SolidStateBattery

Weekly Intelligence Report

2026-09-06 | 20 articles | 7 countries

troy-technical.jp

This Week's Keyword

Solid-State Maturation

Pilot lines scale, but challenges remain

20	7	511.2	381
articles	countries	Wh/kg	Wh/kg
Unique Articles Analyzed	Source Countries Covered	Max Energy Density (Lab)	Max Energy Density (Mass Prod)

All 20 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	Pilot Lines Accelerate	Corporate Strategy	●●●○	●●●○	●●●●	●●●○	●●●●	Major players like QuantumScape, Solid Power, Samsung SDI, CATL, BYD, Toyota accelerate solid-state battery pilot lines for 2027-2028 commercialization.
#02	China Leads SSB Std	Policy/Strategy	●●●○	●●●●	●●●●	●●●●	●●●●	China leads global solid-state EV battery standardization (IEC approved), implements tax incentives, and expands domestic pilot lines.
#03	Gel Polymer Electrolytes	Research	●●●●	○○○○	●●●●	●●●●	●●●●	Novel gel polymer electrolytes enable 4.7V Li-metal batteries and 511.2 Wh/kg pouch cells, enhancing safety and energy density.
#04	Silver-Zipping Sintering	Research	●●●●	○○○○	●●●○	●●●○	●●●○	'Silver-zipping' mechanism enables low-temperature sintering of oxide solid electrolytes, promising cost-effective SSB manufacturing.
#05	ProLogium Mass Prod	New Product	●●●●	●●●●	●●●●	●●●●	●●●●	ProLogium begins GWh-scale mass production of 381 Wh/kg Gen 3.5 lithium ceramic solid-state batteries, certified to China standard.
#06	Chery $1.5B Investment	Corporate Strategy	●●●○	●●○○	●●●●	●●●○	●●●●	Chery invests $1.5B in solid-state batteries, targeting 400-600 Wh/kg and 1,500 km range for 2027 vehicle tests.
#07	Geely 500 Wh/kg SSB	Corporate Strategy	●●●○	●●○○	●●●●	●●●○	●●●●	Geely targets 500 Wh/kg solid-state batteries with 1M km lifespan for 2027 pilot deployment, in real-world validation.
#08	CATL Cautious on SSB	Market Analysis	●●○○	●●●●	●●●●	●●●○	●●●●	NIO sells semi-solid battery packs (300-350 Wh/kg), but CATL chairman remains cautious on full solid-state mass production before 2030.
#09	Greater Bay 375 Wh/kg	New Product	●●●●	●●○○	●●●●	●●●●	●●●●	US-based Greater Bay Technology achieves 375 Wh/kg in 77 Ah solid-state battery with 18-minute fast charging.
#10	Donut Lab Not SSB Break	Market Analysis	●○○○	○○○○	○○○○	●●●○	●●●○	Donut Lab's 409 Wh/kg battery test is not a solid-state breakthrough, falling within existing high-performance Li-ion capabilities.
#11	Samsung SDI Robotics/UAM	Corporate Strategy	●●●●	●●○○	●●●●	●●●●	●●●●	Samsung SDI accelerates next-gen battery development for robotics and UAM, leveraging solid electrolyte and anode-free tech.

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#12	Belkin Semi-Solid Charger	New Product	●●○○○	●●●●●	●●○○○	●●○○○	●●●●●	Belkin launches 'UltraCharge Pro' portable chargers using 'BoostSolid Cell' semi-solid technology for slimmer, more durable design.
#13	Japan $2.4B Subsidies	Policy/Strategy	●●○○○	●●●●○	●●●●○	●●●○○	●●●●○	Japan approves $2.4B in battery subsidies for 12 projects, boosting domestic capacity to 120 GWh, including solid-state.
#14	Tianneng Semi-Solid ESS	New Product	●●●○○	●●●●●	●●●●○	●●●●○	●●●○○	Tianneng and Weilan launch 314Ah semi-solid batteries for grid-scale energy storage, e-motorcycles, and robotics.
#15	SES AI Corp Merger	Corporate Strategy	○○○○○	●●●○○	●●○○○	●●○○○	●●●●○	SES AI Corp exits S&P;/TSX Index after merging with GFL Environmental, aiming to accelerate Li-metal battery tech.
#16	ProLogium Mass Prod	New Product	●●●●○	●●●●●	●●●●○	●●●●○	●●●●○	ProLogium begins GWh-scale mass production of 381 Wh/kg Gen 3.5 lithium ceramic solid-state batteries, certified to China standard.
#17	Chery $1.5B Investment	Corporate Strategy	●●●○○	●●○○○	●●●●○	●●●○○	●●●●○	Chery invests $1.5B in solid-state batteries, targeting 400 Wh/kg for 2027 production vehicles, with road tests starting 2026.
#18	China Sulfide Lag	Market Analysis	○○○○○	●●●○○	●●●●○	●●●●●	●●●●○	China's sulfide solid electrolyte production lags annual targets (20%), with 5.82% operating rate and 24% price drop due to oversupply.
#19	Geely 500 Wh/kg SSB	Corporate Strategy	●●●○○	●●○○○	●●●●○	●●●○○	●●●●○	Geely targets 1,000km range, 500 Wh/kg solid-state battery for 2027 pilot, eyeing Volvo integration.
#20	QuantumScape Delays	Corporate Strategy	●●○○○	○○○○○	●●●●○	●●●○○	●●●●●	QuantumScape shares plunge 96% as solid-state battery commercialization delays from 2024 to 2029 target.
#21	Xpeng Shifts to Semi-SSB	Corporate Strategy	●●○○○	●●●●○	●●●○○	●●○○○	●●●○○	Xpeng's 'Iron' robot shifts from all-solid-state to semi-solid batteries due to mass production and cost challenges.
#22	Tri-Layer Solid Electrolyte	Research	●●●●●	○○○○○	●●●○○	●●●○○	●●●○○	Novel tri-layer solid electrolyte (LLZO + triblock polymer) enhances Li-metal battery safety and longevity by suppressing dendrites.
#23	US DoE $500M Grants	Policy/Strategy	●●○○○	●●○○○	●●●●○	●●●●○	●●●●○	US DoE announces $500M grants for battery minerals and materials, prioritizing next-gen anodes, DLE, electrolytes, and recycling.

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

Three Questions That Demand Your Decision This Week

❶ Is your SSB strategy robust against Asian mass production?

ProLogium's GWh-scale mass production of 381 Wh/kg solid-state batteries (Article #05) and China's aggressive standardization/incentives (Article #02) signal a rapid shift. Are your R&D; timelines and manufacturing scale competitive, or will you be outmaneuvered?

❷ How will China's SSB standards impact your market access?

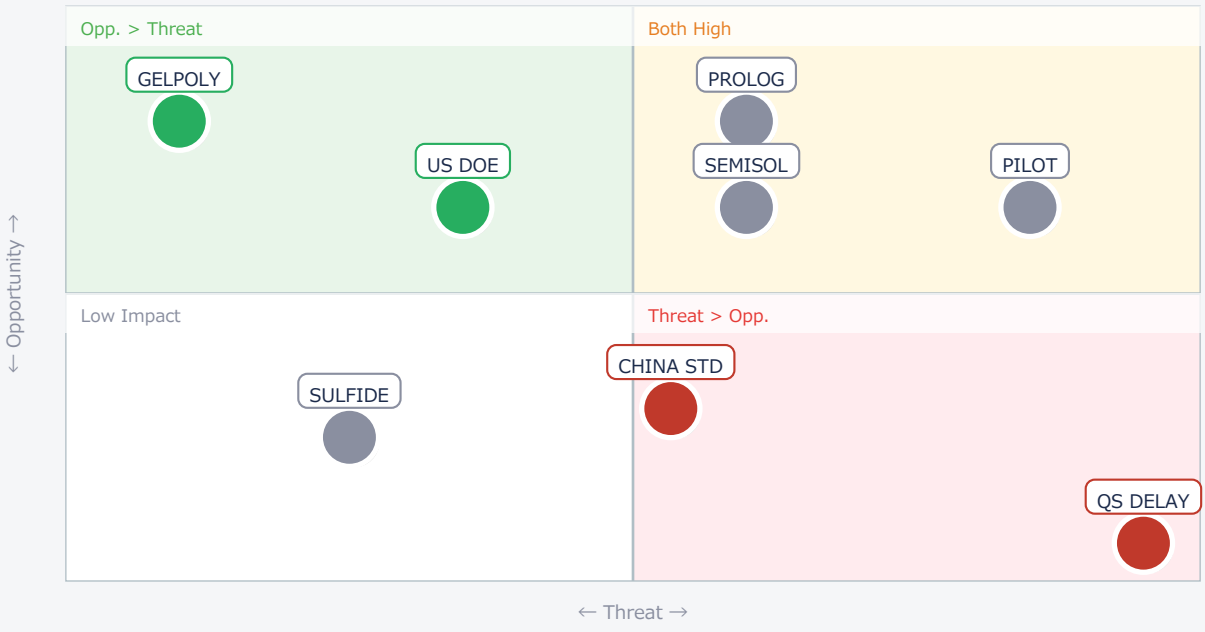
China's IEC-approved solid-state battery standard and tax exemptions (Article #02) create a powerful domestic advantage. Does your product roadmap align with these emerging global benchmarks, and is your IP strategy prepared for a bifurcated market?

