Solid-State Battery

Weekly Intelligence Report

2026-06-13 | 31 articles | 7 countries

troy-technical.jp

This Week's Keyword

ASSB Commercialization

Mass production & cost reduction efforts

31 articles	7 countries	1,000+ km	49.7 % CAGR
Total Articles Analyzed	Source Countries	EV Range Target (China)	Solid Electrolyte Mkt Growth

All 31 Articles This Week — 5-Axis Evaluation Matrix

How to read columns — Tech Novelty: degree of breakthrough Market Proximity: closeness to commercialization Market Impact: industry-wide effect Data Reliability: quantitative data & peer review US/EU Relevance: direct impact on US/European companies & supply chains

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#01	Dongfeng ASSB 2026 H2	Corporate Strategy	●●●●○	●●●●○	●●●●○	●●●○○	●●●●○	Dongfeng targets H2 2026 mass production of oxide-polymer solid-state batteries for 1,000+ km EVs.
#02	Nissan Dry Electrode	Technology Adoption	●●●○○	●●●○○	●●●○○	●●○○○	●●●●●	Nissan partners with US LiCAP for dry electrode tech in ASSB cathode production, targeting FY2028 launch.
#03	Gotion Low-Cost Li$_2$S	Cost Reduction	●●●●○	●●●○○	●●●●○	●●●○○	●●●●○	Gotion High-Tech aims for 'RMB 1/Wh Era' for ASSBs with low-cost Li$_2$S synthesis, targeting 2027-2028 production.
#04	ABTC DOE Grant	Funding	●●○○○	●●●●●	●●●●○	●●●●○	●●●●●	ABTC re-approved for $115M DOE grant to construct Nevada lithium refinery, securing domestic supply chain.
#05	DOE Next-Gen Battery	Policy Overview	●○○○○	●○○○○	●●○○○	●●●○○	●●●●●	U.S. DOE highlights solid-state and flow batteries as key pillars for next-generation energy storage.
#06	BYD/SAIC ASSB 2027	Corporate Strategy	●●●●○	●●●○○	●●●●○	●●○○○	●●●●○	Chinese auto giants BYD and SAIC Motor target 2027 launch for EVs equipped with all-solid-state batteries.
#07	China Semi-Solid EVs	New Product	●●○○○	●●●●○	●●●○○	●●○○○	●●●○○	Chinese automakers launch semi-solid-state battery EVs, with suppliers planning mass production in H2 2026.
#08	Argyrodite Electrolyte	Research	●●●●●	●○○○○	●●●○○	●●●●●	●●○○○	Ultra-densified argyrodite solid electrolyte enables high-current ASSLMBs with 3.8 mA cm^{-2} CCD and 96% retention.
#09	Stellantis/Factorial Test	New Product	●●●●○	●●●○○	●●●●○	●●●●○	●●●●●	Stellantis and Factorial Energy begin North American on-road testing of first ASSB EV (Dodge Charger Daytona).
#10	SSB Adoption Delayed	Market Analysis	●○○○○	●●○○○	●●○○○	●○○○○	●●○○○	ASSB adoption faces production challenges, making hybrid and semi-solid-state batteries crucial transitional solutions.
#11	Jinzhou 1GWh SSB Line	Manufacturing	●●○○○	●●●○○	●●●○○	●●○○○	●●●○○	Jinzhou City and Beijing Judian Boyan agree to construct a 1GWh semi-solid-state battery production line in China.
#12	Nissan UK Li-S Project	Research	●●●●○	●○○○○	●●●○○	●●○○○	●●●●●	Nissan, Oxford University, and Gelion launch UK-funded CoRe-SoLiS project for sulfur-based ASSBs.

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#13	DOE Proton Electrolyte	Research	●●●●●	●○○○○	●●●○○	●●●●●	●●●●●	DOE-funded researchers develop novel proton-conducting electrolyte to enhance safety in large-scale energy storage.
#14	Self-Healing Polymer	Research	●●●●●	●○○○○	●●●○○	●●●●●	●●○○○	Self-healing polymer electrolyte achieves over 6000 hours lifespan in ASSLMBs, suppressing dendrite growth.
#15	ASSB Patent Filings	IP Activity	●●○○○	●●○○○	●●●○○	●●●○○	●●●○○	Qianmo, SK On, and others publish patent applications for ASSB composite cathodes and solid electrolytes.
#16	KAIST Thiophene Li-Metal	Research	●●●●●	●○○○○	●●●○○	●●●●○	●●●○○	KAIST solves Li metal battery interfacial instability with thiophene addition, enabling fast charging and long lifespan.
#17	Drones SSB 320 Wh/kg	Application	●●●○○	●●●●○	●●○○○	●●●○○	●●●○○	Solid-state batteries for drones reach 320 Wh/kg, promising extended flight time and enhanced safety.
#18	Donut Lab Scam	Industry News	●○○○○	●●●●●	●●●○○	●●●●○	●●●●●	Finland's Donut Lab under investigation after 'miracle solid-state battery' revealed as repackaged Li-ion cells.
#19	Halide Electrolyte Doping	Research	●●●●●	●○○○○	●●●○○	●●●●●	●●○○○	Cation doping with Ca, Mg, Al enhances ionic conductivity and lowers activation energy in halide solid electrolytes.
#20	PVDC-Modified SPE	Research	●●●●○	●○○○○	●●●○○	●●●●●	●●○○○	PVDC-modified PVDF-HFP electrolyte achieves over 3000 hours stable cycling and high capacity retention in ASSLMBs.
#21	Nanofiber Li-S CPE	Research	●●●●●	●○○○○	●●●○○	●●●●●	●●○○○	Nanofiber composite polymer electrolyte enhances Li-S battery performance with dual-pathway Li⁺ transport.
#22	Isostatic Tech Market	Market Report	●○○○○	●●●●●	●●○○○	●●●○○	●●●○○	YH Research predicts global ASSB isostatic technology market to grow to $276M by 2032 (8.4% CAGR).
#23	Electrolyte Market	Market Report	●○○○○	●●●●●	●●●●○	●●●○○	●●●○○	YH Research forecasts solid-state battery electrolyte market to reach $743M by 2032 with 49.7% CAGR.
#24	CEC LiCAP Grant	Funding	●●●○○	●●●●○	●●●○○	●●●●○	●●●●●	California Energy Commission awards $11.3M grant to LiCAP Technologies for solid-state battery manufacturing expansion.
#25	New Polymer Electrolyte	Research	●●●●●	●○○○○	●●●○○	●●●●○	●●○○○	New polymer electrolyte enables safer, high-voltage Li metal batteries to function from -40°C to 55°C.
#26	Factorial Nasdaq Listing	Corporate Strategy	●●●●○	●●●●○	●●●●○	●●●○○	●●●●●	Factorial Energy achieves Nasdaq listing and $130M funding, bolstered by 1,200 km solid-state battery demo.
#27	Helios Horizon e-Aircraft	New Product	●●●●●	●●●○○	●●●●○	●●●○○	●●●●●	Helios Horizon flies first manned electric aircraft with ASSBs, achieving 410Wh/kg and sub-15 min fast charging.
#28	Svenner Marine Safety	New Product	●●●●○	●●●○○	●●●○○	●●○○○	●●●●●	Danish Svenner's new battery system endures 6x overcharge and nail penetration without thermal response for marine use.
#29	Gel Electrolyte Anode-Free	Research	●●●●○	●○○○○	●●●○○	●●●●○	●●●●●	New gel electrolyte for multi-layer anode-free pouch cells shows enhanced high-temperature stability and abuse tolerance.
#30	Solidion Space Patents	IP Activity	●●●○○	●●○○○	●●○○○	●●●○○	●●●●●	Solidion Technology granted 7 new U.S. patents for composite anode materials targeting humanoid robots and space.
#31	High-Nickel Cathodes	Market Report	●○○○○	●●●●●	●●●○○	●●●○○	●●●○○	Report forecasts high-nickel cathodes to dominate long-range EVs in 2026 battery market, with R&D; towards >90% Ni.

●●●●○ High ●●●○○ Med-High ●●○○○ Med ●○○○○ Low | Yellow highlight = featured article

Three Questions That Demand Your Decision This Week

❶ Is your EV battery roadmap competitive with China's 2026-2027 ASSB targets?

Chinese OEMs (Dongfeng, BYD, SAIC) and suppliers (Gotion, CALB, SVOLT) are aggressively targeting mass production of ASSBs and SSBs by H2 2026-2027, promising 1,000+ km range and cost reductions. This timeline is significantly ahead of many Western forecasts. Are your strategic plans accounting for this accelerated pace and potential market disruption?

❷ How will cost reduction breakthroughs impact your supply chain and pricing strategy?

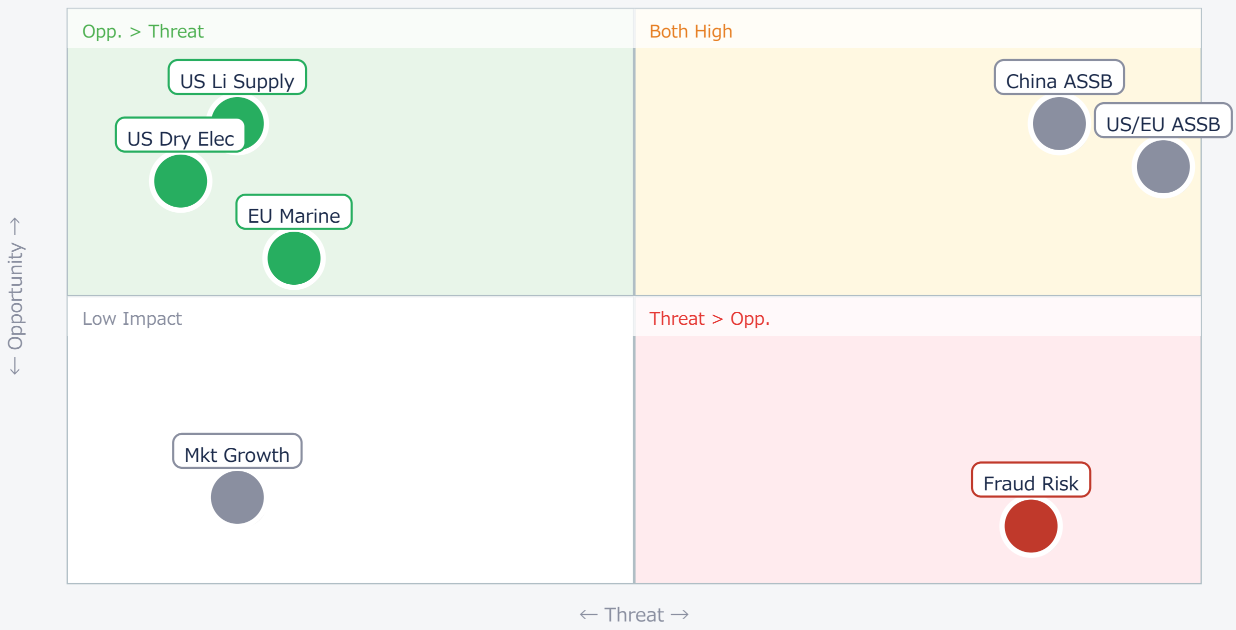
Gotion's aim for 'RMB 1/Wh Era' through low-cost Li_2S synthesis and LiCAP's dry electrode manufacturing could drastically alter ASSB cost structures. Are your procurement teams evaluating these new material and manufacturing cost benchmarks? What is your strategy to remain cost-competitive against these advancements?

❸ Are you investing sufficiently in foundational electrolyte and anode research?

Breakthroughs in self-healing polymers, argyrodite, proton-conducting, and thiophene-modified electrolytes (KAIST, DOE) promise significant gains in safety, lifespan, and performance. While early-stage, these could redefine future battery paradigms. Is your R&D; pipeline exploring these fundamental material innovations to avoid long-term technological obsolescence?

Opportunities vs. Threats for US/European Companies

Opportunity vs. Threat Matrix for US/European Companies



Item	Quadrant	↑ Opportunity	↓ Threat
● China ASSB	Critical	Learn tech, partner	China market lead
● US/EU ASSB	Critical	Scale US/EU tech	Lagging adoption
● US Li Supply	Opp.	Secure supply	—
● US Dry Elec	Opp.	US mfg tech	—

● EU Marine	Opp.	Marine safety	—
● Mkt Growth	Ref.	Mkt growth	—
● Fraud Risk	Threat	Due diligence	Fraud risk

Deep Dive ① — China's Aggressive ASSB Commercialization

#01 | 2026/06/11 | Dongfeng Motors (China) | Tech Novelty●●●●○ Proximity●●●●○ Market Impact●●●●○ Data Reliability●●●○○ US/EU Relevance●●●●○

Dongfeng Motor aims for mass production of self-developed oxide-polymer composite solid-state batteries by H2 2026, targeting over 1,000 km range for NEVs with 350 Wh/kg energy density. Batteries show high safety, retaining 74%+ charge at -30°C and functioning after 170°C exposure.

A low-cost Li_2S synthesis method reduces material costs by over 86%. Pilot production lines are fully automated, and demo vehicles have accumulated over 3.2 million km of safe driving, positioning Dongfeng as a frontrunner in EV solid-state battery commercialization.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: Dongfeng's H2 2026 target is highly ambitious but supported by pilot production and extensive vehicle testing, suggesting the published numbers are realistic under controlled conditions. The key technical barrier remains scaling this cost-effective Li_2S synthesis and ensuring long-term cycle stability in real-world EV conditions. [Opportunity] for US/European materials & component suppliers to develop compatible, cost-competitive materials and manufacturing equipment. [Threat] for OEMs & device manufacturers as Chinese competitors gain a significant lead in range and potentially cost. [Next Actions]: [Strategy] Immediately assess competitive timelines and cost structures of Chinese ASSB players. [Procurement] Identify potential new suppliers for low-cost Li_2S alternatives. [R&D;] Benchmark oxide-polymer composite electrolyte performance and manufacturing scalability by Q4 2026.

Deep Dive ② — Stellantis & Factorial Energy On-Road Testing

#09 | 2026/06/11 | Stellantis Media / Factorial Energy (USA) | Tech Novelty●●●●○ Proximity●●●○○ Market Impact●●●●○ Data Reliability●●●●○ US/EU Relevance●●●●●

Stellantis and Factorial Energy have initiated North American on-road testing of a Dodge Charger Daytona development vehicle integrated with Factorial Electrolyte System Technology (FEST) solid-state battery cells. This marks the first automotive ASSB integration in North America.

The 77Ah cells achieve 375 Wh/kg energy density, >600 cycles, and ultra-fast charging (15-90% in 18 minutes). The battery maintains performance across extreme temperatures (-30°C to 45°C), leveraging a proprietary Stellantis pack architecture.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: The on-road testing by a major OEM like Stellantis validates Factorial's technology beyond lab conditions, making the performance claims (375 Wh/kg, 18 min charge) appear credible for early-stage integration. Remaining technical barriers include long-term durability under diverse driving cycles and cost-effective mass production. [Opportunity] for US/European OEMs to accelerate ASSB integration through strategic partnerships and internal R&D;, leveraging Factorial's progress. [Threat] for OEMs who delay, risking competitive disadvantage in EV performance. [Next Actions]: [R&D;] Evaluate Factorial's FEST technology for potential licensing or partnership. [Business Dev] Explore joint development programs with ASSB startups. [Executive] Allocate resources for accelerated ASSB integration into future vehicle platforms by Q1 2027.

Deep Dive ③ — First Manned Electric Aircraft with ASSBs

#27 | 2026/06/08 | Helios Horizon (USA) | Tech Novelty●●●●● Proximity●●●○○ Market Impact●●●●○ Data Reliability●●●○○ US/EU Relevance●●●●●

Florida-based Helios Horizon successfully flew the first manned electric aircraft powered by all-solid-state batteries. This breakthrough achieved an energy density of 410 Wh/kg, a 60-80% improvement over previous Li-ion batteries.

The ASSB system also demonstrated sub-15 minute fast charging (near empty to 80%), crucial for operational efficiency in electric aviation. Test flights in a modified Pipistrel Taurus motor glider validated range, charging, and safety for commercial electric aviation.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: The 410 Wh/kg and sub-15 min charging for manned flight are significant achievements, suggesting the technology is maturing rapidly for niche, high-value applications. While impressive, these are likely under optimized conditions, and scaling for larger aircraft or higher power demands remains a technical barrier. [Opportunity] for US/European aerospace & defense contractors to integrate this technology into eVTOLs, drones, and future electric aircraft, gaining a first-mover advantage. [Threat] for traditional aviation and battery companies if they underestimate the pace of electric aviation innovation. [Next Actions]: [R&D;] Initiate feasibility studies for ASSB integration into next-gen aerospace platforms. [Business Dev] Engage with Helios Horizon and similar startups for potential collaboration or acquisition. [Strategy] Develop a long-term roadmap for electric aviation battery sourcing and development by Q3 2027.

Other Notable Articles

Gotion Low-Cost Li_2S Synthesis (China EV's Market / Gasgoo)
TN●●●●○ P●●●○○ MI●●●●○

Gotion's cost reduction for Li_2S is critical for ASSB mass adoption; monitor its impact on global material pricing.

DOE-Funded Proton Electrolyte for Safety (Tech Briefs)
TN●●●●● P●○○○○ MI●●●○○

Novel proton-conducting electrolyte offers fundamental safety improvements for large-scale energy storage, a long-term R&D; focus.

Donut Lab 'Miracle Battery' Scam (Tom's Hardware)
TN●○○○○ P●●●●● MI●●●○○

This incident highlights the critical need for rigorous due diligence and independent verification in ASSB investments.

CEC Grant to LiCAP for Dry Electrode Mfg (EV Infrastructure News)
TN●●●○○ P●●●●○ MI●●●○○

US investment in dry electrode manufacturing (LiCAP) is key for cost-effective and scalable ASSB production.

Danish Svenner Solves Marine Battery Fire Risks (Matt Sheahan)
TN●●●●○ P●●●○○ MI●●●○○

Svenner's extreme safety performance for marine batteries could open new high-value markets for ASSB technology in EU.

Recommended Actions This Week

Action recommendations based on article evaluation matrix and opportunity/threat analysis.

Immediate (this week)

- [Executive] Review competitive intelligence on Chinese ASSB commercialization timelines (Dongfeng, Gotion, BYD, SAIC) to update strategic outlook.
- [Procurement] Initiate due diligence on any new solid-state battery suppliers, especially startups, to mitigate fraud risks (Donut Lab incident).
- [R&D;] Task materials science teams to analyze reported breakthroughs in electrolyte materials (e.g., self-healing polymers, argyrodites, proton conductors) for long-term relevance.

Short-term (1 month)

- [Strategy] Develop a response plan to potential Chinese market leadership in ASSB EVs, focusing on differentiation and supply chain resilience.
- [R&D;] Evaluate LiCAP's dry electrode technology for potential adoption or partnership to reduce manufacturing costs and improve ASSB scalability.
- [Business Dev] Explore partnerships with US/EU ASSB developers (e.g., Factorial Energy, Svenner) to accelerate domestic technology integration.
- [Legal/IP] Conduct a landscape analysis of recent ASSB patent filings (Qianmo, SK On, Solidion) to identify key IP trends and potential infringement risks.

Medium-long term (quarter+)

- [Executive] Reallocate R&D; budget towards high-impact, long-term ASSB research areas, including novel electrolytes and anode materials, to secure future competitive advantage.
- [Procurement] Diversify lithium and critical mineral supply chains, investing in domestic refining capabilities (e.g., ABTC) to reduce geopolitical risks.
- [Strategy] Develop market entry strategies for new applications like electric aviation (Helios Horizon) and marine (Svenner) where ASSBs offer significant advantages.

SolidStateBattery — Selected Articles

Date: 2026-06-13

Articles: 31

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#18 Finland's Donut Lab Under Investigation After 'Miracle Solid-State Battery' Revealed as Repackaged Lithium-Ion Cells by Third-Party Tests

#19 Cation Doping with Ca, Mg, Al Enhances Ionic Conductivity and Lowers Activation Energy in Halide Solid Electrolytes

#20 PVDC-Modified PVDF-HFP Electrolyte Achieves Over 3000 Hours Stable Cycling and High Capacity Retention in All-Solid-State Lithium Metal Batteries

#21 Nanofiber-Constructed Composite Polymer Electrolyte Enhances Lithium-Sulfur Battery Performance with Dual-Pathway Li^+ Transport and Catalytic Sulfide Interface

#22 YH Research Predicts Global All-Solid-State Battery Isostatic Technology Market to Grow to $276 Million by 2032

#23 YH Research Predicts Solid-State Battery Electrolyte Market to Reach $743 Million by 2032, with 49.7% CAGR

#24 California Energy Commission Awards $11.3 Million Grant to LiCAP Technologies for Solid-State Battery Manufacturing Expansion

#25 Researchers Develop New Polymer Electrolyte Enabling Safer, High-Voltage Lithium Metal Batteries to Function from -40°C to 55°C

#26 Factorial Energy Achieves Nasdaq Listing and $130M Funding, Bolstered by Real-World 1,200 km Solid-State Battery Driving Range Demonstration

#27 Helios Horizon Flies First Manned Electric Aircraft with All-Solid-State Batteries, Achieving 410Wh/kg Energy Density and Sub-15 Minute Fast Charging

#28 Danish Company Svenner to Solve Marine Battery Fire Risks with New Battery System Enduring 6x Overcharge and Nail Penetration Tests Without Thermal Response

#29 U.S. Tech Briefs Announces New Gel Electrolyte for Multi-Layer Anode-Free Pouch Cells with Enhanced High-Temperature Stability and Abuse Tolerance

#30 Solidion Technology Granted 7 New U.S. Patents for Composite Anode Materials Targeting Humanoid Robots, Space-Based AI Data Centers, and the Lunar Economy

#31 24ChemicalResearch Report Forecasts High-Nickel Cathodes to Dominate Long-Range EVs in 2026 Battery Market

Dongfeng Targets 2026 Solid-State Battery Mass Production, Promising 1,000 km Range and Robust Safety

Published Published June 11, 2026 CarsGuide / SMM / Gasgoo (複数情報源統合) China

OVERVIEW

Chinese automaker Dongfeng Motor plans to commence mass production of its proprietary oxide-polymer composite solid-state batteries by late 2026, promising New Energy Vehicles (NEVs) with over 1,000 km range and an energy density of 350 Wh/kg. These batteries boast exceptional safety, maintaining functionality under extreme temperatures (-30°C to 170°C) and compression, coupled with an 86% cost reduction for key material Li_2S. This strategic move positions Dongfeng as an early commercialization leader, potentially disrupting the EV market with enhanced performance and safety.

