TROY TECHNICAL

ALL-SOLID-STATE BATTERIES

WEEKLY REPORT

November 14 - November 20, 2026 | Issue 2026-W46

Interface stability, manufacturability, safety and automotive qualification

15	10
ANALYZED ARTICLES	PRIORITY THEMES

Issued 2026-11-20 | English edition | fixed approved cover artwork



All-Solid-State Batteries: the boundary moved from isolated claims to qualification evidence

15 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | ELECTROLYTE

Solid-State Batteries: GWh-Scale Production and 2027 Roadmap

Gotion High-tech has launched a 2 GWh all-solid-state mass production line following a 90% yield rate on its 0.2 GWh pilot line.

SIGNAL 02 | ELECTRODE INTERFACE

Helios Horizon: Solid-state battery aircraft specs and roadmap

Helios Horizon has demonstrated the viability of solid-state batteries for high-altitude flight, reaching 17,200 feet while using only 36% of battery power.

SIGNAL 03 | CELL PROCESS

QuantumScape Osprey: All-Solid-State Battery Platform Specs

QuantumScape has introduced Osprey, an open all-solid-state battery platform featuring a sulfide-based cathode that cycles 1,000 times under one atmosphere of pressure.

SIGNAL 04 | VALIDATION

Helios Horizon: Solid-State Battery Flight Tests and 2027 Roadmap

Helios Horizon achieved a claimed record altitude of 17,200 feet using a modified electric Pipistrel Taurus powered by solid-state batteries.

DECISION

Focus this week's management attention on interface stability, manufacturability, safety and automotive qualification. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: compare cell evidence under practical loading, pressure, temperature and cycle conditions.
2. Suppliers: show powder, interface and process consistency together with scale and cost.
3. Executives: track loading, pressure, interface resistance, yield, safety, capacity and timing.

EVIDENCE DISCIPLINE

FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Numbers and evidence anchors that require conditions

2 GW
A10

SOURCE-BOUND CONDITION
Gotion High-tech has launched a 2 GWh all-solid-state mass production line following a 90% yield rate on its 0.2 GWh pilot line.

36%
A15

SOURCE-BOUND CONDITION
Helios Horizon has demonstrated the viability of solid-state batteries for high-altitude flight, reaching 17,200 feet while using only 36% of battery power.

000 time s
A05

SOURCE-BOUND CONDITION
QuantumScape has introduced Osprey, an open all-solid-state battery platform featuring a sulfide-based cathode that cycles 1,000 times under one atmosphere of pressure.

82.3%
A09

SOURCE-BOUND CONDITION
The coating increases critical current density to 3.5 mA cm-2 and maintains 82.3% capacity after 300 cycles.

450 W
A06

SOURCE-BOUND CONDITION
Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications.

HOW TO USE THESE NUMBERS
Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.

1

Electrolyte

P01/P06

Gotion High-tech has launched a 2 GWh all-solid-state mass production line following a 90% yield rate on its 0.2 GWh pilot.

2

Electrode interface

P02/P07

Helios Horizon has demonstrated the viability of solid-state batteries for high-altitude flight, reaching 17,200 feet while.

3

Cell process

P03/P08

QuantumScape has introduced Osprey, an open all-solid-state battery platform featuring a sulfide-based cathode that cycles.

4

Validation

P04/P09

Helios Horizon achieved a claimed record altitude of 17,200 feet using a modified electric Pipistrel Taurus powered by.

5

Vehicle deployment

P05/P10

Enli Power has opened a dedicated R&D center and pilot production base in Nanjing's Jiangbei New Area to accelerate the.

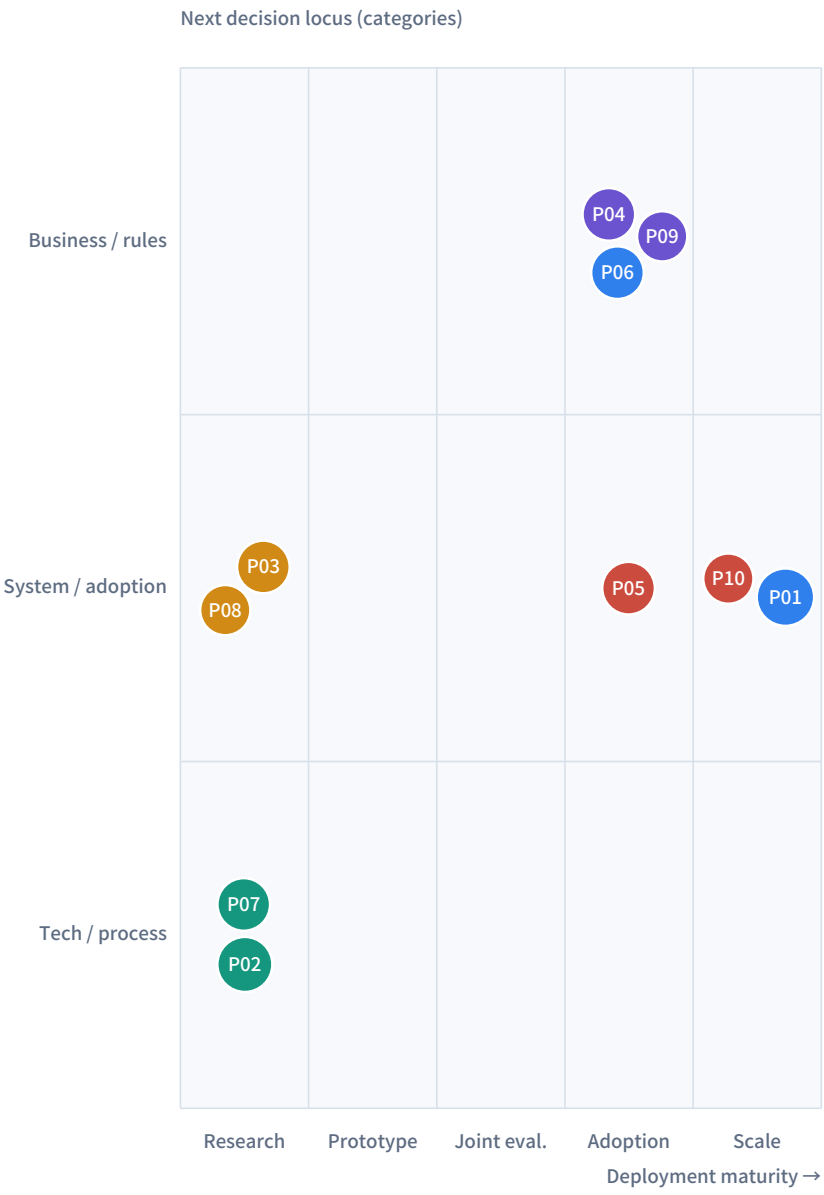
EVIDENCE REQUIRED AT EACH HANDOFF

Electrolyte to Electrode interface	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck loading, pressure, interface resistance, yield, safety, capacity and timing.
Electrode interface to Cell process	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck loading, pressure, interface resistance, yield, safety, capacity and timing.
Cell process to Validation	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck loading, pressure, interface resistance, yield, safety, capacity and timing.
Validation to Vehicle deployment	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck loading, pressure, interface resistance, yield, safety, capacity and timing.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented loading, pressure, interface resistance, yield, safety, capacity and timing.

Priority map: maturity and next decision locus



P01	Solid-State Batteries: GWh-Scale Production and 2027 Roadmap System / adoption | cue: Scale Production
P02	Helios Horizon: Solid-state battery aircraft specs and roadmap Tech / process | cue: no system/business cue
P03	QuantumScape Osprey: All-Solid-State Battery Platform Specs System / adoption | cue: Platform
P04	Helios Horizon: Solid-State Battery Flight Tests and 2027 Roadmap Business / rules | cue: capacity
P05	Enli Power: All-Solid-State Battery R&D and Pilot Base Specs System / adoption | cue: Pilot
P06	Solid-State Batteries: Xidian University's 12 μm Coating Specs Business / rules | cue: capacity
P07	Factorial Lithium-Metal Cells: 450 Wh/kg Aerospace Specs Tech / process | cue: no system/business cue
P08	ProLogium Gen4: Sfie electrolyte specs and charging roadmap System / adoption | cue: system
P09	Hyundai-Kia Dry Cathode Patent: All-Solid-State Battery Specs Business / rules | cue: capacity
P10	Hitachi and Hitachi High-Tech: All-Solid-State Battery Quality Analysis System / adoption | cue: mass production

REPRODUCIBLE POSITIONING RULE

Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01 Solid-State Batteries: GWh-Scale Production and 2027 Roadmap

A10 | Electrolyte | Scale-up

2026-11-19

FACT

Gotion High-tech has launched a 2 GWh all-solid-state mass production line following a 90% yield rate on its 0.2 GWh pilot line. While material prices for sulphide electrolytes and lithium-rich manganese-based cathodes are under pressure, validation is expanding toward 20 Ah cells and diverse energy storage scenarios.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P01.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 22/25 | MATURITY 5/5 | DECISION LOCUS: SYSTEM / ADOPTION