❸ Are you investing in next-gen electrolyte breakthroughs?

Breakthroughs like 511.2 Wh/kg gel polymer electrolytes (Article #03) and tri-layer solid electrolytes (Article #22) show fundamental material science is advancing. Are your R&D; efforts exploring these high-novelty, high-risk areas, or are you solely focused on incremental improvements?

Opportunities vs. Threats for US/European Companies

Opportunity vs. Threat Matrix for US/European Companies



Item	Quadrant	↑ Opportunity	↓ Threat
GELPOLY	Opp.	New IP, high perf	Long dev cycle
US DOE	Opp.	US supply chain	Geopolitical risk
PROLOG	Critical	Market entry	Asian dominance
PILOT	Critical	Partnering	Lagging scale
SEMISOL	Critical	Bridge tech	Full SSB risk
CHINA STD	Threat	New market	Market control
QS DELAY	Threat	Learn from fail	Investor doubt

● SULFIDE	Ref.	Cheaper mat	Supply chain flux

Deep Dive ① — ProLogium Initiates GWh-Scale Mass Production

#05 | 2026/09/02 | GlobeNewswire | Tech Novelty●●●●○ Proximity●●●●● Market Impact●●●●○ Data Reliability●●●●○ US/EU Relevance●●●●○

Taiwan's ProLogium has commenced GWh-scale mass production of its Gen 3.5 Lithium Ceramic Batteries (LCB), achieving 381 Wh/kg and 903 Wh/L. Third-party testing by TÜV and UL Solutions confirms high performance and compliance with China's GB/T 43568-2026 standard.

This milestone signifies a critical transition from R&D; to commercial reality for solid-state batteries, leveraging proprietary lithium ceramic technology for enhanced safety and energy density. ProLogium is also developing Gen 4 LCBs with fully inorganic superfluid electrolytes.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: ProLogium's mass production is a significant validation of solid-state viability, particularly its certification to China's GB/T standard. The 381 Wh/kg is a strong commercial benchmark, though below lab-scale breakthroughs. [Opportunity] for US/EU OEMs to evaluate ProLogium as a potential supplier, diversifying from traditional Asian giants. [Threat] is that Asian players are achieving GWh scale first, potentially locking in market share and setting de facto standards. US/EU battery manufacturers must accelerate their own pilot-to-mass production timelines. [Action] Procurement & R&D;: Initiate technical and commercial evaluation of ProLogium's Gen 3.5 LCBs immediately. Strategy: Assess competitive landscape and potential partnerships by end of quarter.

Deep Dive ② — Innovative Gel Polymer Electrolytes for 511 Wh/kg

#03 | 2026/09/01 | ACS Publications | Tech Novelty●●●●● Proximity●○○○○ Market Impact●●●●○ Data Reliability●●●●● US/EU Relevance●●●●●

Researchers developed locally concentrated gel polymer electrolytes (GPEs) and silsesquioxane-based GPEs, forming anion-rich Li+ solvation sheaths to accelerate Li+ desolvation and stabilize electrode interfaces.

This chemical design enables 4.7V lithium metal 18650 batteries and 6.08 Ah pouch cells achieving an impressive 511.2 Wh/kg. This breakthrough offers intrinsically safer, high-performance solid-state batteries by mitigating dendrite formation and interfacial resistance.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: The 511.2 Wh/kg figure is a significant academic breakthrough, pushing the theoretical limits of Li-metal SSB. However, its proximity to market is low (P1), indicating substantial technical barriers remain for mass production, cost reduction, and long-term reliability. [Opportunity] for US/EU materials suppliers and IP holders to invest in licensing or developing similar advanced electrolyte chemistries. This could be a foundational technology for future high-end applications (e.g., UAM, defense). [Threat] is that without aggressive R&D; investment, US/EU firms risk falling behind in fundamental material science. [Action] R&D;: Establish a dedicated task force to monitor and replicate these electrolyte advancements within 1 month. Legal/IP: Review patent landscape for GPEs and silsesquioxane-based electrolytes by end of quarter.

Deep Dive ③ — China Leads Global SSB Standardization and Incentives

#02 | 2026/09/02 | CarNewsChina | Tech Novelty●●●○○ Proximity●●●●○ Market Impact●●●●● Data Reliability●●●●○ US/EU Relevance●●●●●

China is aggressively advancing international standardization for EV solid-state batteries, with the IEC approving a China-led draft standard. Concurrently, China enacted a 2% consumption tax on Li-ion batteries, exempting solid-state and sodium-ion batteries until 2028.

Domestic pilot line expansions are accelerating, exemplified by Sunwoda's 0.2 GWh sample production line targeting 400 Wh/kg. This comprehensive strategy aims to secure China's leadership in solid-state battery technology and deployment, profoundly impacting global EV markets.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: China's dual strategy of standardization and tax incentives is a powerful market-shaping force. The IEC approval of a China-led standard could create a competitive disadvantage for US/EU firms if their technologies do not align. [Opportunity] for US/EU companies to engage proactively in international standards bodies to ensure their interests are represented. For OEMs, this could open new market segments in China if they adopt compliant SSB technologies. [Threat] is the potential for market fragmentation and increased costs if US/EU companies must adapt to multiple standards or face higher taxes in key markets. [Action] Strategy & Legal/IP: Immediately assess the implications of China's GB/T 43568-2026 standard on current and future product lines. Business Dev: Explore partnerships with Chinese battery firms to navigate new market entry requirements within 1 month.

Other Notable Articles

Greater Bay Technology Achieves 375 Wh/kg with 77 Ah Solid-State Battery, Demonstrating 15-90% Charge in 18 Minutes (Intelligent Living)
Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●●○

US firm achieves high energy density and ultra-fast charging, a key enabler for competitive EVs. Monitor mass production readiness.

Tianneng and Weilan Launch 314Ah Semi-Solid Batteries for Grid-Scale Energy Storage, Expanding to e-Motorcycles and Robotics (Shanghai Metals Market)
Tech Novelty●●●○○ Proximity●●●●● Market Impact●●●●○

Semi-solid batteries are gaining traction in diverse applications, serving as a critical bridge technology to full solid-state. Evaluate for ESS/e-mobility.

Major Players Accelerate Solid-State Battery Pilot Line Operations in 2026: QuantumScape Launches Eagle, Solid Power Prepares Continuous Electrolyte Production (Exoswan Insights)
Tech Novelty●●●○○ Proximity●●●○○ Market Impact●●●●○

Global race intensifies with major players activating pilot lines; US/EU firms must ensure their scaling efforts keep pace.

Samsung SDI Accelerates Next-Gen Battery Development for Robotics and UAM, Advancing Proprietary Solid Electrolyte and Anode-Free Technologies (SAMSUNG SDI (Newsroom))
Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●●○

Samsung SDI's focus on robotics/UAM with anode-free solid-state tech highlights emerging high-value markets beyond EVs. Assess UAM battery needs.

US DoE Announces $500 Million Grants for Battery Minerals and Materials: Prioritizing Next-Gen Anodes, DLE, Electrolytes, and Recycling (Benchmark Source)
Tech Novelty●●○○○ Proximity●●○○○ Market Impact●●●●●

Significant US government investment to bolster domestic battery supply chain, creating opportunities for US/EU materials and manufacturing firms.

Recommended Actions This Week

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

Immediate (this week)

- [Executive] Review competitive intelligence on Asian SSB mass production (ProLogium, China standards) to identify immediate threats and opportunities.
- [Procurement] Initiate contact with ProLogium for technical specifications and sample availability of their Gen 3.5 LCBs for evaluation.
- [Strategy] Convene a cross-functional team (R&D;, Legal, Business Dev) to analyze the impact of China's IEC-approved SSB standard on market access and product compliance.

Short-term (1 month)

- [R&D;] Prioritize internal research on advanced gel polymer and tri-layer solid electrolytes, assessing feasibility for integration into next-gen battery platforms.
- [Business Dev] Explore potential partnerships or joint ventures with US-based SSB developers (e.g., Greater Bay Technology) to accelerate domestic innovation.
- [Procurement] Conduct a deep dive into the sulfide solid electrolyte market, evaluating the implications of China's oversupply and price drops on future material costs and supply chain stability.

