Solid-State Battery

Weekly Intelligence Report

2026-05-18 | 24 articles | 6 countries

troy-technical.jp

This Week's Keyword

ASSB Commercialization

Global race intensifies with aggressive targets

24	6	1500	2026
articles	countries	Wh/kg	year
Total Articles Analyzed	Source Countries/Regions	Highest Energy Density Target	Earliest Mass Production

All 24 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	QuantumScape Safety/Perf	New Product	●●●●○	●●●●○	●●●●○	●●●●○	●●●●●	US-based QuantumScape's solid-state battery passes safety tests, achieving 400-500 Wh/kg and 15-min fast charge, targeting 2025 commercial launch.
#02	Pure Lithium Production	New Product	●●●○○	●●●●○	●●●○○	●●●○○	●●●○○	Chinese startup Pure Lithium scales 500 MWh solid-state battery production, demonstrating cut-test stability and 6000-8000 cycle life for energy storage.
#03	GBT A-Sample EV Battery	New Product	●●●●○	●●●○○	●●●●○	●●●○○	●●●●○	China's GBT initiates A-sample production of solid-state EV batteries, targeting 500 Wh/kg and 1,000 km range for 2026 vehicle integration.
#04	KERI Nanotin Interlayer	Research	●●●●●	●●○○○	●●●○○	●●●●●	●●●○○	KERI develops nanotin interlayer for solid-state batteries, resolving interfacial instability at low pressure, achieving 350 Wh/kg and 81% capacity after 500 cycles.
#05	Samsung Ag-C Interlayer	Research	●●●●○	●●○○○	●●●○○	●●●●○	●●●○○	Samsung advances solid-state batteries with a silver-carbon interlayer, achieving 900 Wh/L energy density and 1,000 cycles by stabilizing the lithium anode interface.
#06	CATL Sulfide Electrolyte	Corporate Strategy	●●●●○	●●●○○	●●●●○	●●●○○	●●●●○	CATL patents advanced sulfide solid-state electrolyte for 500 Wh/kg EV batteries, targeting small-scale production by 2027 with LiF protective layer.
#07	Nissan 2028 EV Launch	Corporate Strategy	●●●○○	●●●○○	●●●●○	●●●●○	●●●●○	Nissan targets 2028 for solid-state EV launch, validating a 23-layer prototype pack and aiming for 1,000 km range and $75/kWh cost.
#08	CATL Roadmap 2026/2030	Corporate Strategy	●●●○○	●●●●○	●●●●○	●●●○○	●●●●○	CATL unveils aggressive solid-state battery roadmap: semi-solid by 2026, full solid by 2030, with 500 Wh/kg condensed-phase battery demonstrated in aircraft.
#09	SSB 2026 Market Overview	Market Overview	●○○○○	●●●○○	●●●○○	●●●○○	●●○○○	As of 2026, semi-solid batteries are commercialized, while full solid-state batteries are in pilot production, targeting 400-500 Wh/kg by 2027-2030.
#10	SSB 2026 Turning Point	Market Overview	●○○○○	●●●○○	●●●○○	●●●○○	●●○○○	2026 marks a turning point for solid-state batteries with China's national standard, as major players target 400-500 Wh/kg and late 2020s mass production.

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#11	Panasonic Non-EV Focus	Corporate Strategy	●●●○○	●●●○○	●●○○○	●●○○○	●●●○○	Panasonic to launch solid-state battery samples in 2027, focusing on robotics and high-temperature industrial applications (125°C operation) before EVs.
#12	SSB Interface Breakthrough	Research	●●●●○	●●○○○	●●●○○	●●●○○	●●●○○	Interfacial resistance is the primary barrier for solid-state batteries; halide/oxychloride electrolytes and in-situ polymerization are key research areas for cost-effective solutions.
#13	IDTechEx SSB Outlook	Market Overview	●○○○○	●○○○○	●●○○○	●●●○○	●●○○○	IDTechEx report forecasts solid-state battery market 2026-2036, highlighting challenges like manufacturing complexity, high costs, and dendrite formation across electrolyte types.
#14	SSB Promise vs. Reality	Analysis	●○○○○	●○○○○	●●○○○	●●●○○	●●○○○	Solid-state battery mass commercialization likely delayed until early 2030s due to manufacturing complexity, interfacial issues, and sulfide electrolyte challenges requiring roll-to-roll.
#15	Solid Power Market Outlook	Corporate Strategy	●●●○○	●●●●○	●●●●○	●●●○○	●●●●●	Solid Power advances sulfide electrolyte production, supplying SK On, Samsung SDI, and BMW, as the solid-state battery market is projected to reach $18.6B by 2032.
#16	Li-S Hybrid Electrolytes	Research	●●●●●	●○○○○	●●●●○	●●●○○	●●●○○	Hybrid solid-state electrolytes advance lithium-sulfur batteries, promising ultra-high energy density (~2600 Wh/kg) and enhanced safety by suppressing polysulfide shuttle.
#17	SSB Energy Independence	Trend Article	●●○○○	●●●○○	●●●○○	●●○○○	●●○○○	Solid-state batteries promise energy independence with wide operating temperatures (-50°C to 125°C), targeting mass production in 2-3 years, with high energy density and fast charging.
#18	Solid Power DOE Funding	Corporate Strategy	●●●○○	●●●●○	●●●●○	●●●●○	●●●●●	Solid Power unveils sulfide solid-state electrolyte production strategy, boosting capacity to 75 tons by 2026 with $50M DOE funding, strengthening US supply chain.
#19	Samsung SDI Robotics	Corporate Strategy	●●●○○	●●●○○	●●●○○	●●○○○	●●●○○	Samsung SDI targets 2027 mass production readiness for "SolidStack" solid-state batteries, positioning them as a "game-changer" for robotics with 8-hour operating times.
#20	Mitsui Kinzoku Electrolyte	New Product	●●●○○	●●●○○	●●●○○	●●○○○	●●●○○	Mitsui Kinzoku's solid electrolyte adopted for BEV all-solid-state batteries, signaling a crucial step towards mass production in the supply chain.
#21	QuantumScape Director Sale	Corporate Strategy	●○○○○	●●●●●	●○○○○	●●●●○	●●●●●	QuantumScape Director Jeffrey B. Straubel sold shares under a pre-arranged trading plan, a routine financial move after strong Q1 2026 results.
#22	Toyota 2028 EV Launch	Corporate Strategy	●●●●●	●●●○○	●●●●●	●●●○○	●●●●○	Toyota targets 2028 for solid-state EV launch, aiming for 5-minute charge, 1200-mile range, and 1500 Wh/kg, with partnerships and pilot factory underway.
#23	ProLogium Super Flow	New Product	●●●●●	●●●○○	●●●●●	●●●○○	●●●●●	ProLogium's "All-Inorganic Super Flow" solid electrolyte enables 5-minute fast charge and 70% reuse of Li-ion equipment, with a Mercedes-Benz collaboration and EU gigafactory by 2028.
#24	SSB EV Roadmaps Converge	Market Overview	●○○○○	●●●○○	●●●○○	●●●○○	●●○○○	Solid-state EV battery roadmaps converge on pilot production in 2026 and consumer availability by late 2027, with aggressive Chinese and steady Japanese advancements.

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

Three Questions That Demand Your Decision This Week

❶ Are your EV platforms ready for a 1200-mile range battery?

Toyota's audacious 1500 Wh/kg, 1200-mile range, 5-minute charge target for 2028 could fundamentally redefine EV expectations. Does your current R&D; roadmap account for such a disruptive leap, or will your next-gen vehicles be obsolete before launch?

❷ How exposed is your supply chain to China's rapid SSB scale-up?

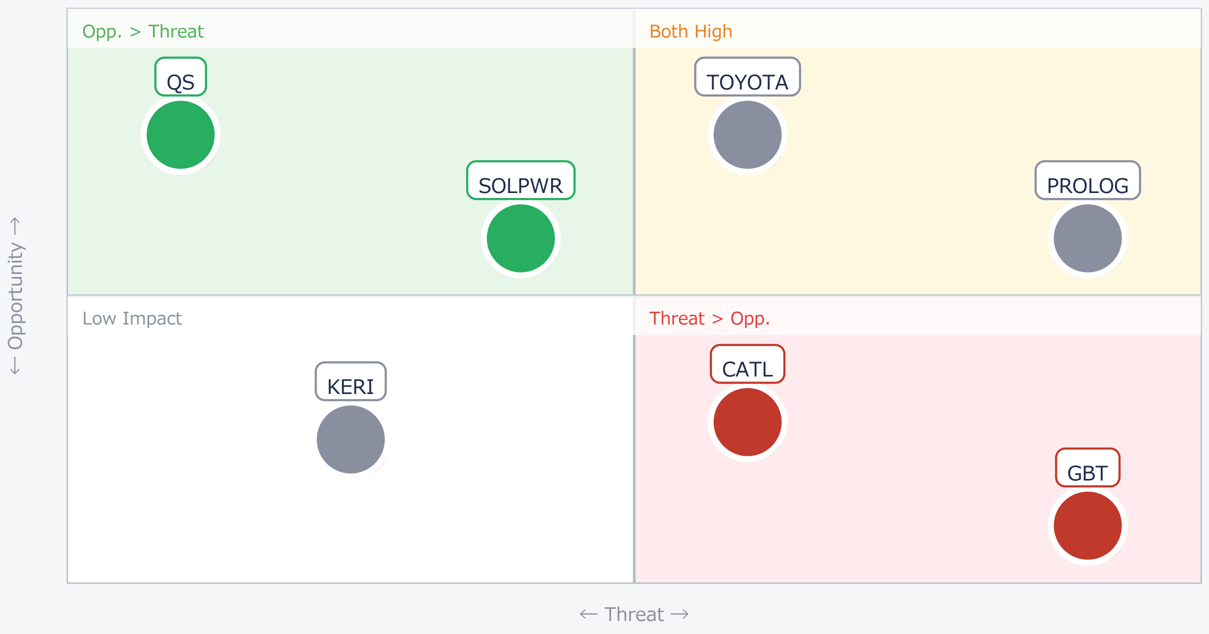
Chinese players like CATL, Pure Lithium, and GBT are aggressively moving from pilot to gigafactory production by 2026-2027, with national standards accelerating adoption. Is your procurement strategy diversified enough to mitigate reliance on these rapidly advancing Asian suppliers?

❸ Is your solid-state battery strategy leveraging cost-efficient production?

ProLogium's 'PCR framework' reuses 70%+ of existing Li-ion equipment, significantly cutting SSB production costs. Are your R&D; and manufacturing teams exploring similar capital-efficient pathways, or are you risking being outmaneuvered on cost?

Opportunities vs. Threats for US/European Companies

Opportunity vs. Threat Matrix for US/European Companies



Item	Quadrant	↑ Opportunity	↓ Threat
● TOYOTA	Critical	Partner for EV tech	Platform obsolescence
● PROLOG	Critical	EU mfg, fast charge	Competitor gains share
● QS	Opp.	US tech leadership	Production scale-up
● SOLPWR	Opp.	US supply chain	Material cost/yield
● CATL	Threat	Learn from roadmap	China market dominance
● GBT	Threat	Niche market entry	Aggressive EV competition
● KERI	Ref.	Fundamental insight	Long-term R&D; cost

Deep Dive ① — QuantumScape Validates High-Performance SSB

#01 | 2026/05/14 | evtech.news | Tech Novelty●●●●○ Proximity●●●●○ Market Impact●●●●○ Data Reliability●●●●○ US/EU Relevance●●●●●

QuantumScape's latest solid-state battery design successfully passed independent safety tests, demonstrating no thermal runaway under extreme conditions. The anode-free lithium-metal battery achieves 400-500 Wh/kg, 80% charge in 15 minutes, and retains 80%+ capacity after 800 cycles.

This safety validation, coupled with high performance, significantly de-risks solid-state technology for mass adoption. QuantumScape targets commercial launch in 2025 and gigafactory-scale production by 2027, positioning it as a potential disruptor in the EV market.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: QuantumScape's safety validation is a critical milestone, addressing a primary hurdle for ASSB adoption. The stated performance metrics (400-500 Wh/kg, 15-min charge) are highly competitive, though 800 cycles is still below some LFP/NMC LIBs. [Opportunity] for US OEMs and technology licensors to integrate proven, safe SSB tech, enhancing product differentiation. [Threat] for existing LIB manufacturers if QuantumScape scales successfully and rapidly. Technical barriers remain in achieving cost parity and consistent yield at gigafactory scale. Next actions: [R&D;] Evaluate QuantumScape's samples immediately for integration feasibility. [Procurement] Assess supply chain readiness for ceramic separators and lithium metal. [Strategy] Model impact on EV market share by 2027.

Deep Dive ② — Toyota's Ambitious 2028 SSB EV Targets

#22 | 2026/05/09 | YouTube (動画コンテンツの要約) | Tech Novelty●●●●● Proximity●●●○○ Market Impact●●●●● Data Reliability●●●○○ US/EU Relevance●●●●○

Toyota is accelerating mass production efforts for all-solid-state battery (ASSB) EVs, targeting a 2027-2028 market introduction. The company aims for a 5-minute charge, 1,200-mile range, 1500 Wh/kg energy density, and 90% capacity retention over 40 years.

To achieve these goals, Toyota has secured production licenses, partnered with Sumitomo Metal Mining for cathode materials, and commenced construction of a large-scale pilot factory with Idemitsu. These moves signal a potentially revolutionary shift in the EV market.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: Toyota's targets are exceptionally ambitious, bordering on aspirational, especially the 1500 Wh/kg and 40-year lifespan. While concrete steps like partnerships and pilot factory construction are underway, the published numbers are likely based on optimal lab conditions or theoretical maximums. [Opportunity] for US/EU materials suppliers to engage with Toyota's supply chain for next-gen materials. [Threat] for all existing EV OEMs and battery manufacturers if even a fraction of these targets are met, as it would render current platforms obsolete. Technical barriers include fundamental material stability, interfacial issues at high current densities, and unprecedented manufacturing precision. Next actions: [R&D;] Initiate competitive benchmarking against these targets. [Strategy] Develop contingency plans for market disruption by 2028. [Business Dev] Explore potential partnerships with Japanese material firms.

Deep Dive ③ — ProLogium's 'Super Flow' Electrolyte & EU Gigafactory

#23 | 2026/05/10 | owl - note | Tech Novelty●●●●● Proximity●●●○○ Market Impact●●●●● Data Reliability●●●○○ US/EU Relevance●●●●●

Taiwan's ProLogium Technology has developed an 'All-Inorganic Super Flow' solid electrolyte, overcoming interfacial resistance in oxide-based systems without external pressure. This enables ultra-fast charging (80% in 5 minutes) and boasts 5-6x higher ionic conductivity.

Crucially, their 'PCR framework' allows over 70% reuse of existing Li-ion battery production equipment, significantly reducing mass production costs. Collaborations with Mercedes-Benz and a planned EU gigafactory (France, 2028) position ProLogium as a major player.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: ProLogium's 'Super Flow' electrolyte and PCR framework represent a significant breakthrough, particularly for cost-efficient mass production and fast charging. The claim of 5-6x higher ionic conductivity is very aggressive and requires independent validation, but the Mercedes-Benz partnership and EU gigafactory plans lend credibility. [Opportunity] for EU OEMs and component suppliers to integrate this technology, leveraging local manufacturing and advanced performance. [Threat] for US/EU battery manufacturers relying on traditional SSB production methods, as ProLogium could achieve cost leadership. Technical barriers include scaling the 'super flow' state consistently and ensuring long-term durability in real-world applications. Next actions: [R&D;] Investigate 'Super Flow' mechanism and PCR framework for potential licensing or internal development. [Procurement] Map ProLogium's EU supply chain and assess competitive implications. [Executive] Evaluate strategic investment or partnership opportunities.