P02 Helios Horizon: Solid-state battery aircraft specs and roadmap

A15 | Electrode interface | Research

2026-11-20

FACT

Helios Horizon has demonstrated the viability of solid-state batteries for high-altitude flight, reaching 17,200 feet while using only 36% of battery power. This achievement breaks three world records for electric aircraft under 500 kilograms, signaling a shift toward sustainable stratospheric aviation.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P02.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 21/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03 QuantumScape Osprey: All-Solid-State Battery Platform Specs

A05 | Cell process | Research

2026-11-14

FACT

QuantumScape has introduced Osprey, an open all-solid-state battery platform featuring a sulfide-based cathode that cycles 1,000 times under one atmosphere of pressure. The platform achieves a 10% to 80% charge in five minutes and projected energy densities up to ~1,100 Wh/L. This development addresses critical pressure and stability limitations previously hindering the commercial viability of sulfide-based solid-state batteries for automotive use.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P03.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P04 Helios Horizon: Solid-State Battery Flight Tests and 2027 Roadmap

A08 | Validation | Product adoption

2026-11-19

FACT

Helios Horizon achieved a claimed record altitude of 17,200 feet using a modified electric Pipistrel Taurus powered by solid-state batteries. The flight demonstrated a significant increase in energy density over lithium-ion cells, utilizing only 36% of battery capacity to reach the peak. This progress supports a long-term goal of reaching 80,000 feet for stratospheric tourism and sensing.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P04.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 20/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05 Enli Power: All-Solid-State Battery R&D and Pilot Base Specs

A07 | Vehicle deployment | Product adoption

2026-11-19

FACT

Enli Power has opened a dedicated R&D center and pilot production base in Nanjing's Jiangbei New Area to accelerate the transition of all-solid-state batteries to mass delivery. The company introduced new quasi-solid-state and all-solid-state cells targeting low-altitude economy and extreme industrial environments.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P05.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 20/25 | MATURITY 4/5 | DECISION LOCUS: SYSTEM / ADOPTION

P06 Solid-State Batteries: Xidian University's 12 μm Coating Specs

A09 | Electrolyte | Product adoption

2026-11-14

FACT

Researchers at Xidian University have developed a 12 μm liquid-applied protective layer that suppresses dendrite growth in lithium-metal batteries. The coating increases critical current density to 3.5 mA cm-2 and maintains 82.3% capacity after 300 cycles. This approach enables the use of high-capacity lithium-metal anodes in solid-state batteries without requiring expensive vacuum chambers.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P06.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 20/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07 Factorial Lithium-Metal Cells: 450 Wh/kg Aerospace Specs

A06 | Electrode interface | Research

2026-11-17

FACT

Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications. This milestone exceeds the company's year-end target and surpasses the performance of its automotive-grade FEST technology.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P07.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

P08 ProLogium Gen4: Sfie electrolyte specs and charging roadmap

A14 | Cell process | Research

2026-11-19

FACT

ProLogium is developing Gen4 battery technology using a superfluidised inorganic electrolyte (Sfie) that enables a charge from 5% to 80% in approximately 6 minutes. The system utilizes a Dynamic Coordination Network to optimize ion transport and a non-Newtonian material structure to maintain electrode contact. These advancements aim to bridge the gap between liquid and solid-state batteries for automotive applications.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P08.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09 Hyundai-Kia Dry Cathode Patent: All-Solid-State Battery Specs

A13 | Validation | Product adoption

2026-11-19

FACT

Hyundai Motor and Kia have secured a U.S. patent for a dry cathode manufacturing process for all-solid-state batteries, achieving a discharge capacity approximately 2.3 times higher than wet methods. The technology optimizes active material content up to 87% to enhance energy density while reducing internal resistance by 85%.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P09.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 19/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

P10 Hitachi and Hitachi High-Tech: All-Solid-State Battery Quality Analysis

A01 | Vehicle deployment | Scale-up

2026-11-20

FACT

Hitachi and Hitachi High-Tech have developed analysis and evaluation technology to determine how metallic contaminants affect the performance of all-solid-state batteries. The research identifies specific risks associated with copper contaminants in the cathode, providing a framework for quality control during mass production.

WHY IT MATTERS

The decision relevance is interface stability, manufacturability, safety and automotive qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, show powder, interface and process consistency together with scale and cost.

ACTION

Within 30 days, compare cell evidence under practical loading, pressure, temperature and cycle conditions; record the evidence and owner against P10.

UNKNOWN

Still unproven or incompletely stated: loading, pressure, interface resistance, yield, safety, capacity and timing.

EDITORIAL SCORE 19/25 | MATURITY 5/5 | DECISION LOCUS: SYSTEM / ADOPTION

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW | 0-30 DAYS	NEXT | 1-12 MONTHS	LATER | 1-5 YEARS
Operating companies	compare cell evidence under practical loading, pressure, temperature and cycle conditions	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	show powder, interface and process consistency together with scale and cost	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map loading, pressure, interface resistance, yield, safety, capacity and timing.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW | 0-30 DAYS
Evidence ledger
Owner: Strategy + quality
Deliverable: claim, source, condition, owner

NOW | 0-30 DAYS
Risk screen
Owner: Procurement + legal
Deliverable: unknowns, alternatives, stop

NEXT | 1-12 MONTHS
Joint qualification
Owner: R&D + supplier
Deliverable: process window and failure data

NEXT | 1-12 MONTHS
Commercial gate
Owner: Business + finance
Deliverable: unit economics and capacity

LATER | 1-5 YEARS
Platform strategy
Owner: Executive team
Deliverable: portfolio and interface roadmap

LATER | 1-5 YEARS
Service layer
Owner: Operations + channel
Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	**Quality**	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	**R&D**	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	**Business**	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	**Operations**	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-15

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	Hitachi and Hitachi High-Tech: All-Solid-State Battery Quality Analysis	https://www.nikkei.com/article/DGXZRSP715599_Q6A121C2000000/
A02	Lithium Metal Anodes: Mask-Assisted Printing for 504 Wh/kg EVs	https://news.qq.com/rain/a/20261118A07GNH00
A03	GS Yuasa: Sulfide Solid Electrolyte Moisture Degradation Mechanism	https://newsroom.gs-yuasa.com/news-release/449
A04	Solid Polymer Electrolytes: Peking University's Decoupled Ion Transport Framework	https://www.miragenews.com/peking-university-scientists-advance-solid-1777133/
A05	QuantumScape Osprey: All-Solid-State Battery Platform Specs	https://batteriesnews.com/quantumscape-expands-commercial-roadmap-with-osprey-the-open-all-solid-state-platform-for-battery-development/
A06	Factorial Lithium-Metal Cells: 450 Wh/kg Aerospace Specs	https://www.bestmag.co.uk/factorial-450-wh-kg-lithium-metal-aerospace/
A07	Enli Power: All-Solid-State Battery R&D and Pilot Base Specs	https://www.itdcw.com/news/qiye/11191592L2026.html
A08	Helios Horizon: Solid-State Battery Flight Tests and 2027 Roadmap	https://www.ainonline.com/aviation-news/futureflight/2026-11-19/helios-horizon-gains-altitude-solid-state-batteries
A09	Solid-State Batteries: Xidian University's 12 μm Coating Specs	https://www.basicthinking.de/blog/2026/11/14/festkoerperbatterie/
A10	Solid-State Batteries: GWh-Scale Production and 2027 Roadmap	https://news.metal.com/newscontent/EJ5YYSHMZ7WU36AEGH3DJWZ4HHLZNKFWDW32CDI-solid-state-battery-gwh-scale-production-line-launched-sulphide-and-lithium-rich-manganese-based-prices-under-pressure
A11	Toyota Electrification Roadmap: All-Solid-State Battery 2028 Timeline	https://tw.news.yahoo.com/toyota-%E6%8F%AD%E7%A4%BA%E6%96%B0%E4%B8%96%E4%BB%A3%E9%9B%BB%E5%8B%95%E5%8C%96%E6%8A%80%E8%A1%93-%E5%85%A8%E5%9B%BA%E6%85%8B%E9%9B%BB%E6%B1%A0-2028-%E5%B9%B4%E5%B0%8E%E5%85%A5%E9%87%8F%E7%94%A2%E8%BB%8A-021023265.html
A12	Hitachi All-Solid-State Battery: Metal Contaminant Analysis Tech	https://news.dellows.jp/1294514/
A13	Hyundai-Kia Dry Cathode Patent: All-Solid-State Battery Specs	https://www.theguru.co.kr/news/article.html?no=109949
A14	ProLogium Gen4: Sfie electrolyte specs and charging roadmap	https://www.repubblica.it/en/motoring/2026/11/19/news/electric_cars_the_battery_that_recharges_in_6_minutes_is_here_here_s_how_it_works-425735583/
A15	Helios Horizon: Solid-state battery aircraft specs and roadmap	https://interestingengineering.com/innovation/electric-aircraft-reaches-17200-feet