IN DEPTH

Background

Solid-state batteries (SSBs) represent a significant leap forward in energy storage technology, poised to revolutionize electric vehicle (EV) performance. They promise superior energy density, enhanced safety, faster charging capabilities, and extended longevity compared to conventional lithium-ion batteries that rely on liquid electrolytes. However, widespread adoption has historically been hampered by substantial material costs and complex manufacturing processes. Against this backdrop, Dongfeng Motor's establishment of the Hubei Solid-State Battery Industry Technology Innovation Consortium underscores its strategic commitment to advancing this critical technology, including pioneering research into long-cycle Li-Te batteries. This recent announcement further distinguishes Dongfeng, positioning it ahead of many competitors, including other major Chinese automakers whose solid-state battery mass production targets are set for 2027 and beyond.

Key Findings

Dongfeng Motor has announced its intent to commence mass production of proprietary oxide-polymer composite solid-state batteries in the second half of 2026, marking a significant milestone in next-generation battery commercialization.

The core technology achieves an impressive energy density of 350 Wh/kg, which is projected to enable New Energy Vehicles (NEVs) to achieve a driving range exceeding 1,000 km on a single charge. This high energy density also translates to a roughly 30% weight reduction compared to existing liquid-electrolyte lithium-ion battery packs, offering substantial benefits for vehicle performance and efficiency.

Crucially, the battery system has demonstrated exceptional safety and robustness under extreme conditions. Validation tests show it retains over 74% of its charge capacity even at an extreme low temperature of -30°C, addressing a common performance challenge for EVs in cold climates. Furthermore, the battery remains fully functional after exposure to 170°C thermal stress and 50% physical compression, fundamentally mitigating the critical risk of thermal runaway that has plagued traditional lithium-ion chemistries.

Dongfeng's innovation extends to its choice of an oxide-polymer composite electrolyte. This specific pathway is designed to optimize the contact interface between the active materials and the electrolyte, which is vital for efficient ion transport and overall cell performance. This optimization also contributes to improved thermal management and enhanced electronic control system efficiency within the vehicle architecture.

Addressing a major economic barrier, Dongfeng's research team has developed a novel, low-cost synthesis method for Li_2S – a critical raw material for sulfide-based solid electrolytes. This breakthrough achieves a cost reduction of over 86%, significantly enhancing the potential for price competitiveness and broader market adoption of solid-state batteries.

The company's readiness for scalable manufacturing is evidenced by an already operational, fully automated production line at its pilot plant, encompassing more than 20 distinct processes. Practical validation has also been extensive, with demonstration vehicles equipped with these batteries accumulating over 3.2 million km of safe driving, providing robust real-world data and confidence in the technology's reliability.

This strategic move by Dongfeng aims to establish a significant competitive advantage in the rapidly evolving EV market. The combination of extended range, superior safety, and a substantial reduction in material costs for critical components is expected to be a compelling differentiator for consumers and a potential disruptor for the broader EV and battery industries, bolstering China's domestic manufacturing and material sourcing capabilities.

Source: https://carnewschina.com/2026/06/09/dongfeng-to-mass-produce-solid-state-batteries-in-h2-2026-enabling-1000-km-range/

Collected: June 12, 2026 | Automated Research System (Gemini API)

Nissan Adopts Dry Electrode Technology for All-Solid-State Battery Cathode Production Through Partnership with LiCAP Technologies

Published June 05, 2026 Yoshi_eco Japan

OVERVIEW

Nissan Motor has partnered with U.S. LiCAP Technologies to implement dry electrode technology for manufacturing all-solid-state battery (ASSB) cathodes. This process reduces manufacturing line energy consumption by 30-50% and significantly cuts CAPEX and OPEX compared to traditional wet coating. Crucially, it addresses the moisture sensitivity of sulfide solid electrolytes, improving electrode density and interfacial contact, thereby enhancing battery life and power characteristics. Nissan has operated an ASSB pilot production line since January 2025 and aims for market launch by fiscal year 2028.

IN DEPTH

Key Findings

Nissan Motor has announced the adoption of dry electrode technology for the manufacturing of all-solid-state battery (ASSB) cathodes, a strategic move made possible through its partnership with U.S.-based LiCAP Technologies. This innovative process is set to reduce energy consumption in manufacturing lines by 30-50% and substantially cut both capital expenditures (CAPEX) and operational expenditures (OPEX) compared to conventional wet coating methods.

Technical & Clinical Details

- The dry electrode technology is particularly critical for ASSBs employing sulfide-based solid electrolytes, which are highly sensitive to moisture. This process minimizes the exposure of electrode materials to air and humidity, simplifying the stringent environmental controls typically required during manufacturing.
- By facilitating uniform material dispersion and high electrode density, the dry process ensures excellent interfacial contact between the active material and the solid electrolyte. This leads to improved lithium-ion transport efficiency, consequently enhancing overall battery charge-discharge efficiency, cycle life, and power output characteristics.
- Nissan has been operating a pilot production line for all-solid-state batteries since January 2025, and the integration of this dry electrode technology represents a crucial step towards achieving mass production capabilities.

Background & Context

All-solid-state batteries are heralded as a transformative technology for electric vehicles (EVs), promising extended driving ranges, faster charging times, enhanced safety, and longer lifespans. However, the high cost of materials and the inherent complexities of manufacturing processes have presented significant barriers to their commercialization. Nissan's target for ASSB market introduction by fiscal year 2028 positions this dry electrode adoption as a key element in its strategy to simultaneously reduce manufacturing costs and improve battery performance. LiCAP Technologies, a recognized leader in battery technology, has notably received substantial grants from the U.S. Department of Energy (DOE), further validating its technical prowess.

Strategic Significance & Outlook

This dry electrode technology holds immense potential to significantly improve the cost-efficiency and production scalability of all-solid-state batteries. The reduction in manufacturing costs is expected to accelerate the widespread adoption of ASSBs in EVs and strongly support Nissan's 2028 market entry target. Furthermore, the enhanced interfacial stability and extended battery lifespan will boost consumer confidence in EVs, marking a vital step toward realizing a next-generation mobility society. It is conceivable that this technology could diffuse across the broader battery manufacturing industry, influencing global cost structures and accelerating solid-state battery commercialization.

Source: #

Collected: June 12, 2026 | Automated Research System (Gemini API)

Solid-State Battery Mass Production Faces Cost Barrier, Gotion High-Tech Aims for 'RMB 1/Wh Era' with Low-Cost Li_2S Synthesis

Published June 10, 2026   China EV's Market / Gasgoo   China

OVERVIEW

2026 is deemed the 'mass production year' for all-solid-state batteries (ASSBs), with CATL, BYD, and Gotion High-Tech planning production by 2027-2028. Gotion has launched its >400Wh/kg 'Jinshi' ASSB, but current cell costs are 3-5 times higher than mainstream LFP batteries (RMB 1.6-2.2/Wh), making cost the primary adoption barrier. Gotion is developing a 'gas-liquid-solid three-phase synthesis method' for Li_2S, which accounts for 50-64% of electrolyte costs, aiming for 50,000 tons/year production by 2030 to reduce Li_2S price to RMB 500,000/ton and solid electrolyte to RMB 300,000/ton, ushering in an 'RMB 1/Wh era'.

IN DEPTH

Key Findings

While 2026 is recognized as the 'mass production year' for all-solid-state batteries (ASSBs), the current high cost remains the primary barrier to widespread adoption. Nevertheless, Gotion High-Tech is advancing with its >400Wh/kg 'Jinshi' ASSB and has developed an innovative, low-cost synthesis method for Li_2S, aiming to dramatically reduce ASSB costs to usher in an 'RMB 1/Wh era'.

Technical & Clinical Details

- Current ASSB cell costs range from RMB 1.6 to 2.2 per Wh, which is 3 to 5 times higher than mainstream lithium iron phosphate (LFP) batteries. This high cost is predominantly driven by material expenses and complex manufacturing processes.
- For sulfide-based ASSBs in particular, the solid electrolyte constitutes 70-80% of the total battery cost, with Li_2S accounting for 50-64% of the electrolyte cost, presenting a significant challenge.
- To address this, Gotion High-Tech has developed a 'gas-liquid-solid three-phase synthesis method' for Li_2S. The company plans to activate a kiloton-scale production line in 2026 and expand to an annual capacity of 50,000 tons by 2030.
- The ambitious price targets for Li_2S are RMB 500,000 per ton, and for the solid electrolyte, RMB 300,000 per ton. These reductions are projected to bring the ASSB cell cost down to 'RMB 1 per Wh'.
- Manufacturing challenges include the extreme sensitivity of solid electrolytes to air and moisture, necessitating strict processing in inert atmospheres, which further contributes to elevated production costs.

Background & Context

Major battery manufacturers in the electric vehicle (EV) market, including CATL, BYD, and Gotion High-Tech, are actively pursuing early mass production of ASSBs, with timelines announced for 2027-2028. ASSBs offer superior safety, energy density, and longer lifespan compared to conventional lithium-ion batteries, but their high cost has been the greatest impediment to widespread EV integration. Gotion High-Tech's initiative to lower Li_2S costs represents a direct approach to solving this industry-wide challenge.

Strategic Significance & Outlook

If Gotion High-Tech successfully reduces Li_2S manufacturing costs and achieves the RMB 1/Wh era, the market penetration of ASSBs could accelerate dramatically. This would enhance the price competitiveness of EVs, making high-performance and safer electric vehicles accessible to a wider consumer base. This breakthrough is expected not only to advance battery technology but also to transform the entire electric vehicle industry landscape and optimize the battery material supply chain. Such a development could also catalyze other battery manufacturers to accelerate their pursuit of similar cost-reduction technologies.

Source: #

Collected: June 12, 2026 | Automated Research System (Gemini API)

ABTC Re-Approved for $115 Million DOE Grant for Nevada Lithium Refinery Construction

Published June 08, 2026 American Battery Technology Company (ABTC) USA

OVERVIEW

American Battery Technology Company (ABTC) announced the re-approval of a $115 million grant from the U.S. Department of Energy (DOE) for the phase one construction of a commercial-scale lithium hydroxide refinery at its Tonopah Flats Lithium Project in Nevada. This funding supports the annual production of 5,000 metric tons of battery-grade lithium hydroxide, critical for securing a domestic battery material supply chain and national energy security. The grant, initially awarded in 2022 and temporarily paused in October 2025, was reinstated in full following ABTC's appeal and rigorous review, validating the project's technical merit and alignment with national objectives.

IN DEPTH

Key Findings

American Battery Technology Company (ABTC) has announced the re-approval of a $115 million grant from the U.S. Department of Energy (DOE) for the initial phase of its commercial-scale lithium refinery at the Tonopah Flats Lithium Project in Nevada. This significant funding marks a crucial step towards strengthening the domestic battery materials supply chain and ensuring national energy security within the United States.

Technical & Clinical Details

- The DOE grant is specifically allocated to support the construction of a refinery capable of producing 5,000 metric tons of battery-grade lithium hydroxide annually. Lithium hydroxide is an indispensable component, particularly for high-performance lithium-ion batteries and advanced nickel-rich cathode materials.
- This project is designed to establish an integrated domestic supply chain, encompassing both lithium extraction and refining within the United States. Such vertical integration aims to mitigate geopolitical supply risks and foster a more sustainable battery ecosystem.
- Initially awarded in 2022, the grant was temporarily suspended in October 2025. ABTC's subsequent appeal, coupled with a rigorous reassessment of the project's technical achievements and alignment with national strategic objectives, led to the full reinstatement of the funding.

Background & Context

As the global transition towards electric vehicles (EVs) and renewable energy storage systems accelerates, lithium has emerged as a strategically vital mineral, often referred to as 'white petroleum.' However, the current lithium supply chain, from mining to refining and battery manufacturing, is highly concentrated in a few countries and regions, leading to concerns regarding supply stability, environmental impact, and ethical sourcing. The U.S. government views the re-establishment of a robust domestic critical minerals supply chain as an urgent priority, actively investing in domestic companies through DOE grant programs.

Strategic Significance & Outlook

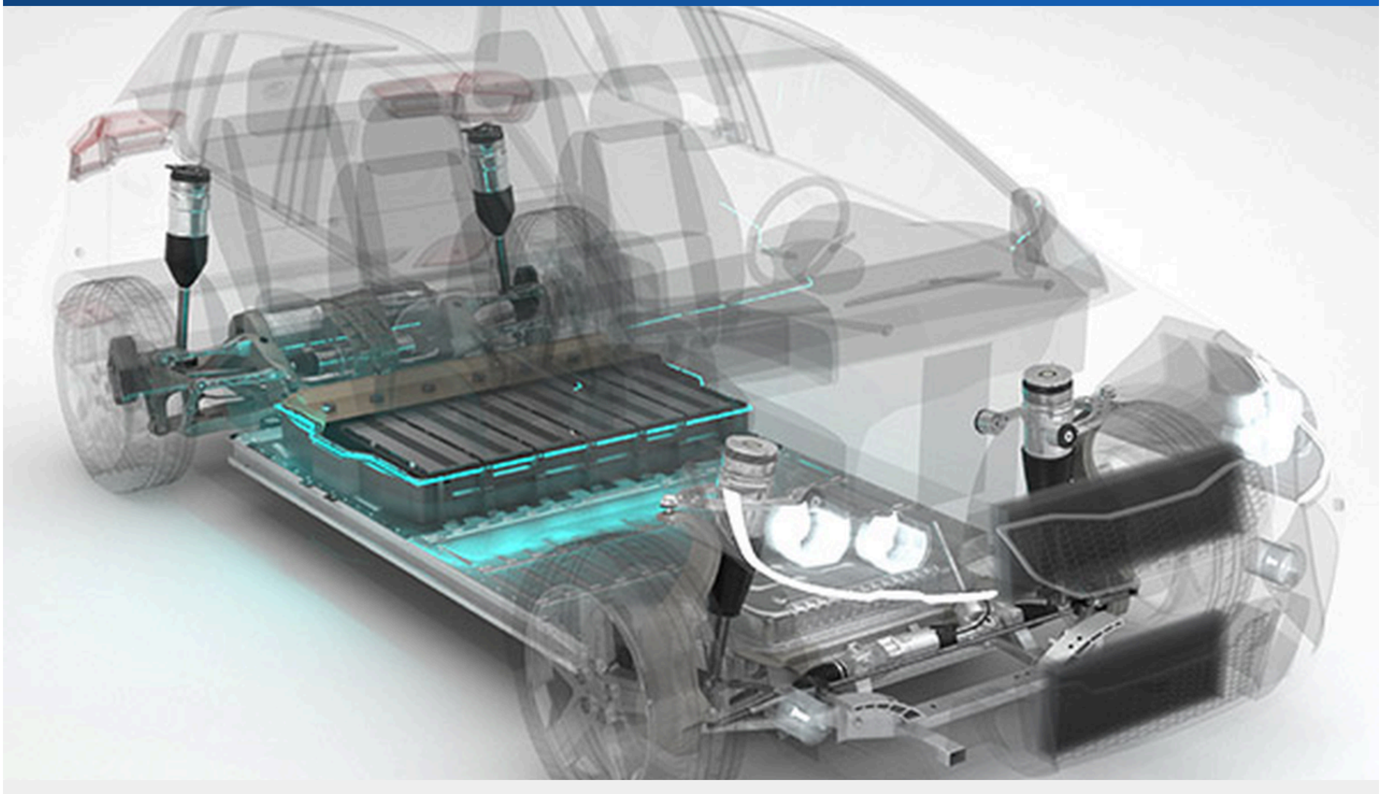
The re-approval of the DOE grant for ABTC underscores the strong commitment of the United States to establishing leadership in clean energy technologies. The operation of this lithium refinery is expected to contribute to stabilizing battery manufacturing costs domestically, creating new jobs, and advancing more environmentally responsible lithium production methods. Crucially, securing a domestic supply of high-performance battery materials will provide EV manufacturers and energy storage system developers with a more stable sourcing channel, thereby accelerating technological innovation and market expansion.

Source: https://americanbatterytechnology.com/press-release/american-battery-technology-company-wins-appeal-and-has-us-department-of-energy-grant-reinstated-for-115-million-project-for-commercial-scale-critical-mineral-lithium-refinery/

Collected: June 12, 2026 | Automated Research System (Gemini API)

U.S. Department of Energy Highlights Solid-State and Flow Batteries as Key Pillars of Next-Generation Battery Technology

Published June 04, 2026 U.S. Department of Energy USA



OVERVIEW

The U.S. Department of Energy (DOE) released an overview focusing on solid-state and flow batteries as the primary pillars of next-generation battery technology. Solid-state batteries, by utilizing solid electrolytes, eliminate the need for separators, reducing leakage risks from damage and swelling at high temperatures, thereby significantly enhancing safety. This technology promises improved performance, such as extended charge duration, alongside superior safety, and holds potential for reducing critical material usage and overall costs.

IN DEPTH

Key Findings

The U.S. Department of Energy (DOE) has published an overview outlining next-generation battery technologies, designating solid-state and flow batteries as key pillars for future energy storage. Solid-state batteries, by employing solid electrolytes, hold the potential to fundamentally address and improve the safety and performance limitations inherent in conventional liquid-electrolyte lithium-ion batteries.

Technical & Clinical Details

- Solid-state batteries eliminate the need for flammable liquid electrolytes and separators, directly adopting a solid electrolyte. This design reduces the risk of electrolyte leakage upon battery damage and swelling at high temperatures, leading to a substantial improvement in overall battery safety.
- This enhanced safety profile enables the utilization of higher energy density lithium metal anodes, contributing to a general increase in battery performance, including extended durations between charges.
- The DOE also highlights the potential for solid-state batteries to become more cost-effective solutions in the future, through simplified manufacturing processes and reduced material costs.
- Furthermore, research is actively exploring the adoption of new material chemistries to lessen reliance on critical materials like lithium, or even to entirely eliminate their use.

Background & Context

As the global energy landscape shifts towards renewable sources, there is an escalating demand for highly reliable and safe energy storage systems. While conventional battery technologies continue to evolve, they face inherent limitations, particularly in terms of safety, energy density, and sustainability. The U.S. government, through the DOE, is strategically investing in the research and development of next-generation battery technologies to support domestic innovation and maintain international competitiveness in the clean energy sector.

Strategic Significance & Outlook

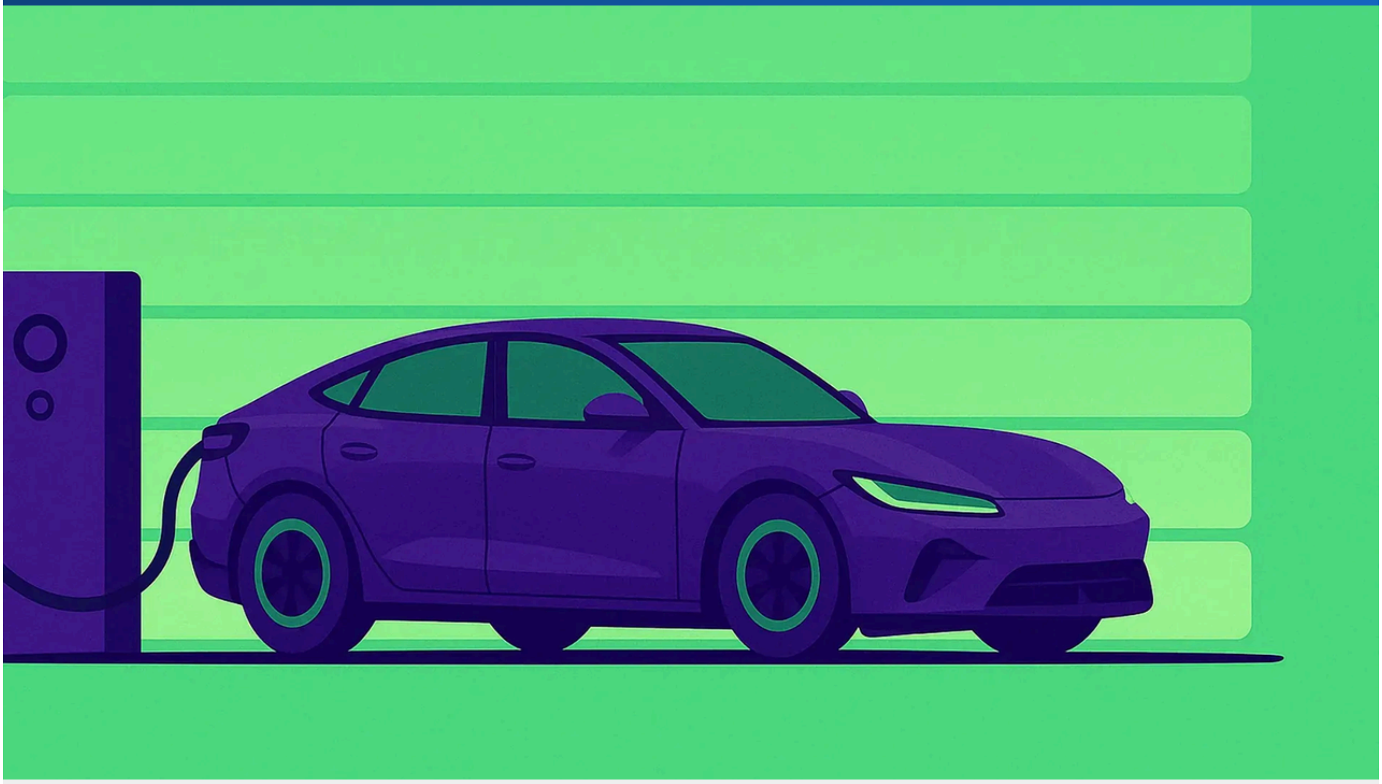
The DOE's identification of solid-state and flow batteries as prime targets for next-generation technology signifies their critical importance within national energy strategies. The enhanced safety and performance of solid-state batteries are expected to enable broad applications, not only in electric vehicles (EVs) but also in grid-scale stationary energy storage, aerospace, and defense sectors. Efforts to reduce reliance on critical materials and lower manufacturing costs are essential for realizing more sustainable and economically viable battery solutions, with the potential to significantly transform the future energy landscape.