Other Notable Articles

Nissan Targets 2028 for Solid-State EV Launch (Electrek)
Tech Novelty●●●○○ Proximity●●●○○ Market Impact●●●●○

Nissan's 2028 EV launch target, 1,000 km range, and $75/kWh cost goal, supported by dry electrode tech, signals concrete OEM commitment.

Solid-State Battery Interface Breakthrough: Halide Electrolytes and In-Situ Polymerization Address Critical Commercialization Hurdles (PatSnap Eureka)
Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●○○

Focus on interfacial resistance with novel halide/oxychloride electrolytes and in-situ polymerization is critical for long-term SSB viability and cost reduction.

Samsung SDI Declares Solid-State Batteries as 'Game Changer' for Robotics Era, Targeting 2027 Mass Production Readiness with 'SolidStack' (BigGo ファイナンス)
Tech Novelty●●●○○ Proximity●●●○○ Market Impact●●●○○

Samsung SDI's strategic pivot to robotics for early SSB adoption highlights niche market opportunities beyond EVs, leveraging safety and extended operation.

Mitsui Kinzoku's Solid Electrolyte Selected for BEV All-Solid-State Batteries, Advancing Towards Mass Production (化学工業日報 電子版)
Tech Novelty●●●○○ Proximity●●●○○ Market Impact●●●○○

Mitsui Kinzoku's electrolyte adoption for BEV ASSBs underscores the critical role of material suppliers in enabling mass production and strengthening the supply chain.

Recommended Actions This Week

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

Immediate (this week)

- [Executive] Review competitive landscape for solid-state batteries, focusing on aggressive Chinese and Japanese roadmaps (CATL, Toyota, GBT).
- [R&D;] Prioritize internal research on interfacial stability solutions (e.g., nanotin, Ag-C interlayers) and cost-efficient manufacturing (e.g., ProLogium's PCR framework).
- [Procurement] Identify critical raw material suppliers for solid electrolytes and assess geopolitical risks associated with current and future supply chains.

Short-term (1 month)

- [Strategy] Develop a detailed scenario analysis for market entry of 1000+ km range EVs by 2028, including impact on current product portfolios and pricing strategies.
- [Business Dev] Initiate discussions with US-based solid electrolyte suppliers (e.g., Solid Power) and dry electrode technology providers (e.g., LiCAP) for potential partnerships or licensing.
- [R&D;] Benchmark internal SSB performance against QuantumScape's validated safety and energy density metrics (400-500 Wh/kg, 15-min charge).

Medium-long term (quarter+)

- [Legal/IP] Conduct a comprehensive IP landscape analysis on solid-state battery electrolytes and manufacturing processes, particularly in China, Japan, and South Korea.
- [Manufacturing] Investigate feasibility and ROI of adapting existing Li-ion production lines for solid-state battery manufacturing, considering ProLogium's PCR framework.
- [Strategy] Explore diversification into non-EV solid-state battery applications (e.g., robotics, high-temperature industrial) as a strategic hedge and early market entry point, following Panasonic and Samsung SDI's lead.

SolidStateBattery — Selected Articles

Date: 2026-05-18

Articles: 24

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#20 Samsung SDI Declares Solid-State Batteries as 'Game Changer' for Robotics Era, Targeting 2027 Mass Production Readiness with 'SolidStack'

#22 Mitsui Kinzoku's Solid Electrolyte Selected for BEV All-Solid-State Batteries, Advancing Towards Mass Production

#23 QuantumScape Director Sells Shares Valued at $212,868 Under Pre-Arranged Trading Plan

#24 Toyota Accelerates Solid-State EV Development for 2028 Launch, Targets 5-Minute Charge and 1,200-Mile Range

#25 ProLogium Revolutionizes Solid-State Batteries with 'All-Inorganic Super Flow' Electrolyte, Achieves 5-Minute Fast Charge and Cost-Efficient Mass Production

#26 Solid-State EV Battery Roadmaps Converge: Pilot Production in 2026, Consumer Availability Expected by Late 2027

QuantumScape All-Solid-State Battery Passes Rigorous Safety Tests, Hits High Performance Benchmarks

Published May 14, 2026 evtech.news USA

OVERVIEW

QuantumScape has announced that its latest solid-state battery design successfully passed a comprehensive suite of independent safety tests, demonstrating no thermal runaway or fire under extreme conditions including nail penetration, overcharge, and crushing. Utilizing an anode-free lithium-metal design with a proprietary ceramic separator, the battery achieves an energy density of 400-500 Wh/kg, an 80% charge in 15 minutes, and retains over 80% capacity after 800 cycles. This safety validation and high performance significantly de-risk solid-state technology for mass adoption, with QuantumScape targeting commercial launch in 2025 and gigafactory-scale production by 2027.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs), particularly those employing lithium-metal anodes, have long been touted as a transformative technology for next-generation energy storage due to their high energy density and inherent safety potential. However, significant challenges have hindered their commercialization, including poor interfacial contact and high resistance between solid electrolytes and electrodes, the formation of lithium dendrites leading to short circuits, and the risk of thermal runaway. Ensuring safety, especially under mechanical stress such as nail penetration, is paramount for automotive applications.

Key Findings and Technical Breakthroughs

QuantumScape has reported that its advanced solid-state battery design successfully passed a series of stringent safety tests conducted by an independent laboratory. The battery demonstrated exceptional resilience, showing no thermal runaway or fire during extreme conditions including nail penetration, overcharging, external short circuits, high-temperature exposure, and crushing. This breakthrough is primarily attributed to the elimination of flammable liquid electrolytes and the use of a proprietary ceramic separator that effectively suppresses the formation of lithium dendrites, dramatically enhancing intrinsic safety.

- **Safety Validation:** Passed all 12 rigorous safety tests with no thermal runaway or ignition.
- **Energy Density:** Achieved 400-500 Wh/kg, significantly surpassing conventional lithium-ion batteries (typically 250-300 Wh/kg).
- **Fast Charging:** Capable of charging from 0% to 80% in just 15 minutes.
- **Cycle Life:** Maintained over 80% of initial capacity after more than 800 cycles.
- **Operating Temperature:** Stable performance demonstrated across a wide range, from -30°C to 60°C.

These performance metrics are critical for extended EV range, reduced charging times, and a substantial improvement in overall vehicle safety.

Technical Significance and Outlook

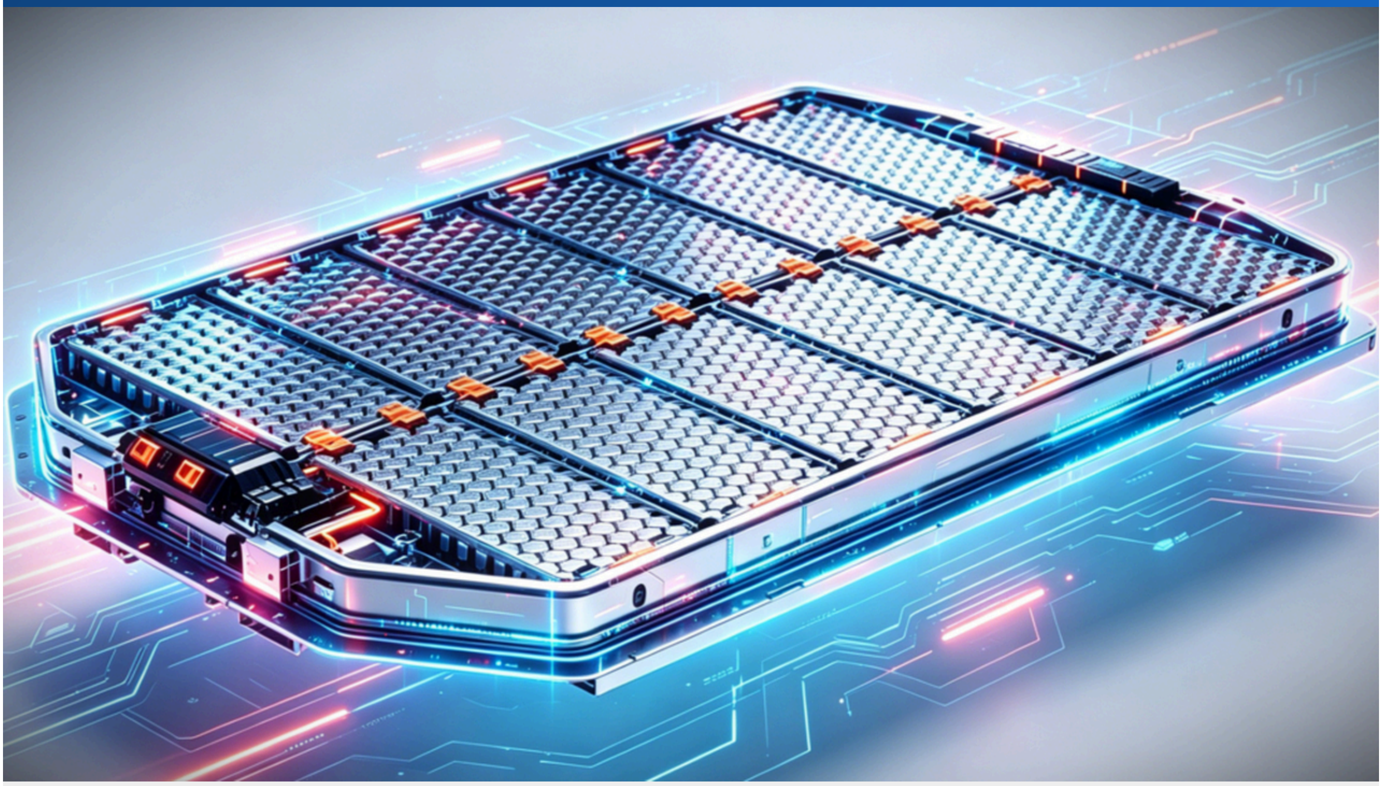
The successful safety validation by QuantumScape represents a major milestone, addressing one of the primary hurdles for ASSB integration into electric vehicles. This development paves the way for accelerated commercialization. QuantumScape's plans include scaling production with its QS-0 pilot facility aiming for 200,000 cells annually, and the future QS-1 facility targeting 1 GWh capacity, with commercial availability anticipated in 2025 and full-scale mass production by 2027. The superior safety, energy density, and charging speed of these batteries position them as a potential disruptor in the EV market. However, challenges such as achieving a cycle life comparable to LFP (3000-5000 cycles) or even NMC-based LIBs (1000-2000 cycles), as well as cost reduction and yield optimization during mass production, remain critical areas for ongoing development and scrutiny.

Source: https://evtech.news/ev-startups/new-solid-state-battery-passes-safety-tests-evtech-news.html

Collected: May 15, 2026 | Automated Research System (Gemini API)

Chinese Startup Pure Lithium Achieves 500 MWh Solid-State Battery Production, Demonstrates Cut-Test Stability

Published May 14, 2026   carnewschina.com   China



OVERVIEW

Pure Lithium New Energy, a Chinese startup, has brought its 500 MWh solid-state battery production line in Henan to full capacity, with a 1 GWh factory planned for 2026. At CIBF 2026, the company demonstrated a solid-state cell continuing to power an external device even after being physically cut, showcasing its enhanced safety. The first-generation batteries, featuring an LFP cathode and graphite anode with an organic-inorganic composite electrolyte, offer 180-190 Wh/kg energy density and an impressive 6,000-8,000 cycle life. This signals significant progress in scaling solid-state battery manufacturing and addressing critical safety concerns for widespread adoption, particularly in energy storage and two-wheeler applications.

IN DEPTH

Background and Technical Challenges

The commercialization of all-solid-state batteries (ASSBs) requires breakthroughs in safety, energy density, and manufacturability. Ensuring battery safety, especially under physical damage, is paramount for their widespread adoption in electric vehicles (EVs) and other applications. Furthermore, challenges such as high interfacial resistance between electrodes and solid electrolytes, and the suppression of lithium dendrite formation, remain key technical hurdles for solid-state systems.

Key Findings and Technical Breakthroughs

Pure Lithium New Energy, a Chinese startup, announced that its 500 MWh all-solid-state battery production line in Lankao, Henan, has reached full operational capacity. The company further plans to commission a GWh-scale factory within 2026, indicating rapid progress toward the mass production of ASSBs.

During CIBF 2026, Pure Lithium conducted a live demonstration of its solid-state battery's superior safety. Even after a cell was physically cut, it continued to supply power to an external device, unequivocally demonstrating the absence of thermal runaway or fire—a critical advantage over traditional liquid electrolyte batteries, particularly for impact-prone applications like EVs.

The first generation of Pure Lithium's solid-state batteries utilizes a lithium iron phosphate (LFP) cathode and a graphite anode, achieving the following performance metrics:

- **Energy Density:** 180-190 Wh/kg
- **Cycle Life:** 6,000-8,000 cycles with capabilities at rates exceeding 1C
- **Safety:** Continued operation after a cut test; certified by CNAS safety tests.

The company has developed proprietary organic-inorganic composite electrolytes and a supercritical coating process to improve conductivity and interfacial stability between the electrolyte and electrodes. The next generation of their products aims for an energy density exceeding 200 Wh/kg.

Technical Significance and Outlook

Pure Lithium's announcement signals that ASSBs, offering comparable or superior safety and longevity to existing lithium-ion batteries, are rapidly entering mass production in China. The company prioritizes initial commercial applications in energy storage systems and battery swap stations for two-wheelers, rather than immediate, full-scale EV integration. This strategic approach allows for practical deployment and market penetration before broader EV adoption. While the current energy density of 180-190 Wh/kg is modest for some EV applications, the exceptional safety and extended cycle life offer significant competitive advantages in specific niche markets.

Future challenges include cost reduction and stringent quality control for GWh-scale production, along with further increases in energy density for next-generation products. China's leading position in this sector is set to significantly reshape the global battery market landscape.

Source: https://carnewschina.com/2026/05/14/pure-lithium-solid-state-battery-keeps-running-after-cut-test-as-startup-hits-500-mwh-output/

Collected: May 15, 2026 | Automated Research System (Gemini API)

Greater Bay Technology Initiates Production of A-Sample All-Solid-State EV Batteries on Manufacturing Line, Targets 1,000 km Range

Published May 04, 2026 intelligentliving.co China

OVERVIEW

China's Greater Bay Technology (GBT) has announced the successful production of its first A-sample all-solid-state EV battery cells on a manufacturing line, signaling a major step towards mass production. These cells, devoid of liquid electrolytes, reportedly passed rigorous stress tests without explosion or fire, demonstrating inherent safety. Backed by GAC Group, GBT is targeting an energy density of 500 Wh/kg, aiming to provide over 1,000 km (621 miles) of range per charge, with vehicle integration targeted by year-end. This development suggests a potentially accelerated timeline for solid-state battery commercialization in the automotive sector, driven by aggressive Chinese innovation.