SolidStateBattery — Selected Articles

Date: 2026-11-21

Articles: 15

Table of Contents

#01 Hitachi and Hitachi High-Tech: All-Solid-State Battery Quality Analysis

#02 Lithium Metal Anodes: Mask-Assisted Printing for 504 Wh/kg EVs

#03 GS Yuasa: Sulfide Solid Electrolyte Moisture Degradation Mechanism

#04 Solid Polymer Electrolytes: Peking University's Decoupled Ion Transport Framework

#05 QuantumScape Osprey: All-Solid-State Battery Platform Specs

#06 Factorial Lithium-Metal Cells: 450 Wh/kg Aerospace Specs

#07 Enli Power: All-Solid-State Battery R&D and Pilot Base Specs

#08 Helios Horizon: Solid-State Battery Flight Tests and 2027 Roadmap

#09 Solid-State Batteries: Xidian University's 12 μm Coating Specs

#10 Solid-State Batteries: GWh-Scale Production and 2027 Roadmap

#11 Toyota Electrification Roadmap: All-Solid-State Battery 2028 Timeline

#12 Hitachi All-Solid-State Battery: Metal Contaminant Analysis Tech

#13 Hyundai-Kia Dry Cathode Patent: All-Solid-State Battery Specs

#14 ProLogium Gen4: Sfie electrolyte specs and charging roadmap

#15 Helios Horizon: Solid-state battery aircraft specs and roadmap

#01 Hitachi and Hitachi High-Tech: All-Solid-State Battery Quality Analysis

Published November 20, 2026　日本経済新聞（プレスリリース）　Japan



OVERVIEW

Hitachi and Hitachi High-Tech have developed analysis and evaluation technology to determine how metallic contaminants affect the performance of all-solid-state batteries. The research identifies specific risks associated with copper contaminants in the cathode, providing a framework for quality control during mass production.

IN DEPTH

Key Findings

Hitachi and Hitachi High-Tech have developed a technical process to analyze the impact of metallic contaminants on all-solid-state battery performance. Using a specific material configuration consisting of a nickel-manganese-cobalt acid lithium cathode, a sulfide-based solid electrolyte, and a lithium alloy anode, the companies confirmed that copper present in the cathode at certain sizes increases the risk of internal short circuits.

Technical Details

The development integrates Hitachi High-Tech's advanced analytical instrumentation—specifically X-ray analysis equipment and electron microscopes—with Hitachi's expertise in battery prototyping and analysis. This combination allows for the precise evaluation of the following variables regarding metallic contaminants:

- Contaminant type
- Contaminant size
- Position of contamination within the battery

Additionally, the companies have established a specialized disassembly and pretreatment process designed to allow analytical instruments to evaluate the exact locations where short circuits occur.

Background and Context

The push toward carbon neutrality and the expansion of electric mobility have accelerated the development of all-solid-state batteries due to their high energy density and safety. However, because these batteries utilize novel materials and structures, stabilizing manufacturing conditions is critical. Specifically, minute metallic contaminants introduced during the production process can vary in their impact on battery performance depending on their characteristics, necessitating a standardized method to identify which items must be prioritized during quality inspections.

Significance and Outlook

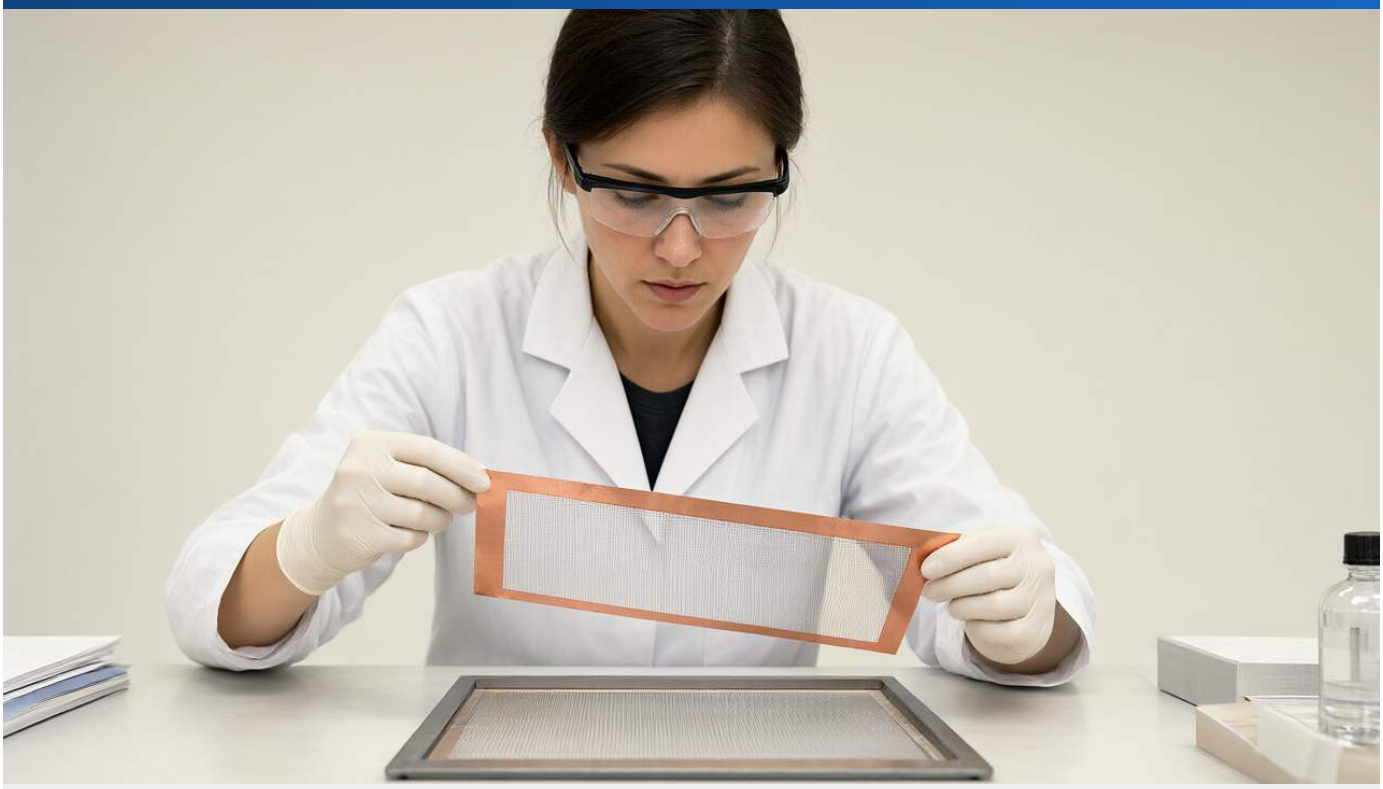
This technology enables manufacturers to organize and prioritize the specific contaminant conditions and inspection items required for mass production. Moving forward, Hitachi and Hitachi High-Tech intend to collaborate with battery-related companies to verify the applicability of this technology. By accumulating data on contaminant conditions and verification items, the companies intend to stabilize quality during the initial ramp-up of all-solid-state battery mass production.

Source: https://www.nikkei.com/article/DGXZRSP715599_Q6A121C2000000/

Collected: November 21, 2026 | Automated Research System (AI)

#02 Lithium Metal Anodes: Mask-Assisted Printing for 504 Wh/kg EVs

Published November 18, 2026 腾讯新闻（知新了了） China



OVERVIEW

Researchers have developed a mask-assisted screen printing method to create ultra-thin lithium micro-disk arrays on copper foil with equivalent thicknesses as low as 10 μm. This technique enables energy densities of 504 Wh/kg when paired with nickel-rich cathodes, significantly reducing battery weight.

IN DEPTH

Key Findings

A research team led by the Shenzhen Institute of Advanced Technology, with participation from Guilin University of Technology and Southern University of Science and Technology, has developed a method to produce ultra-thin lithium metal anodes. The most significant result is the achievement of a potential energy density of 504 Wh/kg and a volumetric energy density of 1,071 Wh/L when using a 20 μm lithium anode paired with a high-loading nickel-rich cathode.

Technical Details

The team utilized a mask-assisted screen printing process to deposit lithium micro-disks onto copper surfaces, overcoming the tendency of molten lithium to form droplets rather than uniform layers. By adjusting size, spacing, and thickness, the researchers produced lithium arrays with equivalent thicknesses of 10, 20, and 28 μm. The scalability of this process was demonstrated on copper sheets measuring 30 $\times$ 10 centimeters.

To mitigate lithium loss and the growth of dendrites during cycling, the researchers added a magnesium-based compound, Mg(TFSI)2, to the molten lithium. This additive reacts to form a protective layer consisting of lithium fluoride, lithium nitride, lithium sulfide, and lithium-magnesium alloys, which stabilizes the anode interface.