Medium-long term (quarter+)

- [Strategy] Develop a comprehensive 3-5 year roadmap for solid-state battery integration, considering both full and semi-solid solutions for diverse applications (EV, ESS, UAM, robotics).
- [Legal/IP] Establish a robust IP defense and offensive strategy, particularly in light of rapid Asian advancements and evolving international standards.
- [R&D;] Allocate dedicated resources to fundamental research in high-novelty electrolyte materials, aiming for breakthroughs that can differentiate US/EU offerings long-term.
- [Executive] Lobby government bodies (e.g., DoE, EU Commission) for sustained funding and policy support to counter aggressive Asian state-backed initiatives in battery technology.

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SolidStateBattery — Selected Articles

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#19 Geely to Pilot 1,000km Range, 500 Wh/kg All-Solid-State Battery in 2027, Eyeing Integration into Volvo Vehicles

#20 QuantumScape Shares Plunge 96%, Solid-State Battery Commercialization Remains Unclear with Delays from 2024 to 2029 Target

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#23 US DoE Announces $500 Million Grants for Battery Minerals and Materials: Prioritizing Next-Gen Anodes, DLE, Electrolytes, and Recycling

#01 Major Players Accelerate Solid-State Battery Pilot Line Operations in 2026: QuantumScape Launches Eagle, Solid Power Prepares Continuous Electrolyte Production

Published September 01, 2026 Exoswan Insights International

OVERVIEW

2026 marks a pivotal year for solid-state battery commercialization as key companies activate pilot lines. QuantumScape commenced operations of its 'Eagle' pilot line in February, with Solid Power slated to launch its continuous electrolyte production line in Q4. Samsung SDI has committed 25 trillion won for mass production at its Ulsan plant by late 2027, while CATL and BYD target pilot line operations in 2027, signaling rapid industry acceleration.

IN DEPTH

Key Findings

The year 2026 is emerging as a critical inflection point for the commercialization of all-solid-state battery technology. Major battery manufacturers and automotive companies are activating pilot lines and disclosing concrete production roadmaps. Notably, QuantumScape initiated operations of its 'Eagle' pilot line in February, and Solid Power is set to launch its continuous electrolyte production line in the fourth quarter, representing significant strides towards the practical application of sulfide-based solid-state batteries.

Technical and Manufacturing Details

Samsung SDI has committed a substantial investment of approximately 25 trillion Korean won (roughly 20 billion USD) to commence mass production of solid-state batteries at its Ulsan factory in South Korea by late 2027. This initiative leverages the company's proprietary high-capacity and stable sulfide solid electrolyte and anode-free battery technologies. Concurrently, Chinese battery giants CATL and automotive manufacturer BYD have both announced plans to operate their prototype lines by 2027, intensifying competition in the solid-state battery sector. Toyota Motor Corporation maintains its target of introducing solid-state battery technology into its Lexus brand EVs between 2027 and 2028, a development closely watched by the industry given its long-standing research in this field.

Background and Industry Context

Solid-state batteries are widely anticipated as a 'game-changer' for electric vehicles (EVs) and energy storage systems (ESS) due to their inherent advantages over conventional lithium-ion batteries, including higher energy density, enhanced safety, and extended lifespan. By replacing liquid electrolytes with solid counterparts, the risk of thermal runaway is significantly reduced, enabling the use of higher-capacity lithium metal anodes. The activation of these pilot lines signifies a critical transition from research and development to scaled manufacturing, with ongoing efforts focused on resolving technical challenges and achieving cost reductions.

Future Outlook

The pilot line operations in 2026 are indispensable steps for technical validation and optimization of production processes. Data collected from these pilot lines over the next few years will largely dictate the commercialization timeline and performance specifications of solid-state batteries. Key determinants for market entry will include the establishment of continuous production technologies, reduction in material costs, and ensuring the reliability and durability of the final products. Investors and the automotive industry are closely monitoring these advancements to gauge the concrete impact solid-state batteries will have on the EV market.

Source: https://exoswan.com/solid-state-battery-stocks

Collected: September 04, 2026 | Automated Research System (Gemini API)

#02 China Leads Global Solid-State EV Battery Standardization, Accelerating Tax Incentives and Domestic Pilot Line Expansion

Published September 02, 2026 CarNewsChina China

OVERVIEW

China is aggressively advancing international standardization for electric vehicle (EV) solid-state batteries, with the IEC approving a China-led draft standard on August 21st. Concurrently, China enacted a policy imposing a 2% consumption tax on lithium-ion batteries from September 1st, while exempting solid-state and sodium-ion batteries until the end of 2028. Domestically, pilot line expansions are accelerating, exemplified by Sunwoda's operational 0.2 GWh sample production line targeting 400 Wh/kg, underscoring China's intent to lead in solid-state battery technology and deployment.

IN DEPTH

Key Findings

China is taking a proactive leadership role in the international standardization of solid-state batteries for electric vehicles (EVs). On August 21, 2026, the International Electrotechnical Commission (IEC) approved a China-led proposal for an international standard on solid-state traction batteries. This international standard aligns with China's national standard GB/T 43568-2026, which includes a 0.5% mass loss threshold for clear classification of solid-state batteries. Complementing this, the Chinese government introduced preferential policies, levying a 2% consumption tax on conventional lithium-ion batteries starting September 1, 2026, while exempting solid-state and sodium-ion batteries from this tax until the end of 2028 to foster industry growth.

Technical and Manufacturing Details

Domestic battery manufacturers are responding actively to these developments by accelerating pilot line expansions and technological advancements. Sunwoda, for instance, has commenced operations of its 0.2 GWh solid-state battery sample production line, targeting an energy density of 400 Wh/kg. Furthermore, the Yibin Smart Solid-State Battery Innovation Centre has successfully achieved roll-to-roll production of composite lithium metal anode materials at gram to kilogram scales, aiming for energy densities of 400-500 Wh/kg. These accomplishments signify China's comprehensive ecosystem development, spanning from advanced material research to scalable manufacturing processes for solid-state batteries.

Background and Industry Context

Solid-state batteries are garnering significant attention as a next-generation technology poised to outperform current lithium-ion batteries in safety, energy density, and longevity, primarily by eliminating liquid electrolytes. China, a global leader in both the EV market and battery industry, is strategically advancing solid-state battery technology development and standardization to secure international dominance in this sector. The establishment of international standards is crucial for ensuring technological compatibility and facilitating efficient deployment across the entire supply chain. Moreover, the tax exemption policy serves as a powerful incentive for domestic companies to invest in solid-state battery R&D and production, thereby accelerating market penetration.

Future Outlook

China's push for international solid-state battery standards and its robust support for the domestic industry are expected to profoundly impact the future of the global EV market. The adoption of international standards will set technical benchmarks for battery and automotive manufacturers worldwide, fostering innovation and competition. While significant technical challenges remain for the mass production of solid-state batteries, China's strong policy backing and substantial R&D investments are highly likely to accelerate their resolution. Automotive manufacturers like Chery and Changan have also announced plans to complete vehicle validation by 2027 and take initial steps towards mass production, indicating that tangible commercialization is drawing nearer.

Source: https://carnewschina.com/2026/09/02/china-pushes-global-solid-state-ev-standard-as-domestic-pilot-lines-scale/

Collected: September 04, 2026 | Automated Research System (Gemini API)

#03 Innovative Highly Concentrated Gel Polymer Electrolytes Enable 4.7V Lithium Metal All-Solid-State Batteries and 511.2 Wh/kg Pouch Cells

Published September 01, 2026 ACS Publications USA

OVERVIEW

Researchers have developed locally concentrated gel polymer electrolytes (GPEs) and silsesquioxane-based GPEs that form anion-rich Li+ solvation sheaths, accelerating Li+ desolvation and stabilizing electrode interfaces. This strategy enables the creation of 4.7V all-solid-state 18650 lithium metal batteries, 4.6V industrial cylindrical lithium-ion batteries, and 6.08 Ah pouch cells achieving 511.2 Wh kg-1. This advancement delivers high-performance and intrinsically safer solid-state batteries through chemical design.

IN DEPTH

Key Findings

Recent research highlights the transformative potential of locally concentrated gel polymer electrolytes (GPEs) and silsesquioxane-based GPEs to dramatically enhance the performance and safety of all-solid-state lithium batteries. These innovative electrolytes optimize lithium ion (Li+) behavior by forming anion-rich Li+ solvation sheaths, which in turn accelerate Li+ desolvation and effectively stabilize both cathode and anode interfaces. This significant advance has enabled the realization of high-voltage 4.7 V all-solid-state 18650 lithium metal batteries, 4.6 V industrial cylindrical lithium-ion batteries, and 6.08 Ah pouch cells delivering an impressive specific energy of 511.2 Wh kg-1.