IN DEPTH

Background and Technical Challenges

The electric vehicle (EV) market is urgently seeking advancements in driving range, charging speed, and battery safety. Current mainstream lithium-ion batteries rely on liquid electrolytes, which pose risks of fire and performance degradation due to dendrite formation. All-solid-state batteries (ASSBs) offer a fundamental solution to these challenges but have faced significant hurdles in material science, interfacial stability, and especially the establishment of robust mass production processes.

Key Findings and Technical Breakthroughs

Greater Bay Technology (GBT), a prominent Chinese battery startup, has achieved a critical milestone by announcing the production of its first A-sample all-solid-state EV battery cells on its manufacturing line. This development is significant because it moves beyond laboratory-scale prototypes to actual production within an infrastructure designed for future mass manufacturing.

These A-sample cells are completely free of liquid electrolytes. GBT asserts that its proprietary composite electrolyte approach is suitable for large-scale production and has successfully passed multiple stringent stress tests without any explosions or fires. This validates one of the core advantages of solid-state technology: enhanced safety.

With strong backing from the GAC Group, GBT's batteries are targeting impressive performance specifications:

- **Energy Density:** Aims for 260 Wh/kg, with a target of up to 500 Wh/kg. This would significantly exceed the performance of current lithium-ion batteries (typically 250-350 Wh/kg).
- **Driving Range:** Achieving the 500 Wh/kg target is expected to enable a single charge range of over 621 miles (approximately 1,000 km), which could substantially mitigate EV range anxiety.
- **Charging Capability:** The company is working towards stable fast-charging capabilities at 2C to 3C rates.

According to reports from China's NE Times, GBT intends to begin mass production of these all-solid-state batteries and their integration into EVs by the end of 2026.

Technical Significance and Outlook

GBT's success in producing A-samples on a manufacturing line indicates that the commercialization of ASSBs is progressing with concrete timelines and established manufacturing infrastructure. The involvement of a major Chinese automotive manufacturer like GAC Group further underscores the high probability of early market introduction for this technology. In the EV market, such significant improvements in range and safety are poised to dramatically alter the competitive landscape.

However, further validation and disclosure are needed regarding actual in-vehicle performance, long-term durability, and cost competitiveness at GWh-scale production. The rapid pace of technological development and commercialization by Chinese players represents a notable trend in the global battery industry, exerting pressure on other key players to accelerate their own commercialization efforts.

Source: https://www.intelligentliving.co/us-solid-state-batteries-2026-greater-bay/

Collected: May 15, 2026 | Automated Research System (Gemini API)

KERI Breakthrough: Nanotin Interlayer Resolves Interfacial Instability in All-Solid-State Batteries at Low Pressure

Published April 29, 2026 EurekAlert! South Korea

OVERVIEW

Researchers at the Korea Electrotechnology Research Institute (KERI) have developed a nanotin (Sn) interlayer control technology to resolve interfacial instability between lithium metal anodes and solid electrolytes. This innovation significantly reduces overall cell resistance by minimizing physical damage to the lithium metal and creating efficient ion transport pathways. Applied to pouch cells, the technology achieved over 81% capacity retention after 500 cycles at a low pressure of 2 MPa, alongside an energy density exceeding 350 Wh/kg. This advancement is critical for overcoming key commercialization hurdles for all-solid-state batteries, offering a simpler, lower-cost approach to enhance performance and design flexibility.

IN DEPTH

Background and Technical Challenges

One of the most formidable challenges in the commercialization of all-solid-state batteries (ASSBs) is the high interfacial resistance and instability arising from the contact between lithium metal anodes and solid electrolytes. While solid electrolytes conduct lithium ions, inadequate physical contact or poor chemical compatibility with electrodes leads to significant interfacial resistance, severely degrading battery performance and lifespan. Previous research has explored solutions like applying high external pressures or complex coating technologies, but these often result in increased costs and manufacturing complexity.

Key Findings and Technical Breakthroughs

A research team led by Dr. Nam Ki-hoon at the Korea Electrotechnology Research Institute (KERI) has developed a groundbreaking control technology that utilizes a nanotin (Sn) interlayer to address this interfacial instability. This nanotin interlayer effectively reduces physical damage to the lithium metal anode and simultaneously functions as an efficient pathway for lithium ion transport. This dual mechanism significantly improves contact between the electrode and the solid electrolyte, substantially reducing the overall interfacial resistance of the cell.

When this novel technology was applied to pouch cells, it demonstrated remarkable performance:

- **Low-Pressure Operation:** Achieved stable operation under a remarkably low pressure of just 2 MPa. This stands in stark contrast to conventional ASSBs that typically require tens of MPa, offering greater flexibility in battery pack design and contributing to lighter weight.
- **Cycling Performance:** Maintained over 81% of its initial capacity after 500 cycles, a crucial metric for the practical viability of ASSBs.
- **Energy Density:** Achieved a high energy density exceeding 350 Wh/kg. This performance significantly surpasses that of existing lithium-ion batteries (typically 150-250 Wh/kg) and is recognized as a world-leading achievement.

This research has been highly acclaimed, featured on the cover of the prestigious journal "Advanced Energy Materials."

Technical Significance and Outlook

The nanotin interlayer control technology developed by KERI has the potential to significantly accelerate the commercialization of all-solid-state batteries. Critically, its ability to improve interfacial stability without requiring expensive and complex manufacturing processes substantially lowers the barrier to mass production. The high performance achieved at low pressures offers greater design freedom for battery packs and contributes to reduced weight, thereby improving electric vehicle (EV) range and potentially lowering costs.

This technology demonstrates clear advantages over existing lithium-ion batteries by simultaneously achieving high energy density and excellent cycle life. Future work will focus on further optimizing the manufacturing cost of the nanotin interlayer, assessing its scalability for large-scale production, and conducting detailed validation of its long-term durability. Nevertheless, this breakthrough represents a pivotal step towards making the future of all-solid-state batteries a reality.

Source: https://www.eurekalert.org/news-releases/1125945

Samsung Advances Solid-State Batteries with Silver-Carbon Interlayer, Achieving High Energy Density and Extended Cycle Life

Published May 04, 2026 AZoM South Korea

OVERVIEW

Researchers from Samsung R&D Institute Japan and Samsung Advanced Institute of Technology have made significant progress in addressing the critical solid-solid interface challenges in all-solid-state batteries. By introducing an ultrathin silver-carbon composite interlayer at the lithium metal anode interface, they successfully controlled lithium deposition, suppressed dendrite formation, and stabilized interfacial contact during cycling. This innovation led to cells achieving a high energy density of up to 900 Wh/L and a cycle life of 1,000 cycles. The advancement underscores the pivotal role of interface engineering and material innovation in realizing high-performance solid-state batteries for future applications.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs) are promising candidates for next-generation energy storage due to their inherent safety and high energy density. However, their commercialization has been primarily hampered by challenges at the solid-solid interface. Specifically, poor contact, undesirable interphase growth, and chemical incompatibility between electrodes and solid electrolytes lead to high interfacial resistance, impeding ion flow and significantly degrading battery performance and longevity. In particular, the use of lithium metal anodes introduces the critical issue of lithium dendrite formation, which severely compromises battery safety and cycle life. Thus, advanced interface engineering and novel material development have been urgently needed to overcome these obstacles.

Key Findings and Technical Breakthroughs

Research teams from Samsung R&D Institute Japan and Samsung Advanced Institute of Technology have presented a groundbreaking solution to the solid-solid interface problems in ASSBs. Their detailed analysis revealed that the crystallographic orientation at the electrode-electrolyte interface significantly impacts cathode stability. They specifically found that a strongly bonded interface between $LiCoO_2$ and Li_3YCl_6 (a halide-based solid electrolyte) exhibited superior resistance to electrode material decomposition.

A more critical advancement involved the introduction of an ultrathin silver-carbon composite interlayer at the lithium metal anode interface, which demonstrated the following effects:

- **Controlled Lithium Deposition:** Suppressed non-uniform lithium plating, promoting the formation of a stable lithium layer.
- **Dendrite Suppression:** Effectively prevented the growth of lithium dendrites, which are a primary cause of short circuits.
- **Stabilized Interfacial Contact:** Maintained consistent contact between the electrode and electrolyte during charge-discharge cycling, thereby mitigating increases in interfacial resistance.

Through these interface engineering techniques, the developed cells achieved impressive performance:

- **Energy Density:** Up to 900 Wh/L.
- **Cycle Life:** Over 1,000 cycles.

These results strongly indicate that interface engineering and material innovation are indispensable for realizing high-performance and long-lasting all-solid-state batteries.

Technical Significance and Outlook

Samsung's progress in interface control technology is immensely significant for substantially improving the practical performance of ASSBs and accelerating the realization of high-energy-density batteries, especially those utilizing lithium metal anodes. By effectively suppressing the conventional challenges of interfacial resistance and dendrite formation, ASSBs that combine high energy density with extended cycle life are moving closer to reality.

If commercialized, this technology would not only contribute to significantly extending the range of electric vehicles (EVs) and reducing charging times but also enable high-performance batteries for a wide range of applications, including portable electronic devices, drones, and robotics. Future challenges include optimizing the manufacturing cost of the proposed silver-carbon composite interlayer, assessing its scalability for large-scale production, and further validating its long-term durability. Nevertheless, this breakthrough is undoubtedly a crucial step toward the commercialization of all-solid-state batteries.

Source: https://www.azom.com/article.aspx?ArticleID=25245

CATL Unveils Advanced Sulfide Solid-State Electrolyte Technology via Patent, Targets 500 Wh/kg EV Batteries

Published March 11, 2026 Electrek China

OVERVIEW

CATL, the world's largest battery manufacturer, has publicly disclosed an international patent for an all-solid-state battery cell and electrolyte material incorporating fluorine-containing lithium salts and sulfide solid electrolytes. This innovative approach aims to mitigate the inherent instability of sulfide electrolytes by forming a protective lithium fluoride (LiF) layer on the anode, extending battery life and enabling fast charging. CATL has already commenced pilot production of 500 Wh/kg all-solid-state EV batteries and targets small-scale production by 2027, aligning with China's impending national standard for solid-state batteries to accelerate market entry.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs) hold immense potential for dramatically improving the range and safety of electric vehicles (EVs). Among various solid electrolyte types, sulfide-based electrolytes are particularly promising due to their high ionic conductivity. However, they face significant hurdles, including chemical instability, especially at the interface with lithium metal anodes, degradation in ambient air, and toxicity concerns. Overcoming these issues to achieve high performance and practical commercialization of sulfide-based ASSBs has been a critical focus for research and development.

Key Findings and Technical Breakthroughs

Contemporary Amperex Technology Co. Limited (CATL), a global leader in battery manufacturing, has revealed its innovative technological approach to ASSBs through the public disclosure of an international patent for solid-state battery cells and electrolyte materials. The core technology described in this patent involves a cathode plate design that combines fluorine-containing lithium salts with sulfide solid electrolyte materials.

The fluorine-containing lithium salt solution is reported to exhibit excellent stability, particularly at high temperatures. More importantly, the sulfide electrolyte material is designed to decompose and generate lithium fluoride (LiF). This LiF then forms a robust protective layer on the battery's anode, leading to several key benefits:

- **Enhanced Sulfide Electrolyte Stability:** Mitigates the intrinsic chemical instability typically associated with sulfide electrolytes.
- **Extended Battery Lifespan:** The anode protective layer suppresses dendrite formation and side reactions, contributing to long-term performance retention.
- **Enabling Fast Charging:** A stable interface and efficient ion transport pathways facilitate rapid charging capabilities.

CATL has already initiated pilot production of all-solid-state EV batteries boasting a very high energy density of 500 Wh/kg, a performance level significantly exceeding that of current lithium-ion batteries (typically 250-300 Wh/kg). With China poised to establish national standards for solid-state batteries in July 2026, CATL aims to commence small-scale production by 2027, accelerating its market entry strategy.

Technical Significance and Outlook

The disclosure of specific technical approaches and aggressive mass production plans by a global battery powerhouse like CATL strongly suggests that the introduction of all-solid-state batteries into the EV market is becoming a tangible reality. CATL's unique approach to addressing sulfide electrolyte instability—via fluorine-containing materials and LiF protective layer formation—is set to accelerate technological innovation in this field.

The synergy between the Chinese government's initiative to establish national standards for solid-state batteries and CATL's production roadmap positions China as a potential leader in this next-generation battery technology. This technology, by offering significantly higher energy density, faster charging, and improved safety compared to existing lithium-ion batteries, has the potential to further propel EV adoption.

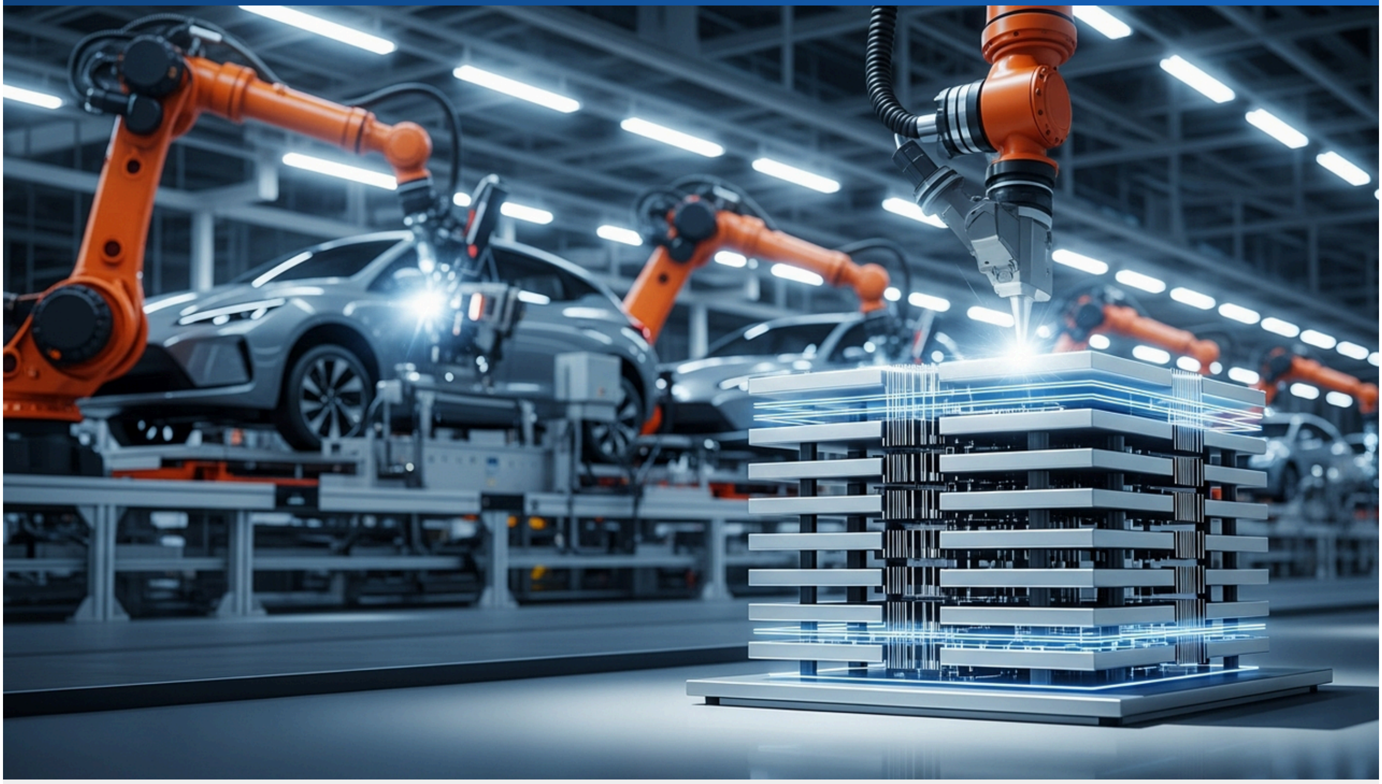
Future challenges include optimizing the cost and yield of the patented technology for large-scale production, and establishing concrete solutions for the remaining issues of air stability and toxicity associated with sulfide electrolytes. However, CATL's move clearly indicates that all-solid-state batteries are no longer a distant future technology.