Background & Context

Lithium metal is highly desirable for electric vehicle (EV) batteries due to its high energy storage capacity without adding significant weight. However, traditional lithium foils are often too thick, which increases overall battery weight and lowers the energy density per unit of mass. The primary challenge in thinning these foils is the poor wetting of molten lithium on copper.

Significance & Outlook

In laboratory tests using lithium iron phosphate (LFP) cathodes, the modified 10 μm anode maintained a specific capacity exceeding 130 mAh/g over 260 cycles with a Coulombic efficiency over 99.8%. The researchers also noted that this printing method shows promise for solid-state battery configurations using gel electrolytes. This advancement could lead to more efficient batteries for EVs, portable electronics, and energy storage systems. The study was published in the journal *Nano-Micro Letters*.

Source: https://news.qq.com/rain/a/20261118A07GNH00

Collected: November 21, 2026 | Automated Research System (AI)

#03 GS Yuasa: Sulfide Solid Electrolyte Moisture Degradation Mechanism

Published November 17, 2026　GSユアサ ニュースルーム　Japan



OVERVIEW

GS Yuasa and Osaka Public University have identified the mechanism causing ionic conductivity loss in sulfide solid electrolytes when exposed to moisture in the air. This discovery enables the development of more water-resistant electrolytes and optimized manufacturing processes for all-solid-state batteries.

IN DEPTH

Key Findings

GS Yuasa, in collaboration with the Inorganic Chemistry Research Group at Osaka Public University's Graduate School of Engineering, has elucidated the mechanism behind the decline in ionic conductivity of sulfide solid electrolytes when exposed to atmospheric moisture. The research specifically reveals that the increase of moisture within the interior of the solid electrolyte leads to a decrease in ionic conductivity.

Technical Details

The research team focused on changes in the spectral shape of solid Nuclear Magnetic Resonance (NMR) when electrolytes were exposed to moisture. To isolate the variables, the team employed the following methodology:

- Used computational chemistry to simulate solid NMR spectral shapes based on modeled electrolyte structures containing moisture.
- Compared these simulations with experimental spectral data to establish a method for separately evaluating the amount of moisture present on the surface versus the interior of the solid electrolyte.
- Correlated the internal moisture levels with the resulting drop in ionic conductivity.

Background and Context

Sulfide solid electrolytes are valued for their high ionic conductivity but are susceptible to the generation of toxic hydrogen sulfide gas and conductivity loss when exposed to moisture. While GS Yuasa had previously succeeded in reducing hydrogen sulfide emissions by optimizing electrolyte composition, the specific mechanism causing the drop in ionic conductivity remained unknown until this study.

This research was conducted as part of the "Advanced Solid-State Battery Development" project, supported by the NEDO Green Innovation Fund (JPNP21026).

Significance and Outlook

The clarification of this degradation mechanism facilitates the development of sulfide solid electrolytes with higher water resistance and the creation of manufacturing processes that suppress electrolyte degradation. GS Yuasa has completed the installation of large-scale battery prototyping equipment at its Kyoto headquarters and will now apply these findings to develop manufacturing processes for full-scale operation.

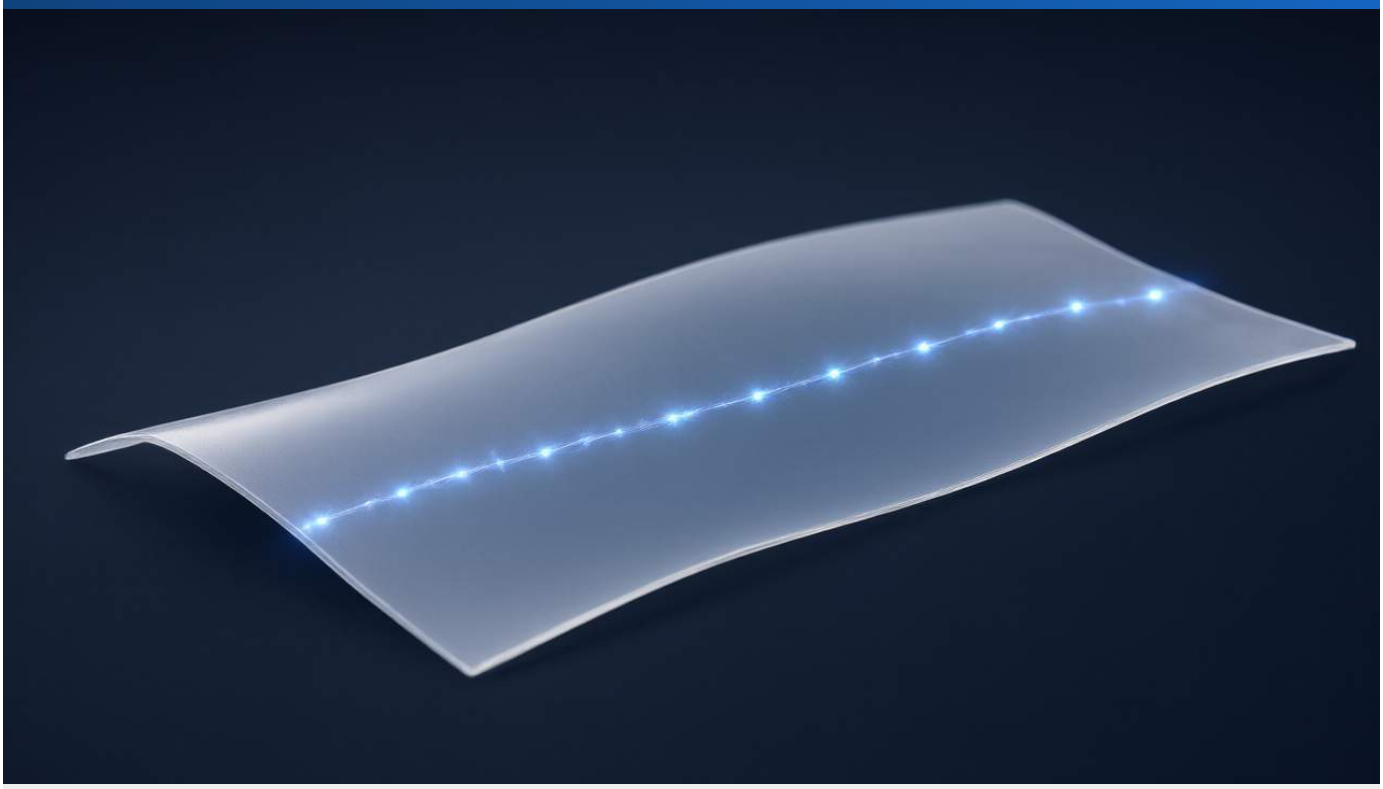
The results are scheduled for presentation at the 67th Battery Discussion Meeting (November 24–26, 2026) and the 52nd Solid Ionics Discussion Meeting (December 14–16, 2026).

Source: https://newsroom.gs-yuasa.com/news-release/449

Collected: November 21, 2026 | Automated Research System (AI)

#04 Solid Polymer Electrolytes: Peking University's Decoupled Ion Transport Framework

Published November 14, 2026 Mirage News China



OVERVIEW

Researchers at Peking University have proposed a paradigm shift in solid polymer electrolytes (SPEs) by decoupling ion transport from polymer host relaxation to overcome the trade-off between ionic conductivity and mechanical strength. This framework provides five diagnostic metrics and four molecular design levers to enable safer, higher-energy solid-state lithium batteries.

IN DEPTH

Key Findings

Prof. Quanquan Pang and researchers at Peking University have introduced a new perspective on decoupled ion transport to resolve the fundamental physical conflict in dry solid polymer electrolytes. By redefining decoupling as a change in the rate-limiting step of ion motion, the team proposes allowing Li^+ to hop through local low-barrier pathways independently of the polymer's main structural relaxation, rather than relying on the segmental motion of the polymer host.

Technical Details

To verify decoupled ion motion, the authors establish five quantitative diagnostic metrics:

- **Arrhenius Temperature Dependence:** A shift from the curved Vogel–Tammann–Fulcher (VTF) relation to Arrhenius behavior.
- **Angell Decoupling Index (R τ):** The ratio of polymer structural relaxation time (τ α) to conductivity relaxation time (τ σ) at T g; values well above unity indicate fast ion motion in a frozen host.
- **Modified Walden Analysis:** Identification of superionic transport where the Walden exponent (α < 1).
- **Conductivity at T g (σ(T g)):** A benchmark to verify Li^+ mobility when the bulk polymer is in a glassy state.
- **Haven Ratio (HR):** Comparison of apparent conductivity diffusion (D σ) and tracer diffusion (D tracer) to confirm net charge transport.

The researchers further outline four molecular design levers for next-generation electrolytes: utilizing ion-rich domains (polymer-in-salt systems), preserving permanent free volume via rigid backbones like Polymers of Intrinsic Microporosity (PIMs), employing orthogonal functional separation through supramolecular clusters or dual-phase architectures, and controlling polarity via polymeric zwitterions or single-ion conductors to boost the Li^+ cation transference number (t +).