Source: https://www.energy.gov/cmei/ammto/breaking-it-down-next-generation-batteries

Collected: June 12, 2026 | Automated Research System (Gemini API)

Chinese Auto Giants BYD and SAIC Motor Target 2027 Launch for All-Solid-State Battery EVs

Published June 10, 2026 KR Asia China



OVERVIEW

Chinese automotive leaders SAIC Motor and BYD are aiming to launch electric vehicles (EVs) equipped with all-solid-state batteries (ASSBs) by 2027. SAIC, collaborating with battery startup Qingtao Energy, is developing the 'Guangqi' ASSB EV prototype, targeting over 1,000 km range while eliminating thermal runaway risks. BYD initiated ASSB R&D in 2013 and eyes mass production by 2030. While semi-solid-state batteries can utilize approximately 80% of existing production lines, ASSBs necessitate new lines, indicating a significant increase in initial investment as a key challenge.

IN DEPTH

Key Findings

Chinese automotive giants SAIC Motor and BYD have set ambitious targets to introduce electric vehicles (EVs) powered by all-solid-state batteries (ASSBs) to the market by 2027. This move signals both companies' intent to lead the global EV market in the commercialization of next-generation battery technology.

Technical & Clinical Details

- SAIC Motor is collaborating with battery startup Qingtao Energy to develop an ASSB-equipped EV prototype dubbed 'Guangqi.' This prototype aims to achieve a driving range exceeding 1,000 km while significantly enhancing safety by completely eliminating the risk of thermal runaway.
- SAIC's MG brand has already integrated semi-solid-state batteries, with liquid electrolyte content reduced to 5%, into its MG4 EV lineup. These semi-solid batteries deliver a range of 530 km and stable low-temperature performance, serving as a crucial transitional step toward full solid-state technology.
- BYD initiated its research and development into all-solid-state batteries back in 2013 and is accelerating its technological advancements with a goal for large-scale production by 2030.
- A significant challenge highlighted is the substantial initial investment required for ASSB manufacturing, as it necessitates entirely new production lines, unlike semi-solid-state batteries which can leverage approximately 80% of existing facilities.

Background & Context

All-solid-state batteries are anticipated to be a transformative next-generation battery technology, surpassing current lithium-ion batteries in terms of energy density, safety, fast-charging capabilities, and longevity. This advancement promises to dramatically improve EV performance, effectively addressing range anxiety and charging time concerns. The Chinese government is actively promoting the development and adoption of new energy vehicles (NEVs) as a national strategy, making innovation in battery technology directly linked to strengthening the competitiveness of domestic automakers.

Strategic Significance & Outlook

The 2027 targets set by SAIC Motor and BYD suggest that the commercialization of all-solid-state batteries is rapidly approaching. SAIC's 'Guangqi' prototype, with its high range and safety objectives, could set a new benchmark in the EV market. However, the substantial upfront investment required for ASSB manufacturing underscores the necessity for continuous advancements in cost reduction and production efficiency alongside technological progress. Both companies' efforts are expected to play a crucial role in China's bid to lead the global EV and battery technology sectors. Semi-solid-state batteries are serving as an important validation stage in this technological transition, paving the way for the ultimate widespread adoption of all-solid-state solutions.

Source: https://kr-asia.com/chinas-byd-saic-motor-eye-evs-with-all-solid-state-batteries-in-2027

Chinese Automakers Launch Semi-Solid-State Battery EVs, Suppliers Plan Mass Production in H2 2026

Published June 11, 2026 Internet Info Agency China

OVERVIEW

In the first half of 2024 (as referenced, despite the article date), multiple Chinese automakers, including SAIC Motor with its MG4 'Semi-Solid-State Peace-of-Mind Edition' and NIO with its 150kWh semi-solid battery pack, launched or announced semi-solid-state battery (SSB) EVs. Chery and GAC Group also plan to adopt SSBs within the year. Driven by this demand, battery manufacturers CALB and SVOLT are set to begin mass production of SSBs in the second half of 2026, accelerating the commercialization of semi-solid technology in the battery industry.

IN DEPTH

Key Findings

In a significant development for the Chinese automotive market, major automakers such as SAIC Motor, NIO, Chery, and GAC Group have successively launched or announced plans for electric vehicles (EVs) equipped with semi-solid-state batteries (SSBs). Responding to this demand, leading battery suppliers CALB and SVOLT are scheduled to commence mass production of SSBs in the second half of 2026, marking a rapid advancement in the commercialization of semi-solid battery technology.

Technical & Clinical Details

- In the first half of 2024 (referencing the period of events, despite the article's publication date of June 11, 2026), SAIC Motor introduced its 'MG4 Semi-Solid-State Peace-of-Mind Edition,' while NIO unveiled models featuring a 150kWh semi-solid-state battery pack. These vehicles demonstrate enhanced energy density, improved safety, and superior low-temperature performance compared to conventional liquid-electrolyte lithium-ion batteries.
- Chery and GAC Group have also declared their intentions to adopt semi-solid-state batteries in their vehicles within the current year, which is expected to further expand the range of SSB-equipped EVs available in the market.
- Driven by robust demand from these automakers, CALB and SVOLT are committed to establishing full-scale mass production capabilities for semi-solid-state batteries starting in the second half of 2026. This indicates the maturation of the SSB supply chain and the prospect of stable supply.

Background & Context

Semi-solid-state batteries have garnered considerable attention as an intermediate technology bridging the gap towards full solid-state batteries. They offer higher energy density and improved safety profiles compared to existing lithium-ion batteries, without requiring the extreme manufacturing complexities of full solid-state solutions, thus enabling earlier commercialization. Particularly in China, with its rapidly expanding new energy vehicle (NEV) market, battery technology innovation is crucial for bolstering competitive advantage. The close collaboration between automakers and battery suppliers is significantly accelerating the practical application of this technology.

Strategic Significance & Outlook

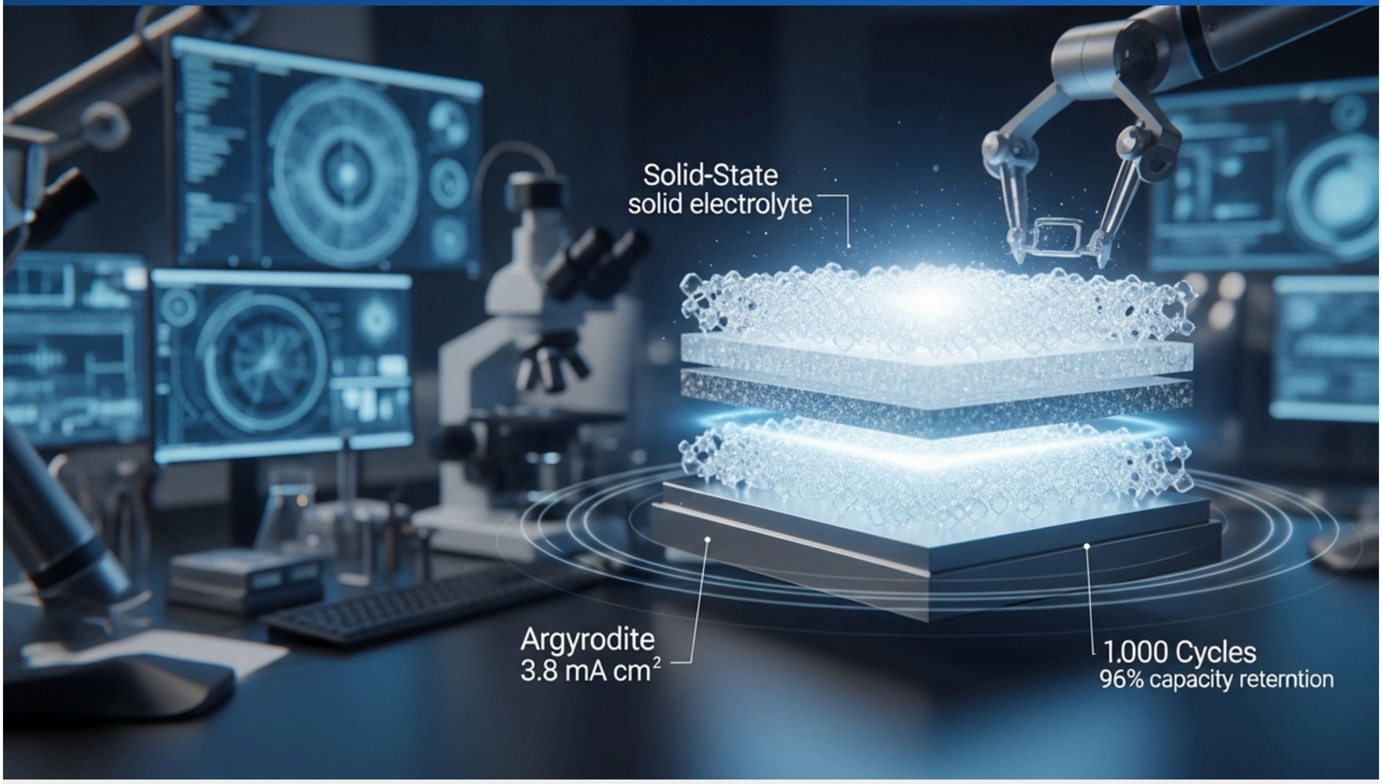
The market introduction of SSB EVs by multiple automakers, followed by battery suppliers' mass production plans, suggests that semi-solid-state batteries are likely to establish themselves as a mainstream technology in the EV market. This development will allow consumers to consider EVs with extended range and enhanced safety as more accessible options. Furthermore, the mass production of SSBs is expected to further optimize manufacturing costs and lay a foundational pathway for a smoother technological transition to full solid-state batteries. This represents a significant trend that will contribute substantially to the overall development of the EV market and the wider adoption of next-generation battery technologies.

Source: https://english.news18a.com/news/english_264747.html

Collected: June 12, 2026 | Automated Research System (Gemini API)

Ultra-Densified Argyrodite Electrolyte Achieves Record Performance for All-Solid-State Lithium Metal Batteries

Published Published June 11, 2026 ResearchGate (Angew. Chem. Int. Ed. / JACS 参照)
Unknown



OVERVIEW

Researchers have developed an ultra-densified argyrodite solid electrolyte (BMAN-LPSCB) via a unique cold-pressing method, achieving a critical current density of 3.8 mA cm^{-2} in all-solid-state lithium metal batteries (ASSLMBs). This advancement significantly reduces porosity to suppress dendrite formation, enabling Li/NCM cells to retain 96% capacity after 1000 cycles at a 1C rate. This breakthrough paves the way for high-current, long-lifecycle ASSLMBs critical for next-generation EVs and portable electronics.

IN DEPTH

Background

All-solid-state lithium metal batteries (ASSLMBs) promise significantly higher energy density and improved safety compared to conventional liquid-electrolyte lithium-ion batteries, making them highly anticipated as next-generation power sources for electric vehicles (EVs), aerospace applications, and large-scale energy storage. However, when utilizing lithium metal anodes, major technical hurdles to practical application have included lithium dendrite formation, which can lead to internal short circuits, and high interfacial resistance with the solid electrolyte. The current research directly addresses these challenges through a fundamental approach: optimizing the structure and properties of the electrolyte itself.

Key Findings

In a significant advancement for ASSLMBs, researchers have successfully developed an ultra-densified argyrodite solid electrolyte, designated BMAN-LPSCB. Fabricated using a unique cold-pressing technique, this electrolyte substantially reduces porosity within the material, forming a robust physical barrier that effectively suppresses lithium dendrite growth—a critical challenge for battery safety and longevity.

This novel solid electrolyte enables ASSLMBs to achieve an exceptionally high critical current density of 3.8 mA cm^{-2}, a crucial metric for high-power applications. Furthermore, Li/NCM batteries incorporating the BMAN-LPSCB electrolyte demonstrated remarkable durability, maintaining an impressive 96% capacity retention after 1000 charge-discharge cycles at a demanding 1C rate. This performance represents a significant leap forward in realizing long-life ASSLMBs capable of operating at high current densities, surpassing many existing lithium-ion technologies and early solid-state prototypes.

Complementary research also highlights progress in anode development, with an Ag-C composite anode utilizing sulfide electrolytes showing stable lithium plating/stripping. This contributes to improved interfacial stability between the solid electrolyte and anode, addressing another key hurdle. The team further notes advancements in optimizing the mechanical properties of sulfide electrolytes and in Li-S battery research exploring redox-mediated Solid-State Redox Reactions (SSSRR), collectively advancing diverse solid-state battery technologies.

Strategic Significance & Outlook

The groundbreaking performance of ASSLMBs powered by this ultra-densified argyrodite electrolyte holds immense strategic significance. It promises to accelerate the realization of high-energy-density, long-lifespan batteries for electric vehicles (EVs), high-performance portable electronics, and demanding aerospace applications. Crucially, stable operation at high current densities will dramatically enhance fast-charging capabilities for EVs, a pivotal factor in consumer adoption.

Looking ahead, future efforts will concentrate on scaling up this innovative technology, optimizing manufacturing costs, and seamlessly integrating it into practical cell designs. These steps are anticipated to provide a powerful impetus for the widespread commercialization of all-solid-state batteries, transforming the landscape of energy storage.

Source: https://www.researchgate.net/publication/406498767_Ultra-densified_solid_electrolyte_enabling_high-current_and_long-cycling_all-solid-state_lithium_metal_batteries

Collected: June 12, 2026 | Automated Research System (Gemini API)

Stellantis and Factorial Energy Initiate North American On-Road Testing of First All-Solid-State Battery EV

Published June 11, 2026 Stellantis Media / Electrek / Autoweek USA

OVERVIEW

Stellantis and Factorial Energy have begun on-road testing in North America, integrating Factorial Electrolyte System Technology (FEST) all-solid-state battery cells into a Dodge Charger Daytona development vehicle—a first for automotive ASSB integration in North America. The 77Ah cells achieve an energy density of 375 Wh/kg and a lifespan exceeding 600 cycles, with ultra-fast charging from 15% to 90% in 18 minutes. The battery maintains performance across extreme temperatures (-30°C to 45°C) and delivers up to a 4C discharge rate. This integration leverages a proprietary battery pack architecture designed by Stellantis.

IN DEPTH

Key Findings

Automotive giant Stellantis and solid-state battery technology developer Factorial Energy have announced the commencement of on-road testing in North America, integrating Factorial Electrolyte System Technology (FEST) all-solid-state battery cells into a Dodge Charger Daytona development vehicle. This marks the first automotive integration of solid-state battery technology in North America and the inaugural deployment of solid-state cells in a Stellantis vehicle.

Technical & Clinical Details

- The 77Ah FEST all-solid-state battery cells developed by Factorial achieve a high energy density of 375 Wh/kg and boast a long lifespan exceeding 600 cycles.
- In terms of charging performance, the battery demonstrates ultra-fast charging capability, completing a 15% to 90% charge in just 18 minutes, which significantly enhances the electric vehicle user experience.
- This battery is capable of maintaining stable performance across an extreme temperature range from -30°C to 45°C and supports discharge rates of up to 4C. This broad operational range contributes to its practicality in diverse climatic conditions.
- The integration of the battery pack leveraged an innovative, patented mechanical architecture designed by Stellantis, facilitating sophisticated engineering solutions for the SLTA Large platform.
- Previous demonstrations include Mercedes-Benz successfully achieving over 1,200 km of driving range using Factorial's cells, underscoring the technology's reliability and potential.

Background & Context

With the rapid expansion of the electric vehicle (EV) market, improving battery performance—including range, charging time, safety, and cost—has become an urgent priority. Solid-state batteries represent a technology with the potential to fundamentally resolve these challenges faced by conventional liquid-electrolyte lithium-ion batteries, thereby dramatically enhancing the performance of next-generation EVs. Stellantis is committed to accelerating its EV transition through its 'Dare Forward 2030' strategy, and its partnership with Factorial is a critical pillar of this strategy.

Strategic Significance & Outlook

The initiation of on-road testing with the Dodge Charger Daytona in North America is a significant milestone towards the commercialization of solid-state battery technology. This testing aims to validate the battery's performance, safety, and reliability under real-world conditions, and successful outcomes could lead to the widespread adoption of solid-state batteries in Stellantis' future EV lineup. Factorial Energy's technology is anticipated to find applications not only in the EV market but also across various industries requiring high-performance batteries, such as defense, aerospace, and robotics. This partnership holds the potential to become a successful example of international collaboration in realizing next-generation mobility.

Source: https://www.stellantismedia.com/news-release/stellantis-and-factorial-integrate-advanced-solid-state-battery-into-stellantis-development-vehicle-and-launch-road-testing/

Collected: June 12, 2026 | Automated Research System (Gemini API)

Solid-State Battery Adoption Delayed, Hybrid and Semi-Solid-State Batteries Emerge as Transitional Solutions

Published June 09, 2026 Geeky Gadgets / Solar Directory (Blog) Unknown

OVERVIEW

Despite offering compelling advantages like high energy density, fast charging, and enhanced safety, all-solid-state batteries (ASSBs) still face production challenges, delaying their widespread adoption. Solid electrolytes (ceramics, polymers, sulfides) act as physical barriers against dendrite formation, enabling higher energy density lithium metal anodes. Hybrid and semi-solid-state batteries are emerging as transitional technologies; MG (SAIC) has already integrated hybrid systems with reduced liquid electrolyte content into its MG4 model, improving charging speed and thermal stability. These semi-solid systems offer superior thermal stability, energy density, and reduced fire risk while maintaining compatibility with existing production methods.

IN DEPTH

Key Findings

While all-solid-state batteries (ASSBs) garner significant anticipation as a revolutionary next-generation battery technology due to their innovative properties, their mass production still faces considerable challenges, leading to delayed widespread adoption. In response to this, hybrid and semi-solid-state batteries are rapidly emerging as crucial transitional solutions bridging the gap between existing technologies and full solid-state solutions.

Technical & Clinical Details

- The primary advantages of ASSBs include high energy density, rapid charging capabilities, significantly enhanced safety, reduced weight, and extended lifespan. These characteristics are highly appealing for electric vehicles (EVs) and other advanced applications.
- Solid electrolytes, which can be ceramics, polymers, or sulfide compounds, function as a physical barrier against the growth of lithium dendrites. This enables the use of higher energy density lithium metal anodes, which has historically been challenging.
- However, high manufacturing costs of solid electrolytes, significant interfacial resistance between solid-solid contacts, and yield challenges in large-scale production continue to hinder the widespread commercialization of ASSBs.
- Transitional technologies like semi-solid and hybrid batteries address these challenges by retaining a partial liquid electrolyte while leveraging the benefits of solid electrolytes. For instance, SAIC's MG brand has introduced a hybrid system with reduced liquid electrolyte content in its MG4 models, achieving improvements in charging speed and thermal stability.
- Semi-solid systems offer high compatibility with existing battery production methods, minimizing capital investment while providing superior thermal stability, energy density, and reduced fire risk compared to conventional batteries.

Background & Context

As the electric vehicle market continues its growth trajectory, consumers increasingly demand higher performance and safer batteries. While ASSBs are considered the ultimate solution, their technological and economic hurdles remain substantial. Consequently, battery manufacturers and automakers are turning to semi-solid technologies as a pragmatic option to bridge the gap until full ASSB commercialization. This approach allows for incremental technological evolution and diversifies the risks associated with introducing new technologies to the market.

Strategic Significance & Outlook

The rise of semi-solid and hybrid batteries represents an important pragmatic approach in the battery technology roadmap. These technologies will continue to provide ongoing performance improvements and enhanced safety to the EV market while the challenges of ASSB mass production are addressed. In the long term, the knowledge and supply chains developed through semi-solid technologies may ultimately pave the way for the complete commercialization of ASSBs. The coming years are expected to see a mixed market environment where both semi-solid and all-solid-state batteries coexist and evolve.