Source: https://electrek.co/2026/03/11/solid-state-ev-battery-patent-reveals-catls-ambitious-plans/

Collected: May 15, 2026 | Automated Research System (Gemini API)

Nissan Targets 2028 for Solid-State EV Launch, Validates 23-Layer Prototype Pack at Pilot Plant

Published April 20, 2026 Electrek Japan



OVERVIEW

Nissan has announced significant progress towards launching EVs powered by all-solid-state batteries by 2028, having established a pilot production line at its Yokohama plant in January 2025 and partnering with U.S. firm LiCAP Technologies for mass production. The company successfully stacked 23 battery cells into a prototype solid-state pack, confirming it meets charging and discharging targets for vehicle applications. Nissan aims to double current EV range to over 1,000 km (620 miles) and substantially reduce battery pack costs to $75/kWh by fiscal year 2028. This development highlights a concrete path for a major OEM to deploy next-generation battery technology, addressing range anxiety and cost barriers in the EV market.

IN DEPTH

Background and Technical Challenges

Accelerating the adoption of electric vehicles (EVs) hinges critically on extending driving range, reducing charging times, and lowering battery costs. Conventional lithium-ion batteries are approaching their performance limits, making all-solid-state batteries (ASSBs) a focal point for next-generation technology. ASSBs, which replace liquid electrolytes with solid counterparts, offer the potential for enhanced safety and higher energy density. However, their complex manufacturing processes, high costs, and challenges in ensuring consistent yield at large scales have remained significant technical hurdles.

Key Findings and Technical Breakthroughs

Nissan has announced steady progress towards its goal of introducing vehicles equipped with all-solid-state EV batteries to the market by 2028. The company established a pilot production line for ASSBs at its Yokohama plant in January 2025, signaling its concrete preparations for mass production. Furthermore, Nissan has partnered with U.S.-based LiCAP Technologies to accelerate the development of mass production techniques. LiCAP Technologies' unique dry electrode technology is expected to significantly reduce manufacturing costs and improve efficiency by eliminating the solvent recovery and drying processes associated with traditional wet-coating methods.

Nissan has confirmed the achievement of several crucial milestones:

- **Prototype Pack Stacking:** Successfully developed a prototype all-solid-state battery pack by stacking 23 individual battery cells.
- **Vehicle-Specific Charge/Discharge Targets Met:** This prototype pack has been validated to meet the required charge and discharge performance targets for actual vehicle applications, marking a significant step from laboratory results toward practical implementation.
- **Targeted Range:** The introduction of ASSBs is projected to double the range of current EVs, aiming for over 1,000 km (620 miles), based on WLTP (Worldwide Harmonized Light Vehicles Test Procedure) estimates. This could substantially alleviate consumer range anxiety.

- **Cost Targets:** Nissan aims to reduce battery pack costs to $75/kWh by fiscal year 2028, with a long-term goal of $65/kWh. Achieving this would make ASSBs comparable to or even cheaper than existing LIBs, dramatically enhancing the price competitiveness of EVs.

Technical Significance and Outlook

The announcement by a major automaker like Nissan, detailing the establishment of a production line, strategic partnerships, and a clear target year of 2028, strongly indicates that the adoption of ASSBs in the EV market is entering a realistic phase. The embrace of dry electrode technology is key to overcoming major barriers in ASSB mass production, not only by reducing environmental impact but also by cutting manufacturing costs and time.

The goal of doubling EV range has the potential to significantly reduce consumer apprehension towards EVs, accelerating their widespread adoption. Furthermore, if cost reduction targets are met, ASSB-equipped EVs could expand beyond the premium segment into broader markets.

Future challenges include replicating prototype performance in large-scale production, ensuring long-term durability in real-world conditions, establishing a robust supply chain, and securing stable raw material supplies. However, Nissan's initiative demonstrates a strong commitment from the Japanese automotive industry to reclaim global leadership in next-generation battery technology, with a potentially profound impact on the global EV market.

Source: https://electrek.co/2026/04/20/nissans-first-ev-solid-state-batteries-on-track-2028/

CATL Unveils Aggressive Solid-State Battery Roadmap: Semi-Solid by 2026, Full Solid by 2030

Published January 16, 2026 english.news18a.com China

OVERVIEW

CATL, the world's largest battery producer, has announced a clear dual-track roadmap for solid-state battery development, targeting mass production of semi-solid batteries by 2026, followed by small-scale production of full solid-state batteries in 2027, and large-scale commercial deployment by 2030. Adopting a "hybrid solid-liquid first, then all-solid" strategy, CATL has already demonstrated a condensed-phase battery with 500 Wh/kg energy density in a 4-ton electric aircraft, proving over 2,000 cycles. This comprehensive plan from a major industry player underscores the accelerating commercialization of advanced battery technologies across automotive and aerospace sectors.

IN DEPTH

Background and Technical Challenges

The escalating growth of the electric vehicle (EV) market and the emergence of new electrification sectors, such as aviation, are driving an urgent demand for battery technologies with higher energy density, superior safety, and extended lifespans. All-solid-state batteries (ASSBs) hold the potential to meet these stringent requirements. However, significant technical hurdles persist, particularly concerning manufacturing costs, scalability, and seamless integration into existing infrastructure. Consequently, many companies are exploring phased approaches to market entry.

Key Findings and Technical Breakthroughs

CATL, the world's largest EV battery manufacturer, has unveiled an ambitious roadmap for the commercialization of all-solid-state batteries. The company has adopted a distinct dual-track strategy—"hybrid solid-liquid first, then all-solid"—planning to introduce technologies to the market incrementally:

- **Semi-Solid Battery Mass Production:** CATL aims to begin mass production of semi-solid (hybrid solid-liquid) batteries, offering energy densities between 300-480 Wh/kg, by 2026. These are positioned as an intermediate solution during the transition to fully solid-state technology.
- **Small-Scale Full Solid-State Production:** The company targets the initiation of small-scale production for more advanced all-solid-state batteries in 2027.
- **Large-Scale Commercial Deployment:** By 2030, CATL plans for the widespread commercial deployment of its all-solid-state battery technology.

CATL has already achieved significant milestones in high-energy-density technology. Its "condensed-phase battery" (a hybrid type, distinct from pure all-solid-state) has demonstrated an impressive energy density of 500 Wh/kg. This battery has been successfully deployed in a 4-ton electric aircraft, where it has proven a cycle life exceeding 2,000 cycles. This achievement clearly showcases CATL's capability to commercialize advanced battery technologies.

Technical Significance and Outlook

The announcement of this clear roadmap by CATL signifies the rapid industrialization of all-solid-state battery technology and is expected to have a profound impact on the global battery market. The phased strategy, transitioning from semi-solid to full solid-state batteries, represents a pragmatic approach to managing technical risks while introducing high-performance batteries to the market at an earlier stage. The successful demonstration of condensed-phase batteries in electric aircraft expands the potential applications of ASSB technology beyond EVs to demanding sectors like aerospace, which require extremely high energy density.

CATL's aggressive timeline will likely compel other major battery manufacturers and automotive OEMs to accelerate their own ASSB development and commercialization schedules. Future challenges include cost reduction for full solid-state battery mass production, establishing robust supply chains, and ensuring consistent quality at large production volumes. Nevertheless, CATL's proactive stance heightens expectations for ASSBs to emerge as a dominant technology in the market within the next few years.

Source: http://english.news18a.com/news/english_224747.html

Solid-State Batteries in 2026: Navigating Advances, Persistent Challenges, and Future Use Cases

Published January 13, 2026 bonnenbatteries.com Global

OVERVIEW

As of 2026, solid-state batteries (SSBs) promise high energy density, superior safety, and rapid charging, yet they contend with critical technical hurdles such as high solid-solid interfacial resistance and dendrite growth. While semi-solid batteries, like NIO's 150 kWh pack delivering 930 km range, are already on the market, fully solid-state variants are primarily in pilot production. Major players like Toyota and CATL target 400 Wh/kg prototypes by 2027 and 500 Wh/kg mass production by 2030, with early EV integration anticipated post-2027 as high-value niche products. Cost remains a significant challenge, currently 3-5 times that of conventional lithium-ion batteries.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs) are heralded as the leading contenders for next-generation battery technology, promising substantial improvements in energy density, inherent safety (non-flammability), and fast-charging capabilities compared to conventional liquid-electrolyte lithium-ion batteries (LIBs). These characteristics directly contribute to significantly extended electric vehicle (EV) ranges, simplified charging infrastructure, and enhanced battery safety. However, the commercialization of ASSBs faces several critical technical barriers: high 'solid-solid interfacial resistance' between solid electrolytes and electrodes, the persistent issue of 'dendrite growth' with lithium metal anodes, and complex, high-cost manufacturing processes.

Key Findings and Technical Breakthroughs

As of 2026, all-solid-state battery technology is beginning to emerge in the market, primarily in the form of semi-solid batteries (hybrid solid-liquid electrolytes). For instance, China's NIO already sells EVs equipped with a 150 kWh battery pack featuring WeLion-manufactured semi-solid cells, achieving approximately 930 km of range and an energy density of 300-350 Wh/kg. Gotion Hi-Tech has also successfully passed nail penetration tests with its semi-solid 'G-Dome' cells and plans for a 12 GWh semi-solid production line by 2025, indicating that this intermediate technology is gaining commercial traction.

Concurrently, the development of fully all-solid-state batteries is making steady progress:

- **Prototype Targets:** Major players such as Toyota and CATL aim to introduce 400 Wh/kg ASSB prototypes by 2027.
- **Mass Production Targets:** By 2030, these companies target the mass production of ASSBs with a high energy density of 500 Wh/kg.
- **Charging Speed:** ASSBs are targeting a charging time of 10-15 minutes to reach 80% capacity, which would significantly reduce current LIB charging durations.

Nevertheless, fully all-solid-state batteries remain largely in small-scale pilot production as of 2026, with industry roadmaps suggesting that initial EV integration will begin as a first milestone in 2027 or later.

Technical Significance and Outlook

The strong industry consensus indicates that ASSB commercialization will proceed in phases, starting with semi-solid batteries and gradually transitioning to fully solid-state variants. This phased approach suggests that market impact will be realized progressively from an early stage. Initially, due to their high performance and safety, ASSBs are expected to be adopted in high-end luxury EVs and specific niche industrial applications (e.g., drones, medical devices).

From a long-term perspective, ASSBs are poised to revolutionize the EV market by alleviating consumer concerns regarding range and safety. However, a significant current challenge is the high cost, estimated to be 3-5 times that of existing LIBs, due to expensive materials and complex manufacturing processes. Therefore, cost reduction and yield improvement are indispensable for achieving large-scale mass production. Continuous optimization across materials science, manufacturing technology, and the entire supply chain will be required for the widespread adoption of this technology.

Source: https://www.bonnenbatteries.com/solid-state-batteries-advances-challenges-future-use-cases/

Solid-State Batteries: 2026 Marks Turning Point Towards Commercial Reality as Manufacturers Race for Deployment

Published February 11, 2026 to7motor.com Global

OVERVIEW

In 2026, solid-state battery technology is transitioning from research to practical implementation, with major manufacturers intensely competing for commercialization. China is set to release its first national solid-state battery standard in July 2026, accelerating market adoption. Companies like CATL, BYD, Toyota, Samsung SDI, and QuantumScape are targeting high energy densities of 400-500 Wh/kg, fast charging capabilities, and superior safety, aiming for mass production in the late 2020s to early 2030s. Despite promising performance, manufacturing complexity and high costs remain significant challenges on the path to widespread deployment.

IN DEPTH

Background and Technical Challenges

With the rapid expansion of the electric vehicle (EV) market, demand for enhanced battery performance and safety is continuously escalating. Current lithium-ion batteries (LIBs) are nearing maturity, and all-solid-state batteries (ASSBs) are drawing significant attention as the next-generation technology poised to surpass their limitations. ASSBs offer the potential for fundamental improvements in safety (due to non-flammable solid electrolytes), higher energy density, and faster charging capabilities. However, several factors have historically hindered their commercialization, including high interfacial resistance between solid electrolytes and electrodes, the growth of lithium dendrites under high current densities, and the complexity and high cost of manufacturing processes.

Key Findings and Technical Breakthroughs

As of 2026, all-solid-state battery technology is moving beyond the laboratory phase and making significant strides toward real-world production and commercialization. A notable development is China's plan to release its first national standard for all-solid-state batteries in July 2026, which is expected to strongly propel industrialization in this sector.

Leading battery manufacturers and automotive OEMs have announced specific roadmaps and performance targets:

- **CATL:** Plans to initiate initial production in 2027 and full-scale mass production by 2030.
- **BYD:** Aims for initial production in 2027, targeting an energy density of 400 Wh/kg and 5C charging capability (full charge in 12 minutes).
- **Dongfeng:** Projects mass production of 350 Wh/kg solid-state batteries by the end of 2026.
- **Toyota:** Plans to begin small-scale production between 2027 and 2028, targeting an energy density of 450-500 Wh/kg.
- **Samsung SDI:** Aims to achieve technology capable of 80% charge in 9 minutes by 2027.

- **QuantumScape:** Reports maintaining over 80% capacity after 400 cycles, indicating high durability.

These targets highlight the superior advantages of all-solid-state batteries over existing LIBs in terms of safety (thermal event onset temperature of 247°C vs. 90°C), target energy density of 400-500 Wh/kg, and fast-charging capabilities.

Technical Significance and Outlook

The commercialization of ASSBs is not expected to be an overnight event but rather a gradual transition, with semi-solid and advanced hybrid batteries preceding the full market entry of pure all-solid-state batteries in the late 2020s to early 2030s. This phased approach represents a pragmatic strategy to steadily address technical challenges and reduce costs.

China's establishment of national standards will likely stimulate rapid domestic market growth and further intensify global competition. ASSBs are poised to dramatically improve EV performance and, in the long term, reduce battery fire risks, contributing to more sustainable transportation systems. However, manufacturing complexities, particularly managing the air-sensitive nature of sulfide electrolytes, and persistently high production costs (currently several times that of LIBs) remain challenges. Resolving these issues will be key to the large-scale adoption of all-solid-state batteries.