Background & Context

In traditional SPEs such as poly(ethylene oxide) (PEO), lithium ions move via polymer coordination sites. Traditionally, increasing ion transport required lowering the glass transition temperature (T g) to increase chain flexibility. However, this softening degrades mechanical stability, complicating thin-film processing and increasing the risk of lithium dendrite penetration.

Significance & Outlook

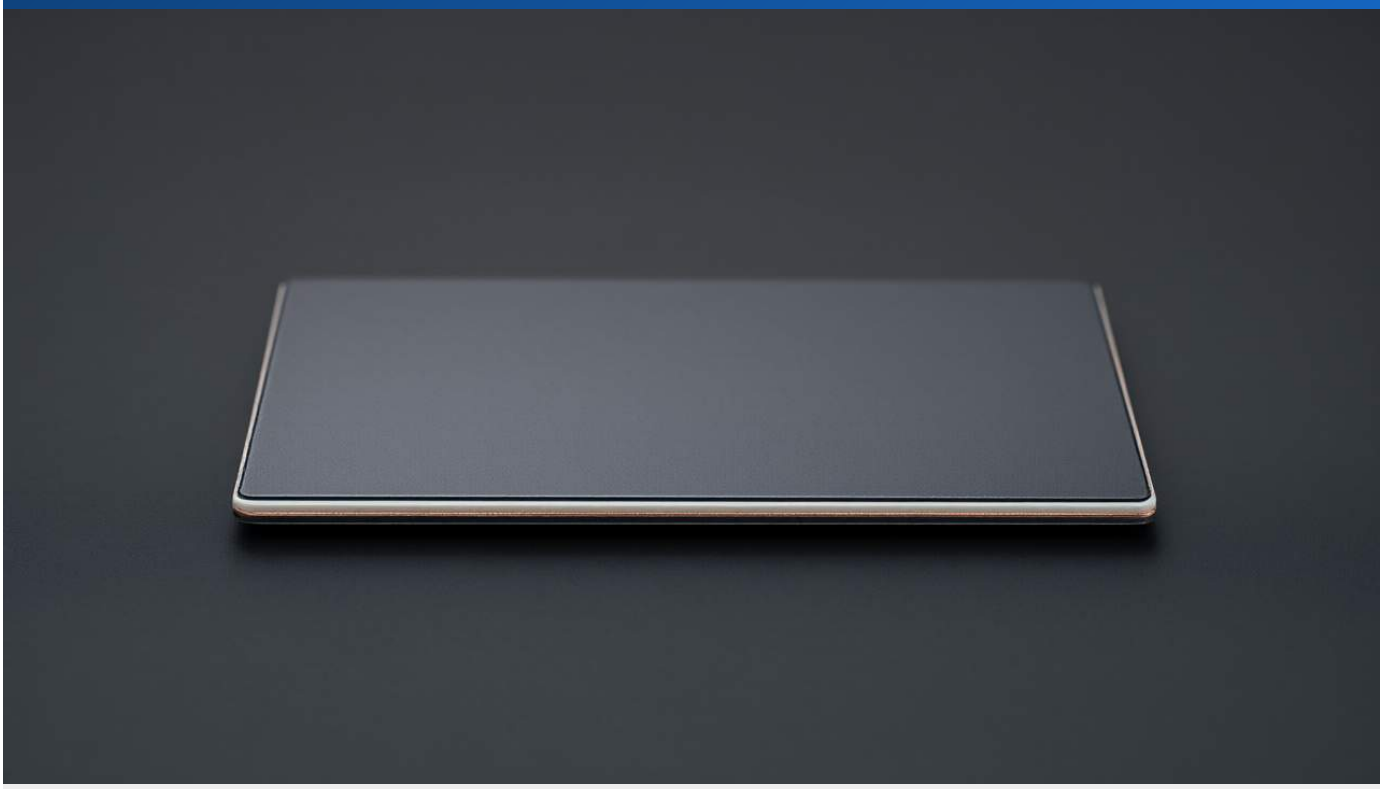
The authors emphasize that bulk conductivity alone is insufficient for industrial application. Future development must balance T g, transference numbers, and interface stability to maintain steady-state DC current and conformal physical contact with lithium metal anodes and high-voltage cathodes.

Source: https://www.miragenews.com/peking-university-scientists-advance-solid-1777133/

Collected: November 21, 2026 | Automated Research System (AI)

#05 QuantumScape Osprey: All-Solid-State Battery Platform Specs

Published November 14, 2026 Batteries News USA



OVERVIEW

QuantumScape has introduced Osprey, an open all-solid-state battery platform featuring a sulfide-based cathode that cycles 1,000 times under one atmosphere of pressure. The platform achieves a 10% to 80% charge in five minutes and projected energy densities up to ~1,100 Wh/L. This development addresses critical pressure and stability limitations previously hindering the commercial viability of sulfide-based solid-state batteries for automotive use.

IN DEPTH

Key Findings

QuantumScape's Osprey platform has demonstrated the first public data for a sulfide-based cathode capable of 1,000 full charge cycles with approximately 80% capacity retention under gold-standard testing conditions. A critical technical milestone is the cell's ability to operate under just one atmosphere of pressure, a requirement for practical automotive integration.

Technical Details

The Osprey cell integrates a solid cathode with QuantumScape's proprietary ceramic separator and anode-free lithium-metal design. This configuration yields several performance advantages over conventional lithium-ion cells:

- **Charging Speed:** 10% to 80% state-of-charge achieved in five minutes.
- **Energy Density:** Projected densities reaching up to ~1,100 Wh/L.
- **Thermal Range:** Operational capability in cold weather at temperatures below -20 °C (-4 °F).
- **Pressure Requirements:** Operates at one atmosphere of pressure.

Background and Context

The industry has historically struggled with sulfide-based electrolytes due to two primary factors: their tendency to react with lithium metal, which reduces battery life, and the requirement for high operating pressure. Osprey is designed as an open platform to overcome these fundamental limits. It is compatible with various cathode chemistries, and QuantumScape has already conducted tests using cathodes developed both internally and by automotive customers.

Significance and Outlook

Osprey builds upon the existing QSE platform to provide a long-term technology solution for all-solid-state battery development. By offering new licensing and co-development options, QuantumScape is expanding its ecosystem to include developers of sulfide-based batteries. While cells based on the QSE platform are currently shipping to customers, the Osprey platform serves as the roadmap for future commercialization and is already being utilized in development with partners across the automotive industry.

Source: https://batteriesnews.com/quantumscape-expands-commercial-roadmap-with-osprey-the-open-all-solid-state-platform-for-battery-development/

Collected: November 21, 2026 | Automated Research System (AI)

#06 Factorial Lithium-Metal Cells: 450 Wh/kg Aerospace Specs

Published November 17, 2026 BEST Magazine USA



OVERVIEW

Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications. This milestone exceeds the company's year-end target and surpasses the performance of its automotive-grade FEST technology.

IN DEPTH

Key Findings

Factorial has reached an energy density of 450 Wh/kg in lithium-metal cells developed for the aerospace sector. According to the company's third-quarter 2026 shareholder letter, this result is approximately 15% higher than the cells used in a record-setting drone flight conducted earlier in the year. This achievement puts the aerospace cells ahead of the company's scheduled year-end energy-density target.

Technical Details

The aerospace cells utilize lithium-metal anodes and are based on Factorial’s FEST quasi-solid-state platform, which employs a quasi-solid polymer electrolyte. This differs from the company's Solstice technology, which uses a fully solid sulfide electrolyte. The 450 Wh/kg cells build upon FEST B-samples delivered to Mercedes-Benz that exceeded 390 Wh/kg.

While the chemistry is broadly the same as Factorial's automotive cells, the aerospace version is optimized for weight reduction. The company has not disclosed the capacity, cell dimensions, cycle life, or volumetric energy density for these specific 450 Wh/kg cells.

Background and Context

Factorial is currently pursuing two parallel solid-state platforms:

- **FEST:** A quasi-solid polymer electrolyte design compatible with up to 80% of conventional lithium-ion manufacturing equipment. Factorial and SK On have signed an MoU to assess manufacturing FEST cells using existing infrastructure.
- **Solstice:** An all-solid-state battery using a sulfide-based electrolyte and dry cathode process. Solstice cells of up to 40Ah have been produced and supplied to partners, with a potential energy density target of 450 Wh/kg for aerospace, robotics, and space systems.

In the automotive sector, FEST cells validated with Stellantis in 2025 achieved 375 Wh/kg, over 600 cycles, and 15–90% charging in 18 minutes. These are currently undergoing public-road testing in a Dodge Charger Daytona.