Technical Details

Locally concentrated gel polymer electrolytes dissolve high concentrations of lithium salts in minimal solvent, leading to improved lithium ion transference numbers and suppressed undesirable side reactions compared to conventional liquid electrolytes. Silsesquioxane-based GPEs, with their unique molecular architecture, achieve a balance between mechanical strength and ionic conductivity. The deployment of these electrolytes significantly reduces interfacial resistance between the lithium metal anode and the solid electrolyte, effectively mitigating lithium dendrite formation. This leads to substantial improvements in battery cycle life and safety, with the 4.7 V high-voltage operation directly translating to higher energy density. Crucially, multiple chemical design principles have been incorporated into the cell design, ensuring intrinsic safety at various levels.

Background and Industry Context

All-solid-state batteries are anticipated as a next-generation technology to address key limitations of existing lithium-ion batteries, particularly safety concerns (thermal runaway risk) and energy density (EV range limitations). However, major hurdles to commercialization have been the high interfacial resistance between solid electrolytes and electrodes, and dendrite formation when utilizing lithium metal anodes. The highly concentrated gel polymer electrolytes presented in this study offer an effective solution to these challenges, proving particularly groundbreaking by enabling both high voltage and high energy density. This technology holds potential for a breakthrough, especially in electric vehicles and high-power industrial applications.

Future Outlook

These research findings represent a critical milestone towards the practical implementation of all-solid-state lithium metal batteries. The combination of a 4.7 V high voltage and 511.2 Wh kg-1 specific energy could dramatically extend the driving range of EVs and bring about revolutionary changes in sectors such as drones and mobile devices. Future efforts will focus on establishing mass production techniques for these electrolytes and achieving cost reductions. Furthermore, ongoing validation of long-term reliability and stability under various operating conditions is expected to clarify the path toward widespread commercialization.

Source: https://pubs.acs.org/achre4/article/doi/10.1021/acs.accounts.6c00431/5398363/Solid-State-Lithium-Batteries-with-In-Situ

#04 Novel 'Silver-Zipping' Mechanism Enables Low-Temperature Sintering of Oxide Solid Electrolytes, Promising Cost-Effective Solid-State Battery Manufacturing

Published August 28, 2026 Chemical Engineering Journal International

OVERVIEW

A groundbreaking 'silver-zipping' mechanism has been discovered for low-temperature sintering of oxide solid electrolytes, a critical advancement in solid-state battery research. This innovation has the potential to simplify the manufacturing process and enhance energy efficiency for solid electrolyte materials. Historically, high-temperature sintering was required for oxide solid electrolytes, but this new technique is expected to reduce production costs and improve scalability, marking a significant breakthrough for solid-state battery manufacturing.

IN DEPTH

Key Findings

A significant breakthrough has been reported in the research and development of solid electrolytes, a core component of all-solid-state batteries. A newly discovered mechanism, termed 'silver-zipping,' enables the low-temperature sintering of oxide solid electrolytes, a process traditionally requiring extremely high temperatures. This technological innovation holds paramount importance for substantially reducing manufacturing costs and improving the production efficiency of all-solid-state batteries.

Technical and Manufacturing Details

While the full details of the 'silver-zipping' mechanism have not been entirely disclosed, reports indicate that specific silver-based compounds act as sintering aids, facilitating the bonding between oxide solid electrolyte particles at much lower temperatures. This process is said to form dense and stable solid electrolyte membranes while mitigating the risks of material degradation and phase transformation commonly encountered with conventional high-temperature sintering methods. Oxide-based solid electrolytes have long faced challenges due to their high sintering temperature requirements, in contrast to sulfide-based electrolytes which can be processed at relatively lower temperatures. The 'silver-zipping' mechanism provides a crucial solution to this. This low-temperature sintering technology holds particular promise for the manufacturing of laminated all-solid-state batteries, potentially easing co-sintering with electrode materials and enhancing interfacial compatibility.

Background and Industry Context

All-solid-state batteries are considered prime candidates for next-generation battery technology due to their superior safety and energy density. Oxide-based solid electrolytes, in particular, offer advantages such as chemical stability and non-toxicity. However, their manufacturing typically necessitates sintering at temperatures exceeding 1000°C, leading to escalated production costs and complexity. This high-temperature process also poses challenges for compatibility with electrode materials and other battery components. The establishment of low-temperature sintering technologies, such as 'silver-zipping,' is drawing significant attention from the entire industry as it addresses long-standing hurdles in the manufacturing of oxide-based solid-state batteries and could considerably lower barriers to mass production.

Future Outlook

Further research and application development of the 'silver-zipping' mechanism could dramatically improve the cost competitiveness of oxide-based all-solid-state batteries, enabling their deployment in a wider range of markets. Adoption is expected to accelerate particularly in sectors where cost and reliability are paramount, such as electric vehicles and large-scale energy storage systems. The key focus for the solid-state battery industry will be whether this technology can be successfully integrated into mass production processes and its efficacy empirically demonstrated. Furthermore, low-temperature processing offers greater material selection flexibility and design freedom, potentially contributing to enhanced performance of next-generation solid-state batteries.

Source: https://www.sciltp.com/journals/aes/articles/2606004435

Collected: September 04, 2026 | Automated Research System (Gemini API)

#05 ProLogium Initiates Mass Production of Gen 3.5 Lithium Ceramic All-Solid-State Batteries, Achieving 381 Wh/kg Energy Density

Published September 02, 2026 GlobeNewswire Taiwan

OVERVIEW

Taiwan-based ProLogium has officially commenced mass production of its Gen 3.5 Lithium Ceramic Batteries (LCB) at its gigafactory. Third-party testing by TÜV confirms the large-format cells achieve a high specific energy of 381 Wh/kg and a volumetric energy density of 903 Wh/L. Furthermore, UL Solutions testing under China's GB/T 43568-2026 standard recorded a mass loss of less than 0.05%, significantly below the 0.5% threshold for solid-state battery classification, validating its quality and technical maturity. The company is also developing Gen 4 LCBs, incorporating fully inorganic superfluid electrolytes.

IN DEPTH

Key Findings

ProLogium has officially commenced mass production of its advanced Gen 3.5 Lithium Ceramic Batteries (LCB) at its gigafactory located in Taiwan. These large-format cells have demonstrated exceptional performance, verified by multiple third-party organizations. According to TÜV test reports, the batteries achieve a gravimetric energy density of 381 Wh/kg and a volumetric energy density of 903 Wh/L, placing them among the top-tier performers in the current market. Notably, testing conducted by UL Solutions against China's national standard GB/T 43568-2026 showed a mass loss of less than 0.05%, significantly below the strict 0.5% threshold for solid-state battery classification. This emphatically validates the high reliability and safety of ProLogium's products as true solid-state batteries.

Technical and Manufacturing Details

ProLogium's Gen 3.5 LCBs are built upon proprietary lithium ceramic technology, leveraging solid electrolytes to establish advantages in both safety and energy density. The mass production facility is designed for gigawatt-hour (GWh) scale output and incorporates advanced automation and quality control systems. This ensures the consistent production of battery cells with stable quality and high energy density. Looking ahead, ProLogium is also progressing with the development of its Gen 4 LCB, which plans to introduce a fully inorganic superfluid electrolyte. The company states that its existing production lines can be adapted for Gen 4 with only approximately 10% modifications, underscoring the robustness of its technological roadmap.

Background and Industry Context

All-solid-state batteries are widely anticipated as a 'game-changer' for electric vehicles (EVs), promising extended driving range, faster charging times, and crucially, enhanced safety. Conventional liquid-electrolyte lithium-ion batteries carry risks of electrolyte leakage and thermal runaway, whereas solid-state batteries, by utilizing solid electrolytes, substantially mitigate such risks. ProLogium's commencement of mass production signifies the transition of this next-generation technology from the R&D phase to commercial production, marking a major milestone for the entire industry. The mass production of products combining high energy density with safety validated against international standards will serve as a powerful impetus for accelerating the adoption of solid-state batteries in the EV market.

Future Outlook

The initiation of mass production for high-energy-density solid-state batteries by ProLogium offers an attractive option for EV manufacturers, potentially increasing design flexibility. This is expected to enable more performant EVs and open doors to new mobility sectors such as drones and robotics. The progress of Gen 4 LCB development will be a future focal point, with the introduction of superfluid electrolytes anticipated to deliver further performance enhancements. However, key factors determining future market competitiveness will include cost reduction with scaled production, establishment of robust supply chains, and demonstration of long-term reliability. ProLogium aims to leverage this production milestone to further strengthen its global market presence.