Source: https://www.geeky-gadgets.com/why-solid-state-batteries-delayed/

Jinzhou City and Beijing Judian Boyan Agree to Construct 1GWh Semi-Solid-State Battery Production Line

Published June 09, 2026   Energytrend   China

OVERVIEW

The Linghe District People's Government of Jinzhou City, Liaoning Province, China, has signed a strategic cooperation framework agreement with Beijing Judian Boyan New Energy Technology Co., Ltd. to construct a 1GWh semi-solid-state battery production line. This agreement is part of China's broader energy storage project advancements, including sodium-ion and semi-solid-state batteries. Both parties plan deep collaboration in industrial layout, technological innovation, and coordinated regional economic development within the semi-solid-state battery sector, aiming to promote regional economy and new energy industry growth.

IN DEPTH

Key Findings

The Linghe District People's Government of Jinzhou City, Liaoning Province, China, has announced a strategic cooperation framework agreement with Beijing Judian Boyan New Energy Technology Co., Ltd. for the joint construction of a semi-solid-state battery production line with an annual capacity of 1 GWh. This agreement marks a significant step in accelerating the commercialization of next-generation energy storage technologies, particularly semi-solid-state batteries, and regional industrial development within China.

Technical & Clinical Details

- The planned facility will be a large-scale production line for semi-solid-state batteries, boasting an annual capacity of 1 GWh. This volume is equivalent to the batteries needed for tens of thousands of electric vehicles, aiming to establish a stable and substantial battery supply capability.
- Semi-solid-state batteries represent an intermediate technology between conventional liquid-electrolyte lithium-ion batteries and all-solid-state batteries. They offer improved safety, energy density, and low-temperature performance compared to traditional batteries. Furthermore, their manufacturing processes exhibit higher compatibility with existing equipment than all-solid-state batteries, facilitating relatively faster mass production.
- This project is not solely focused on semi-solid-state battery production; it also encompasses a broader vision for the development of energy storage technologies, including sodium-ion batteries. This holistic approach aims to establish a diverse battery solution supply system to meet the varied needs of the energy storage market.

Background & Context

China is actively pursuing the development and expansion of high-performance, safe battery technologies and production capacities as a national strategy, driven by the increasing adoption of electric vehicles (EVs) and renewable energy. Semi-solid-state batteries are gaining traction as a next-generation battery type that balances high energy density with excellent safety, leading to growing demand from automakers. Beijing Judian Boyan New Energy Technology, a company dedicated to technological innovation and industrialization in the new energy sector, is leveraging this partnership with local government to accelerate its business expansion.

Strategic Significance & Outlook

The construction of a 1GWh semi-solid-state battery production line in Jinzhou City will significantly bolster China's battery industry supply capacity. This project is expected to drive down the cost and improve the performance of semi-solid-state batteries, promoting their widespread adoption in various applications such as EVs, stationary energy storage, and other mobile devices. Moreover, this collaborative model between local government and enterprise serves as a positive example of linking technological innovation with regional economic development, potentially spurring further new energy-related investments across China.

Source: https://www.energytrend.com/news/20260609-51567.html

Nissan, Oxford University, and Gelion Launch UK Government-Funded CoRe-SoLiS Research Project for Sulfur-Based All-Solid-State Batteries

Published June 05, 2026 electrive.com UK

OVERVIEW

Nissan Motor, in collaboration with Oxford University and battery materials manufacturer Gelion, has launched the UK government-funded research project 'Cost-effective, Resilient Solid-state Li–S (CoRe-SoLiS).' This project aims to develop sulfur-based all-solid-state lithium batteries with high charging power, energy density, and extended lifespan. The plan involves integrating Gelion Technologies' cost-effective and readily procurable Nano-Encapsulated Sulfur (NES) cathode material into Nissan's future EV solid-state batteries, expected to overcome durability and cost barriers, thereby facilitating mass market adoption of ASSBs.

IN DEPTH

Key Findings

Nissan Motor, in collaboration with Oxford University and battery materials manufacturer Gelion, has launched the UK government-funded research project titled 'Cost-effective, Resilient Solid-state Li–S (CoRe-SoLiS).' This international partnership aims to develop sulfur-based all-solid-state lithium batteries that achieve high charging power, superior energy density, and extended cycle life.

Technical & Clinical Details

- The CoRe-SoLiS project focuses on integrating Gelion Technologies' proprietary Nano-Encapsulated Sulfur (NES) cathode material into Nissan's future all-solid-state batteries for electric vehicles (EVs).
- Sulfur-based cathode materials are theoretically capable of higher energy densities than traditional lithium-ion batteries and are attractive due to their abundance and lower cost. The NES material specifically offers high cost-effectiveness and ease of procurement, making it a strong contender.
- Through this project, the developed solid-state batteries are expected to address the critical challenges of durability and cost, which are major barriers in current battery technology. Particularly, achieving a stable interface between the solid electrolyte and the sulfur cathode is a key technical hurdle.
- The characteristic of NES material being easily integrated into existing battery production lines is a vital factor in resolving scalability issues for the mass market introduction of all-solid-state batteries.

Background & Context

To further accelerate the adoption of electric vehicles, next-generation battery technologies that surpass the performance of current lithium-ion batteries are indispensable. While all-solid-state batteries promise significant advancements in safety, energy density, and charging speed, their high cost and complex manufacturing processes have been impediments to commercialization. Sulfur-based all-solid-state batteries are gaining attention as a promising alternative due to their resource sustainability and cost advantages, potentially reducing reliance on scarce metals like nickel and cobalt. The UK government's funding is part of a broader policy to boost investment in clean energy technologies and foster domestic innovation.

Strategic Significance & Outlook

The CoRe-SoLiS project, spearheaded by Nissan, Oxford University, and Gelion, is poised to be a significant driving force for the commercialization of sulfur-based all-solid-state battery technology. The cost-effectiveness of the NES cathode material and its compatibility with existing production lines will be key to introducing all-solid-state batteries into the mass market. If successful, this research will enable Nissan to offer more high-performance and sustainable battery solutions for future EVs, contributing to further extending EV driving ranges and accelerating their widespread adoption. Moreover, this international collaborative research highlights the potential for UK-Japan partnerships to generate new value in the global battery technology race.

Source: https://www.electrive.com/2026/06/05/nissan-collaborates-with-partners-on-sulphur-based-solid-state-battery-research/

DOE-Funded Researchers Engineer Novel Proton-Conducting Electrolyte for Ultra-Safe Grid-Scale Energy Storage

Published Published June 08, 2026 Tech Briefs (PNASを引用) USA

OVERVIEW

Researchers at the DOE-funded BEES2 EFRC have engineered a novel proton-conducting electrolyte, published in PNAS, that achieves highly efficient charge transport through proton hopping. This breakthrough directly addresses the fire risks posed by volatile organic liquid electrolytes in conventional lithium-ion batteries, enabling safer and more flexible designs for large-scale energy storage. The new electrolyte not only enhances safety but also promises improved electron flow, paving the way for more efficient grid-scale energy solutions.

IN DEPTH

Background

The escalating integration of intermittent renewable energy sources worldwide has created a critical demand for robust, large-scale energy storage systems capable of buffering power generation fluctuations and ensuring grid stability. While lithium-ion batteries currently dominate many energy storage applications, their inherent safety concerns, particularly the risk of thermal runaway and associated fires, impose significant limitations on their deployment at grid scale. Recognizing these challenges, the U.S. Department of Energy (DOE) is strategically funding research and development into next-generation battery technologies to accelerate the transition to a clean energy economy.

Key Findings

Scientists at the BEES2 Energy Frontier Research Center (EFRC), supported by the DOE, have successfully engineered a novel electrolyte that facilitates highly efficient proton conduction through a unique proton-hopping mechanism between molecular bonds. This innovative electrolyte, detailed in a recent publication in *PNAS*, represents a significant breakthrough with the potential to fundamentally transform battery safety for large-scale energy storage applications.

Technical Details

- The core innovation lies in the electrolyte's exceptionally efficient proton conduction, where protons migrate via a mechanism analogous to the classical Grotthuss mechanism. This "hopping" between chemical bonds facilitates significantly faster and more stable charge transport pathways compared to those found in conventional electrolyte systems.
- Crucially, this proton-conducting electrolyte directly mitigates the severe fire hazards associated with volatile organic liquid electrolytes, which are standard in current lithium-ion batteries. The inherent flammability of these liquid components has long been a primary safety impediment, particularly for industrial and grid-scale energy storage deployments.

- The elimination of liquid electrolyte-related fire risks offers unprecedented flexibility in battery architecture. This allows for the design and construction of inherently safer, and potentially higher-energy-density, energy storage systems.
- Beyond safety, the highly efficient proton conduction is anticipated to optimize overall electron flow within the battery cells, thereby contributing to a measurable improvement in energy conversion efficiency.

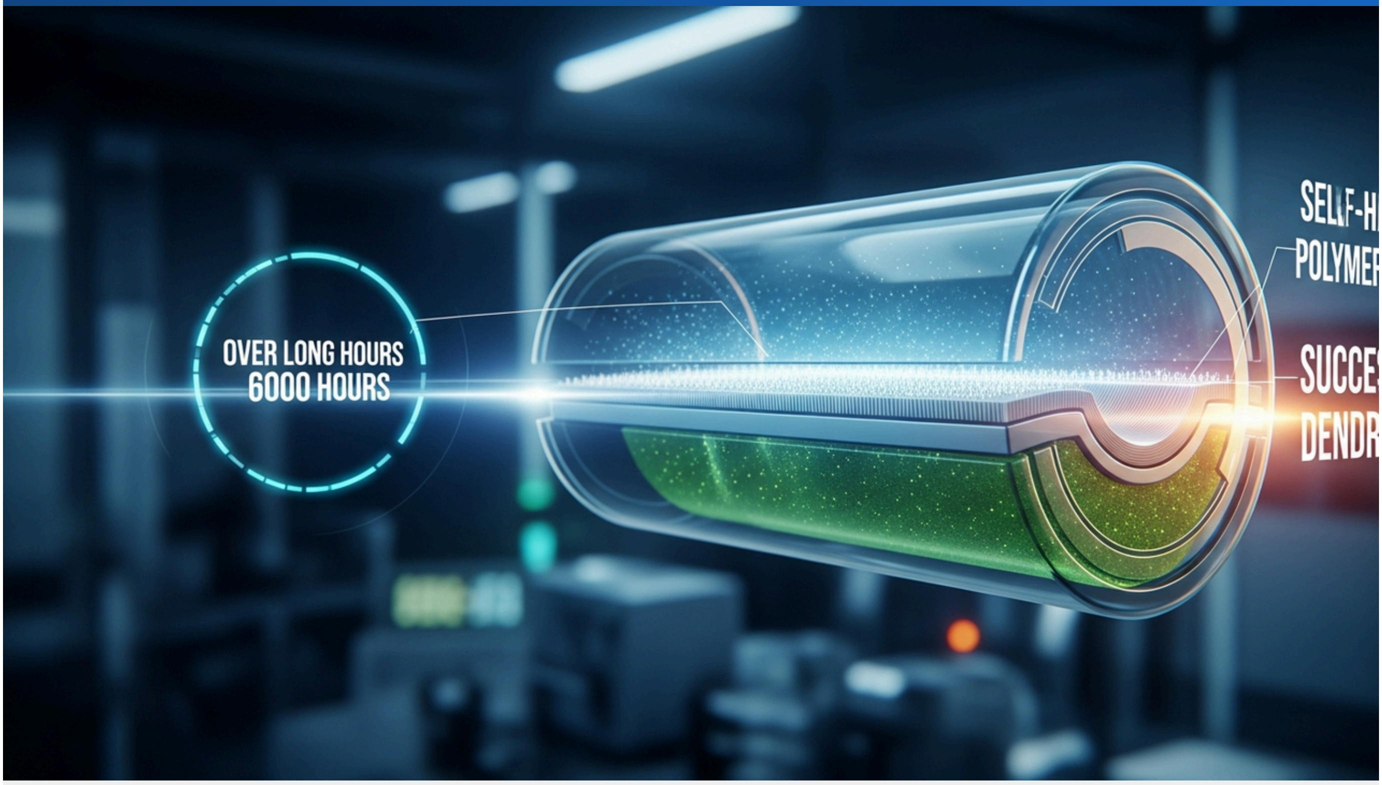
Strategic Significance & Outlook

The advent of this novel proton-conducting electrolyte holds the potential for a paradigm shift in both the safety and performance of large-scale energy storage. A substantial reduction in fire risk would broaden the permissible deployment environments for battery systems, extending their reach from residential installations to critical grid infrastructure, and significantly accelerating renewable energy integration. While future research efforts will naturally concentrate on optimizing the electrolyte's long-term durability, cost-effectiveness, and seamless integration into practical battery cell designs, this technology is poised to become a cornerstone in the development of robust and sustainable energy infrastructure for the future.

Source: https://www.techbriefs.com/component/content/article/55256-safer-batteries-for-storing-energy-at-massive-scale

Self-Healing Polymer Electrolyte Achieves Over 6000 Hours Ultra-Long Lifespan in All-Solid-State Lithium Metal Batteries, Successfully Suppressing Dendrite Growth

Published June 10, 2026 ACS Applied Energy Materials (Journal) Unknown



OVERVIEW

A research report describes a polyether-urethane-based self-healing solid polymer electrolyte (SPE) incorporating disulfide bonds and hydrogen bonds, achieving an impressive symmetric lithium cell lifespan exceeding 6000 hours (3000 cycles) at a current density of 0.2 mA cm^{-2}. This SPE successfully suppresses dendrite growth and maintains stable electrode-electrolyte contact over extended periods. Furthermore, SPE_TF/TMI-20, with its semi-interpenetrating dynamic network, also demonstrated stable Li plating/stripping at 0.5 mA cm^{-2}, significantly advancing interfacial stability and degradation suppression for lithium metal batteries.

IN DEPTH

Key Findings

To address one of the most significant challenges in all-solid-state lithium metal batteries (ASSLMBs)—dendrite formation and interfacial degradation—researchers have developed a polyether-urethane-based self-healing solid polymer electrolyte (SPE) that integrates both disulfide and hydrogen bonds. This innovative SPE has achieved an ultra-long lifespan exceeding 6000 hours (3000 cycles) in symmetric lithium cells at a current density of 0.2 mA cm^{-2}, successfully suppressing dendrite growth and maintaining long-term electrode-electrolyte contact.

Technical & Clinical Details

- The developed polyether-urethane-based SPE possesses self-healing and external recovery capabilities by incorporating both reversible disulfide bonds and dynamic hydrogen bonds into its molecular structure. This allows the electrolyte layer to self-repair minor damage and suppress dendrite formation that occurs during lithium-ion charge-discharge cycles, maintaining its integrity.
- In symmetric lithium cell (Li||Li) tests, the SPE demonstrated extremely stable operation for over 6000 hours or 3000 cycles at a practical current density of 0.2 mA cm^{-2}. This represents a groundbreaking improvement in the cycle life of lithium metal batteries.
- This SPE effectively inhibits dendrite (tree-like crystal) growth both physically and chemically. Dendrites are a primary cause of internal short circuits, severely compromising battery safety and lifespan.
- Furthermore, SPE_TF/TMI-20, featuring a semi-interpenetrating dynamic network structure, also exhibited stable lithium plating/stripping behavior at 0.5 mA cm^{-2}. This network further promotes electrode-electrolyte interfacial stability and contributes to the suppression of interfacial degradation.

Background & Context

Lithium metal batteries are theoretically capable of approximately ten times the energy density of current lithium-ion batteries, making them a highly anticipated next-generation technology for dramatically extending the range of electric vehicles (EVs). However, dendrite formation during the charge-discharge cycles of lithium metal anodes, along with the resulting unstable interface with the electrolyte, has been the greatest challenge to ensuring safety and long cycle life. The advent of self-healing SPEs offers a fundamental solution to these long-standing issues, potentially accelerating the practical application of lithium metal batteries.

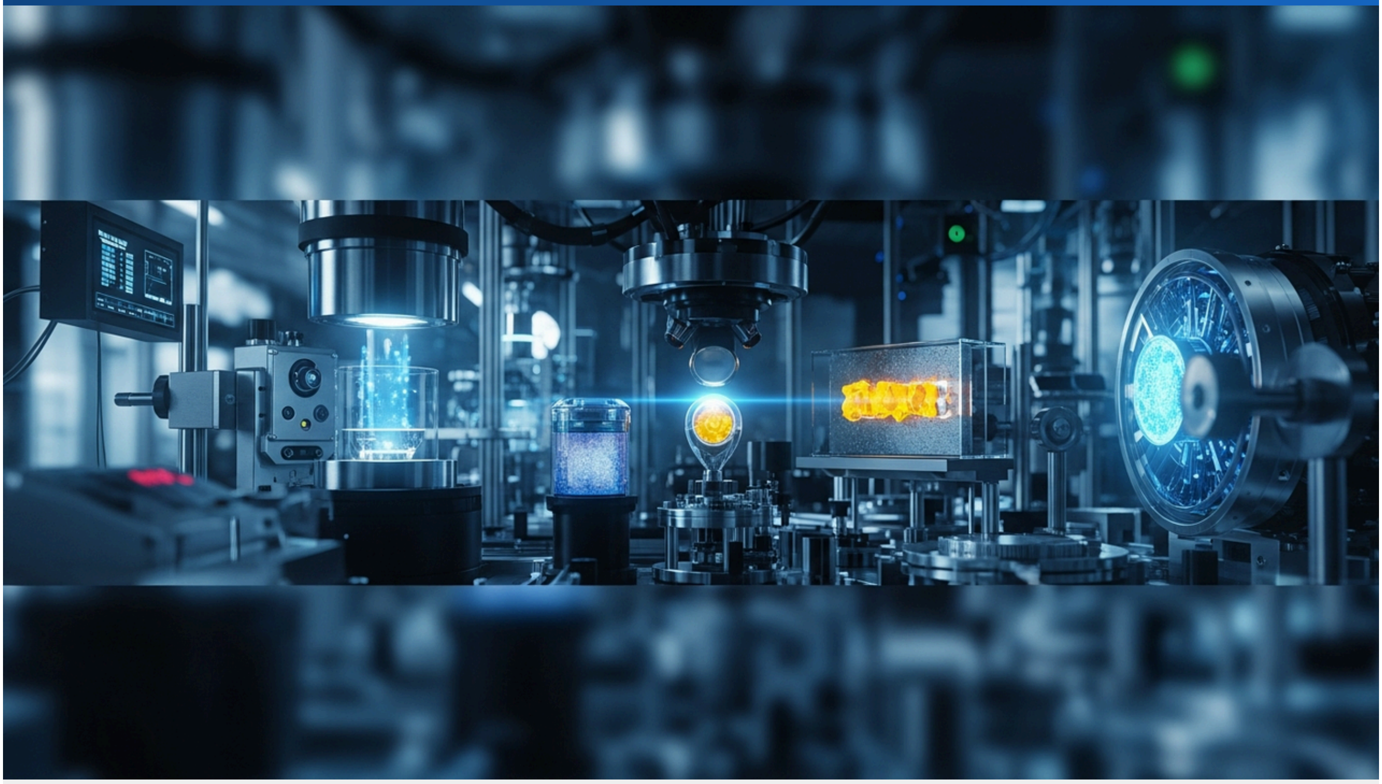
Strategic Significance & Outlook

The success of this self-healing SPE represents a significant advancement in the development of high-performance and safe all-solid-state lithium metal batteries. The achievement of an ultra-long lifespan is particularly crucial for reducing EV battery replacement frequency and lowering total ownership costs. Future efforts will focus on scaling up the manufacturing process for this SPE, validating its performance at higher current densities, and applying it to actual full cells (e.g., lithium metal/cathode material). If commercialized, this technology is expected to revolutionize a wide range of fields, including electric vehicles, drones, portable electronic devices, and large-scale energy storage.

Source: https://pubs.acs.org/doi/10.1021/acsaem.6c01052

Next-Gen Battery IP Heats Up: Qianmo New Mat, SK On Lead Charge in All-Solid-State Cathode and Electrolyte Patents

Published Published June 10, 2026 GLOBAL IP NEWS (中国国家知識産権局、世界知的所有権機関) China



OVERVIEW

The race for next-generation battery supremacy is intensifying, with Qianmo New Mat Jiaxing and SK On filing key patent applications for all-solid-state lithium battery composite cathodes and solid electrolytes. This surge in intellectual property, including advancements from Tsinghua and Xiamen Knano, underscores a global push to secure competitive advantages in materials crucial for future EVs and energy storage systems.

IN DEPTH

Background

The global landscape for battery technology is experiencing an unprecedented surge in investment and research and development, particularly in next-generation solutions like all-solid-state batteries. This acceleration is fueled by the explosive growth across electric vehicles (EVs), portable electronics, and renewable energy storage systems. Against this backdrop, the increasing volume of patent filings signals a strategic imperative for companies to assert technological superiority and secure future market dominance. Notably, China and South Korea, already central to the global battery supply chain, are reinforcing their technological leadership through heightened intellectual property activity.

Key Developments

Reflecting the rapid advancements in next-generation battery technology, a concentrated effort by leading companies and research institutions to secure intellectual property in all-solid-state lithium batteries is underway. Qianmo New Mat Jiaxing Co Ltd has notably published a patent application (CN202511934948) detailing composite cathodes and their manufacturing processes, crucial for enhancing all-solid-state battery performance. Concurrently, SK On Co Ltd, in collaboration with the Korea Research Institute of Chemical Technology, has filed patents for solid electrolyte compositions and the solid electrolytes themselves, along with their application in lithium secondary batteries. This surge in patent activity underscores tangible progress towards the commercialization of these advanced battery technologies, addressing critical bottlenecks in energy density, safety, and durability.