Significance and Outlook

The technology has already been demonstrated in flight; a Group I drone powered by Factorial cells flew for 521 minutes and covered approximately 483km. Initial flight testing showed more than 30% additional system-level range compared to conventional lithium-ion batteries. Factorial intends to further increase the energy density of its aerospace cells in 2027.

Source: https://www.bestmag.co.uk/factorial-450-wh-kg-lithium-metal-aerospace/

Collected: November 21, 2026 | Automated Research System (AI)

#07 Enli Power: All-Solid-State Battery R&D and Pilot Base Specs

Published November 19, 2026 电池网 China



OVERVIEW

Enli Power has opened a dedicated R&D center and pilot production base in Nanjing's Jiangbei New Area to accelerate the transition of all-solid-state batteries to mass delivery. The company introduced new quasi-solid-state and all-solid-state cells targeting low-altitude economy and extreme industrial environments.

IN DEPTH

Key Findings

On November 19, 2026, Enli Power inaugurated its Nanjing Solid-State Battery R&D Center and Pilot Base in the Jiangbei New Area. This facility serves as the company's first center focused on all-solid-state batteries, designed to bridge the gap between pilot verification and small-batch delivery. To support industrialization, Enli Power signed strategic cooperation agreements with Tianchuang Robot, Kunlun New Materials, and Jun-En New Energy.

Technical Details

The company released two primary product series targeting high-energy-density requirements:

- **Enli Tianji Ultra (Quasi-solid-state/Anode-free lithium metal):** Designed for industrial drones and special robots.
  - One variant achieves an energy density of 530Wh/kg with 5C continuous discharge.
  - A 20Ah cell reaches 534Wh/kg with 3C continuous discharge for stratospheric drones.
  - A 9Ah cell offers over 420Wh/kg, supporting 10C continuous discharge and over 500 cycles.
- **Enli Xingji (All-solid-state):** Designed for extreme industrial environments and special robots.
  - Supports normal charging and discharging at 150°C.
  - Operates with low pre-tightening force (below 0.5MPa or without external pre-tightening).
  - A 10Ah cell achieves an energy density exceeding 400Wh/kg.

Background & Context

The project is supported by the Jiangbei New Area New Materials Science and Technology Park. From a strategic integration perspective, Enli Power is collaborating with Junheng Group to combine cell hardware with smart energy management for applications in embodied AI and robotics. The supply chain integration involves Kunlun New Materials for key battery materials and Tianchuang Robot for application-specific solutions.

Significance & Outlook

The Nanjing base is positioned as a critical pillar for Enli Power's "15th Five-Year Plan" goals. By leveraging local industrial resources, the company intends to accelerate the commercialization of all-solid-state batteries and provide a standardized "Enli Solution" for industry-wide mass production.

Source: https://www.itdcw.com/news/qiye/11191592L2026.html

Collected: November 21, 2026 | Automated Research System (AI)

#08 Helios Horizon: Solid-State Battery Flight Tests and 2027 Roadmap

Published November 19, 2026 Aviation International News USA



OVERVIEW

Helios Horizon achieved a claimed record altitude of 17,200 feet using a modified electric Pipistrel Taurus powered by solid-state batteries. The flight demonstrated a significant increase in energy density over lithium-ion cells, utilizing only 36% of battery capacity to reach the peak. This progress supports a long-term goal of reaching 80,000 feet for stratospheric tourism and sensing.

IN DEPTH

Key Findings

Helios Horizon has completed flight tests in Grand Forks, North Dakota, where a modified electric Pipistrel Taurus reached a claimed record altitude of 17,200 feet. The flight, piloted by founder Miguel Iturmendi on October 29, reportedly broke three world records for electric aircraft under 500 kilograms: maximum altitude, altitude in level flight, and time to climb to 3,000 meters (which took 27 minutes). Iturmendi used only 36% of the battery capacity during this mission.

Technical Details

The aircraft utilized solid-state battery cells with an energy density of 410 Wh/kg, a substantial increase over the 245 Wh/kg provided by the lithium-ion batteries used in previous 2024 tests. By replacing flammable liquid electrolytes with solid electrolytes, these cells reduce the risk of thermal runaway and allow the aircraft to fly lighter for specific missions. To prepare for higher altitudes, Iturmendi used a hypobaric chamber at the University of North Dakota’s John D. Odegard School of Aerospace Sciences to evaluate life-support systems and a pressure suit.

Background & Context

While the aircraft previously reached 24,000 feet in 2024 using lithium-ion batteries near Bishop, California, that flight was not certified by an observer and involved a heavier configuration. The recent October 29 flight was witnessed by a National Aeronautic Association observer, though the World Air Sports Federation has yet to ratify the new records. Iturmendi previously set ratified records in 2023 near Minden, Nevada, reaching 4,959 meters (16,270 feet) for maximum altitude.

Significance & Outlook

Helios Horizon plans to integrate batteries with 25% greater energy density to attempt a climb to 40,000 feet in early 2027. Looking further ahead, Iturmendi intends to develop the Helios Horizon 2, a pressurized aircraft designed to carry a pilot and two passengers to 80,000 feet for stratospheric tourism and high-altitude sensing. Other industry players are pursuing similar paths, including EHang with solid-state lithium-metal batteries and Safran with semi-solid cells from Saft.

Source: https://www.ainonline.com/aviation-news/futureflight/2026-11-19/helios-horizon-gains-altitude-solid-state-batteries

Collected: November 21, 2026 | Automated Research System (AI)

#09 Solid-State Batteries: Xidian University's 12 μm Coating Specs

Published November 14, 2026 BASIC thinking Germany



OVERVIEW

Researchers at Xidian University have developed a 12 μm liquid-applied protective layer that suppresses dendrite growth in lithium-metal batteries. The coating increases critical current density to 3.5 mA cm^{-2} and maintains 82.3% capacity after 300 cycles. This approach enables the use of high-capacity lithium-metal anodes in solid-state batteries without requiring expensive vacuum chambers.

IN DEPTH

Key Findings

A research team from Xidian University has developed a thin-film liquid coating that significantly enhances the stability of lithium-metal anodes. The protected anode demonstrates a critical current density of 3.5 mA cm^{-2}, which is more than four times the 0.8 mA cm^{-2} threshold of unprotected lithium. In full-cell tests using a sulfide solid-state electrolyte, the coated cells retained 82.3% of their original capacity after 300 charging cycles, compared to only 43% for unprotected cells.

Technical Details

The "chemical armor" consists of a fluorine-containing silicone polymer and indium chloride. When applied, the mixture reacts directly on the metal to form a flexible hybrid layer measuring only 12 μm in thickness. The coating functions through three primary mechanisms:

- **Mechanical Buffering:** The elastic polymer network absorbs mechanical stresses caused by the expansion and contraction of the cell during charging.
- **Electronic Insulation:** A formed lithium fluoride phase acts as an insulator to block electrons, preventing the initiation of dendrites.
- **Ion Distribution:** Lithium-indium alloy nanoparticles act as microscopic guides to distribute incoming lithium ions evenly, preventing the accumulation of spikes.

Background & Context

Pure lithium is a preferred battery material due to a theoretical energy storage capacity nearly ten times higher than the graphite used in current electric vehicles and smartphones. However, the formation of needle-like dendrites during charging can pierce cell barriers, leading to short circuits and fire risks. These defects have historically hindered the deployment of high-performance solid-state batteries.

Significance & Outlook

The liquid-based application process is compatible with standard roll-to-roll production lines via slot-die or gravure printing, eliminating the need for costly vacuum chambers. If scaled, this technology could lead to lighter batteries with significantly increased range and charging times comparable to traditional refueling stops. Beyond electric vehicles, the researchers suggest this approach could be applied to aviation and stationary energy storage for renewable energy, with potential for testing alternative metals such as tin or zinc in future protective layers.

Source: https://www.basicthinking.de/blog/2026/11/14/festkoerperbatterie/

Collected: November 21, 2026 | Automated Research System (AI)

#10 Solid-State Batteries: GWh-Scale Production and 2027 Roadmap

Published November 19, 2026 Shanghai Metals Market China



OVERVIEW

Gotion High-tech has launched a 2 GWh all-solid-state mass production line following a 90% yield rate on its 0.2 GWh pilot line. While material prices for sulphide electrolytes and lithium-rich manganese-based cathodes are under pressure, validation is expanding toward 20 Ah cells and diverse energy storage scenarios.

IN DEPTH

Key Findings

Gotion High-tech has transitioned from a 0.2 GWh all-solid-state pilot line to a 2 GWh mass production line, with plans for small-batch vehicle installation in 2027. The pilot line achieved a 90% battery cell yield using warm isostatic pressing (WIP) technology. Simultaneously, Changan Automobile has begun validating 20 Ah oxygen-polymer composite solid-state batteries, which feature energy densities exceeding 350 Wh/kg and electrolyte conductivity greater than 4.5 mS/cm, targeting 400 Wh/kg for 2027 demonstration operations.