Source: https://www.globenewswire.com/news-release/2026/09/02/3354848/0/en/prologium-begins-mass-production-of-high-energy-density-all-solid-state-battery-reaching-381-wh-kg-and-903-wh-l.html

Collected: September 04, 2026 | Automated Research System (Gemini API)

#06 Chery Commits $1.5 Billion Investment in Solid-State Battery Development, Targeting Vehicle Real-World Tests by 2027

Published September 03, 2026 Car News China China

OVERVIEW

Chinese automaker Chery announced a 10 billion yuan (approximately $1.5 billion USD) investment in solid-state battery development, with plans to commence real-world vehicle testing by 2027. The company is developing cells ranging from 400 Wh/kg to 600 Wh/kg under its 'Rhino S' solid-state battery line, aiming for an impressive driving range of up to 1,500 km on a single charge. This initiative highlights the aggressive stance of China's automotive industry toward early commercialization of solid-state battery technology.

IN DEPTH

Key Findings

Chery Automobile, a leading Chinese automaker, has announced a substantial investment in the development of next-generation solid-state battery technology. The company plans to allocate a total of 10 billion yuan, equivalent to approximately $1.5 billion USD (around 210 billion Japanese Yen), to this critical sector. As part of this ambitious investment strategy, Chery aims to commence real-world vehicle testing of its solid-state batteries by 2027, signaling a clear commitment to the early commercialization of this advanced battery technology.

Technical and Manufacturing Details

Chery's development efforts are focused on a solid-state battery line designated 'Rhino S'. The primary objective for this line is to achieve high-energy-density battery cells with gravimetric energy densities ranging from 400 Wh/kg to an ambitious 600 Wh/kg. The target of 600 Wh/kg is particularly significant, representing approximately double the energy density of current mass-produced lithium-ion batteries. If achieved, this could dramatically extend the driving range of electric vehicles (EVs). Chery aims to enable an astonishing driving range of up to 1,500 km on a single charge with these high-energy-density solid-state batteries, potentially redefining the concept of EV range.

Background and Industry Context

Solid-state batteries are widely expected to surpass conventional batteries in terms of safety (reduced risk of thermal runaway), energy density, and longevity, due to their elimination of liquid electrolytes. Consequently, automotive manufacturers and battery developers worldwide are engaged in fierce competition to develop this technology. China, a global leader in the EV market and battery supply chain, is strongly supporting domestic development and commercialization of solid-state batteries. Chery's announcement contrasts with the more cautious view expressed by the CATL chairman, who stated that mass production of solid-state batteries would not materialize before 2030, highlighting the diverse approaches and rapid pace of solid-state battery technology development within China.

Future Outlook

Chery's $1.5 billion investment and the target of commencing vehicle real-world testing by 2027 suggest the company's confidence in solving the technical challenges associated with solid-state battery mass production. The success of these tests is crucial for verifying the technology's reliability and practicality, and favorable outcomes could significantly enhance the company's competitiveness in the EV market. However, numerous challenges remain, including achieving high-energy-density targets, optimizing mass production costs, and ensuring long-term durability. Chery's developments will serve as a key indicator for the future evolution of the solid-state battery market in China and globally.

Source: https://carnewschina.com/2026/09/03/chery-to-start-solid-state-battery-real-world-tests-in-2027-chairman-says/

#07 Geely Developing Next-Gen Solid-State Batteries Up to 500 Wh/kg, Targeting Pilot Deployment by 2027

Published August 29, 2026 CarBuzz China

OVERVIEW

Chinese automotive giant Geely is developing next-generation all-solid-state batteries with a gravimetric energy density of up to 500 Wh/kg, aiming to commence pilot deployment by 2027. These batteries are reportedly in real-world vehicle validation, with the company claiming an impressive 1 million km lifespan. Geely's initiative underscores the aggressive posture of Chinese companies to establish a leading edge in advanced battery technology within the intensifying EV market.

IN DEPTH

Key Findings

Geely, a prominent Chinese automotive conglomerate, is actively focusing on the development of innovative next-generation solid-state batteries, targeting an exceptionally high gravimetric energy density of up to 500 Wh/kg. The company has announced plans to initiate pilot deployment of these high-performance solid-state batteries by 2027. This declaration unequivocally indicates that solid-state battery technology is transitioning from the laboratory phase to practical application, potentially significantly enhancing Geely's competitive position in the electric vehicle (EV) market.

Technical and Manufacturing Details

The solid-state batteries currently under development by Geely are reportedly undergoing real-world vehicle validation. This signifies that their performance, safety, and durability are being evaluated not only in bench tests but also under actual vehicular operating conditions. The company asserts an astonishing lifespan of 1 million kilometers for this new battery, which, if realized, would dramatically improve EV ownership costs and operational convenience. An energy density of 500 Wh/kg substantially surpasses that of current mass-produced lithium-ion batteries, promising significantly extended EV driving ranges and acting as a crucial factor in alleviating consumer 'range anxiety.' This impressive performance is attributed to the adoption of solid electrolytes, balancing safety and high performance.

Background and Industry Context

Solid-state batteries are widely recognized as the next-generation technology that, by using solid electrolytes instead of liquid ones, can deliver enhanced battery safety (reduced risk of thermal runaway), significantly increased energy density, and extended lifespan. A fierce global development race is underway for this technology. With major automakers like Toyota targeting introduction for Lexus models between 2027 and 2028, Geely's objective for a 2027 pilot deployment symbolizes the rapid progress of Chinese companies in this sector. Notably, strong support from the Chinese government for solid-state battery development and standardization further bolsters aggressive investments from companies like Geely.

Future Outlook

The commencement of pilot deployment for solid-state batteries by Geely will serve as a significant differentiator within its EV portfolio. High energy density and extended lifespan are likely to stimulate consumer interest and further accelerate EV adoption. However, challenges remain from pilot deployment to full-scale mass production and market launch, including cost reduction, establishment of robust supply chains, and further validation of long-term reliability. The success of Geely's technological development is expected to strengthen the competitiveness of the entire Chinese EV industry and significantly influence the evolution of global battery technology.

Source: https://carbuzz.com/geely-solid-state-batteries-arriving-2027/

Collected: September 04, 2026 | Automated Research System (Gemini API)

#08 Solid-State Batteries to Hit EV Market by 2027-2028? CATL Chairman Cautious on Mass Production Before 2030

Published August 31, 2026 BlueGoldSolar International

OVERVIEW

Solid-state batteries are anticipated to be a game-changer for the EV industry due to their high energy density, fast charging, and improved safety, yet timelines for market entry vary. NIO is already selling 150 kWh packs with WeLion semi-solid cells, achieving approximately 930 km range and 300-350 Wh/kg. Conversely, the chairman of CATL, the world's largest battery maker, expressed caution, stating that mass production of solid-state batteries is unlikely before 2030 and assessing current technology maturity at only level 4 out of 9.

IN DEPTH

Key Findings

While solid-state batteries (SSBs) are widely regarded as a potential 'game-changer' for the electric vehicle (EV) market due to their revolutionary properties, there are diverse industry perspectives on their actual market entry timeline and technological maturity. NIO, a Chinese EV manufacturer, has already launched a 150 kWh battery pack featuring WeLion-made semi-solid cells, achieving approximately 930 km of CLTC (China Light-duty Vehicle Test Cycle) range and an energy density of 300-350 Wh/kg. This demonstrates that semi-solid battery technology is already in practical use. However, the chairman of CATL, the world's largest battery manufacturer, expressed a cautious outlook, stating that full-scale mass production of solid-state batteries is unlikely before 2030, assessing current technological maturity at only level 4 out of 9.

Technical and Market Details

Solid-state batteries hold the potential to significantly reduce the risk of thermal runaway, achieve higher energy densities, and extend battery lifespan by replacing conventional liquid electrolytes with solid counterparts. This promises dramatic increases in EV driving range, substantial reductions in charging times, and significant safety improvements. NIO's WeLion semi-solid battery technology represents an intermediate solution between existing lithium-ion and full solid-state batteries, demonstrating a strategy to balance early market introduction with performance enhancements. This technology is expected to serve as a bridge to full solid-state battery mass production, which still faces higher technical hurdles.

Background and Industry Context

In 2026, multiple next-generation battery technologies—including solid-state batteries, sodium-ion chemistry, silicon anodes, and megawatt charging—are transitioning from laboratories to production vehicles. Specifically in China, test standards for solid-state and semi-solid batteries came into effect on July 1, 2026, reflecting the government's aggressive efforts in industrial development and standardization. However, the CATL chairman's comments indicate that significant technical and economic challenges, such as materials science, manufacturing techniques, and cost reduction, still persist for the widespread adoption of solid-state batteries. Ensuring reliability and cost-effectiveness at mass production scale remains a crucial focus.