Source: https://to7motor.com/solid-state-batteries-2026-commercial-reality

Panasonic to Launch Solid-State Battery Samples in 2027, Prioritizing Robotics and High-Temperature Industrial Applications

Published September 18, 2025 Cryptorank Japan

OVERVIEW

Panasonic Holdings Corp. plans to commence sample shipments of its all-solid-state batteries in fiscal year 2027, strategically focusing on non-EV applications such as industrial robots, tire pressure monitoring systems, and high-temperature equipment. This approach leverages the batteries' inherent high heat resistance (operable at 125°C) and long lifespan, which are critical for these niche markets. By eliminating liquid electrolytes for enhanced safety and energy density, Panasonic aims to carve out market share by capitalizing on unique advantages where conventional batteries fall short, rather than directly entering the intensely competitive EV market initially.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs) offer significant advantages over conventional liquid-electrolyte lithium-ion batteries, including superior safety, higher energy density, and a wider operating temperature range. These characteristics hold the potential to break through the limitations of existing battery technologies, particularly in industrial applications demanding high reliability under extreme conditions and in sensor applications requiring small, high-performance power sources. However, for large-scale EV mass production, challenges related to manufacturing costs, scalability, and ensuring long-term reliability remain substantial, leading many companies to explore optimal market entry strategies.

Key Findings and Technical Breakthroughs

Panasonic Holdings Corp. has announced its plan to begin sample shipments of all-solid-state batteries in fiscal year 2027. A notable aspect of this announcement is the company's strategic decision to focus on specific non-EV sectors for initial market deployment, rather than the electric vehicle market. Specifically, Panasonic is targeting the following applications:

- **Industrial Robots:** Requiring high reliability and extended operational periods.
- **Tire Pressure Monitoring Systems (TPMS):** Placed in confined spaces and demanding stable operation in high-temperature environments.
- **High-Temperature Equipment:** Such as industrial furnace monitoring systems, where the ability to stably charge and discharge at extremely high temperatures (e.g., 125°C) is essential.

Panasonic's ASSBs achieve fundamental safety improvements and high heat resistance in these specialized environments by eliminating liquid electrolytes. The guaranteed operation at temperatures as high as 125°C, in particular, opens up numerous industrial applications previously challenging for conventional batteries. By entering these niche markets, the company aims to establish technological superiority and ultimately enhance its competitiveness in broader markets.

This strategy is seen as Panasonic's effort to differentiate itself and leverage its unique strengths in a competitive landscape that includes major small-battery manufacturers like TDK.

Technical Significance and Outlook

Panasonic's strategy highlights the diversity of approaches towards ASSB commercialization. In a current environment where large-scale EV production remains a significant technical and cost challenge, prioritizing high-value, niche non-EV applications allows Panasonic to demonstrate the advantages of its ASSBs early on and achieve commercial success. This approach offers the benefit of increasing technological maturity and accumulating experience in optimizing manufacturing processes.

Success in non-EV applications could potentially serve as a strong foothold for future expansion into the EV sector. The characteristics of high-temperature resistance, safety, and long lifespan are also highly valuable for in-vehicle sensors and broader mobility systems, suggesting indirect contributions to EVs even if not directly integrated into powertrains initially. Future challenges include expanding demand in these niche markets, further improving cost competitiveness, and scaling up production volumes. Nevertheless, Panasonic's strategy is a pragmatic and promising step toward the practical implementation of all-solid-state batteries.

Source: https://cryptorank.io/news/feed/84620-panasonic-to-debut-solid-state-batteries-in-2027-with-focus-on-robots-monitoring-systems

Collected: May 15, 2026 | Automated Research System (Gemini API)

Solid-State Battery Interface Breakthrough: Halide Electrolytes and In-Situ Polymerization Address Critical Commercialization Hurdles

Published April 22, 2026 PatSnap Eureka Global

OVERVIEW

In 2026, interfacial resistance, not bulk conductivity, is recognized as the primary barrier to solid-state battery commercialization. Beyond conventional oxides and sulfides, low-cost, high-conductivity halide and oxychloride electrolytes are emerging as promising alternatives; China's USTC, for instance, targets oxychlorides with <\$12/kg cost and 2.42 mS cm^{-1} conductivity. Concurrently, in-situ polymerization for electrode-electrolyte interface integration is a vibrant research area, demonstrating improved interfacial compatibility and dendrite suppression. These advancements represent critical steps in resolving fundamental challenges, paving the way for more cost-effective and higher-performing all-solid-state batteries.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs) are a promising next-generation battery technology, but a consensus has emerged that the primary obstacle to their practical implementation is not the bulk ionic conductivity of the solid electrolyte itself, but rather the 'interfacial resistance' between the electrodes and the solid electrolyte. Because both electrodes and electrolytes are solid, insufficient physical contact or existing chemical and electrochemical incompatibilities at the interface hinder lithium ion transport, significantly degrading battery performance. Furthermore, when using lithium metal anodes, dendrite formation remains a critical issue threatening safety and lifespan. The key to commercializing ASSBs lies in resolving these complex interfacial problems in a cost-effective manner.

Key Findings and Technical Breakthroughs

As of 2026, all-solid-state battery interface research is showing multidisciplinary advancements:

- **Importance of Interfacial Resistance:** As highlighted by a 2020 Oxford University study, while ceramic solid electrolytes possess sufficient ionic conductivity, challenges persist regarding electrode-electrolyte interface characteristics, mechanical properties, and manufacturing scalability. This understanding has shifted the focus of R&D from bulk materials to the interface.
- **Emergence of Novel Electrolyte Materials:** In addition to the traditionally dominant oxide and sulfide electrolytes, halide and oxychloride electrolytes are gaining attention as cost-effective new alternatives. China's University of Science and Technology of China (USTC) has developed an oxychloride targeting a material cost of less than $12/kg while achieving a high ionic conductivity of 2.42 mS cm^{-1}. This suggests a significant contribution to material cost reduction.

- **In-Situ Polymerization for Interface Integration:** 'In-situ polymerization,' a method for directly integrating the electrode and solid electrolyte interfaces, is one of the most active research areas. This approach offers several benefits:
  - **Improved Interfacial Compatibility:** Forms excellent contact between electrodes and electrolytes, reducing interfacial resistance.
  - **Suppression of Transition Metal Dissolution:** Prevents the dissolution of transition metals from the cathode, thereby inhibiting electrolyte degradation.
  - **Dendrite Suppression:** Effectively blocks the growth of lithium dendrites, enhancing safety and lifespan.
  - **Improved Electrode Wettability:** Ensures uniform contact between the electrolyte and electrode materials, optimizing ion transport efficiency.

These technologies offer fundamental solutions to interfacial problems, with the potential to dramatically improve the performance and reliability of all-solid-state batteries.

Technical Significance and Outlook

Solving interfacial problems is crucial for the practical implementation and large-scale mass production of ASSBs. The emergence of low-cost, high-performance halide-based electrolytes will significantly contribute to reducing ASSB manufacturing costs and enhancing market competitiveness. Furthermore, in-situ polymerization techniques for interface integration hold the promise of simultaneously simplifying manufacturing processes and boosting performance, expected to accelerate the evolution of future mass production technologies.

However, the long-term stability and safety of halide electrolytes, as well as the scalability of in-situ polymerization processes for large-scale production, remain future challenges. If these issues are resolved, ASSBs will transcend the limitations of existing lithium-ion batteries, opening the way for their widespread adoption as a next-generation energy source across various fields, including electric vehicles (EVs), stationary energy storage, and portable electronic devices.

Source: https://www.patsnap.com/resources/blog/rd-blog/solid-state-battery-electrolyte-interface-2026-

patsnap-eureka-2/

Solid-State Batteries 2026-2036: Technology, Forecasts, Players - IDTechEx Market Overview

Published March 30, 2026 IDTechEx Global

OVERVIEW

This article provides an overview of the IDTechEx market research report, "Solid-State Batteries 2026-2036: Technology, Forecasts, Players." The report covers the solid-state battery market from 2026 to 2036, analyzing technological trends, market forecasts, and key players. While solid-state batteries offer advancements in safety, energy density, and simplified design, the report highlights persistent challenges including complex manufacturing processes, high costs, dendrite formation, limited low-temperature performance, and reduced cycle life during fast charging. It details the characteristics and issues associated with sulfide, polymer, and oxide electrolyte types, emphasizing the global collaborative efforts across the supply chain.

IN DEPTH

This article provides an overview of the market research report "Solid-State Batteries 2026-2036: Technology, Forecasts, Players" published by IDTechEx.

Report Overview

This IDTechEx report focuses on the all-solid-state battery (ASSB) market from 2026 to 2036. The report provides a detailed analysis of ASSB technological evolution, market growth forecasts, and key player activities, outlining the future of ASSBs across a wide range of application areas, including EVs, consumer electronics, and stationary energy storage. It delves particularly deeply into the characteristics of each solid electrolyte type (sulfide, polymer, oxide) and the associated technical and manufacturing challenges.

Key Findings

The report emphasizes that all-solid-state batteries have the potential to bring transformative advancements in safety, energy density, and simplified design compared to conventional lithium-ion batteries (LIBs). However, it points out that several significant challenges remain for their commercialization:

- **Manufacturing Process Complexity:** Low compatibility with existing battery manufacturing lines necessitates new capital investment and technological development.
- **High Costs:** High material costs and complex manufacturing processes tend to result in significantly higher final product costs compared to LIBs.
- **Lithium Dendrite Formation:** When using lithium metal anodes, dendrites can form during charge-discharge cycles, posing risks of short circuits and reduced safety.
- **Limited Low-Temperature Performance:** For some solid electrolytes, ionic conductivity decreases at low temperatures, limiting performance.
- **Reduced Cycle Life during Fast Charging:** Fast charging can accelerate dendrite formation, potentially shortening battery lifespan.

The report also analyzes the main solid electrolyte types:

- **Sulfide Electrolytes:** Offer high ionic conductivity but face challenges with air instability, toxicity, and manufacturing difficulty.

- **Polymer Electrolytes:** Scalable and flexible, but generally require high operating temperatures and may have stability issues.
- **Oxide Electrolytes:** Provide excellent stability against lithium metal anodes but are challenged by high interfacial resistance and manufacturing costs.

The report underscores the importance of manufacturing process adaptability, highlighting the need for cost-effective methods that can integrate new materials and components.

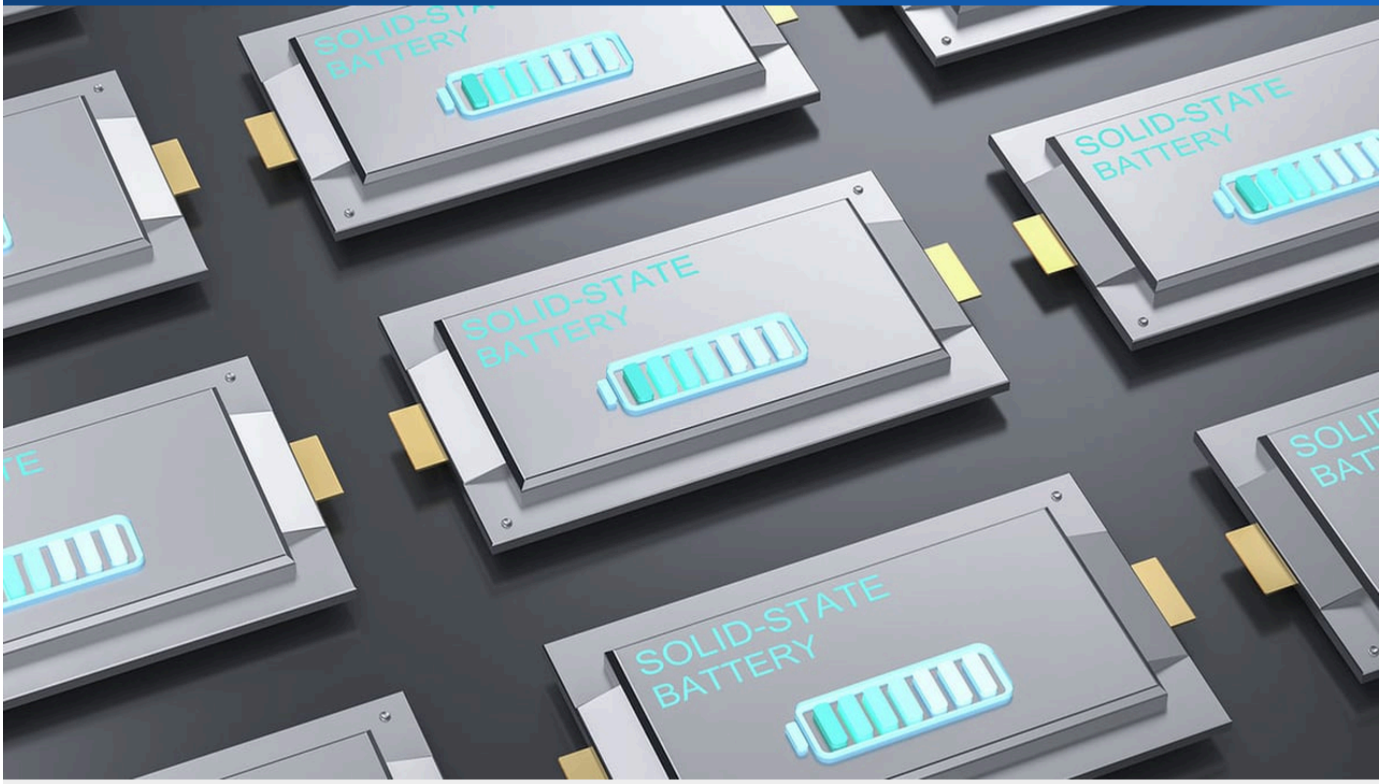
About the Publisher

IDTechEx is a global market research and business intelligence firm that provides independent analysis, reports, and consulting services on technology markets. The company focuses on emerging technologies, with deep expertise in areas such as energy storage, flexible electronics, robotics, and electric vehicles. Through detailed technical analysis and market forecasting, IDTechEx helps companies and investors understand future markets and make strategic decisions.

Source: https://www.idtechex.com/en/research-report/solid-state-batteries/1130

Solid-State Batteries in 2026: The Gap Between Promise and Reality for Mass Commercialization

Published April 14, 2026 Battery Technology Online Global



OVERVIEW

This article provides a technical analysis of the "promise versus reality" for lithium all-solid-state batteries as of 2026. While solid-state batteries offer high energy density and safety, their mass commercialization is predicted to be delayed until the early 2030s due to manufacturing complexities. Achieving true solid-state batteries necessitates resolving mechanical, interfacial, and production challenges. Sulfide-glass electrolytes, though highly conductive, require extremely low dew points (below -70°C) and exhibit limited stability with lithium metal. Establishing innovative production techniques, such as roll-to-roll manufacturing, is deemed critical for commercial viability.

IN DEPTH

This article provides an overview of a technical analysis report on the current status and future outlook of lithium all-solid-state battery technology as of 2026.

Report Overview

This technical analysis comprehensively evaluates the 'promise versus reality' of lithium all-solid-state batteries (ASSBs) in 2026, focusing on their technical challenges and the path to commercialization. While ASSBs theoretically offer high energy density and superior safety, the report indicates that significant technical and manufacturing hurdles remain, suggesting that large-scale mass commercialization may be delayed until the early 2030s. The report details the remaining challenges and future directions from the perspectives of materials science, interfacial engineering, and manufacturing processes.

Key Findings

Despite their numerous advantages, the report highlights that several critical challenges persist for the widespread adoption of all-solid-state batteries as of 2026:

- **Manufacturing Complexity:** There is a significant gap between laboratory-scale success and large-scale mass production, making it difficult to establish and optimize manufacturing processes.
- **Commercialization Timeline:** Mass commercialization is currently projected to be delayed until the early 2030s. This represents a challenge against the mature supply chain and cost advantages of existing liquid-electrolyte lithium-ion batteries.
- **Technical Hurdles:** To achieve true all-solid-state batteries, the following issues must be resolved:
  - **Mechanical Challenges:** Maintaining physical contact between solid materials and accommodating volume changes during charge-discharge cycles.
  - **Interfacial Challenges:** Reducing interfacial resistance between electrodes and solid electrolytes and ensuring stability.
  - **Manufacturing Challenges:** Efficiently manufacturing complex multi-layered structures with high yields.