Technical Details and Material Pricing

Material prices showed divergence between November 12 and November 19, 2026. Sulphide-route materials saw declines: battery-grade lithium sulphide averaged 1.25 million yuan/mt (down 10,000 yuan) and LPSC averaged 2.85 million yuan/mt (down 50,000 yuan). Conversely, oxide electrolytes edged up, with LATP averaging 127,500 yuan/mt. Lithium-rich manganese-based cathodes remained weak, with prices for high, medium, and low-voltage variants averaging 222,000, 171,500, and 153,000 yuan/mt respectively, each decreasing by 500-1,000 yuan/mt.

Industry Implementation and Context

Several companies are scaling production and diversifying applications:

- **Easpring Technology:** Expects its 60,000 mt high-nickel cathode base in Europe to partially commence production by year-end.
- **WELION New Energy:** Signed a strategic agreement with Yubang Power to apply hybrid solid-liquid and all-solid-state batteries to grid-side and energy storage markets.
- **Guangdong Nuojia:** Filed a 1.8 GWh consumer-grade semi-solid-state battery project in Yunfu with a 680 million yuan investment, slated for construction in January 2027.
- **Nanjing Yanpo:** Entered the environmental impact assessment stage for a 1 MWh-class sulphide project focusing on H_2S prevention and inert atmosphere control.

Significance and Outlook

The industry is currently navigating a tug-of-war between capacity release and market demand. While lithium-rich manganese-based materials are viewed as the long-term direction for cathodes, high-nickel ternary materials are considered a more realistic transitional solution. The shift from laboratory-scale cells to 20 Ah validation and GWh-scale lines indicates a move toward vehicle integration, though actual deployment depends on yield rates and equipment commissioning.

Source: https://news.metal.com/newscontent/EJ5YYSHMZ7WU36AEGH3DJWZ4HHLZNKFWDW32CDI-solid-state-battery-gwh-scale-production-line-launched-sulphide-and-lithium-rich-manganese-based-prices-under-pressure

Collected: November 21, 2026 | Automated Research System (AI)

#11 Toyota Electrification Roadmap: All-Solid-State Battery 2028 Timeline

Published November 16, 2026 Yahoo奇摩新聞（DDCAR電動車） Taiwan



OVERVIEW

Toyota plans to introduce all-solid-state batteries into mass-production vehicles by the end of 2028. The company is also developing a new prismatic lithium-ion battery with a 20% reduction in height and a 20% increase in efficiency.

IN DEPTH

Key Findings

Toyota has detailed its next-generation electrification and automation roadmap, highlighting a target to implement all-solid-state batteries in mass-production models by the end of 2028. Additionally, the company is advancing a new prismatic lithium-ion battery design and a camera-based L2++ autonomous driving system scheduled for 2028.

Technical Details

The company's battery innovations follow a "multi-path" strategy to provide diverse options for consumers:

- **Prismatic Lithium-ion Batteries:** By changing the electrode terminals to a horizontal configuration, Toyota has reduced battery height by approximately 20% and improved efficiency by approximately 20%.
- **All-Solid-State Batteries:** These batteries are designed to store more energy in smaller spaces and provide faster charging speeds compared to traditional batteries.
- **L2++ Autonomous Driving:** Scheduled for introduction in 2028 starting with one vehicle model, this system will rely on seven on-board cameras rather than LiDAR. It will be deployed in both electric and hybrid vehicles.

Background & Context

These technologies were presented by Chief Technology Officer Hiroki Nakajima at a technical exhibition at Toyota's North American research headquarters in Michigan. The development integrates AI, software, and robotics with data accumulated from real-world experience and manufacturing advantages. The L2++ system specifically utilizes end-to-end AI combined with real-road data and professional driving experience, incorporating a safety "guardrail" mechanism.

Significance & Outlook

The shift toward all-solid-state batteries is expected to expand the utility of electrification beyond passenger cars to include commercial vehicles, drones, and electric Vertical Take-off and Landing (eVTOL) aircraft. By diversifying its battery chemistry and autonomous driving hardware, Toyota aims to accelerate the development of smarter vehicles and more flexible manufacturing processes to improve mobility solutions.

Source: https://tw.news.yahoo.com/toyota-%E6%8F%AD%E7%A4%BA%E6%96%B0%E4%B8%96%E4%BB%A3%E9%9B%BB%E5%8B%95%E5%8C%
%E5%85%A8%E5%9B%BA%E6%85%8B%E9%9B%BB%E6%B1%A0-2028-%E5%B9%B4%E5%B0%8E%E5%85%A5%E9%87%8F%E7%94%A2%E8%BB%8A-021023265.html

Collected: November 21, 2026 | Automated Research System (AI)

#12 Hitachi All-Solid-State Battery: Metal Contaminant Analysis Tech

Published November 20, 2026 Dellows News Japan



OVERVIEW

Hitachi and Hitachi High-Tech have developed a technology to analyze how metal contaminants in all-solid-state batteries affect performance. The research identifies that copper contaminants of a certain size in the cathode increase internal short-circuit risks and degrade battery performance.

IN DEPTH

Key Findings

Hitachi and Hitachi High-Tech have developed a technical framework to analyze and evaluate the impact of metal contaminants on the performance of all-solid-state batteries. The study specifically confirmed that the presence of copper contaminants exceeding a certain size within the cathode increases the risk of internal short circuits. Furthermore, it was revealed that reactions involving copper during charging can lead to a decline in overall battery performance.

Technical Details

The evaluation focused on the effects of contaminant type, size, and location, specifically targeting metals such as copper, iron, and zinc. The battery material configuration used for this evaluation consisted of:

- **Cathode:** Nickel manganese cobalt oxide
- **Electrolyte:** Sulfide-based solid electrolyte
- **Anode:** Lithium alloy

To enable detailed analysis, the companies established a disassembly and pretreatment process. This allows for the excision of target areas for observation and analysis without exposing them to the atmosphere, thereby maintaining the internal state of the battery and facilitating the identification of failure causes. This process utilizes Hitachi High-Tech's X-ray analysis equipment and electron microscopes combined with Hitachi's battery prototyping and analysis expertise.

Significance and Outlook

By organizing data on contaminant types, sizes, and locations in a comparable format, this technology provides the fundamental knowledge necessary to determine which contaminants and inspection items should be prioritized for mass production management. Moving forward, Hitachi and Hitachi High-Tech intend to collaborate with battery-related companies to verify the applicability of this technology and accumulate data on contaminant conditions required for mass production.

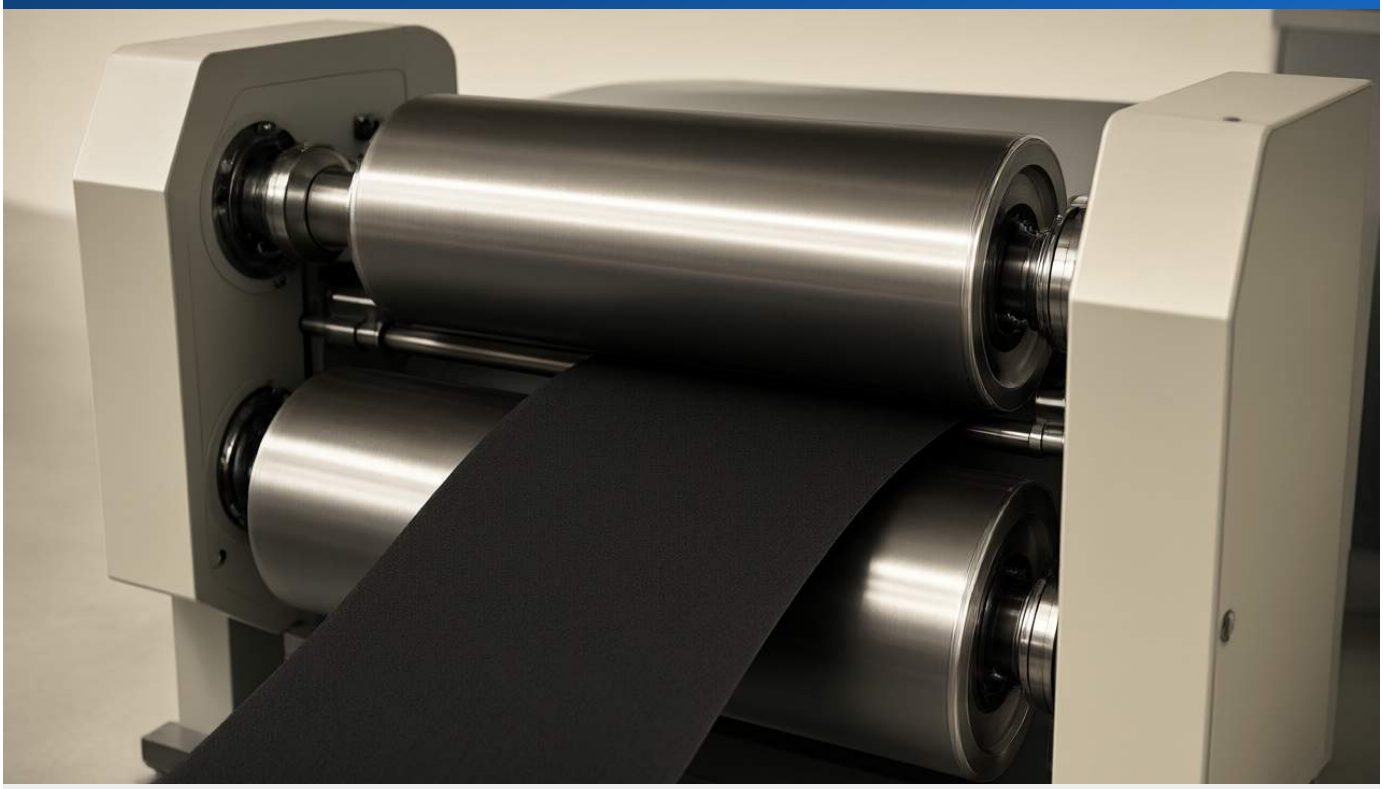
The companies plan to integrate analysis equipment, prototyping expertise, and quality data utilization into a quality management solution under "One Hitachi," developing it as a quality control technology to support Lumada 3.0. Part of these results will be presented at the 67th Battery Discussion meeting in Yokohama, Kanagawa Prefecture, from November 24 to 26, 2026.