Future Outlook

Regarding the market entry timeline for solid-state batteries, there is a mix of pioneering examples like NIO and cautious perspectives like CATL, making future technological advancements and industry trends a key area of observation. Limited introduction by some automakers is projected for 2027-2028, but widespread adoption will necessitate further technological innovation and robust cost competitiveness. While solid-state batteries retain high potential to be an EV market 'game-changer,' achieving this will hinge on R&D and manufacturing process optimization over the next few years. International standardization efforts will also be crucial in facilitating technology adoption.

Source: https://bluegoldsolar.com/solid-state-sodium-ion-and-megawatt-charging-2026-ev-battery-revolution

#09 Greater Bay Technology Achieves 375 Wh/kg with 77 Ah Solid-State Battery, Demonstrating 15-90% Charge in 18 Minutes

Published August 30, 2026 Intelligent Living USA

OVERVIEW

Greater Bay Technology, a U.S. firm, has achieved a gravimetric energy density of 375 Wh/kg in its 77 Ah large-format solid-state battery cell, capable of charging from 15% to 90% in just 18 minutes. Solid-state batteries reduce thermal runaway risk by replacing liquid with solid electrolytes and possess the potential to double energy density through the use of lithium metal anodes. This technology is expected to significantly extend EV range and shorten charging times.

IN DEPTH

Key Findings

Greater Bay Technology, based in the United States, has made remarkable progress in solid-state battery technology. The company's developed 77 Ah high-capacity cell achieved a high gravimetric energy density of 375 Wh/kg and demonstrated ultra-fast charging capability, replenishing its battery capacity from 15% to 90% in just 18 minutes. This achievement holds the potential to fundamentally resolve the range and charging time anxieties faced by electric vehicle (EV) users.

Technical and Manufacturing Details

Solid-state batteries inherently offer superior safety by replacing the liquid electrolyte of conventional lithium-ion batteries with a solid electrolyte, significantly reducing the risk of thermal runaway. Furthermore, solid electrolytes enable the stable use of lithium metal anodes, which theoretically possess the potential to double the energy density compared to existing lithium-ion batteries. Greater Bay Technology's battery successfully delivers both enhanced safety and high energy density. The report notes that Toyota is establishing optimized cathode material supply chains for sulfide-based electrolytes, and Japan's Idemitsu Kosan is expanding lithium sulfide production, suggesting active movements in building supply chains for solid-state battery commercialization.

Background and Industry Context

Solid-state batteries are widely anticipated as a key technological breakthrough to accelerate EV adoption, drawing significant expectations from automakers and battery companies worldwide. Ultra-fast charging capabilities promise to bring EV convenience closer to that of gasoline vehicles, alleviating 'range anxiety' during long-distance travel. Concurrently, high energy density extends EV driving range and enables EV deployment across a wider variety of vehicle types. Greater Bay Technology's innovation presents concrete solutions to these major challenges and is viewed as playing a crucial role in the solid-state battery development race within the United States.

Future Outlook

This technological advancement by Greater Bay Technology marks a significant step forward for the commercialization of solid-state batteries. Future efforts will focus on establishing mass production techniques for this 77 Ah cell, cost reduction, and validating long-term reliability and durability. Particularly for full-scale integration into electric vehicles, stringent safety and durability requirements must be met. If the company's technology proves successful at a mass-production level, it is expected to have ripple effects not only in the EV market but also in other sectors such as drones, robotics, and stationary energy storage, contributing significantly to the formation of the next-generation battery market.

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

Collected: September 04, 2026 | Automated Research System (Gemini API)

#10 Donut Lab's 409 Wh/kg Battery Test Results Deemed Not a Breakthrough for Solid-State Batteries, Falls Within Existing Li-ion Performance

Published September 02, 2026 Electrek USA

OVERVIEW

Donut Lab claimed 409 Wh/kg in a battery lab test, but this figure is noted to be within the range of existing high-performance lithium-ion batteries, such as Amprius's 450 Wh/kg silicon anode Li-ion cells. Consequently, this result is not considered a distinctive breakthrough for solid-state batteries. Leading solid-state battery developers like QuantumScape, Toyota, and Samsung SDI are currently targeting 350-450 Wh/kg for their pilot versions, suggesting Donut Lab's claim needs to be evaluated in a different context than specific solid-state battery market dynamics.

IN DEPTH

Key Findings

Donut Lab announced achieving an energy density of 409 Wh/kg in laboratory battery tests, but this figure is not being lauded as a significant breakthrough in the field of solid-state batteries. It has been pointed out that this energy density falls within the capabilities of existing high-performance lithium-ion batteries, such as the 450 Wh/kg achieved by Amprius's silicon anode lithium-ion batteries already on the market. Therefore, Donut Lab's achievement is considered a performance gain within existing technology rather than an inherent innovation specific to solid-state batteries.

Technical and Analytical Details

Solid-state battery technology fundamentally aims for substantial improvements in safety and energy density compared to conventional liquid-electrolyte lithium-ion batteries. However, the 409 Wh/kg reported by Donut Lab is within a range achievable by current lithium-ion batteries employing advanced materials like silicon anodes, and it does not represent the kind of 'game-changing' performance leap that solid electrolytes are expected to deliver. Leading solid-state battery developers, including QuantumScape in the US, Toyota in Japan, and Samsung SDI in South Korea, are targeting energy densities of 350-450 Wh/kg for their pilot-version solid-state batteries. These companies, however, are striving for comprehensive advantages that encompass not just high energy density but also safety, long cycle life, fast charging, and competitive mass production costs.

Background and Industry Context

The solid-state battery market is attracting significant attention as a next-generation technology poised to solve the challenges of electric vehicle (EV) range and safety. Various performance figures are announced during the research and development phase in this sector, but their true value is judged on whether they represent an incremental improvement over existing technology or a fundamental breakthrough unique to solid-state batteries. Donut Lab's announcement is currently perceived within the context of 'performance enhancement of existing technology' and is not considered a specific milestone for solid-state battery commercialization. This highlights the importance of evaluating not only a single performance number but also the underlying technical context and its positioning within the broader industry when assessing solid-state battery technological progress.

Future Outlook

For the genuine commercialization of solid-state battery technology, it is essential to achieve not only increased energy density but also stability of solid electrolytes, reduction of interfacial resistance between electrodes and electrolytes, and establishment of mass production processes. Major companies are comprehensively addressing these challenges, aiming for pilot line operations and limited market introduction within the next few years. The case of Donut Lab suggests the need for careful evaluation when new battery technologies touting high energy density emerge, to discern whether they are truly innovative within the solid-state battery context. The overall industry progress will continue to be driven by the developments of key players like QuantumScape, Toyota, and Samsung SDI.

Source: https://electrek.co/2026/09/02/donut-lab-409-whkg-battery-test-no-production-ev/

Collected: September 04, 2026 | Automated Research System (Gemini API)

#11 Samsung SDI Accelerates Next-Gen Battery Development for Robotics and UAM, Advancing Proprietary Solid Electrolyte and Anode-Free Technologies

Published September 03, 2026 SAMSUNG SDI (Newsroom) South Korea

OVERVIEW

Samsung SDI is accelerating the development of next-generation battery technologies to meet the growth of emerging industries like robotics and Urban Air Mobility (UAM). The company aims to enhance battery performance by combining its proprietary solid electrolyte technology with innovative anode-free technology. Samsung SDI is supplying pouch-type batteries for robots and prismatic batteries for EVs, and its research on lithium metal batteries, conducted in partnership with Columbia University, was published in the prestigious scientific journal Joule in February 2026, demonstrating concrete R&D progress.

IN DEPTH

Key Findings

Samsung SDI is significantly accelerating its research and development into next-generation battery technologies to address the burgeoning demands of emerging sectors such as the rapidly growing robotics industry and Urban Air Mobility (UAM), which is poised to define future mobility. The company aims for a dramatic leap in key performance indicators like energy density, safety, and lifespan by integrating its proprietary solid electrolyte technology with groundbreaking anode-free technology. This strategy enables the provision of optimized battery solutions tailored for diverse applications.