- **Sulfide Glass Electrolyte Issues:** While sulfide glass electrolytes offer high ionic conductivity, maintaining their performance requires extremely low dew points (below -70°C), and they exhibit poor chemical stability against lithium metal.
- **Manufacturing Process Innovation:** The report emphasizes that innovative production technologies, such as 'roll-to-roll (R2R) manufacturing,' which have not yet been widely implemented in the current battery industry, are indispensable for the cost-effective production of all-solid-state batteries.

The analysis concludes that these challenges are still actively being researched and developed, and that integration of manufacturing processes, beyond just material discovery, is key.

About the Publisher

Battery Technology Online is an online media and information platform dedicated to battery technology and related industries. It provides the latest news, technical articles, analyses, and expert opinions on battery materials, design, manufacturing, applications, and market trends. The site serves as a reliable information source for a broad readership involved in the battery sector, including engineers, researchers, and business leaders.

Source: https://www.batterytechonline.com/industry-outlook/lithium-solid-state-batteries-in-2026-promise-physics-and-the-path-to-commercial-reality

Solid-State Battery Energy Storage Market Outlook: Solid Power Advances Electrolyte Production, Market Projected to Reach $18.6 Billion by 2032

Published May 13, 2026 openPR.com Global

OVERVIEW

This article provides an overview of the solid-state battery energy storage market, highlighting key developments from Solid Power, including the completion of site acceptance testing for SK On's pilot cell line and factory acceptance testing for its continuous sulfide-electrolyte manufacturing line. Solid Power is also supplying electrolytes to Samsung SDI under a joint evaluation with BMW. The report notes Texas is emerging as a US solid-state manufacturing testbed for aerospace and defense, with J-Star Holding planning a 100 MWh polymer-based line targeting over 350 Wh/kg for UAVs. The global market is projected to grow from $2.4 billion in 2025 to $18.6 billion by 2032.

IN DEPTH

This article provides an overview of the solid-state battery energy storage market distributed via OpenPR.com.

Report Overview

This market overview focuses on the latest trends and activities of key players in the all-solid-state battery (ASSB) energy storage market. It specifically highlights the technological development and supply chain role of Solid Power in the United States, as well as the emerging production hub for aerospace and defense applications in Texas, USA. This report reflects the current expectation that ASSBs will be applied not only to traditional electric vehicle (EV) uses but also to a wide range of energy storage systems.

Key Findings

Solid Power has made significant progress in the commercialization of its sulfide solid-state electrolyte-based battery technology. In May 2026, the company reported achieving the following milestones:

- **SK On Pilot Cell Line Testing:** Completed site acceptance testing (SAT) for the pilot cell line of SK On, a major Korean battery manufacturer.
- **Solid Electrolyte Manufacturing Line Testing:** Completed factory acceptance testing (FAT) for Solid Power's own continuous sulfide-electrolyte manufacturing pilot line.
- **Joint Evaluation Agreements:** Commenced supplying solid electrolytes under joint evaluation agreements with Samsung SDI and BMW.

Solid Power's business model specializes in the sale of solid electrolytes and the licensing of cell designs and manufacturing processes, exemplifying a specialized approach within the supply chain.

Furthermore, the state of Texas in the U.S. is emerging as a testbed for solid-state battery manufacturing, with a focus on aerospace and defense applications. J-Star Holding announced plans for a modular, automated, polymer-based solid-state battery production line specifically for UAVs (unmanned aerial vehicles) and drones. This line aims for a production capacity of 100 MWh and targets an energy density exceeding 350 Wh/kg.

The global solid-state battery energy storage market is estimated to grow from $2.4 billion in 2025 to $18.6 billion by 2032, according to market forecasts.

About the Publisher

OpenPR.com is a platform for companies and organizations worldwide to distribute press releases. It is not a specific research institution or consulting firm, but rather disseminates a wide range of the latest information from various market research firms and companies. This platform plays a role in quickly providing information on industry news, technological innovations, and market trends, serving as an accessible information source for a broad readership.

Source: https://www.openpr.com/news/4512783/solid-state-battery-energy-storage-market-outlook

Collected: May 15, 2026 | Automated Research System (Gemini API)

Lithium-Sulfur Cathodes Advance with Hybrid Solid-State Electrolytes, Promising Ultra-High Energy Density and Enhanced Safety for Automotive Scale

Published May 14, 2026 PatSnap Eureka Global

OVERVIEW

Lithium-sulfur (Li-S) batteries, with a theoretical energy density of ~2,600 Wh/kg, are gaining attention as a next-generation power source, despite historical challenges like sulfur's low conductivity, the polysulfide shuttle effect, and significant volume expansion. This analysis highlights hybrid solid-state electrolytes as a promising solution, combining polymer processability with ceramic ionic conductivity and stability. This approach effectively suppresses the polysulfide shuttle effect and enables stable lithium metal anodes, crucially enhancing safety by eliminating flammable liquid electrolytes. Li-S batteries are transitioning from lab-scale to early commercialization, particularly for high-energy automotive applications.

IN DEPTH

Background and Technical Challenges

High-performance applications such as electric vehicles (EVs) and aerospace demand energy densities far beyond what conventional batteries can provide. Lithium-sulfur (Li-S) batteries are considered one of the most promising candidates for next-generation power sources, theoretically boasting an exceptionally high energy density of approximately 2,600 Wh/kg—roughly 10 times that of existing lithium-ion batteries (typically 250-300 Wh/kg). However, several significant technical hurdles have impeded their commercialization:

- **Low Electrical Conductivity of Sulfur:** Sulfur, as a cathode material, has poor electrical conductivity, making efficient electron transfer challenging.
- **Polysulfide Shuttle Effect:** Intermediate polysulfide species formed during charge-discharge cycles dissolve into the electrolyte and migrate between cathode and anode, leading to active material loss and irreversible reactions that severely degrade cycle life.
- **Volume Expansion:** During discharge, sulfur reacts with lithium to form lithium sulfides, resulting in up to 80% volume expansion. This can cause structural degradation and physical disruption of the electrodes.

These challenges have severely limited the performance of Li-S batteries, particularly their cycle life and energy efficiency. Furthermore, the flammability of liquid organic electrolytes raised safety concerns for high-energy-density Li-S battery systems.

Key Findings and Technical Breakthroughs

This technical analysis focuses on recent advancements aimed at overcoming these key challenges in Li-S batteries. While various strategies, including optimizing conductive host materials and controlling the polysulfide shuttle effect, are under investigation, 'hybrid solid-state electrolytes' are particularly emphasized as a promising technological direction.

Hybrid solid-state electrolytes aim to combine the following advantages:

- **Processability of Polymer Electrolytes:** Retains flexible and easy-to-process characteristics.

- **Ionic Conductivity and Stability of Ceramic Electrolytes:** Benefits from high ionic conductivity and chemical stability.

This composite approach is particularly critical for Li-S systems due to the following:

- **Suppression of Polysulfide Shuttle Effect:** The solid electrolyte physically blocks the dissolution and diffusion of polysulfides, significantly reducing active material loss.
- **Stabilization of Lithium Metal Anodes:** Suppresses dendrite formation, enabling the safe operation of lithium metal anodes, which are essential for maximizing energy density.
- **Enhanced Safety:** Eliminating flammable liquid electrolytes substantially improves battery safety.

Once considered a laboratory curiosity, Li-S batteries are reportedly transitioning into early commercialization stages, particularly for automotive applications, thanks to these technological advancements.

Technical Significance and Outlook

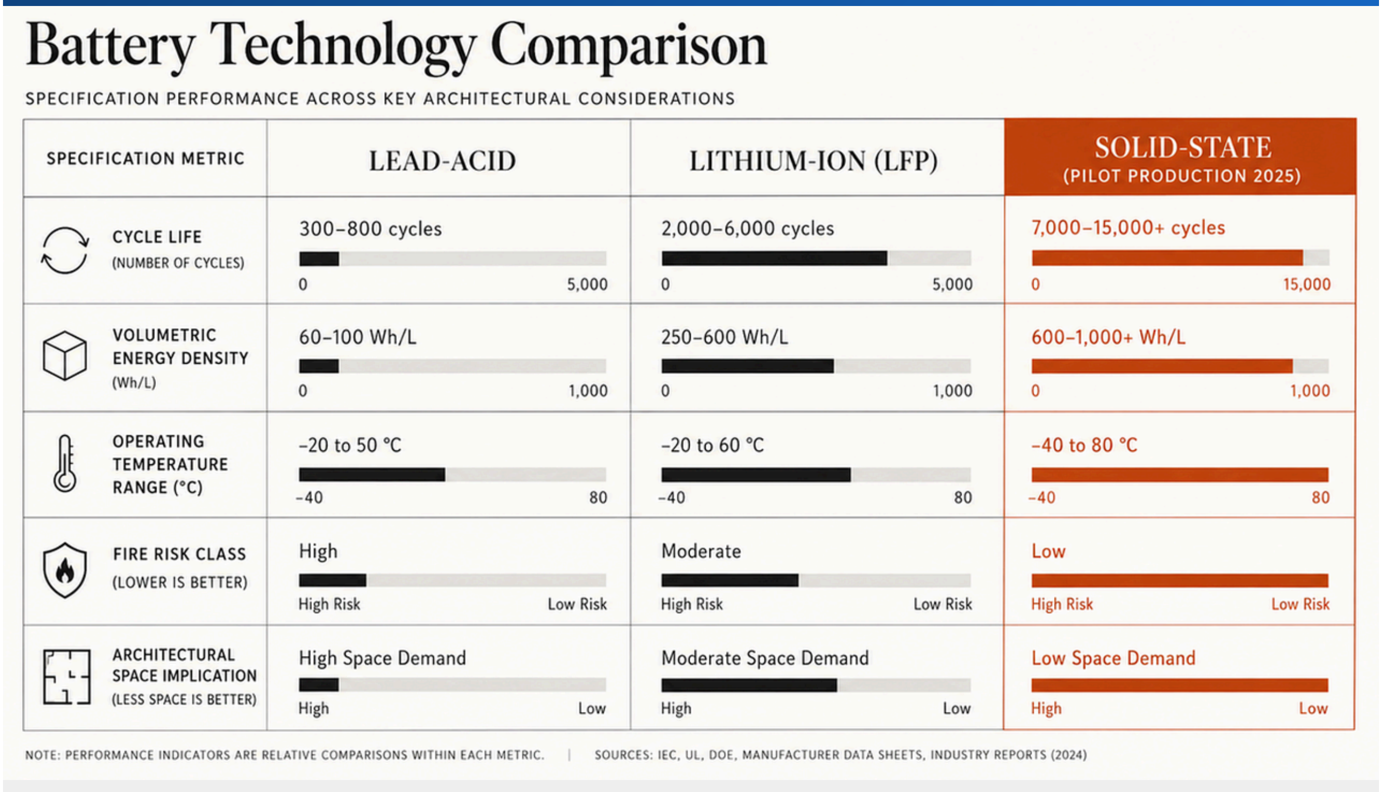
The commercialization of lithium-sulfur batteries has the potential to revolutionize the EV market by extending the range of electric vehicles several-fold and significantly contributing to battery weight reduction. Its applications are immeasurable in fields where weight directly impacts performance, such as aircraft, drones, and space probes.

Advances in hybrid solid-state electrolyte technology are key to resolving the two major challenges of Li-S batteries—safety and cycle life—thereby accelerating their practical implementation. However, future focus will be on cost reduction in large-scale production, optimization of manufacturing processes, and ensuring long-term stability. As this technology matures, it is expected to push the performance limits of battery-powered devices and contribute to a sustainable society.

Source: https://eureka.patsnap.com/blog/research-report/lithium-sulfur-cathodes-conductive-hosts-polysulfide-control-automotive-scaling/

Solid-State Batteries Powering Energy Independence: Mass Production on Horizon with Expanded Operating Temperatures

Published May 09, 2026 Medium (Ar. Prerana Kothari) Global



Battery Technology Comparison

SPECIFICATION PERFORMANCE ACROSS KEY ARCHITECTURAL CONSIDERATIONS

SPECIFICATION METRIC	LEAD-ACID	LITHIUM-ION (LFP)	SOLID-STATE (PILOT PRODUCTION 2025)
CYCLE LIFE (NUMBER OF CYCLES)	300–800 cycles (0 – 5,000)	2,000–6,000 cycles (0 – 5,000)	7,000–15,000+ cycles (0 – 15,000)
VOLUMETRIC ENERGY DENSITY (Wh/L)	60–100 Wh/L (0 – 1,000)	250–600 Wh/L (0 – 1,000)	600–1,000+ Wh/L (0 – 1,000)
OPERATING TEMPERATURE RANGE (°C)	-20 to 50 °C (-40 – 80)	-20 to 60 °C (-40 – 80)	-40 to 80 °C (-40 – 80)
FIRE RISK CLASS (LOWER IS BETTER)	High (High Risk – Low Risk)	Moderate (High Risk – Low Risk)	Low (High Risk – Low Risk)
ARCHITECTURAL SPACE IMPLICATION (LESS SPACE IS BETTER)	High Space Demand (High – Low)	Moderate Space Demand (High – Low)	Low Space Demand (High – Low)

NOTE: PERFORMANCE INDICATORS ARE RELATIVE COMPARISONS WITHIN EACH METRIC. | SOURCES: IEC, UL, DOE, MANUFACTURER DATA SHEETS, INDUSTRY REPORTS (2024)

OVERVIEW

Solid-state battery storage is identified as a key component in enabling large-scale energy independence and off-grid living, though cost-competitive mass production is still 2-3 years away. Samsung SDI targets 900 Wh/L volumetric density for 2027 mass production, while Toyota aims for automotive-scale sulfide-based cells on a similar timeline. Eliminating flammable liquid electrolytes, solid-state architecture significantly extends operating temperatures, enabling operation from -50°C to 125°C. Pilot cells from Factorial Energy have already validated 375 Wh/kg with 15-90% charge in 18 minutes, highlighting promising performance for diverse applications including building energy systems.

IN DEPTH

Background and Technical Challenges

The realization of energy independence and large-scale off-grid living, once a long-held dream, is becoming increasingly feasible due to recent technological innovations. At the core of this progress lies high-performance battery storage technology, particularly all-solid-state batteries (ASSBs). Conventional liquid-electrolyte lithium-ion batteries have limitations in terms of safety, energy density, and operating temperature range, rendering them insufficient for large-scale energy storage systems (ESS) or applications in extreme environments. ASSBs hold the potential to overcome these challenges, but their technological maturity and the establishment of cost-effective mass production processes remain key barriers to widespread adoption.

Key Findings and Technical Breakthroughs

This article emphasizes the role of all-solid-state batteries within the convergence of technologies enabling energy independence. As of 2026, it is estimated that mass production of ASSBs will still require another 2 to 3 years to reach cost-competitive volumes.

