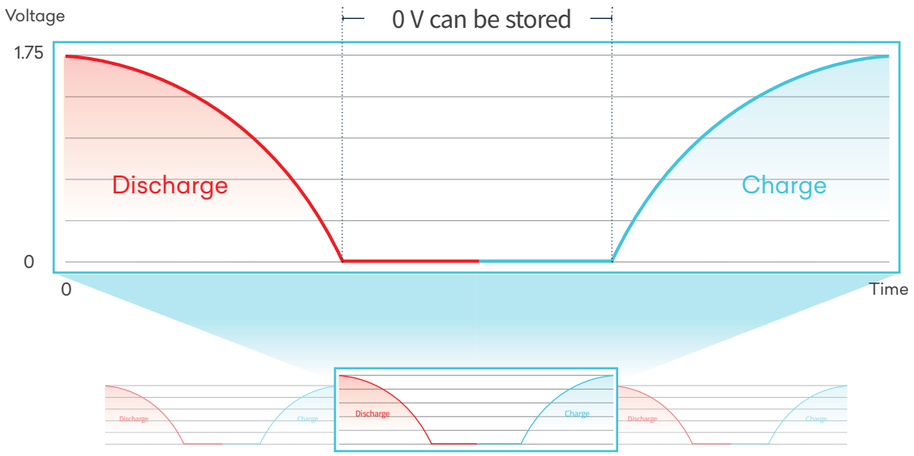
Data 3 Durable Cycle Longevity

· Offers non-flammability and a stable cycle life.



Data 4 Complete Discharge

· Performance recovery after 0 V storage
· Transportable in a 0 V state
· Zero electric shock risk in a 0 V state



Applications


Datacenter UPS

Utility ESS

Residential ESS

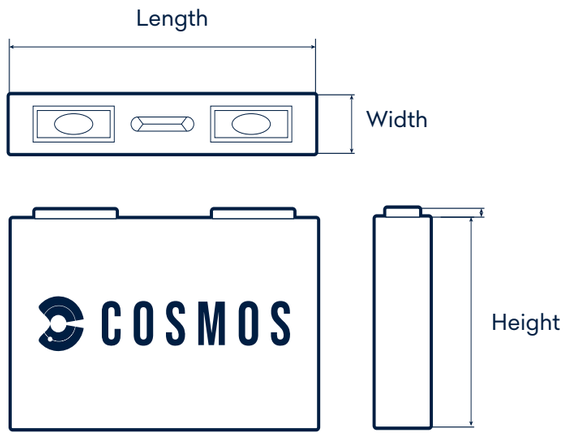
For Micro-Mobility

Product Portfolio

Specification

Product Sketch

Unit: mm



Product Line-up Specification

Model	Size (mm)			Min Capacity (Ah)
	Width	Length	Height	
Earth™ P6-15	26.5	148	95	15
Earth™ P6-30	45	173	115	30

Item		Specification	Remarks
Discharge capacity		15 Ah	Based on standard charge / discharge (1 C)
		30 Ah	
Nominal voltage		1.55 V	Average voltage@standard discharge
Standard charge	Current	0.5 - 1.0 C	Constant current
Max charge	Voltage	1.9 V	0 °C ≤ Working temperature ≤ 60°C
	Current	1.0 C	0°C ≤ Working temperature ≤ 60°C
		0.3 C	-20°C ≤ Working temperature ≤ 0°C
Standard discharge	Current	1.0 C	Constant current
	Cutoff	0 V	
Max discharge	Current	4.0 C	0°C ≤ Working temperature ≤ 60°C
		1.0 C	-20°C ≤ Working temperature ≤ 0°C

Applications

Electricity Meter

Sensor

Smart Watch

ESL (Electric Shelf Label)

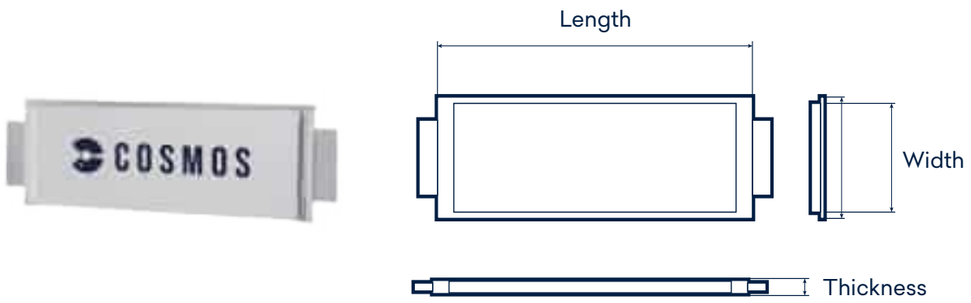
Toy (Drone)

Product Portfolio

Specification

Product Sketch

Unit: mm



Product Line-up Specification

Model	Size (mm)			Min Capacity (mAh)
	Width	Length	Thickness	
Earth™ P6-100	The product size can be customized.			100
Earth™ P6-200				200
Earth™ P6-300				300
Earth™ P6-500				500
Earth™ P6-1000				1,000

Item		Specification	Remarks
Discharge capacity		100 mAh	Based on standard charge / discharge (1 C)
		200 mAh	
		300 mAh	
		500 mAh	
		1,000 mAh	
Nominal voltage		1.6 V	Average voltage@standard disccharge
Standard charge	Current	0.5 ~ 1.0 C	Constant current
Max charge	Voltage	1.9 V	0°C ≤ Working temperature ≤60°C
	Current	1.0 C	0°C ≤ Working temperature ≤ 60°C
		0.3 C	-20°C ≤ Working temperature ≤ 0°C
Standard discharge	Current	1.0 C	Constant current
		0 V	
Max discharge	Current	4.0 C	0°C ≤ Working temperature ≤ 60°C
		1.0 C	-20°C ≤ Working temperature ≤ 0°C

COSMOS

Deep Dive, Great Impact

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