Technical and Manufacturing Details

The solid electrolyte technology championed by Samsung SDI aims to overcome the safety challenges (thermal runaway risk) and energy density limitations inherent in conventional liquid electrolytes. Specifically, the company focuses on sulfide-based solid electrolytes, characterized by high ionic conductivity and stability, which enable the adoption of lithium metal anodes to substantially boost battery energy density. Furthermore, anode-free technology contributes to higher energy density and cost reduction by simplifying battery construction through the elimination of anode materials. For its product lineup, Samsung SDI supplies lightweight and flexible pouch-type batteries for robotics and high-power, high-capacity prismatic batteries for electric vehicles (EVs). A testament to its R&D prowess, a paper on lithium metal batteries, co-authored with Columbia University, was published in the prestigious scientific journal Joule in February 2026, signifying international recognition of its technological superiority.

Background and Industry Context

Emerging industries like autonomous robots, drones, and UAM demand high reliability, long lifespan, and lightweight, compact, high-performance batteries. Current lithium-ion batteries often struggle to fully meet these stringent requirements. All-solid-state batteries and anode-free technology are considered the most promising solutions to these challenges, making Samsung SDI's aggressive investment a strategic move to secure leadership in this vast growth market. South Korea, in particular, is one of the leading nations in battery technology development, and the pursuit of cutting-edge technologies by major corporations like Samsung SDI contributes to enhancing the nation's overall competitiveness.

Future Outlook

Samsung SDI's accelerated development of next-generation battery technologies holds the potential to drive innovation in the robotics and UAM markets. Pouch-type batteries will enhance design flexibility for robots, enabling smaller, longer-operating devices. Prismatic batteries for EVs will improve driving range and safety, further accelerating EV adoption. Moving forward, the company is expected to focus on establishing mass production systems and achieving cost reductions for the commercialization of these technologies, thereby further strengthening its competitiveness in the global market. The publication in Joule signifies high recognition at the fundamental research stage, raising expectations for future product development.

Source: https://news.samsungsdi.com/global/click?seq=452

Collected: September 04, 2026 | Automated Research System (Gemini API)

#12 Belkin Unveils 'UltraCharge Pro' Portable Chargers Featuring 'BoostSolid Cell' Semi-Solid Technology

Published September 03, 2026 Belkin (Press Release) USA

OVERVIEW

Belkin has launched its new 'UltraCharge Pro' portable charging solutions, incorporating proprietary 'BoostSolid Cell' semi-solid technology. This next-generation battery technology enhances durability, enables a slimmer design, and extends battery life, all while maintaining superior charging performance. Specifically, the 'UltraCharge Pro 5K' model offers a 5,000mAh capacity in an ultra-thin 8.8mm profile, aiming to elevate the consumer mobile experience. This represents a tangible application of semi-solid battery technology in consumer products.

IN DEPTH

Key Findings

Belkin, a leading manufacturer of mobile accessories, has unveiled its latest innovation: the 'UltraCharge Pro with BoostSolid Cell' series of portable charging solutions. This new product line features the company's proprietary semi-solid battery technology, dubbed 'BoostSolid Cell,' which aims to elevate the performance and convenience of portable chargers to a new standard. The announced products emphasize enhanced durability, a sophisticated slim design, and extended battery life, all without compromising on charging speed or efficiency.

Technical and Manufacturing Details

The 'BoostSolid Cell' technology is a semi-solid solution designed to surpass the limitations of conventional liquid-electrolyte lithium-ion batteries by solidifying a portion of the liquid electrolyte. This approach improves the internal stability of the battery, enhancing its resistance to external impacts and pressure. Consequently, it allows for a thinner and lighter design while simultaneously boosting the battery's safety and reliability. For instance, the 'UltraCharge Pro 5K' model boasts an impressively slim profile of just 8.8mm, yet delivers a substantial 5,000mAh capacity. This provides practical specifications for multiple recharges of mobile devices such as smartphones and tablets, making it ideal for daily portability.

Background and Industry Context

Consumers are consistently seeking thinner, lighter, and longer-lasting mobile devices, along with the charging solutions that support them. Traditional portable chargers have faced challenges in balancing performance and design due to the limitations of existing battery cell technology. The semi-solid technology introduced by Belkin is positioned as an intermediate solution, addressing current challenges while serving as a bridge to next-generation technologies, given that fully solid-state batteries are not yet in mass production. This development indicates that semi-solid battery technology is expanding beyond electric vehicles into the consumer electronics market, representing a significant trend in shaping the future of mobile devices.

Future Outlook

The introduction of Belkin's 'UltraCharge Pro with BoostSolid Cell' is expected to foster new competition in the portable charger market and potentially accelerate other manufacturers' adoption of similar semi-solid technologies. This will empower consumers with a wider choice of higher-performing, safer, and more aesthetically pleasing charging solutions. Looking ahead, the focus will be on the further evolution of this semi-solid technology and its eventual transition to fully solid-state battery technology. Through this new product, Belkin aims to strengthen its position as an innovation leader in the mobile accessories market and fundamentally enhance the user charging experience.

Source: https://www.belkin.com/pr-belkin-ultra-charge-pro-semi-solid-state-power-banks.html

Collected: September 04, 2026 | Automated Research System (Gemini API)

#13 Japan Approves $2.4 Billion in Battery Subsidies to Boost Domestic Manufacturing Capacity, Fueling Solid-State Battery Development

Published August 28, 2026 East Asia Brief Japan

OVERVIEW

Japan's Ministry of Economy, Trade and Industry has approved $2.4 billion (approximately ¥340 billion) in battery subsidies for 12 industrial projects, aiming to increase domestic storage battery manufacturing capacity from 80 GWh to 120 GWh. This substantial funding will support major companies like Toyota, Nissan, and Panasonic in constructing next-generation liquid-electrolyte and solid-state battery pilot to commercial lines. The initiative seeks to reduce investment costs for domestic production facilities and directly link Japan's next-generation cell patents to its domestic manufacturing capabilities.

IN DEPTH

Key Findings

Japan's Ministry of Economy, Trade and Industry (METI) has approved a substantial battery subsidy package totaling $2.4 billion (approximately 340 billion Japanese Yen), aimed at strengthening the competitiveness and self-sufficiency of the domestic storage battery industry. This funding is designed to significantly expand Japan's domestic battery manufacturing capacity from the current 80 GWh to 120 GWh annually, distributed across 12 key industrial projects. Crucially, it provides strong impetus for major Japanese corporations such as Toyota, Nissan, and Panasonic, supporting their transition from pilot lines to commercial production lines for both next-generation liquid-electrolyte and innovative solid-state batteries.

Technical and Manufacturing Details

This subsidy is specifically intended to directly contribute to the development and manufacturing of next-generation battery technologies. The primary targets include enhancing the production efficiency of high-performance liquid-electrolyte lithium-ion batteries and establishing mass production technologies for solid-state batteries. Given that Japanese companies hold numerous foundational patents in solid-state battery technology, this subsidy represents a strategic investment to directly link these patents to domestic manufacturing capabilities, thereby securing a technological edge. By reinforcing domestic production capacity, Japan aims to enhance the stability of its battery supply chain and build a system resilient to geopolitical risks. Furthermore, the subsidy covers parts of factory construction, equipment installation, and R&D costs, enabling companies to undertake significant initial investments without hesitation.

Background and Industry Context

Batteries are strategic materials indispensable for the widespread adoption of electric vehicles (EVs) and renewable energy, and the manufacturing competition is intensifying globally. As China and South Korea rapidly expand their production capacities through massive investments and government support, maintaining and strengthening the competitiveness of Japan's domestic industry has become an urgent priority. This latest subsidy package signifies the Japanese government's strong commitment to positioning next-generation battery technologies, including solid-state batteries, as a national strategy to secure Japan's presence in international competition. This is expected to establish a stable supply system for high-performance and safe batteries, which is crucial for accelerating the EV shift in Japan's automotive industry.

Future Outlook

The $2.4 billion subsidy is expected to provide a significant tailwind for Japan's battery industry, particularly in solid-state battery development. By enabling companies like Toyota, Nissan, and Panasonic to accelerate their R&D and mass production efforts with this support, the market introduction of solid-state batteries between 2027 and 2028 could become more realistic. Moving forward, attention will focus on whether these projects progress as planned and if domestic manufacturing capacity is indeed expanded. Coupled with global supply chain restructuring, the question remains whether Japan can solidify its position as a global leader in next-generation battery technology.

Source: https://eastasiabrief.com/batteries-ev/japan-certifies-2-4-billion-battery-subsidies-lock-solid-65

Collected: September 04, 2026 | Automated Research System (Gemini API)

#14 Tianneng and Weilan Launch 314Ah Semi-Solid Batteries for Grid-Scale Energy Storage, Expanding to e-Motorcycles and Robotics

Published September 03, 2026 Shanghai Metals Market China

OVERVIEW

Tianneng Battery and Weilan New Energy have commenced large-scale batch shipments of their co-developed 314Ah semi-solid (solid-liquid hybrid) battery cells for grid-side energy storage, with first applications validated on August 27, 2026. This significant rollout demonstrates the technology's readiness for commercial deployment in utility-scale energy systems. Concurrently, the companies introduced 72V50Ah and 72V100Ah hybrid solid-liquid batteries for high-end electric motorcycles, and their 300Wh/kg hybrid solid-liquid cells are now undergoing small-batch shipments for robotics, underscoring broad market applicability.