However, major players are making steady progress:

- **Samsung SDI:** Targets mass production in 2027 with a high volumetric energy density of 900 Wh/L.
- **Toyota:** Aims for automotive-scale cell mass production with its sulfide-based solid electrolyte platform, following a similar timeline to Samsung SDI.
- **Blue Solutions:** Targets a gravimetric energy density of 315-450 Wh/kg with its polymer-based Gen 4 cells.
- **Factorial Energy:** Pilot production cells have achieved an energy density of 375 Wh/kg and demonstrated 15-90% charging in 18 minutes.

One of the greatest advantages of ASSBs is the elimination of flammable liquid electrolytes. This not only significantly enhances operational safety but also dramatically expands the operating temperature range. For instance, stable operation is possible over a very wide temperature range, from -50°C to 125°C, greatly improving reliability in extremely cold or hot environments.

Furthermore, for integration into homes and buildings, ASSBs offer structural advantages in terms of battery bank sizing, fire risk, and thermal management compared to conventional batteries, enabling safer and more efficient integration.

Technical Significance and Outlook

The maturation of all-solid-state battery technology will bring about revolutionary impacts not only on EV performance but also on energy storage systems, especially in off-grid, smart home, and industrial applications. Their high safety and wide operating temperature range increase flexibility in battery placement and enable use in environments where battery deployment was previously challenging.

The specific mass production targets and performance metrics announced by various companies indicate that ASSBs are transitioning from conceptual promise to tangible products entering the market. If cost competitiveness improves over the next 2-3 years, their adoption could accelerate rapidly. This would enhance energy independence at both individual and regional levels, strengthen resilience during disasters, and significantly improve the integration efficiency of renewable energy sources. In the long term, high-performance batteries are expected to become a crucial pillar for achieving a sustainable society.

Source: https://medium.com/@Architects_Blog/unplugged-at-scale-the-converging-technologies-turning-energy-independence-from-homesteader-7aa780374748

Solid Power Unveils Sulfide Solid-State Electrolyte Production Strategy, Secures DOE Funding for Capacity Expansion

Published May 08, 2026   sahmcapital.com   USA

OVERVIEW

Solid Power has released an investor presentation detailing its strategy for sulfide all-solid-state battery electrolytes, aiming to significantly boost annual production capacity from 30 to 75 tons by the end of 2026 through a continuous production pilot line. The company reported robust liquidity of $435.3 million as of March 31, and has secured up to $50 million in grants from the U.S. Department of Energy (DOE). This announcement underscores Solid Power's critical role as a material supplier in the solid-state battery supply chain and its aggressive investment to accelerate mass production of next-generation battery technology.

IN DEPTH

Background and Technical Challenges

The commercialization of all-solid-state batteries (ASSBs) hinges on the stable and cost-effective mass production of high-performance solid electrolytes. Sulfide solid electrolytes are considered promising due to their high ionic conductivity and favorable processability, yet their manufacturing requires advanced techniques. Scaling up production while maintaining quality and reducing costs presents a significant challenge. Solid electrolyte manufacturers must overcome these hurdles to support the mass production plans of battery makers and automotive OEMs.

Key Findings and Technical Breakthroughs

Solid Power, a U.S. all-solid-state battery materials company, has released an investor presentation outlining its production strategy for sulfide solid electrolytes, revealing ambitious expansion plans. The key points of this announcement are as follows:

- **Production Capacity Expansion:** Solid Power aims to significantly increase its annual production capacity for sulfide solid electrolytes from the current 30 tons to 75 tons by the end of 2026. This represents a crucial strategic investment to meet the growing demand for all-solid-state batteries.
- **Continuous Production Pilot Line:** The company plans to implement a continuous production pilot line to efficiently supply stable, high-quality electrolytes. This is expected to optimize manufacturing processes and improve yields.
- **Strong Financial Position:** As of March 31, 2026, the company's liquid assets reached $435.3 million, with no debt reported. This substantial funding will strongly support research and development investments and capacity expansion.
- **Government Financial Support:** Solid Power has received a substantial grant of up to $50 million from the U.S. Department of Energy (DOE). This aligns with the U.S. government's strategy to strengthen the domestic battery supply chain and indicates that Solid Power's technology is deemed nationally significant.

Solid Power positions itself not as a 'cell manufacturer' but as a 'solid electrolyte supplier,' aiming to be a core player in the all-solid-state battery ecosystem by supplying electrolyte materials and providing technology licenses to major battery manufacturers and automotive OEMs.

Technical Significance and Outlook

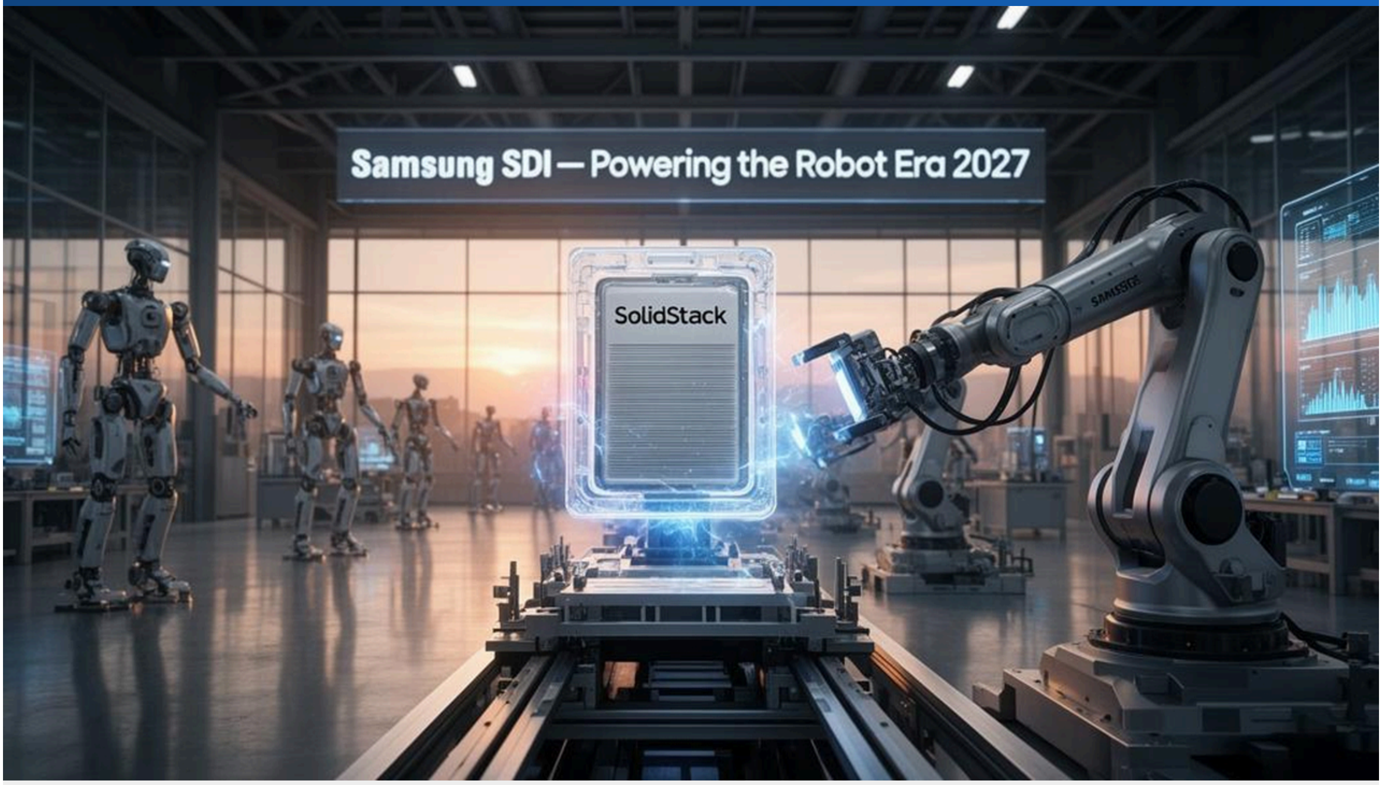
Solid Power's significant expansion of electrolyte production capacity and strong government funding support are critically important for the all-solid-state battery supply chain. The stable supply of high-quality solid electrolytes is an indispensable factor for accelerating the mass production of ASSBs, and Solid Power's actions are expected to help resolve this bottleneck. The DOE grant, in particular, aims to foster domestic next-generation battery technology and strengthen the supply chain, which is also vital for mitigating geopolitical risks.

Going forward, the focus will be on how the electrolytes supplied by Solid Power perform in the final products (battery cells) of its customers, the battery manufacturers and OEMs, and when they will be adopted on a large scale. Establishing cost-efficient production technologies and securing a broad customer base will contribute to the company's long-term growth and the overall development of the all-solid-state battery industry. This progress indicates that all-solid-state batteries are not a distant future technology but are steadily moving towards mass production.

Source: https://www.sahmcapital.com/news/content/solid-power-publishes-investor-presentation-on-sulfide-solid-state-battery-electrolyte-strategy-2026-05-07

Samsung SDI Declares Solid-State Batteries as 'Game Changer' for Robotics Era, Targeting 2027 Mass Production Readiness with 'SolidStack'

Published May 12, 2026   BigGo ファイナンス   South Korea



OVERVIEW

Samsung SDI announced at InterBattery 2026 its goal to complete mass production readiness for all-solid-state batteries by 2027, positioning them as a "game-changer" for the robotics era. The company unveiled "SolidStack," its proprietary brand, and showcased pouch-type solid-state battery samples developed specifically for physical AI systems. These batteries promise absolute safety, lightweight design, and high energy density, capable of extending robot operating times up to 8 hours. Samsung SDI aims to capture a leading technical standard in the rapidly growing global service robot market, projected to quadruple by 2030, by leveraging the unique advantages of solid-state technology.

IN DEPTH

Background and Technical Challenges

The rapid evolution of physical AI systems, including humanoid robots, demands increasingly advanced mobility, extended operating hours, and absolute safety. Traditional liquid-electrolyte lithium-ion batteries often pose risks of ignition under specific conditions, and their weight and size can impose significant constraints on system design. All-solid-state batteries (ASSBs) offer the potential to resolve these challenges faced by robots and dramatically enhance their performance. However, hurdles in robustness, flexibility, and mass production costs have remained barriers to their practical implementation.

Key Findings and Technical Breakthroughs

Samsung SDI unveiled groundbreaking advancements in all-solid-state battery technology and its strategic application areas at the "InterBattery 2026" conference in Seoul. The company positioned ASSBs as a "game-changer" for the emerging robotics era.

- **Mass Production Readiness Target:** Samsung SDI aims to complete preparations for mass production of all-solid-state batteries by 2027. This indicates that the transition from laboratory achievements to commercial production is imminent.
- **New Brand "SolidStack":** The company introduced "SolidStack," its proprietary all-solid-state battery brand specifically for physical AI systems like robots. This strategy aims to provide specialized solutions for particular market segments.
- **Pouch-Type for Physical AI:** Samsung SDI unveiled initial pouch-type all-solid-state battery samples. Pouch cells are well-suited for integration into complex robot systems due to their high design flexibility and energy density.

- **Performance Advantages:** The following characteristics of all-solid-state batteries offer significant benefits for robotic applications:
  - **Absolute Safety:** Eliminating liquid electrolytes dramatically reduces the risk of thermal runaway and ignition.
  - **Lightweight Design:** Reduced battery pack weight improves robot mobility, efficiency, and payload capacity.
  - **High Energy Density:** These batteries are expected to extend robot operating times by up to 8 hours. This represents a substantial improvement over existing batteries, reducing charging frequency and increasing productivity.

Samsung SDI predicts that the global service robot market will more than quadruple by 2030 and aims to establish leading technical standards in this rapidly growing sector.

Technical Significance and Outlook

Samsung SDI's clear targeting of the robotics sector as a primary market for its all-solid-state batteries represents an innovative strategy that expands the application potential of ASSBs beyond EVs to new growth engines. For robots, particularly humanoids, logistics robots, and drones, extended operation, high power output, and absolute safety in collaborative human environments are essential. ASSBs are an optimal solution to meet these stringent requirements.

The concrete target of mass production readiness by 2027 indicates Samsung SDI's strong intent to exert leadership in this field, which will likely accelerate investment and technological innovation in related industries. Success in the robotics market could potentially lead to expansion into other industrial applications and ultimately the EV sector. Future challenges include establishing cost competitiveness in early adoption markets, managing yields and quality during mass production, and promoting standardization for integration into diverse robotic platforms. Samsung SDI's "SolidStack" has the potential to set new battery technology standards in the robotics domain.

Source: https://finance.biggo.jp/news/aLBY5ZwBZk7xib5fvwj6

Collected: May 15, 2026 | Automated Research System (Gemini API)

Mitsui Kinzoku's Solid Electrolyte Selected for BEV All-Solid-State Batteries, Advancing Towards Mass Production

Published May 14, 2026 化学工業日報 電子版 Japan

OVERVIEW

Mitsui Kinzoku, a major Japanese materials manufacturer, announced that its solid electrolyte has been adopted for all-solid-state batteries targeting battery electric vehicles (BEVs). This signifies a crucial step in the solid-state battery supply chain, indicating that the provision of high-quality materials is entering a practical phase for mass production. Although specific details are behind a paywall, this news is seen by industry insiders as a concrete advancement towards the commercialization of solid-state batteries. The collaboration between material manufacturers and battery producers is key to accelerating the mass production of next-generation batteries.

IN DEPTH

Background and Technical Challenges

The commercialization of all-solid-state batteries (ASSBs), particularly their full-scale integration into battery electric vehicles (BEVs), requires not only high-performance battery cells but also the stable supply and quality assurance of solid electrolyte materials. Solid electrolytes offer advantages in safety and energy density compared to liquid organic electrolytes, but optimizing their material properties, reducing manufacturing costs, and establishing mass production systems demand advanced technology and significant investment. Japanese material manufacturers, with years of R&D experience in this field, play a critical role in the ASSB supply chain.

Key Findings and Technical Developments

Mitsui Kinzoku, a leading Japanese non-ferrous metal manufacturer, announced that its proprietary solid electrolyte has been adopted for all-solid-state batteries intended for BEV applications. This adoption marks a significant milestone demonstrating concrete progress toward the practical implementation of ASSBs.

- **Establishment of Material Supply Chain:** The adoption of Mitsui Kinzoku's solid electrolyte signifies that the material supply chain for ASSB mass production is steadily being built. A stable supply of high-quality, reliable solid electrolytes is an indispensable element for battery manufacturers to produce ASSBs on a large scale.
- **Evaluation of Material Technology:** The selection of the company's solid electrolyte for BEV applications indicates that its ionic conductivity, stability, and manufacturing compatibility have met the stringent requirements of automotive and battery manufacturers. While the specific type of electrolyte and performance figures are not available in the public portion of the article, this represents a significant achievement in materials science.
- **Contribution of Japanese Companies:** Japan has long been a global leader in basic research and material development for all-solid-state batteries. Mitsui Kinzoku's announcement reaffirms that Japanese material manufacturers continue to make crucial contributions to the commercialization of next-generation batteries.

This news strongly suggests that all-solid-state batteries are transitioning from a mere R&D stage to actual product implementation. Given that the overall battery performance heavily depends on the quality of the solid electrolyte, the role of material manufacturers is paramount.