Technical Deep Dive

- **Qianmo New Mat Jiaxing Co Ltd's (CN202511934948) patent application** addresses composite cathodes and their manufacturing methods, vital for elevating the performance of all-solid-state lithium batteries. These composite structures are designed to mitigate interfacial resistance between active materials and solid electrolytes, thereby preserving high ionic conductivity and enabling superior energy density and stability.

- **The joint patent application by SK On Co Ltd and the Korea Research Institute of Chemical Technology** covers novel compositions for forming solid electrolytes, the solid electrolytes themselves, and their integration into lithium secondary batteries. As the foundational component of all-solid-state batteries, improvements in solid electrolyte ionic conductivity, mechanical robustness, and chemical stability are paramount for achieving competitive advantages.
- **Tsinghua Shenzhen International Graduate School** has also secured a patent for multi-element co-doped single-crystal high-nickel cathode materials. This innovation is poised to enhance the energy density and extend the cycle life not only for emerging all-solid-state applications but also for high-performance conventional lithium-ion batteries.
- **Xiamen Knano Graphene Technology** has filed a patent for graphene-coated lithium-ion battery anode materials. This technology is expected to play a role in suppressing electrode material degradation, thereby contributing to improved battery longevity and advanced fast-charging capabilities.

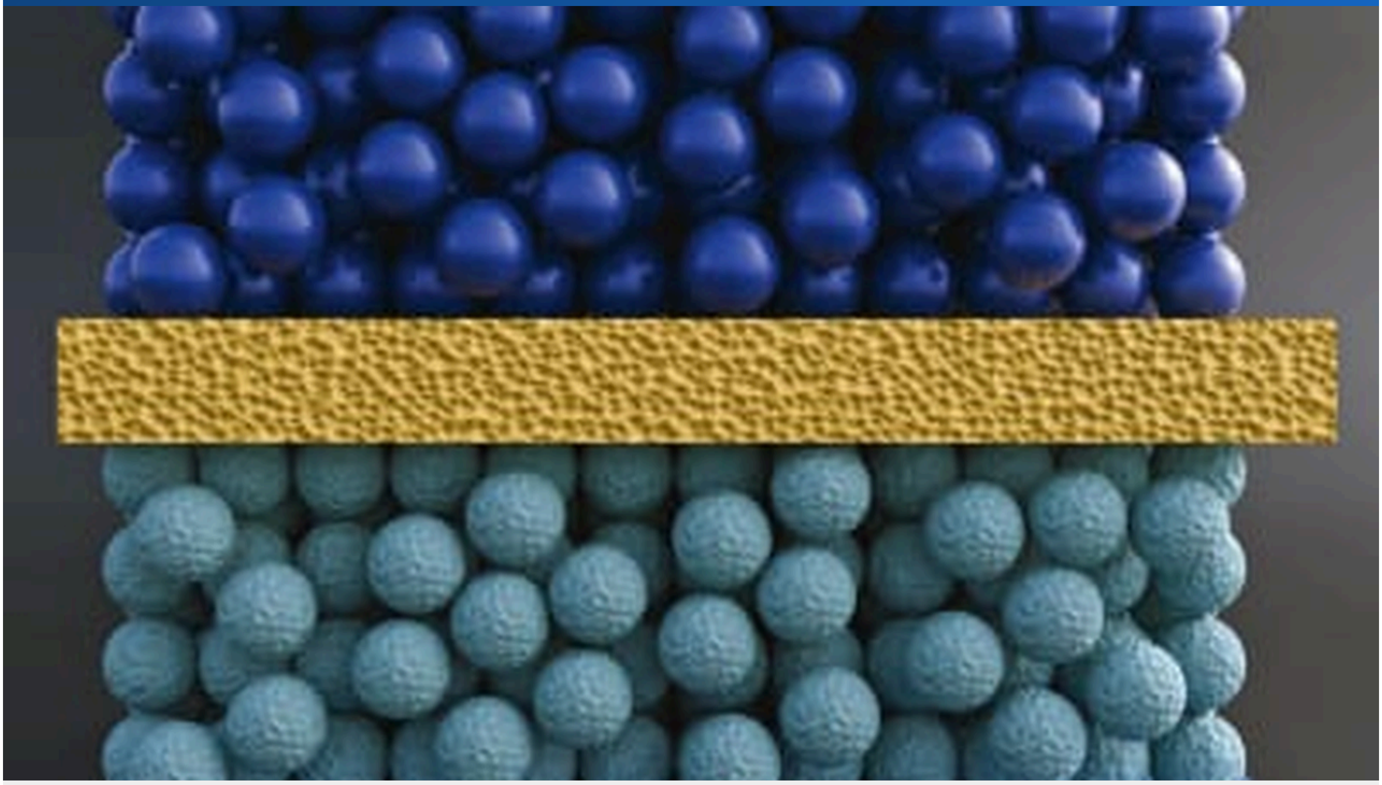
Strategic Significance & Outlook

The successful integration of these patented technologies into commercial products is anticipated to drive significant advancements in battery performance and cost efficiency. The strategic securing of intellectual property rights remains a critical differentiator, continuously shaping technological innovation and fostering a sustainable competitive environment within the rapidly evolving battery industry.

Source: #

Thiophene-Enabled 'Intelligent' Interface Stabilizes Lithium Metal Batteries for Fast Charging and Extended Lifespan

Published Published June 08, 2026 Tech Briefs (KAIST研究を引用) South Korea



OVERVIEW

Researchers from KAIST and Korea University have developed a novel approach to stabilize lithium metal batteries by incorporating thiophene into the electrolyte. This creates an 'intelligent protective layer' that dynamically reconfigures its electronic structure to guide stable lithium ion movement, effectively suppressing dendrite formation even under high current densities (>4 mA/cm^2). This breakthrough promises safer, longer-lasting, and fast-charging lithium metal batteries, critical for applications like ultra-long-range EVs and Urban Air Mobility.

IN DEPTH

Background

Lithium metal batteries are widely recognized as a leading candidate for next-generation energy storage, offering a theoretical energy density up to ten times greater than conventional lithium-ion batteries. This potential could dramatically extend the range of electric vehicles (EVs) and power other high-demand applications. However, their widespread adoption has been hampered by critical issues: the uncontrolled growth of lithium dendrites on the anode during charge-discharge cycles, and the resulting unstable solid-electrolyte interphase (SEI). This interfacial instability, fundamentally rooted in non-uniform electron and ion transport, has posed a significant challenge to battery safety and longevity, resisting fundamental solutions until now.

Key Findings

A collaborative research team, spearheaded by Professor Seung-Choi Nam of KAIST (Korea Advanced Institute of Science and Technology) and Professor Sang-Kyu Kwak of Korea University, has made a pivotal advance in lithium metal battery technology. They have fundamentally resolved the persistent 'interfacial instability' challenge at the electronic structure level, leading to the successful suppression of dendrite growth under fast-charging conditions and a significant extension of battery lifespan.

The core innovation involves incorporating a small amount of thiophene into the electrolyte to form an 'intelligent protective layer' on the lithium metal anode. Unlike static barriers, this layer dynamically rearranges its electronic structure throughout charge-discharge cycles. This dynamic reordering actively creates optimal, uniform pathways for lithium ions, ensuring their stable movement along the electrode surface and effectively preventing the chaotic, tree-like growth of lithium dendrites.

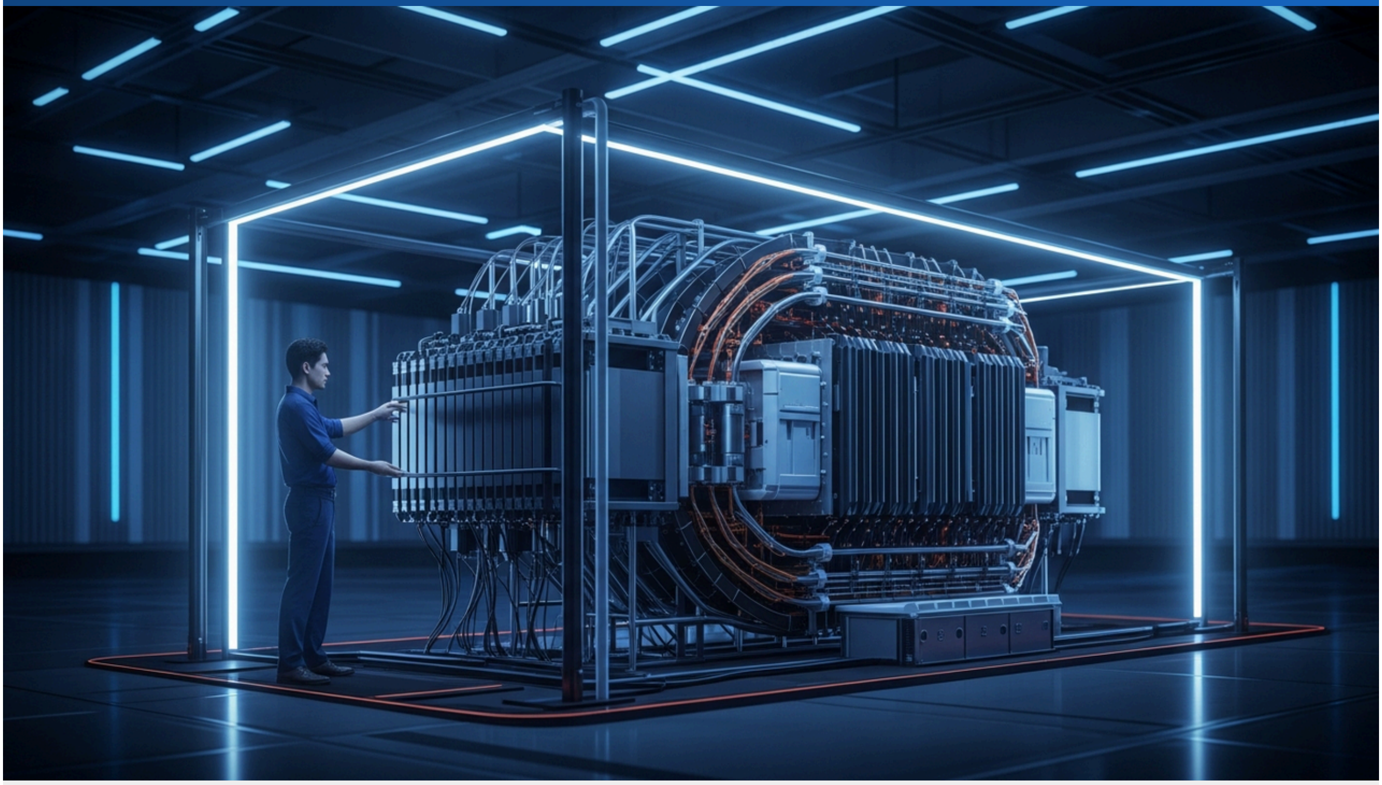
Experimental validation demonstrated the robust inhibition of dendrite formation, even under aggressive current densities exceeding 4 mA/cm^2 – a regime characteristic of high-speed charging. This achievement marks a critical step towards simultaneously realizing both rapid charging capabilities and extended cycle life, a combination previously difficult to attain with conventional approaches. By mitigating dendrite growth, the technology inherently reduces safety hazards associated with internal short circuits, thereby dramatically enhancing battery longevity.

This significant breakthrough is expected to accelerate the commercialization of lithium metal batteries, particularly for applications demanding high energy density and fast charging. It holds transformative potential for ultra-long-range electric vehicles (EVs), Urban Air Mobility (UAM), and advanced high-density energy storage systems. Moving forward, the team plans to focus on scaling up manufacturing, enhancing cost-effectiveness, and conducting comprehensive long-term performance evaluations in full lithium metal/cathode cells, paving the way for a new era of high-performance mobility solutions.

Source: https://www.techbriefs.com/component/content/article/55254-lithium-metal-battery-issue-might-be-solved

Solid-State Batteries for Drones: 320 Wh/kg Energy Density Promises Extended Flight Time and Enhanced Safety

Published June 08, 2026 Shenzhen Ebattery Technology Co., Ltd. (ZYE News) China



OVERVIEW

Commercial-grade UAV solid-state battery packs are reaching approximately 320 Wh/kg energy density, suggesting significant potential for extended flight times, increased payload capacity, and reduced battery replacement frequency for drones. The use of solid electrolytes inherently lowers flammability and prevents leakage, thus improving fire safety and thermal stability. For commercial UAV markets in surveying, security, agriculture, and industrial inspection, these advantages are expected to provide substantial value, greatly enhancing operational efficiency and safety.

IN DEPTH

Key Findings

The adoption of all-solid-state batteries for drone applications is poised to bring significant operational benefits, with commercial UAV solid-state battery packs achieving an energy density of approximately 320 Wh/kg. This advancement promises extended flight times, increased payload capacity, and reduced battery replacement frequency. Furthermore, the inherent use of solid electrolytes dramatically lowers the risk of fire and enhances thermal stability, thereby bolstering drone safety and reliability.

Technical & Clinical Details

- Currently, commercial UAV (Unmanned Aerial Vehicle) solid-state battery packs have achieved an energy density of approximately 320 Wh/kg. This is a high figure compared to conventional lithium-ion batteries used in drones, with even higher energy densities expected at the laboratory level.
- High energy density significantly extends drone flight duration, enabling broader mission execution without battery swaps. Alternatively, for the same flight time, lighter batteries can be integrated, increasing payload capacity and allowing for the inclusion of more sophisticated sensors or additional equipment.
- All-solid-state batteries eliminate the need for flammable liquid electrolytes, resulting in an extremely low risk of fire and no concerns about leakage. This drastically reduces the danger of thermal runaway caused by overcharging or external impact, thereby enhancing operational safety for drones.
- Superior thermal stability ensures consistent battery performance even under extreme temperature conditions, allowing drones to operate reliably in a wider range of environments.

Background & Context

The drone market is experiencing rapid growth across diverse sectors, including surveying, security, agriculture, logistics, and industrial inspection. These commercial applications demand long flight durations, high reliability, and, critically, enhanced safety. Conventional drone batteries, particularly lithium-ion cells, have faced limitations in flight time and risks of thermal events, which have constrained further drone proliferation and functional expansion. All-solid-state batteries are emerging as a groundbreaking solution to these challenges.

Strategic Significance & Outlook

For drone pilots, the advantages of all-solid-state batteries directly translate into improved operational efficiency and safety, offering substantial value that justifies their cost. Especially in professional drone missions requiring extended flight capabilities and high safety, solid-state batteries will become an indispensable technology. As manufacturing costs for all-solid-state batteries are further optimized, their penetration into broader drone markets is anticipated to increase. This technology holds the potential to accelerate the growth of the drone industry and foster the creation of new services and applications.

Source: https://www.zyebattery.com/news/is-a-solid-state-battery-worth-it-for-drone-pilots.html

Collected: June 12, 2026 | Automated Research System (Gemini API)

Donut Lab Under Investigation After 'Miracle Solid-State Battery' Exposed as Repackaged Li-ion Cells

Published Published June 09, 2026 Tom's Hardware フィンランド

OVERVIEW

Finnish startup Donut Lab, which secured substantial investment for its 'miracle' solid-state battery claiming breakthrough performance at CES 2026, is now under investigation. Independent third-party analysis has revealed the product to be conventional lithium-ion cells in new packaging. This incident underscores the critical need for rigorous technical validation and transparency in the high-stakes solid-state battery development sector.

IN DEPTH

Background

All-solid-state batteries are garnering significant global attention from automakers, battery manufacturers, and investors as a pivotal next-generation technology poised to dramatically enhance the range, safety, and charging speed of electric vehicles (EVs). While the immense potential of this technology fuels high market expectations for any announced breakthroughs, the formidable challenges inherent in their development can sometimes lead to overstated claims or even fabrication. The recent Donut Lab incident starkly illuminates the disparity between these expectations and the technical realities, underscoring the paramount importance of robust technical validation in investment decisions.

Key Findings

Finnish startup Donut Lab, which had secured significant investment following its prominent announcement at CES 2026 of a 'miracle solid-state battery' boasting extraordinary performance specifications—400 Wh/kg energy density, 100,000 cycles, and 5-minute charging—is now under investigation. Independent third-party tests have conclusively revealed the company's product to be repackaged conventional lithium-ion batteries, challenging its claims of groundbreaking all-solid-state technology.

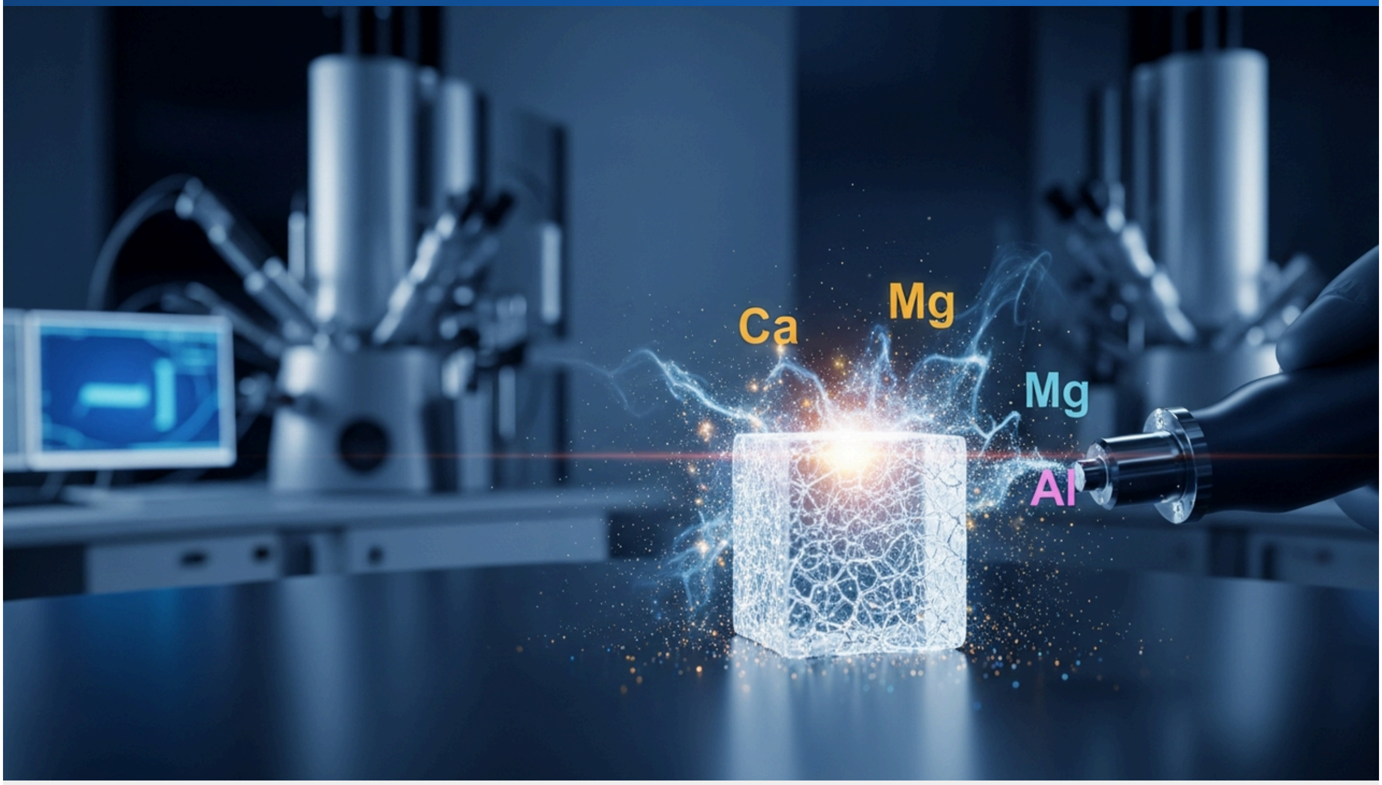
Donut Lab had consistently maintained that its battery was an 'all-solid-state battery,' capable of achieving performance metrics that vastly exceed the current state-of-the-art in battery technology. Had these figures been genuine, they would represent a revolutionary leap for the battery industry, particularly for electric vehicles. However, detailed technical analysis and testing conducted by independent organizations confirmed that the battery exhibited the chemical composition and operational characteristics indicative of existing lithium-ion systems, providing definitive evidence that it was not an all-solid-state battery. This critical discovery emerged after a highly publicized CES launch and subsequent substantial investment rounds, including a $25 million raise at a $1.25 billion valuation. Prior to these third-party tests, internal sources had already raised concerns about the veracity of Donut Lab's asserted specifications.

This incident profoundly impacts the future trajectory of battery technology development and the investment environment. It is anticipated to heighten industry-wide emphasis on transparency and independent third-party validation for startups presenting innovative technologies. For investors, due diligence protocols are expected to become considerably more stringent, demanding a deeper and more critical understanding of intricate technical details. The Donut Lab case is poised to serve as an enduring cautionary tale, crucial for distinguishing legitimate technological advancements from speculative or unfounded claims in the vital and rapidly evolving field of solid-state batteries.