Source: https://news.dellows.jp/1294514/

Collected: November 21, 2026 | Automated Research System (AI)

#13 Hyundai-Kia Dry Cathode Patent: All-Solid-State Battery Specs

Published November 19, 2026 더구루 South Korea



OVERVIEW

Hyundai Motor and Kia have secured a U.S. patent for a dry cathode manufacturing process for all-solid-state batteries, achieving a discharge capacity approximately 2.3 times higher than wet methods. The technology optimizes active material content up to 87% to enhance energy density while reducing internal resistance by 85%.

IN DEPTH

Key Findings

Hyundai Motor and Kia have registered a U.S. patent (US12802998 B2) titled "Dry Cathode For All-solid-state Battery With High Energy Density And Method Of Manufacturing Same." The core achievement is a dry manufacturing process that significantly improves energy density and ion mobility compared to traditional wet methods. Experimental data shows that when active material content is set to 85%, the dry process yields a discharge capacity of 3.84 mAh/㎠, compared to 1.70 mAh/㎠ for the wet process.

Technical Details

The patented technology eliminates the use of solvents, avoiding the limitations of wet processes where drying thick electrodes is difficult and binders can obstruct the movement of lithium ions and electrons. The dry process involves mixing cathode active materials, solid electrolytes, and fibrous binders in powder form, applying pressure to create binder filaments that secure materials while maintaining pathways for ion and electron transport.

- **Material Composition:** The patent specifies an active material content of 80–87% and a solid electrolyte content of 13–20% based on the combined weight of the two.
- **Performance Metrics:** Internal resistance for the dry process was measured at 2.91 Ω, representing an 85% reduction compared to the 19.40 Ω recorded for the wet process.
- **Optimization Limits:** The researchers found that increasing active material content beyond 90% leads to decreased lithium-ion conductivity and reduced discharge capacity.

Background & Context

All-solid-state batteries are viewed as next-generation power sources due to their safety and energy density advantages over liquid electrolytes. However, commercialization has been hindered by challenges in optimizing manufacturing processes and ensuring ion delivery within the electrode. Specifically, sulfide-based solid electrolytes used in these batteries are known to be vulnerable to certain solvents used in wet processing.

Significance & Outlook

By securing this patent, Hyundai and Kia have established a technical foundation for high-energy-density cathode design and dry manufacturing. While the companies have not disclosed a specific timeline for commercialization or mass production, the technology is expected to strengthen their competitiveness in the development of next-generation electric vehicle batteries.

Source: https://www.theguru.co.kr/news/article.html?no=109949

Collected: November 21, 2026 | Automated Research System (AI)

#14 ProLogium Gen4: Sfie electrolyte specs and charging roadmap

Published November 19, 2026　la Repubblica　イタリア



OVERVIEW

ProLogium is developing Gen4 battery technology using a superfluidised inorganic electrolyte (Sfie) that enables a charge from 5% to 80% in approximately 6 minutes. The system utilizes a Dynamic Coordination Network to optimize ion transport and a non-Newtonian material structure to maintain electrode contact. These advancements aim to bridge the gap between liquid and solid-state batteries for automotive applications.

IN DEPTH

Key Findings

ProLogium's Gen4 technology utilizes a superfluidised inorganic electrolyte called Sfie to achieve rapid charging speeds. Internal tests indicate that Gen4 cells can charge from 5% to 80% in 6.4 minutes, maintaining this performance over 1,000 rapid charging cycles. Additionally, the cells reportedly retain 90% of their capacity at −20 °C. A further iteration, Gen4.2, which incorporates a porous ceramic separator impregnated with Sfie, is predicted to reduce the 5% to 80% charging time to under 5 minutes.

Technical Details

The technology relies on a Dynamic Coordination Network (DCN) to facilitate lithium ion transport. Within this network, ligand chemical groups form local structures that transform over time, allowing lithium ions to move rapidly while restricting anion mobility to minimize concentration differences. The Sfie electrolyte also exhibits non-Newtonian behavior, meaning it flows to adapt to electrode surfaces under stress and reverts to a more solid structure when stress ceases. This flexibility reduces the need for high mechanical pressure to maintain interface contact during volume changes in charge/discharge cycles.

Safety is addressed via the Active Safety Mechanism (ASM), which promotes the passivation of reactive materials at approximately 125 °C to prevent thermal runaway. Regarding conductivity, the Sfie electrolyte achieved 57 millisiemens per centimetre (mS/cm) at room temperature in tests supervised by SGS.

Background & Context

The Gen4 approach seeks to combine the advantages of liquid and solid electrolytes without creating a traditional semi-solid battery. While laboratory results are promising, the company acknowledges that performance in a complete vehicle depends on cell architecture, electrode materials, and thermal management systems.

Significance & Outlook

ProLogium is collaborating with Mercedes-Benz, granting the manufacturer priority access to the cells for testing in future models. The company has also partnered with FEV for battery module integration and OPmobility for the development of prototype battery packs across various vehicle categories, as showcased at the 2026 Paris Motor Show.

Source:
https://www.repubblica.it/en/motoring/2026/11/19/news/electric_cars_the_battery_that_recharges_in_6_minutes_425735583/

Collected: November 21, 2026 | Automated Research System (AI)

#15 Helios Horizon: Solid-state battery aircraft specs and roadmap

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OVERVIEW

Helios Horizon has demonstrated the viability of solid-state batteries for high-altitude flight, reaching 17,200 feet while using only 36% of battery power. This achievement breaks three world records for electric aircraft under 500 kilograms, signaling a shift toward sustainable stratospheric aviation.

IN DEPTH

Key Findings

Helios Horizon has completed a flight test campaign proving that solid-state batteries can power sustained, high-altitude flight. In a primary test flight, pilot Miguel Iturmendi reached an altitude of 17,200 feet using only 36% of the aircraft's battery capacity. The mission reportedly broke three world records for electric planes under 500 kilograms: total altitude, horizontal flight altitude, and time to climb past 3,000 meters, which was achieved in 27 minutes.

Technical Details

The aircraft is a heavily modified Pipistrel Taurus, a lightweight, two-seat motorized glider chosen for its aerodynamic efficiency in thin air. The core technical advancement is the integration of new solid-state cells delivering approximately 410 watt-hours per kilogram (Wh/kg). This represents a 60% increase in energy density compared to the 260 Wh/kg lithium-ion batteries previously utilized by the team.

To support these tests, Helios Horizon collaborated with the University of North Dakota’s John D. Odegard School of Aerospace Sciences. The partnership included the use of a hypobaric chamber to test life support gear and pressure suits, as well as the deployment of an experimental gas analyzer developed by researcher Shawn Wagner.

Background and Context

Miguel Iturmendi, a veteran test pilot with experience at NASA, HondaJet, Solar Impulse 2, and the Perlan Project, led the initiative. The team aims to overcome the weight limitations traditionally imposed by heavy batteries in electric aviation. The recent flights are currently awaiting official validation from the World Air Sports Federation, having been witnessed by a National Aeronautic Association observer.

Significance and Outlook

The roadmap for Helios Horizon includes upgrading batteries to provide an additional 25% energy density, with a goal to exceed 40,000 feet by early 2027. Looking further ahead, Iturmendi plans to develop the Helios Horizon 2, a pressurized commercial aircraft capable of transporting a pilot and two passengers to 80,000 feet. This platform is intended for atmospheric sensing, reconnaissance, and stratospheric tourism, allowing passengers to observe the curvature of the Earth.

Source: https://interestingengineering.com/innovation/electric-aircraft-reaches-17200-feet

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