Technical Significance and Outlook

The adoption of Mitsui Kinzoku's solid electrolyte for BEV all-solid-state batteries is groundbreaking news for the industrialization of ASSBs. This development brings significant impacts in the following areas:

- **Acceleration Towards Mass Production:** The secured supply of reliable solid electrolytes allows battery and automotive manufacturers to advance their ASSB production plans more concretely.
- **Strengthening Competitive Advantage:** High-performance solid electrolytes maximize the characteristics of ASSBs, such as energy density, safety, and charging speed, directly enhancing the competitive advantage of BEVs equipped with them.
- **Deepening Industrial Collaboration:** Collaboration among material manufacturers, battery producers, and automotive OEMs will further deepen, optimizing the entire supply chain.

Future challenges include detailed performance evaluation of the adopted solid electrolyte, cost reduction in large-scale production, and maintaining the position of Japanese material manufacturers in the international competitive landscape. However, this adoption clearly demonstrates that all-solid-state batteries are not a 'dream technology' but are steadily moving towards real market deployment, fostering great expectations for the future of the next-generation automotive industry.

Source: https://chemicaldaily.com/archives/801807

QuantumScape Director Sells Shares Valued at $212,868 Under Pre-Arranged Trading Plan

Published May 14, 2026 Investing.com JP USA

OVERVIEW

QuantumScape Director Jeffrey B. Straubel reportedly sold 27,106 shares of Class A common stock for approximately $212,868 on May 12, 2026. This transaction was executed under a pre-arranged Rule 10b5-1 trading plan adopted on June 13, 2025. Following the sale, Mr. Straubel directly holds 131,298 shares. This activity comes after QuantumScape announced first-quarter 2026 results that exceeded analyst expectations, suggesting a planned financial move rather than a reaction to recent performance. The event provides indirect insights into the company's financial health and executive market valuation.

IN DEPTH

Background and Corporate Finance

QuantumScape is a startup company attracting significant attention for its development of innovative all-solid-state battery technology, and its technological advancements are highly regarded by the market. However, as a publicly traded company, its financial status and the stock trading activities of its executives are consistently scrutinized by investors as indicators of market sentiment and the company's future prospects. Planned stock sales are a common practice as part of executives' personal asset management, but their timing and scale can influence the company's stock price.

Key Financial Information and Transaction Details

According to reports on May 14, 2026, Jeffrey B. Straubel, a director at QuantumScape, sold a portion of his Class A common stock in the company.

- **Transaction Date:** May 12, 2026
- **Number of Shares Sold:** 27,106 shares
- **Proceeds from Sale:** Approximately $212,868
- **Nature of Transaction:** This transaction was conducted under a "Rule 10b5-1 trading plan" adopted on June 13, 2025. This rule allows company insiders to pre-arrange a plan for buying or selling shares at future specific dates, which helps to avoid accusations of insider trading. Therefore, this sale was pre-planned and not an impromptu reaction to recent market information.
- **Shares Retained:** Following the sale, Mr. Straubel directly holds 131,298 shares of QuantumScape stock. This can be interpreted as still holding a substantial number of shares, which could imply continued confidence in the company.

Separately from this stock sale, QuantumScape announced favorable first-quarter 2026 results that surpassed analyst expectations. This suggests that technological development progress and financial health continue to be maintained.

Technical Significance and Outlook

A planned stock sale by an executive is a normal part of corporate activity and does not necessarily signal a negative outlook for the company's future. Particularly, sales executed under a Rule 10b5-1 plan are often conducted in accordance with predetermined financial plans and are therefore not directly related to market movements.

However, for a startup developing a nascent technology like all-solid-state batteries, executive stock transactions always draw investor attention. This sale should be viewed as part of an individual's asset management, independent of the company's financial status or technological advancements.

QuantumScape's future prospects continue to depend on the progress of its technological development, especially the concrete roadmap for mass production, cost reduction, and the depth of its partnerships with automotive OEMs. Strong quarterly results indicate a stable company foundation and are important for maintaining investor confidence. Moving forward, the achievement of technological milestones and financial reports will remain key factors determining market valuation.

Source: https://jp.investing.com/news/insider-trading-news/article-93CH-1537107

Toyota Accelerates Solid-State EV Development for 2028 Launch, Targets 5-Minute Charge and 1,200-Mile Range

Published May 09, 2026   YouTube (動画コンテンツの要約)   Japan

OVERVIEW

Toyota is intensifying its mass production efforts for all-solid-state battery (ASSB) EVs, targeting market introduction between 2027 and 2028. The company has set ambitious performance goals: a 5-minute charge time, a staggering 1,200-mile (approx. 1930km) driving range, an energy density of 1500Wh/kg, and 90% capacity retention over 40 years. Toyota has already secured production licenses in Japan, partnered with Sumitomo Metal Mining for cathode material development, and commenced construction of a large-scale pilot factory with Idemitsu. These moves signal a potentially revolutionary shift in the EV market, addressing core consumer anxieties around range and charging speed.

IN DEPTH

Background and Technical Challenges

The electric vehicle (EV) market faces increasingly fierce competition, with range anxiety, lengthy charging times, and battery degradation remaining significant barriers for consumers transitioning to EVs. All-solid-state batteries (ASSBs), by eliminating liquid electrolytes, offer a fundamental solution to these challenges, promising superior safety, high energy density, and rapid charging capabilities as a next-generation technology. However, mass production has been hampered by major technical hurdles, including ensuring uniform manufacturing of solid electrolyte sheets, reducing production costs, and guaranteeing long-term durability.

Key Findings and Technical Breakthroughs

Toyota, the automotive industry giant, has reportedly intensified its mass production plans for ASSB-equipped EVs, aiming for an early market launch between 2027 and 2028. The company's performance targets are exceptionally ambitious and, if realized, would revolutionize the EV market:

- **Ultra-Fast Charging:** A mere 5 minutes to fully charge the battery, a speed comparable to refueling a gasoline car.
- **Ultra-Long Range:** An astonishing 1,200-mile (approximately 1,930km) driving range on a single charge, which would entirely eliminate range anxiety.
- **High Energy Density:** An extremely high energy density of 1500 Wh/kg, roughly double that of current lithium-ion batteries.
- **Extended Lifespan:** A target of 90% capacity retention over 40 years, fundamentally addressing battery degradation concerns.

To achieve these goals, Toyota is taking concrete steps in supply chain development:

- **Production License Acquisition:** Already secured production licenses for all-solid-state batteries within Japan.
- **Partnerships with Material Manufacturers:** Signed a joint development agreement with Sumitomo Metal Mining for the mass production of cathode materials.
- **Pilot Factory Construction:** A large-scale all-solid-state battery pilot factory with Idemitsu Kosan has commenced construction.

These actions indicate Toyota's deep commitment not only to R&D but also to establishing actual production and material supply systems.

Technical Significance and Outlook

Toyota's announcements regarding ASSBs have the potential to send "shockwaves" through the global EV market. If the targets of 5-minute charging, 1,200-mile range, and 40-year lifespan are achieved, the very concept of an EV will be profoundly transformed. Consumers would be able to choose EVs without worrying about range, charging time, or battery degradation, removing the biggest barriers to EV adoption. This could dramatically accelerate the transition from gasoline vehicles to EVs.

Crucially, the concrete actions of major Japanese companies, collaborating with material manufacturers like Idemitsu and Sumitomo Metal Mining, acquiring production licenses, and commencing pilot factory construction, strongly indicate that ASSBs are transitioning from "laboratory-level technology" to "industrial-level reality." The biggest hurdles in mass production are the uniform manufacturing of solid electrolyte sheets and the reduction of production costs. Toyota's strong momentum and comprehensive supply chain efforts will be key to overcoming these challenges. This progress suggests that the Japanese automotive industry is poised to once again lead the world in next-generation battery technology and shape the future of global mobility.

Source: https://www.youtube.com/watch?v=jfANh5Cv2zc

ProLogium Revolutionizes Solid-State Batteries with 'All-Inorganic Super Flow' Electrolyte, Achieves 5-Minute Fast Charge and Cost-Efficient Mass Production

Published May 10, 2026   owl - note   Taiwan

OVERVIEW

Taiwan's ProLogium Technology is breaking through key barriers to solid-state battery commercialization with its proprietary 'All-Inorganic Super Flow' solid electrolyte technology. This innovation overcomes the interfacial resistance common in oxide-based systems without external pressure, enabling ultra-fast charging to 80% in just 5 minutes. Furthermore, its 'PCR framework' allows over 70% reuse of existing Li-ion battery production equipment, significantly reducing mass production costs and environmental impact. Collaborations with Mercedes-Benz and the construction of Europe's first gigafactory in France (targeting 2028 operation) aim to apply this technology across EV, robotics, and aerospace sectors.

IN DEPTH

Background and Technical Challenges

All-solid-state batteries (ASSBs) are leading candidates for next-generation battery technology, promising high safety, long lifespan, and high energy density. However, their commercialization faces several significant hurdles. Specifically, 'interfacial resistance' between the solid electrolyte and electrodes has been a major factor hindering efficient lithium ion transfer and degrading battery performance. While oxide-based solid electrolytes offer high chemical stability, their inherent rigidity leads to poor adhesion with electrodes and often requires external pressure during operation, complicating battery pack design and increasing manufacturing costs. Low compatibility with existing lithium-ion battery production equipment has also been a barrier to large-scale ASSB mass production.

Key Findings and Technical Breakthroughs

ProLogium Technology, a Taiwanese all-solid-state battery startup, has developed a proprietary 'All-Inorganic Super Flow' solid electrolyte technology to overcome these challenges. This innovative approach features groundbreaking characteristics:

- **'Super Flow' Solid Electrolyte:** Successfully resolved the major weakness of oxide-based solid electrolytes—interfacial resistance—without requiring external pressure. This is attributed to achieving a 'super flow' state where the solid electrolyte smoothly conducts lithium ions across the electrode surface, akin to a liquid. This fundamentally resolves the issue of poor contact between solids.
- **Ultra-Fast Charging:** Achieved ultra-fast charging performance, capable of charging to 80% in just 5 minutes. This has the potential to reduce EV charging times to a level comparable to gasoline refueling.
- **High Ionic Conductivity:** ProLogium's solid electrolyte is reported to have astonishing ionic conductivity, 5-6 times higher than sulfide-based or liquid electrolytes.
- **PCR Framework:** Established a 'PCR (Production Cost Reduction) framework' that allows over 70% reuse of existing lithium-ion battery production equipment. This significantly reduces manufacturing costs and environmental impact for all-solid-state batteries, lowering the barrier to mass production.

ProLogium is pursuing strategic partnerships with major automotive companies like Mercedes-Benz and is constructing Europe's first gigafactory (Fab 1) in France (targeting operation in 2028). These moves indicate that the company's technology is entering the commercial validation phase.

Technical Significance and Outlook

ProLogium's 'All-Inorganic Super Flow' all-solid-state battery technology holds the potential to revolutionize not only the EV market but also a wide range of sectors including robotics, aerospace, and consumer electronics. In particular, the characteristic of not requiring external pressure dramatically increases battery pack design freedom and contributes to overall system weight reduction and simplification. The cost reduction strategy via the PCR framework is also crucial for accelerating the adoption of all-solid-state batteries.

This technology, with its high energy density, ultra-fast charging, and superior safety, will alleviate range anxiety in EVs and reduce dependence on charging infrastructure, paving the way for a future of sustainable mobility. Future challenges include ensuring the French gigafactory proceeds as planned, maintaining performance in large-scale mass-produced cells, and further cost reductions. Nevertheless, ProLogium's technology will continue to attract attention as one of the most promising paths to the practical implementation of all-solid-state batteries.

Source: https://note.com/metalslime11/n/n8d957db02cfd

Collected: May 15, 2026 | Automated Research System (Gemini API)

Solid-State EV Battery Roadmaps Converge: Pilot Production in 2026, Consumer Availability Expected by Late 2027

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OVERVIEW

The year 2026 is marked as a period of intensified pilot production and trial integration for all-solid-state batteries (ASSBs), with consumer-ready ASSB EVs anticipated from late 2027 to 2028. Chinese manufacturers like Chery, Changan, Dongfeng, BYD, and CATL are leading with aggressive speed and volume; Chery, for example, has completed pilot production of 60Ah, 400Wh/kg ASSB cells. Japanese OEMs (Toyota, Nissan, Honda) are pursuing a more foundational, robust technology approach. Meanwhile, semi-solid batteries are already commercially available in models like the MG4 EV, setting an early market precedent.

IN DEPTH

Background and Technical Challenges

With the expansion of the electric vehicle (EV) market, battery technology is constantly pressured to evolve. All-solid-state batteries (ASSBs) are anticipated as a next-generation technology that can surpass existing lithium-ion batteries (LIBs) in terms of safety, energy density, charging speed, and longevity. However, the practical implementation of ASSBs has faced numerous technical and economic challenges, including interfacial resistance between solid electrolytes and electrodes, manufacturing costs, and ensuring consistent quality during mass production. Roadmaps to overcome these hurdles and achieve large-scale commercialization are rapidly advancing across various countries and manufacturers.

Key Findings and Market Analysis

According to analysis as of 2026, all-solid-state batteries are entering a phase of intensive pilot production and trial integration. It is projected that general consumers will be able to purchase ASSB-equipped EVs from late 2027 to 2028 at the earliest.

Leading automotive and battery manufacturers worldwide are pursuing ASSB development with their own distinct strategies.

Aggressive Moves by Chinese Players
China is leading in the development and market introduction of all-solid-state batteries in terms of both speed and volume:

- **Chery:** Has completed pilot production of 60Ah, 400Wh/kg all-solid-state battery cells, setting an ambitious future target of 600Wh/kg. They are employing an approach that combines high-nickel cathodes with lithium-rich manganese-based cathodes.
- **Changan, Dongfeng, BYD, CATL:** These major corporations are also accelerating ASSB development with diverse technological approaches, including sulfide solid electrolytes and in-situ polymerized solid electrolytes, targeting trial deployments and mass production around 2027.

Steady Pursuit by Japanese Players

Japanese manufacturers leverage their long history of fundamental research and robust technological development:

- **Toyota:** Aims to introduce ASSB-equipped EVs to the market around 2027-2028, focusing on developing technology that balances high performance with superior safety.
- **Nissan:** Is proceeding with plans to launch all-solid-state battery EVs by 2028.
- **Honda:** Is actively investing in all-solid-state battery development, with the goal of future integration into EVs.

It is worth noting that semi-solid batteries (hybrid solid-liquid electrolytes) are already commercially available in vehicles like the MG4 EV, indicating that this intermediate technology is leading the market.

Technical Significance and Outlook

The progress in ASSB commercialization is poised to bring about a significant transformation in the entire EV market. Specifically, improvements in energy density will directly lead to extended driving ranges, and enhanced safety will boost consumer confidence. The aggressive push for mass production by Chinese players intensifies the global competitive landscape, pressuring manufacturers in other countries to accelerate their development pace.

Future challenges include whether the announced performance metrics can be replicated in large-scale mass production, and most importantly, how far cost reductions can progress. Compared to existing LIBs, ASSBs are still more expensive, so achieving price competitiveness is key to their widespread adoption. Addressing issues such as interfacial stability between solid electrolytes and electrodes, and managing mechanical stress from temperature changes, also remain continuous technical challenges. However, the roadmaps and concrete advancements from various companies suggest that all-solid-state batteries are not a distant future technology but are likely to begin permeating our daily lives within the next few years.

Source: https://kokishi-computing.com/vehicle/solid-state-battery-ev-2026-roadmap/