Source: https://www.tomshardware.com/tech-industry/startups-miracle-solid-state-battery-actually-uses-lithium-ion-chemistry-according-to-third-party-tests-donut-lab-raised-usd25m-and-is-valued-at-usd1-25b-on-what-now-appear-to-be-debunked-claims

Cation Doping with Ca, Mg, Al Enhances Ionic Conductivity and Lowers Activation Energy in Halide Solid Electrolytes

Published June 04, 2026 ACS Sustainable Chemistry & Engineering (Journal) Unknown



OVERVIEW

Research on halide solid electrolytes (Li_3InCl_6 and Li_3ScCl_6) for all-solid-state lithium batteries demonstrates that cation doping with elements like Ca, Mg, and Al promotes cooperative ion migration, optimizing ionic conductivity and activation energy. Specifically, certain doped structures, such as $Li_{2.5}InCa_{0.25}Cl_6$ and $Li_{2.5}ScMg_{0.25}Cl_6$, achieve the highest conductivity and lowest activation energy, significantly improving ion transport efficiency. This discovery provides new guidelines for designing high-performance halide solid electrolytes.

IN DEPTH

Key Findings

In research aimed at improving all-solid-state lithium battery performance, it has been discovered that cation doping with elements such as Ca, Mg, and Al significantly enhances the ionic conductivity and reduces the activation energy of halide solid electrolytes (Li_3InCl_6 and Li_3ScCl_6). Specifically, certain doped structures, including $Li_{2.5}InCa_{0.25}Cl_6$ and $Li_{2.5}ScMg_{0.25}Cl_6$, exhibit optimal conductivity and the lowest activation energy, contributing substantially to improved ion transport efficiency. This finding provides novel guidelines for the design of high-performance halide solid electrolytes.

Technical & Clinical Details

- The study employed a method of doping small amounts of cation elements with different valences, such as Ca, Mg, and Al, into the crystal structure of halide solid electrolytes. This doping strategy allowed for the precise tuning of lithium ion vacancy concentrations within the electrolyte, optimizing the pathways for lithium ion migration.
- The doped cations were observed to increase the ionic potential (ratio of ionic charge to radius), which in turn promotes cooperative ion migration—a phenomenon where multiple ions move in a concerted manner. Cooperative migration is a critical mechanism for efficient ion transport within solid electrolytes.
- As a result, the doped electrolytes exhibited significantly higher ionic conductivity and lower activation energy required for ion migration compared to their undoped counterparts. This suggests that batteries using these electrolytes could perform better at low temperatures and enable faster charging and discharging.
- Specific optimal compositions, such as $Li_{2.5}InCa_{0.25}Cl_6$ and $Li_{2.5}ScMg_{0.25}Cl_6$, were identified, indicating their potential as new benchmarks for high-performance halide solid electrolytes.

Background & Context

All-solid-state batteries are considered a next-generation technology poised to resolve the safety and energy density issues of conventional liquid-electrolyte lithium-ion batteries. Among various candidates, halide solid electrolytes are regarded as promising due to their high ionic conductivity, excellent chemical stability, and relatively good processability. However, further improvements in ionic conductivity and interfacial stability, including suppression of dendrite formation, were crucial for their enhanced performance and practical application. This research addresses these challenges from a materials design perspective.

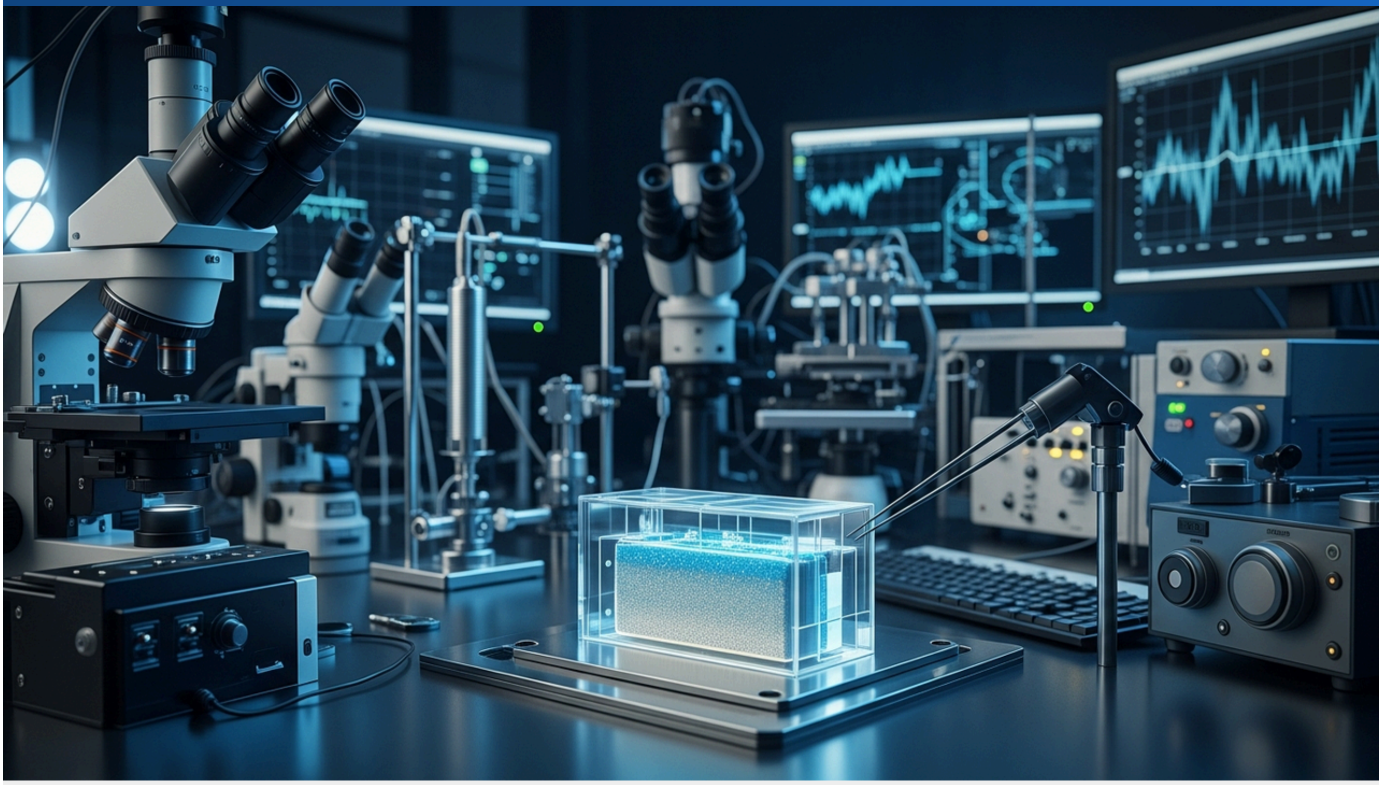
Strategic Significance & Outlook

This cation doping strategy opens new avenues for the molecular design of high-performance halide solid electrolytes. Improvements in ionic conductivity and reductions in activation energy directly translate to enhanced energy density, power output, low-temperature performance, and lifespan of all-solid-state batteries. Moving forward, it is anticipated that these optimized doped halide electrolytes will be integrated into actual all-solid-state battery cells for practical validation. This technology holds the potential to contribute to the realization of next-generation batteries for a wide range of applications demanding high power and safety, including electric vehicles (EVs), portable electronic devices, and aerospace.

Source: https://pubs.acs.org/doi/10.1021/acssuschemeng.6c01721

PVDC-Modified PVDF-HFP Electrolyte Achieves Over 3000 Hours Stable Cycling and High Capacity Retention in All-Solid-State Lithium Metal Batteries

Published June 09, 2026 ACS Applied Materials & Interfaces (Journal) Unknown



OVERVIEW

Research on a molecularly designed PVDF-HFP electrolyte modified with PVDC (PH-PVDC SPE) for high-performance all-solid-state lithium metal batteries has been published. The optimized PH-PVDC-10% SPE exhibited a high ionic conductivity of 7.07×10^{-4} S cm^{-1}, a lithium-ion transference number of 0.62, and excellent interfacial stability, enabling over 3000 hours of stable cycling in Li||Li symmetric cells. Li||LFP cells achieved 97.5% capacity retention after 300 cycles at 0.5C, and Li||NCM811 cells showed 90.3% retention after 100 cycles at 0.2C, demonstrating PVDC's role in forming a LiCl-LiF composite SEI layer to suppress dendrite growth.

IN DEPTH

Key Findings

Towards the realization of high-performance all-solid-state lithium metal batteries (ASSLMBs), a molecularly designed solid polymer electrolyte (PH-PVDC SPE) has been developed. This electrolyte modifies polyvinylidene fluoride-hexafluoropropylene (PVDF-HFP) with polyvinylidene chloride (PVDC). The optimized PH-PVDC-10% SPE achieves high ionic conductivity, a favorable lithium-ion transference number, and excellent interfacial stability, enabling stable cycling for over 3000 hours in Li||Li symmetric cells.

Technical & Clinical Details

- The developed PH-PVDC-10% SPE demonstrated a high ionic conductivity of 7.07×10^{-4} S cm^{-1} and a lithium-ion transference number (contribution ratio of Li^+) of 0.62. High ionic conductivity reduces internal battery resistance and improves charge-discharge efficiency.
- This SPE exhibited excellent interfacial stability with the Li metal anode, achieving remarkably stable charge-discharge cycling in Li||Li symmetric cells for over 3000 hours. This suggests effective suppression of lithium dendrite growth.
- In practical battery cell tests, a Li||LFP cell, combining a Li metal anode with a lithium iron phosphate (LFP) cathode, achieved a high capacity retention of 97.5% after 300 cycles at a fast charge/discharge rate of 0.5C.
- Furthermore, a Li||NCM811 cell, using a high-nickel cathode (NCM811), maintained a capacity retention of 90.3% after 100 cycles at a 0.2C rate. This demonstrates high compatibility with various cathode materials.
- The PVDC modification is suggested to promote the formation of a LiCl-LiF composite solid electrolyte interphase (SEI) layer, which plays a crucial role in inhibiting lithium dendrite growth.

Background & Context

All-solid-state lithium metal batteries are considered superior to conventional liquid-electrolyte lithium-ion batteries in terms of higher energy density, enhanced safety, and longer lifespan, making them highly anticipated next-generation batteries for electric vehicles (EVs) and portable electronic devices. However, ensuring interfacial stability between the lithium metal anode and the solid electrolyte, and suppressing lithium dendrite growth, have been major challenges for practical implementation. Polymer solid electrolytes, in particular, are considered promising due to their flexibility and simpler manufacturing processes, but improvements in ionic conductivity and mechanical strength have been required.

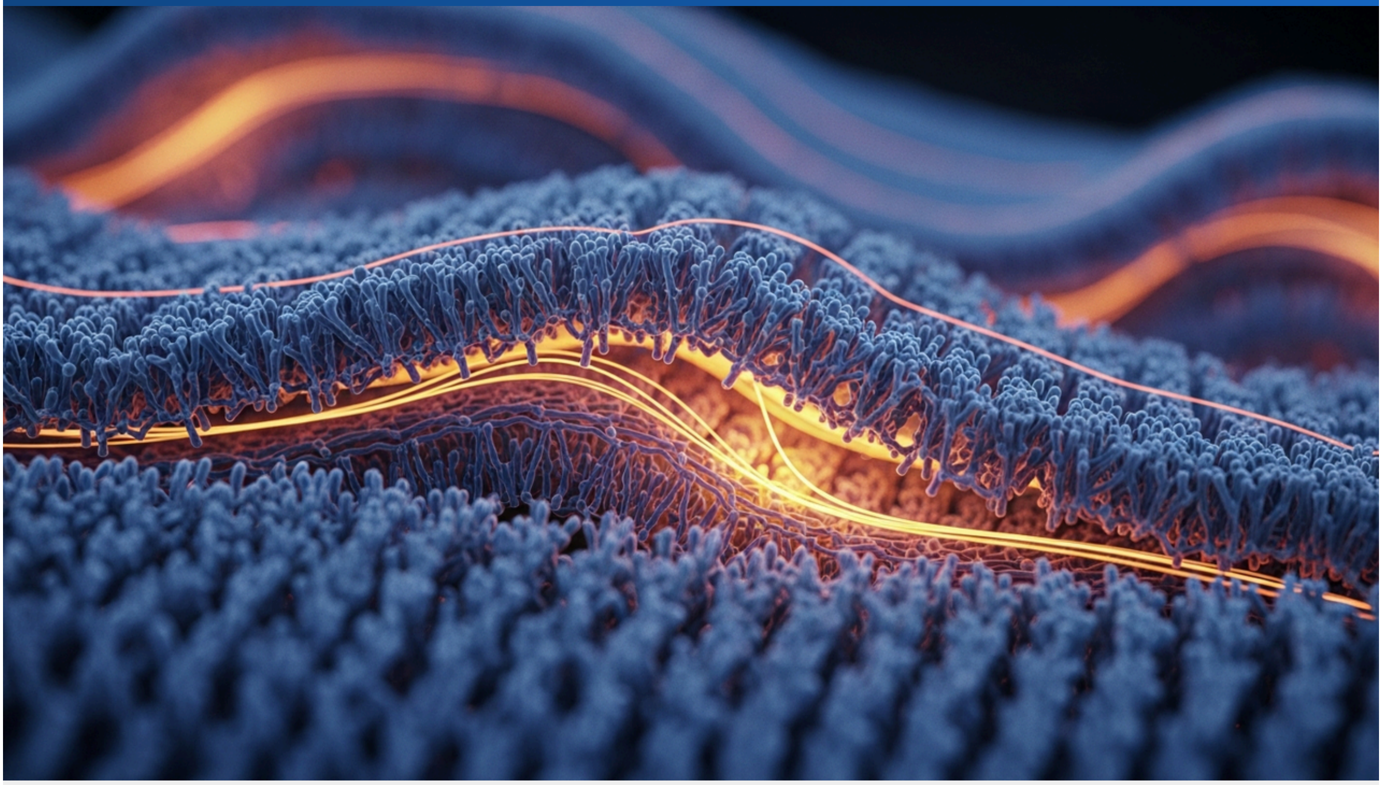
Strategic Significance & Outlook

The development of this PVDC-modified PVDF-HFP electrolyte significantly advances the practical application of high-performance all-solid-state lithium metal batteries. The ability to achieve both long lifespan and high capacity retention directly translates to extended EV driving ranges and improved battery reliability. Future efforts will focus on reducing the manufacturing cost and scaling up this SPE, as well as evaluating its long-term reliability under more demanding conditions. If commercialized, this technology is expected to have a revolutionary impact on a wide range of sectors, including next-generation electric vehicles, aerospace, and high-capacity electronic devices.

Source: https://pubs.acs.org/doi/10.1021/acsami.6c05642

Nanofiber-Constructed Composite Polymer Electrolyte Enhances Lithium-Sulfur Battery Performance with Dual-Pathway Li^+ Transport and Catalytic Sulfide Interface

Published June 08, 2026 ResearchGate (PDF) Unknown



OVERVIEW

A nanofiber-constructed hybrid composite polymer electrolyte (CPE) integrating poly(ionic liquid)-modified aramid nanofibers (PIL@ANFs) and sulfide-based lithium thiophosphate (Li3PS4, LPS) nanoparticles has been developed for lithium-sulfur (Li-S) batteries. This CPE exhibits high ionic conductivity (~10^{-3} S cm^{-1}), a high Li^+ transference number (>0.7), and robust interfacial stability at 60°C. The PIL coating forms a 3D Li^+ transport scaffold, while LPS nanoparticles reinforce the mechanical framework and provide a catalytic sulfide interface, significantly improving Li-S battery performance.

IN DEPTH

Key Findings

To significantly enhance the performance of lithium-sulfur (Li-S) batteries, an innovative nanofiber-constructed hybrid composite polymer electrolyte (CPE) has been developed. This CPE integrates poly(ionic liquid)-modified aramid nanofibers (PIL@ANFs) with sulfide-based lithium thiophosphate (Li3PS4, LPS) nanoparticles. The new CPE demonstrates high ionic conductivity of approximately 10^{-3} S cm^{-1}, a high lithium-ion transference number (Li^{+} contribution ratio) exceeding 0.7, and robust interfacial stability even at 60°C.

Technical & Clinical Details

- The developed composite polymer electrolyte (CPE) primarily consists of two innovative components. One is poly(ionic liquid)-modified aramid nanofibers (PIL@ANFs), which construct a 'dual pathway' for Li^{+} transport. These PIL-coated nanofibers function as a three-dimensional scaffold for Li^{+} transport, enhancing ionic conductivity.
- The other key component is sulfide-based lithium thiophosphate (Li3PS4, LPS) nanoparticles, which increase the mechanical strength of the CPE and simultaneously provide a catalytic sulfide interface. LPS nanoparticles also act as a catalyst, promoting the reaction of the sulfur cathode and suppressing the polysulfide shuttle effect in Li-S batteries.
- This hybrid composite achieves both high ionic conductivity (approximately 10^{-3} S cm^{-1}) and a high Li^{+} transference number (>0.7). This signifies that lithium ions efficiently move within the electrolyte and constitute the majority of charge carriers in the electrolyte.
- Furthermore, robust interfacial stability was confirmed even in high-temperature environments of 60°C. This is highly important for extending the practical operating temperature range of Li-S batteries and improving their reliability.

Background & Context

Lithium-sulfur batteries theoretically possess an energy density approximately five times higher than conventional lithium-ion batteries and attract significant attention as a next-generation battery due to the low cost and abundance of sulfur. However, low electrical conductivity of sulfur, volume changes during charge-discharge, and the shuttle effect of soluble polysulfides (irreversible loss of active material) have been major challenges hindering their practical implementation. In particular, the interfacial stability between the sulfur cathode and electrolyte is a critical factor determining the cycle life and efficiency of Li-S batteries.

Strategic Significance & Outlook

The development of this nanofiber-constructed CPE offers a comprehensive solution to long-standing challenges in lithium-sulfur batteries. The combination of high ionic conductivity, Li^+ transference number, robust interfacial stability, and catalytic action has the potential to significantly improve the energy density, cycle life, and charge-discharge efficiency of Li-S batteries. Future efforts will focus on scaling up the manufacturing process and reducing the cost of this technology. If commercialized, this CPE is expected to be a powerful driving force for the widespread adoption of Li-S batteries in a wide range of fields requiring high energy density, such as electric vehicles (EVs), aerospace, and large-scale energy storage.

Source: https://www.researchgate.net/publication/406184844_Nanofiber-constructed_composite_polymer_electrolytes_with_dual-pathway_Li_transport_and_catalytic_sulfide_interfaces_for_lithium-sulfur_batteries

YH Research Predicts Global All-Solid-State Battery Isostatic Technology Market to Grow to $276 Million by 2032

Published June 06, 2026 YH Research China

OVERVIEW

This article is an overview of a market research report issued by YH Research. The report forecasts that the global market for isostatic technology—which ensures close contact between electrodes and solid electrolytes in all-solid-state battery manufacturing—will grow from $131 million in 2025 to $276 million by 2032. The compound annual growth rate (CAGR) for the period 2026-2032 is projected to be 8.4%, with global production of isostatic presses reaching approximately 102 units in 2025.

IN DEPTH

Key Findings

This article is an overview of a market research report issued by YH Research.

Report Overview

This market research report focuses on 'isostatic technology,' which is essential in the manufacturing process of all-solid-state batteries. Isostatic technology is used to create uniform and intimate contact between electrodes and solid electrolytes, contributing to improved battery performance. The market under investigation is the global all-solid-state battery isostatic technology industry, with a forecast period from 2026 to 2032.

Key Research Findings

- The global market size for all-solid-state battery isostatic technology is projected to grow from $131 million in 2025 to $276 million by 2032.
- The Compound Annual Growth Rate (CAGR) for the forecast period from 2026 to 2032 is estimated at 8.4%.
- In 2025, the global production volume of isostatic presses reached approximately 102 units.

About the Publisher

YH Research is a global research firm that provides market intelligence reports across various industry sectors. It offers deep insights into the latest market trends, growth opportunities, and competitive landscapes, assisting companies in their strategic planning.

Source: https://www.yhresearch.com/reports/3122592/solid-state-battery-isostatic-technology

Collected: June 12, 2026 | Automated Research System (Gemini API)

YH Research Predicts Solid-State Battery Electrolyte Market to Reach $743 Million by 2032, with 49.7% CAGR

Published June 04, 2026 YH Research China

OVERVIEW

This article is an overview of a market research report published by YH Research. The report forecasts that the global production of solid electrolytes, a key material for all-solid-state and semi-solid-state batteries, will reach approximately 5K metric tons in 2025. The market size is projected to grow from $34.02 million in 2025 to $743 million by 2032. The compound annual growth rate (CAGR) for the period 2026-2032 is estimated at 49.7%, driven by objectives such as enhanced safety, enabling lithium metal anodes, increasing energy density, and stabilizing cell structure.

IN DEPTH

Key Findings

This article is an overview of a market research report issued by YH Research.

Report Overview

This market research report focuses on the solid electrolyte market, which is a key component material for both all-solid-state batteries and semi-solid-state batteries. Solid electrolytes are categorized into main types such as sulfides, oxides, polymers, halides, and composites, primarily aiming to enhance battery safety, enable lithium metal anodes, improve energy density, and stabilize cell structures. The scope of the study covers the global solid electrolyte industry, with a forecast period from 2026 to 2032.

Key Research Findings

- Global production volume of solid electrolytes reached approximately 5,000 metric tons (5K MT) in 2025.
- The global market size for solid electrolytes is projected to grow from $34.02 million in 2025 to $743 million by 2032.
- A very high compound annual growth rate (CAGR) of 49.7% is anticipated for the forecast period from 2026 to 2032.

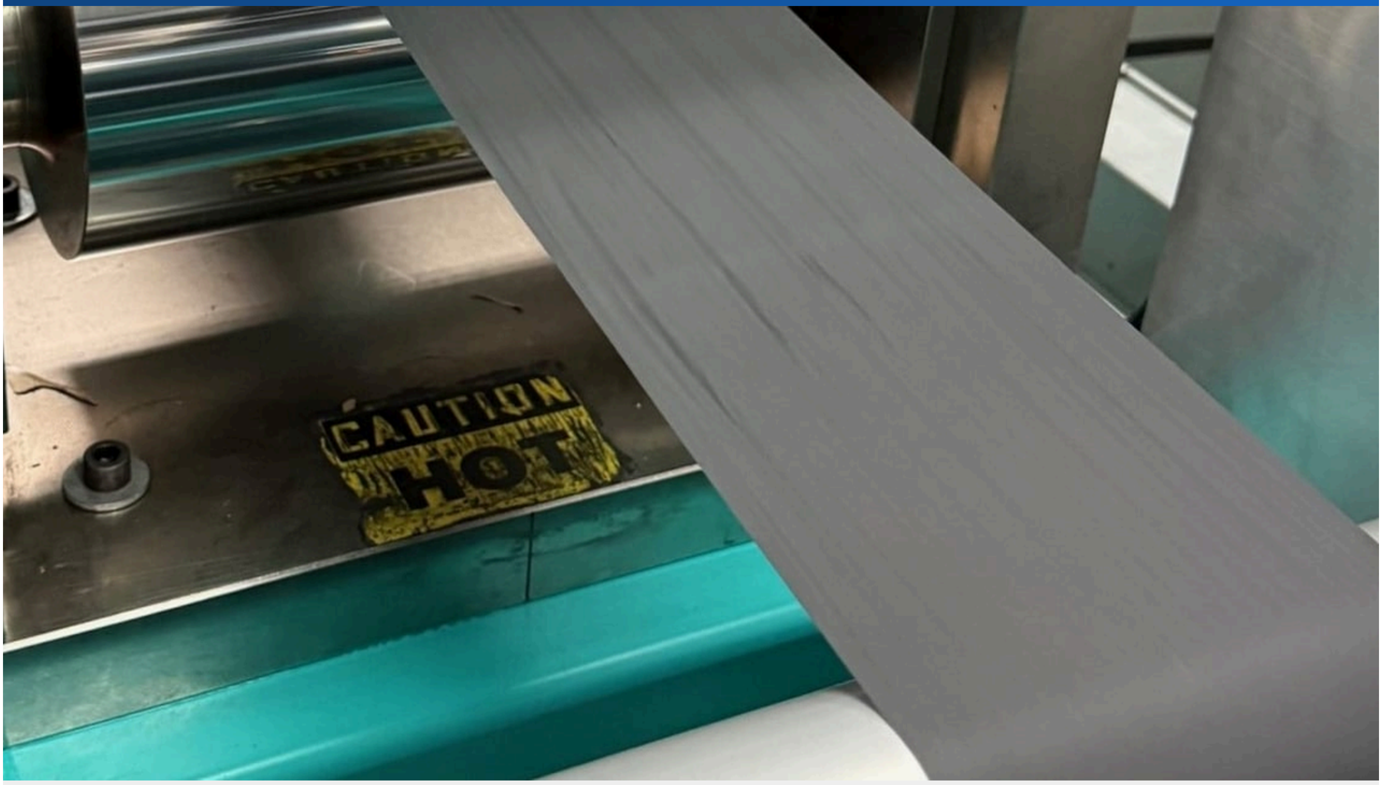
About the Publisher

YH Research is a global research firm that provides market intelligence reports across various industry sectors, including battery technology. It offers insights into market size forecasts, competitive analysis, and technological trends to support strategic decision-making for businesses.

Source: https://www.yhresearch.com/reports/3121643/solid-state-battery-electrolytes

California Energy Commission Awards $11.3 Million Grant to LiCAP Technologies for Solid-State Battery Manufacturing Expansion

Published June 08, 2026 EV Infrastructure News USA



OVERVIEW

The California Energy Commission (CEC) has awarded LiCAP Technologies, a next-generation battery manufacturing company, an $11.3 million grant. This funding will be used to expand LiCAP's proprietary 'Activated Dry Electrode' process for solid-state battery manufacturing and accelerate commercialization. LiCAP plans to integrate AI-powered robotics and intelligent manufacturing systems to enhance manufacturing consistency and scalability, contributing to the strengthening of the U.S. battery supply chain.

IN DEPTH

Key Findings

The California Energy Commission (CEC) has awarded LiCAP Technologies, a company specializing in next-generation battery manufacturing, an $11.3 million grant. This significant funding is designated to help LiCAP expand its manufacturing capacity for all-solid-state batteries using its proprietary 'Activated Dry Electrode' process and to accelerate their commercialization.

Technical & Clinical Details

- LiCAP Technologies has developed the 'Activated Dry Electrode' process, an innovative dry electrode technology that serves as an alternative to conventional wet coating methods. This process significantly reduces energy consumption and manufacturing costs, enabling more environmentally sustainable battery production.
- The grant funds will be utilized to scale up the manufacturing of this groundbreaking dry electrode process. This expansion is expected to enhance throughput and efficiency in the production of solid-state battery cathodes, clarifying the pathway to mass production.
- LiCAP plans to integrate AI-powered robotics and intelligent manufacturing systems into its production processes. This integration will improve manufacturing consistency and reproducibility, ensuring product quality while also boosting production scalability.
- Dry electrode technology offers substantial advantages, particularly for the manufacturing of all-solid-state batteries that employ moisture-sensitive sulfide-based solid electrolytes. It is expected to facilitate excellent interfacial contact between electrode materials and solid electrolytes, thereby improving battery performance and lifespan.

Background & Context

All-solid-state batteries are highly anticipated as a next-generation battery technology for electric vehicles (EVs), promising extended range, fast charging, and enhanced safety. California is a leading state in promoting clean energy and EV adoption, and the CEC's grant program is a crucial policy instrument to support advanced domestic battery technology development and strengthen the supply chain. LiCAP Technologies has garnered increasing industry recognition, notably with Nissan Motor adopting its dry electrode technology for its solid-state battery manufacturing processes.

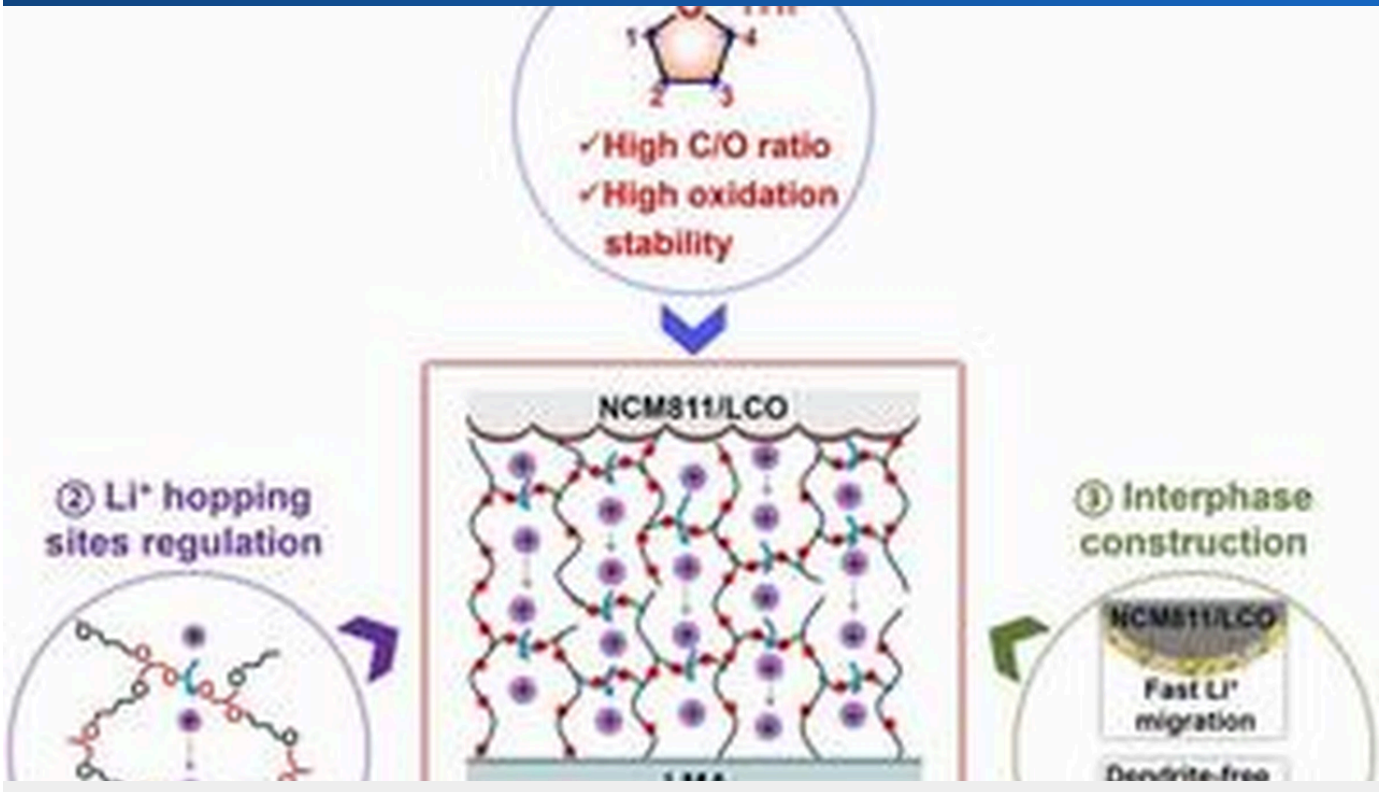
Strategic Significance & Outlook

The $11.3 million grant from the CEC will provide a strong impetus for LiCAP Technologies to substantially expand its solid-state battery manufacturing capacity and accelerate commercialization. The implementation of dry electrode technology alongside AI-powered intelligent manufacturing systems is indispensable for reducing manufacturing costs and stabilizing the quality of solid-state batteries. If successful, this initiative is expected to contribute to strengthening the competitiveness of the battery supply chain not only in California but across the entire U.S., further promoting the adoption of next-generation EVs. LiCAP's technology holds the potential to establish a new standard for mass-producing high-performance batteries in an environmentally responsible manner.

Source: https://www.evinfrastructurenews.com/ev-battery/california-energy-commission-awards-us-11-3m-for-solid-state-battery-manufacturing

Researchers Develop New Polymer Electrolyte Enabling Safer, High-Voltage Lithium Metal Batteries to Function from -40°C to 55°C

Published June 08, 2026 EurekAlert! Unknown



OVERVIEW

Researchers have developed a novel polymer electrolyte that allows lithium metal batteries to operate safely at high voltages and across extreme temperatures, from -40°C to 55°C. This material directly addresses long-standing barriers in next-generation energy storage: poor oxidative stability and insufficient ionic conductivity. By tuning molecular structure and building a cross-linked network, the electrolyte achieves superior electrochemical stability and rapid ion transport, paving new ways for high-performance battery designs.

IN DEPTH

Key Findings

Researchers have developed a groundbreaking polymer electrolyte that simultaneously addresses the key challenges of safety and performance in lithium metal batteries. This novel electrolyte enables stable and safe operation under high voltage across an extreme temperature range from -40°C to 55°C, marking a significant breakthrough for next-generation energy storage systems.

Technical & Clinical Details

- The developed polymer electrolyte is specifically designed to directly tackle the long-standing barriers in lithium metal batteries: 'poor oxidative stability' and 'insufficient ionic conductivity.' These issues have historically limited battery lifespan, safety, and performance across various temperature environments.
- The research team precisely tuned the molecular structure of the electrolyte and constructed a robust cross-linked network to improve these performance characteristics. This cross-linked network enhances the electrolyte's mechanical strength, suppresses dendrite formation, and simultaneously ensures rapid transport pathways for lithium ions.
- Due to this optimized molecular design, the electrolyte exhibits excellent electrochemical stability, maintaining stable operation without degradation even under high voltage conditions.
- As a result, lithium metal batteries equipped with this polymer electrolyte have been demonstrated to perform consistently well across a wide temperature range, from extremely low -40°C to high 55°C. This significantly boosts their practicality for diverse applications such as electric vehicles (EVs), aerospace, and energy storage in severe cold or hot climates.

Background & Context

Lithium metal batteries are theoretically capable of achieving very high energy densities compared to current lithium-ion batteries, making them highly anticipated as the ultimate battery for dramatically extending EV driving ranges. However, safety concerns arising from the high reactivity of lithium metal (dendrite formation and electrolyte degradation) and performance degradation at extreme temperatures have been major obstacles to their commercialization. Specifically, the volatility and flammability issues of liquid electrolytes have been a primary motivation to transition towards polymer electrolytes.

Strategic Significance & Outlook

The development of this new polymer electrolyte has the potential to significantly enhance the safety, performance, and durability of lithium metal batteries. Stable operation across a broad temperature range will not only accelerate the market penetration of EVs but also open new opportunities in fields where battery performance has been a bottleneck, such as Urban Air Mobility (UAM), space exploration, and military applications. Future efforts will focus on scaling up the manufacturing process and reducing the cost of this electrolyte, as well as long-term reliability evaluations, further driving the practical implementation of next-generation battery technology.

Source: https://www.eurekalert.org/news-releases/1131319

Factorial Energy Achieves Nasdaq Listing and $130M Funding, Bolstered by Real-World 1,200 km Solid-State Battery Driving Range Demonstration

Published June 08, 2026 GlobeNewswire / Electrek USA

OVERVIEW

U.S. all-solid-state battery technology developer Factorial Inc. has completed a SPAC business combination and commenced trading on the Nasdaq market under the ticker symbol 'FAC.' The transaction values the company at approximately $1.3 billion and raised over $100 million in gross proceeds to support the commercialization of next-generation batteries for defense, aerospace, hyperscale data centers, and e-mobility. Factorial leverages its proven capability of achieving over 745 miles (1,200 km) real-world driving range with its solid-state batteries to advance partnerships with automakers and expand into drone and robotics sectors.

IN DEPTH

Key Findings

U.S. all-solid-state battery technology developer Factorial Inc. has successfully completed its business combination with a Special Purpose Acquisition Company (SPAC) and has commenced trading on the Nasdaq market under the ticker symbol 'FAC.' This listing values the company at approximately $1.3 billion and has secured over $100 million in gross proceeds, intended to accelerate the commercialization of next-generation battery technologies. The company's primary strength lies in its proven ability to achieve real-world driving ranges exceeding 745 miles (approximately 1,200 km) with its solid-state batteries.

Technical & Clinical Details

- Factorial Energy's all-solid-state batteries have been demonstrated in extensive real-world tests to enable driving ranges beyond 745 miles (approximately 1,200 km). This is a critically important achievement for alleviating consumer range anxiety in electric vehicles (EVs) and enabling long-distance travel.
- The Nasdaq listing aims to raise capital for commercializing the company's next-generation battery technology for diverse industries that require high-performance batteries, including defense, aerospace, hyperscale data centers, and e-mobility (EVs, drones, and robotics).
- Factorial has established partnerships with major automakers, with the initiation of on-road testing of its solid-state batteries in a Stellantis Dodge Charger Daytona development vehicle serving as a prime example. These collaborations indicate the high regard and trust the automotive industry places in Factorial's technology.
- The over $100 million in raised capital is planned to be used for expanding manufacturing capabilities, accelerating research and development, and supporting product launches into the market.

Background & Context

All-solid-state batteries are globally recognized as a technology poised to lead the next wave of the electric vehicle revolution, offering superior energy density, safety, fast-charging capabilities, and longer lifespans compared to conventional liquid-electrolyte lithium-ion batteries. However, manufacturing costs and the difficulties of mass production have been long-standing challenges. Factorial Energy's listing signals to the market that its technology is overcoming these commercialization hurdles, reflecting high investor interest in next-generation battery technologies.

Strategic Significance & Outlook

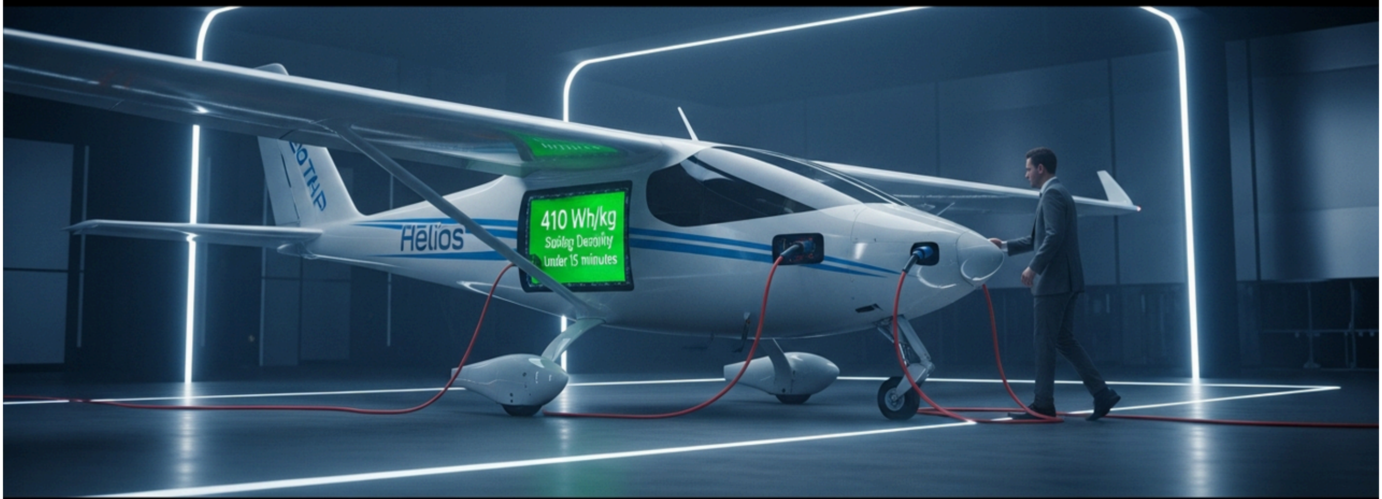
Factorial Energy's Nasdaq listing and substantial funding will provide a powerful impetus for the company to transition its all-solid-state battery technology from the 'validation stage to scale.' The demonstrated capability of achieving over 1,200 km driving range represents a highly attractive value proposition for automakers and other industrial clients. Moving forward, the company is expected to rapidly expand its manufacturing capacity and advance product introductions across various sectors. This will enable solid-state battery technology to permeate the market and play a critical role in shaping the future of many high-tech industries, including electric vehicles.

Source: https://www.globenewswire.com/news-release/2026/06/08/3308167/0/en/factorial-lists-on-nasdaq-bringing-solid-state-batteries-from-validation-to-scale.html

Collected: June 12, 2026 | Automated Research System (Gemini API)

Helios Horizon Flies First Manned Electric Aircraft with All-Solid-State Batteries, Achieving 410Wh/kg Energy Density and Sub-15 Minute Fast Charging

Published June 08, 2026 Helios Horizon / Aviation International News USA



OVERVIEW

Florida-based nonprofit Helios Horizon successfully flew the first manned electric aircraft powered by all-solid-state batteries, marking a new step in electric aviation history. This new solid-state battery achieved an energy density of 410 Wh/kg, a 60-80% improvement over previous Li-ion batteries (260Wh/kg), and charges from near empty to 80% in under 15 minutes. Test pilot Miguel Iturmendi completed a series of short-range test flights in a modified Pipistrel Taurus motor glider, demonstrating the necessary range, charging time, and safety for practical commercial electric aviation.

IN DEPTH

Key Findings

Helios Horizon, a Florida-based non-profit organization, has successfully flown the first manned electric aircraft powered by all-solid-state batteries, marking a new milestone in the history of electric aviation, including eVTOL. This innovative all-solid-state battery system demonstrated groundbreaking performance, achieving a high energy density of 410 Wh/kg and enabling the battery to charge from near empty to 80% in less than 15 minutes.

Technical & Clinical Details

- Helios Horizon's new all-solid-state battery achieved an energy density of 410 Wh/kg, representing a 60-80% improvement over the lithium-ion batteries (260 Wh/kg) previously used in electric aircraft. This significant advancement substantially extends the range and payload capacity of electric aircraft.
- Remarkable progress was also observed in charging time, with the battery capable of charging from near empty to 80% in under 15 minutes. This enables rapid turnaround times for commercial electric aircraft, dramatically improving operational efficiency.
- Test pilot Miguel Iturmendi completed a series of short-range test flights using a modified Pipistrel Taurus motor glider, validating the integration of all-solid-state batteries into aircraft and their performance under real-world conditions.
- As all-solid-state batteries do not use liquid electrolytes, the risk of thermal runaway is significantly reduced, enhancing battery safety and reliability. This is critically important for applications like aircraft, where safety is paramount.

Background & Context

Electric aviation holds immense promise for the future of urban air mobility (UAM) and short-range regional transport, but its widespread adoption is contingent upon high-performance and safe batteries. Existing lithium-ion batteries have limitations in energy density and charging speed, posing challenges for the range and operational costs of electric aircraft. All-solid-state batteries are gaining attention as a technology that can overcome these challenges and significantly expand the possibilities of electric aviation.

Strategic Significance & Outlook

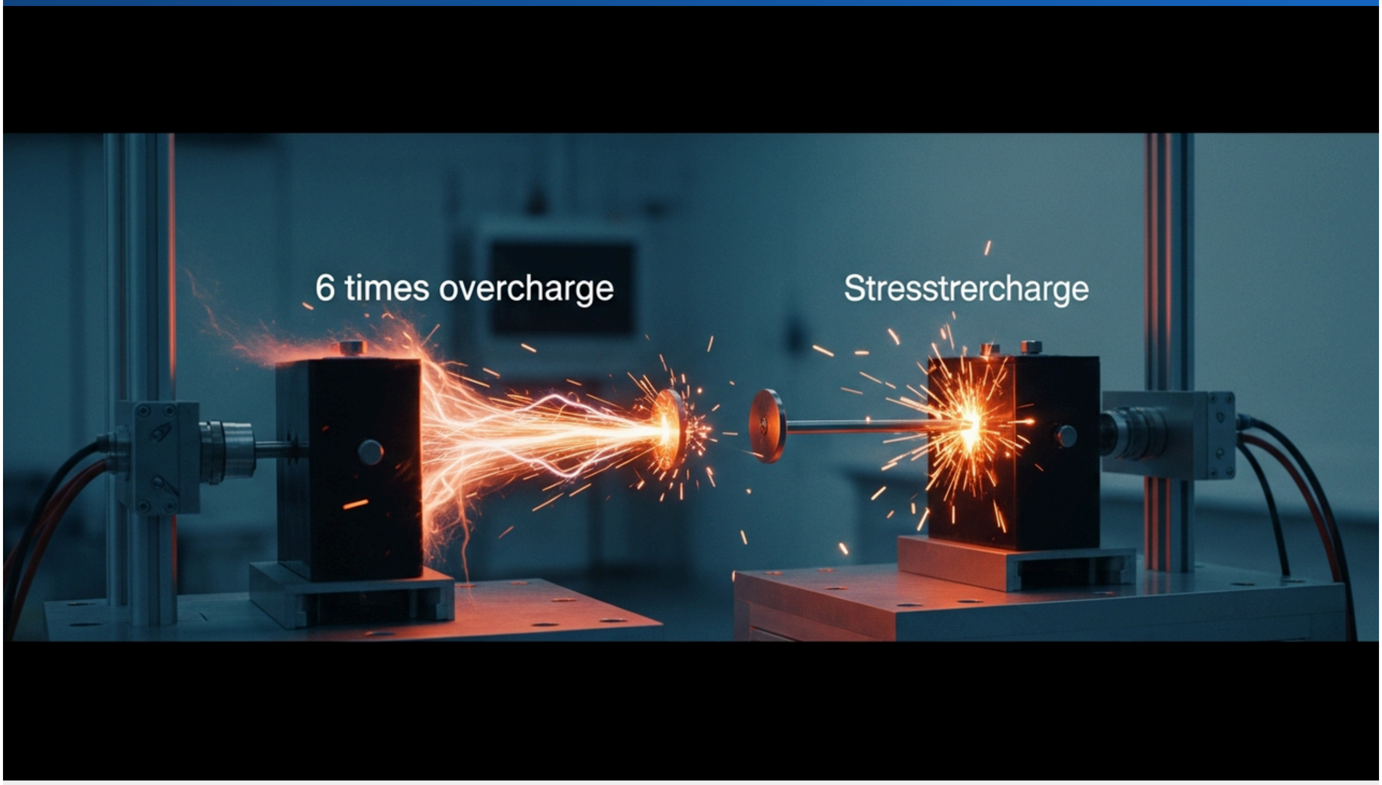
Helios Horizon's successful flight of a manned electric aircraft powered by all-solid-state batteries represents a decisive step towards the practical realization of commercial electric aviation. The combination of high energy density and ultra-fast charging capabilities will improve the economics and practicality of electric aircraft, significantly contributing to the decarbonization of the aviation industry and a sustainable future. Moving forward, further development and scaling of this technology are expected to accelerate the commercial deployment of a wide range of electric aircraft, including short-haul air transport, air taxis, and logistics drones. This achievement serves as a powerful illustration of how battery technology can transform the aerospace industry.

Source: https://runwaygirlnetwork.com/2026/06/press-release-helios-horizon-makes-history-with-solid-state-batteries/

Collected: June 12, 2026 | Automated Research System (Gemini API)

Svenner's Novel Solid-State Battery Withstands Extreme Abuse, Paving Way for Safer Marine Electrification

Published Published June 11, 2026   Matt Sheahan   デンマーク



OVERVIEW

Danish firm Svenner has unveiled a novel all-solid-state battery system capable of withstanding extreme abuse, including 6x overcharge and 8mm nail penetration, without any thermal response. By replacing flammable liquid electrolytes with solid materials, this breakthrough dramatically mitigates thermal runaway risks, offering a foundational solution to pervasive fire safety concerns in marine electrification. Svenner's innovation is poised to significantly enhance the safety and reliability of electric vessels and offshore facilities.

IN DEPTH

Background

The marine sector, encompassing electric vessels and offshore facilities, faces exceptionally stringent safety requirements for battery integration. Challenges such as corrosive seawater, severe vibrations, and the heightened risk of fire in enclosed environments have significantly hindered the widespread adoption of conventional liquid-electrolyte lithium-ion batteries. Given that battery fires can lead to catastrophic accidents and loss of life, the development of non-flammable all-solid-state battery technology has become indispensable for accelerating electrification and decarbonization initiatives in this critical industry.

Key Findings

Danish battery development company Svenner has announced a significant breakthrough with its new Svenner battery system, demonstrating resilience under extreme conditions far exceeding typical industry testing standards. The system successfully endured rigorous safety evaluations, specifically a 6x overcharge test and an 8mm nail penetration test, without exhibiting any thermal reaction whatsoever. This unprecedented safety performance holds the potential to fundamentally resolve the pervasive risk of battery fires within marine environments.

Technical Insights

- Svenner's innovative battery system dramatically mitigates the risk of thermal runaway, a primary safety concern for conventional lithium-ion batteries. By replacing the flammable liquid electrolytes typically found in existing batteries with non-flammable solid materials, the system inherently prevents ignition and explosive reactions, even in scenarios involving internal short circuits or external mechanical damage.
- Its robustness was emphatically demonstrated through severe safety tests: the battery maintained complete stability without any thermal reactions (e.g., temperature rise, ignition, or explosion) even under a 6x overcharge condition and direct penetration by an 8mm-thick nail. This performance significantly surpasses current international battery safety standards.

- Beyond immediate safety, the implementation of solid electrolytes is also anticipated to stabilize lithium-ion pathways and effectively suppress the formation of dendrites. This characteristic is expected to further enhance the battery's long-term performance, cycle life, and overall reliability.

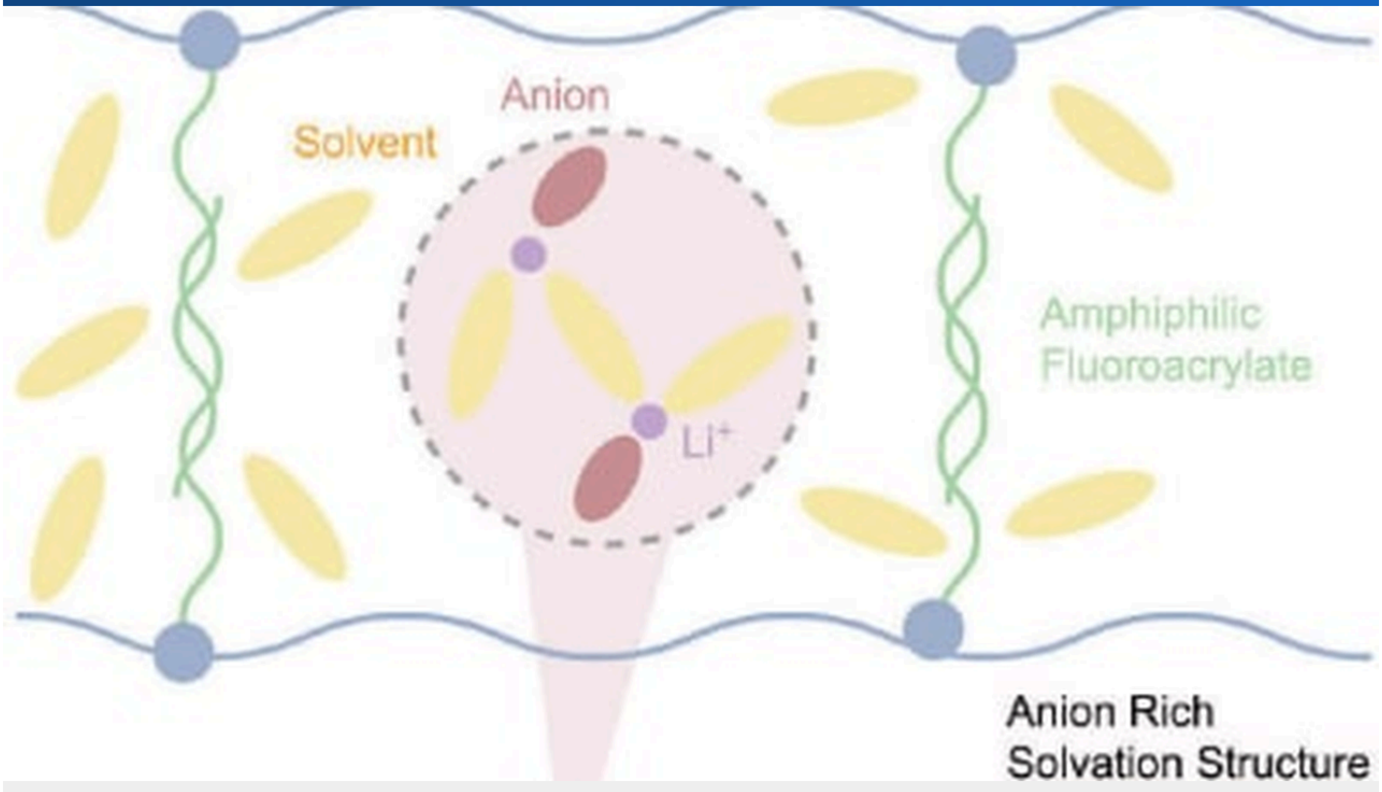
Strategic Significance & Outlook

Svenner's novel battery system is poised to redefine safety and reliability benchmarks for electrification across the marine sector. With its substantial reduction in thermal runaway risk, the adoption of all-solid-state batteries is expected to accelerate across a diverse array of marine applications, including electric ferries, cruise ships, fishing vessels, and submersibles. This widespread integration will contribute significantly to reducing fuel consumption and greenhouse gas emissions within the marine industry, thereby fostering the realization of more sustainable global maritime transport systems. Attention will now shift to how Svenner's groundbreaking technology will be integrated into and influence international marine safety regulations and certification processes.

Source: #

U.S. Tech Briefs Announces New Gel Electrolyte for Multi-Layer Anode-Free Pouch Cells with Enhanced High-Temperature Stability and Abuse Tolerance

Published June 08, 2026 Tech Briefs USA



OVERVIEW

Researchers have developed a new gel electrolyte for multi-layer anode-free pouch cells, demonstrating significant improvements in high-temperature stability and surviving severe abuse tests (intense drilling) without thermal runaway. The findings highlight a novel design principle utilizing polymer scaffold chemistry to engineer nanoscale solvation structures, further advancing the practical application of anode-free batteries and contributing to stronger, safer batteries.

IN DEPTH

Key Findings

Researchers have developed a novel gel electrolyte for multi-layer anode-free pouch cells, achieving groundbreaking results in terms of high-temperature stability and abuse tolerance. This gel electrolyte demonstrated its ability to withstand severe conditions, such as intense drilling, without experiencing thermal runaway, paving the way for more robust and safer battery designs.

Technical & Clinical Details

- The developed gel electrolyte is specifically optimized for multi-layer anode-free pouch cells. Anode-free batteries are a next-generation technology that aims to enhance energy density while circumventing the safety challenges associated with lithium metal itself, by eliminating the need for a pre-lithium metal anode.
- This new gel electrolyte significantly improved stability under high-temperature environments. Conventional electrolytes often degrade at elevated temperatures, negatively impacting battery performance and lifespan, but this gel electrolyte overcomes this limitation.
- Most notably, its abuse tolerance is exceptional. Even during aggressive drilling tests, the battery maintained stability without initiating thermal runaway, unlike traditional batteries. This is a critical indicator for evaluating battery safety and offers significant advantages for applications in consumer products and electric vehicles.
- This achievement is based on a novel design principle for gel electrolytes, which cleverly utilizes polymer scaffold chemistry to engineer nanoscale solvation structures. This optimizes the conduction pathways for lithium ions, enhancing the overall performance and stability of the electrolyte.

Background & Context

With the widespread adoption of electric vehicles (EVs) and portable electronic devices, there is a growing demand for batteries with high energy density, fast charging capabilities, and, above all, superior safety. Anode-free batteries are considered strong candidates for next-generation batteries, as they can leverage the potential benefits of lithium metal anodes while mitigating issues like dendrite formation and volume changes. However, electrolyte safety and performance have remained factors hindering their practical application. The development of this gel electrolyte offers a practical solution to the safety challenges associated with this technology.

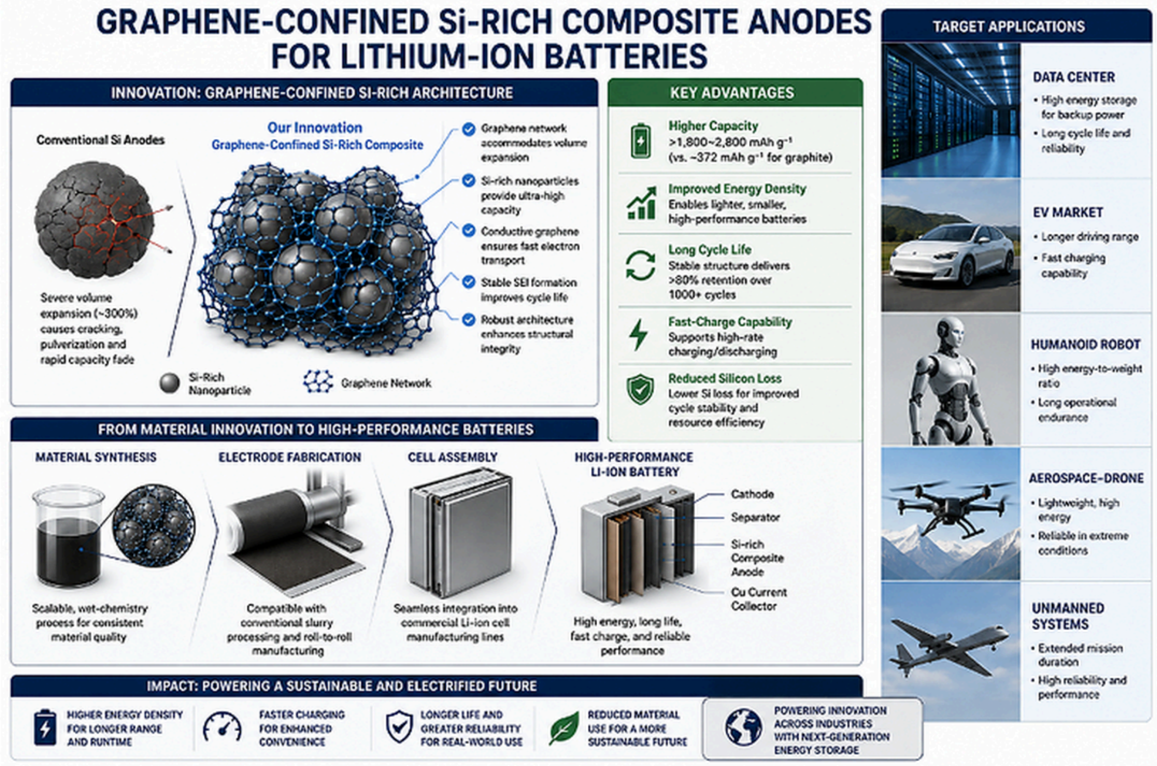
Strategic Significance & Outlook

The development of this new gel electrolyte holds significant potential to accelerate the practical implementation of anode-free batteries. Particularly, its high-temperature stability and excellent abuse tolerance will bolster its adoption in applications requiring high safety and reliability, such as electric vehicle batteries and large-scale energy storage systems. Future efforts will focus on scaling up the manufacturing process and reducing the cost of this gel electrolyte, as well as its integration into actual EV battery packs. This technology is expected to play a crucial role in paving the way for a future where more powerful and safer batteries are widely accessible.

Source: https://www.techbriefs.com/component/content/article/55255-a-new-electrolyte-points-to-stronger-safer-batteries

Solidion Technology Granted 7 New U.S. Patents for Composite Anode Materials Targeting Humanoid Robots, Space-Based AI Data Centers, and the Lunar Economy

Published June 08, 2026 PR Newswire USA



OVERVIEW

Solidion Technology Inc. announced it has been granted seven new U.S. patents for composite anode materials, bringing its total U.S. anode technology portfolio to 130 patents. These patents target batteries for humanoid robots, space-based AI data centers, and the lunar economy, utilizing porous graphene balls capable of housing up to 90% silicon to achieve high energy density, low cost, and a safe, silane-free process. This marks a significant advancement in battery technology for next-generation high-load applications.

IN DEPTH

Key Findings

Solidion Technology Inc. has announced the grant of seven new U.S. patents related to composite anode materials, elevating the company's U.S. anode technology portfolio to a total of 130 patents. These patents specifically target battery technologies for high-load applications in extremely demanding environments, such as humanoid robots, space-based artificial intelligence (AI) data centers, and the burgeoning lunar economy.

Technical & Clinical Details

- The newly granted patents pertain to composite anode materials primarily composed of porous graphene balls capable of accommodating up to 90% silicon. While silicon is recognized as a next-generation anode material for its theoretically high lithium storage capacity, its significant volume expansion and contraction during charge-discharge cycles have been a challenge. The porous graphene balls effectively mitigate this volume change.
- This composite anode material has the potential to deliver high energy density while simultaneously reducing manufacturing costs. Notably, it is produced using an environmentally friendly and safe silane-free process, which minimizes manufacturing risks.
- The technology, combining high energy density, safety, and cost reduction, is crucial for designing batteries that meet the stringent requirements of specific environments like space and the lunar surface. These environments demand highly reliable batteries capable of withstanding extreme temperature fluctuations, radiation, and vibrations.

Background & Context

In recent years, competition in the development of humanoid robots has intensified, and space exploration is progressing towards lunar base construction and Mars colonization plans. These frontier domains necessitate batteries with exceptionally high energy density, safety, and durability that conventional battery technologies cannot provide. In space environments, specifically, specialized materials and designs are indispensable to cope with unique gravity, radiation, and temperature conditions. Solidion Technology's patent grants aim to provide foundational technologies to support the growth of these future industries.

Strategic Significance & Outlook

The acquisition of seven new patents by Solidion Technology for composite anode materials reinforces the company's technological leadership in next-generation battery technologies, particularly in high-load, high-value application sectors like space and robotics. Characterized by high energy density, low cost, and a safe manufacturing process, this technology will contribute to critical elements shaping future society and economy, such as extended operational times for humanoid robots, stable operation of space-based AI data centers, and lunar exploration and resource development. Future attention will be on whether these technologies are integrated into actual products and create new markets.

Source: https://www.prnewswire.com/news-releases/solidion-technology-granted-7-new-patents-on-composite-anode-materials-for-batteries-targeting-humanoid-robots-space-based-artificial-intelligence-data-centers-and-the-lunar-economy-302793673.html

Collected: June 12, 2026 | Automated Research System (Gemini API)

24ChemicalResearch Report Forecasts High-Nickel Cathodes to Dominate Long-Range EVs in 2026 Battery Market

Published June 11, 2026   24ChemicalResearch   Unknown

OVERVIEW

This article is an overview of a market research report issued by 24ChemicalResearch. The report forecasts that high-nickel cathodes will continue to dominate the premium and long-range vehicle categories in the 2026 EV battery market. NMC 811 and advanced nickel-rich cathodes remain preferred choices for automakers seeking over 500 km range, with research progressing towards ultra-high-nickel cathodes containing over 90% nickel. New coating technologies and electrolyte formulations aim to improve thermal stability and energy density.

IN DEPTH

Key Findings

This article is an overview of a market research report issued by 24ChemicalResearch.

Report Overview

This market research report focuses on the impact and trends of high-nickel cathode materials within the 2026 electric vehicle (EV) battery market. It analyzes how the differentiated demands of long-range EVs versus entry-level EVs affect the nickel cathode market, specifically forecasting the dominant position of high-nickel cathodes in the premium and long-range vehicle segments.

Key Research Findings

- In the 2026 EV battery market, high-nickel cathodes such as NMC 811 and more advanced nickel-rich cathodes will remain the primary choice for automakers aiming for driving ranges exceeding 500 km.
- Research and development efforts are accelerating towards the realization of ultra-high-nickel cathodes, which feature nickel content exceeding 90%.
- New coating technologies and electrolyte formulations are being developed with the goal of further enhancing thermal stability and energy density.
- The demand for high-nickel cathodes is particularly pronounced in the luxury EV segment, indicating that this trend will increase the overall importance of nickel in the market.

About the Publisher

24ChemicalResearch is a company specializing in market research and analysis for the chemical and related industries. It provides deep insights into market trends, technological innovations, and competitive landscapes to support clients' strategic planning.

Source: #

Collected: June 12, 2026 | Automated Research System (Gemini API)