IN DEPTH

Key Findings

Tianneng Battery and Weilan New Energy have successfully initiated scaled batch shipments of their co-developed 314Ah semi-solid (solid-liquid hybrid) battery cells for grid-side energy storage. This critical milestone, achieved on August 27, 2026, unequivocally signals the transition of semi-solid battery technology from research and development to practical, large-scale application in the energy sector. Simultaneously, the companies announced hybrid solid-liquid batteries (72V50Ah and 72V100Ah) for high-end electric motorcycles and commenced small-batch shipments of 300Wh/kg hybrid solid-liquid cells for robotic applications, demonstrating the technology's versatile utility.

Technical / Clinical Details

Semi-solid batteries combine the advantages of both liquid and solid electrolytes, offering enhanced safety and higher energy density compared to conventional liquid lithium-ion batteries, while being more straightforward to manufacture than all-solid-state alternatives. The substantial 314Ah capacity ensures efficiency and reliability, particularly for large-scale energy storage systems. For electric motorcycles, these batteries are expected to deliver extended range and lighter weight compared to traditional lead-acid or even standard lithium-ion options, significantly improving user experience. The 300Wh/kg cells tailored for robotics will contribute to longer operating times and improved performance for both industrial and consumer robots, accelerating advancements in the field.

Background & Context

The energy storage market is experiencing rapid growth, driven by the increasing integration of renewable energy sources and the imperative to stabilize power grids. Semi-solid batteries are emerging as a responsive solution to meet this demand, also serving as a critical bridge technology until the full commercialization of all-solid-state batteries. China is a global leader in EV and battery technology R&D and manufacturing; therefore, the introduction of innovative products by domestic companies like Tianneng further solidifies the nation's energy independence and technological edge. High-performance batteries are also in increasing demand in the electric motorcycle and robotics markets, where these new deployments will enhance market competitiveness.

Strategic Significance & Outlook

The market introduction of semi-solid batteries by Tianneng Battery and Weilan New Energy is set to accelerate the evolution of battery technology in both energy storage and mobility sectors. Their adoption in grid-side energy storage will help mitigate the intermittency of renewable energy, contributing to the development of sustainable power infrastructure. Furthermore, applications in electric motorcycles and robotics will enhance the performance and convenience of these products, facilitating broader consumer adoption. As semi-solid battery cost-efficiency and performance continue to improve, they are poised to become a mainstream solution until all-solid-state batteries fully mature, thereby fostering competition across the battery industry and driving the realization of safer, higher-performing energy solutions.

Source: https://news.metal.com/en/newscontent/104090094-solid-state-battery-august-review-industry-accelerates-across-standards-materials-projects-and-capital

Collected: September 04, 2026 | Automated Research System (Gemini API)

#15 SES AI Corp to Exit S&P/TSX Composite Index Following GFL Environmental Merger, Consolidating Operations for Accelerated Growth

Published September 02, 2026 GuruFocus USA

OVERVIEW

SES AI Corporation announced its removal from the S&P/TSX Composite Index effective September 4, 2026, following its merger with GFL Environmental. This strategic consolidation integrates SES's advanced battery technology business into GFL's larger corporate structure, with SES shareholders receiving a combination of cash and GFL shares. SES remains focused on developing cutting-edge secondary battery technologies and materials for diverse applications including energy storage, urban air mobility, drones, robotics, and EVs, with this merger poised to strengthen its operational foundation and accelerate market penetration.

IN DEPTH

Key Findings

On September 1, 2026, SES AI Corporation announced its imminent removal from the S&P/TSX Composite Index, effective before the market open on September 4, 2026. This decision follows the completion of its merger with GFL Environmental. This strategic integration will see SES's business consolidated into a larger entity, with SES shareholders receiving a combination of cash and GFL shares. The merger is designed to bolster SES's advanced battery technology development and market deployment capabilities by leveraging GFL's extensive resources and operational scale.

Technical / Clinical Details

SES AI Corp specializes in lithium-metal battery technology, developing high-performance battery solutions that combine high energy density with superior safety characteristics. The company’s technologies are targeting a broad range of applications, including electric vehicles (EVs), energy storage systems, urban air mobility (UAM), drones, and robotics. In these sectors, lightweight and high-energy-density batteries are paramount, and SES's innovations directly address these critical needs. The merger is expected to integrate GFL's robust financial backing and operational expertise, which will facilitate faster product development and market entry for SES's advanced battery solutions.

Background & Context

The battery technology market is experiencing unprecedented growth, fueled by the accelerating adoption of electric vehicles, increasing demand for renewable energy storage, and the emergence of new mobility paradigms. Companies like SES AI Corp, focused on cutting-edge battery technologies, play a crucial role in this evolving market. The merger with GFL Environmental represents more than just a financing event or a change in shareholder structure; it signifies the integration of SES's technology into a broader industrial ecosystem. Its removal from the S&P/TSX Composite Index is a procedural consequence of this corporate restructuring and does not reflect negatively on the company's fundamental financial health or business value. Instead, it opens new avenues for SES's technology to be deployed across wider markets by capitalizing on GFL’s infrastructure and resources.

Strategic Significance & Outlook

The merger with GFL Environmental portends significant expansion and accelerated growth for SES AI Corp. With GFL’s strong market presence and financial capacity, SES will be able to intensify its research and development investments and further drive innovation in battery technology. There is a heightened potential for rapid adoption of SES's high-performance battery solutions, particularly in high-growth sectors such as energy storage, eVTOL, and robotics. This integration is a critical step for SES to establish leadership in the next-generation battery market and contribute to a sustainable future. For shareholders, becoming part of a larger corporate group is expected to yield long-term value appreciation and stability.

Source: https://www.gurufocus.com/news/9062808/ses-ai-corp-ses-to-exit-sptsx-composite-index-following-gfl-environmental-merger

Collected: September 04, 2026 | Automated Research System (Gemini API)

#16 ProLogium Initiates GWh-Scale Mass Production of Gen 3.5 Lithium Ceramic All-Solid-State Batteries: Achieves 381 Wh/kg, 903 Wh/L, Certified to China Standard GB/T 43568-2026

Published September 04, 2026 Metrix Taiwan

OVERVIEW

Taiwan's ProLogium announced on September 2nd the commencement of GWh-scale mass production for its Gen 3.5 lithium ceramic all-solid-state batteries. These large 185.4Ah cells achieve high energy densities of 381 Wh/kg and 903 Wh/L, certified by UL Solutions to comply with China Standard GB/T 43568-2026. This production milestone is a significant step in the commercialization of solid-state battery technology, addressing the growing demand for high-energy-density batteries, particularly in the EV market.

IN DEPTH

ProLogium, a pioneering Taiwanese battery manufacturer, has marked a significant advancement in the commercialization of all-solid-state battery technology. On September 2nd, the company announced the commencement of GWh-scale mass production for its 3.5 generation lithium ceramic all-solid-state batteries at its dedicated manufacturing facility.

Key Findings

- **GWh-Scale Mass Production Initiated:** ProLogium has begun mass production of its high-energy-density 3.5 generation lithium ceramic all-solid-state batteries at a gigawatt-hour scale plant. This signifies a readiness for practical, large-volume supply to the market.
- **Exceptional Energy Density Achieved:** The new 185.4Ah large-format cells demonstrate outstanding performance, achieving a gravimetric energy density of 381 Wh/kg and a volumetric energy density of 903 Wh/L. These figures place ProLogium's cells among the industry leaders, promising substantial improvements in electric vehicle range and design flexibility.
- **Compliance with Chinese Standards and UL Solutions Certification:** The all-solid-state battery has been certified by UL Solutions as compliant with China Standard GB/T 43568-2026. This certification underscores the battery's adherence to stringent safety and reliability requirements, bolstering confidence for market integration.

Technical & Clinical Details

ProLogium's 3.5 generation lithium ceramic all-solid-state battery employs an innovative architecture combining a ceramic solid electrolyte with a lithium metal anode. This lithium ceramic composite offers superior safety compared to traditional liquid electrolytes and effectively suppresses the formation of lithium dendrites. The result is an improved battery lifespan and reliability, coupled with a significant reduction in fire risk. The 381 Wh/kg energy density translates to longer driving ranges for EVs on a single charge, while the 903 Wh/L volumetric energy density allows for more compact and lighter battery packs, providing greater design freedom for vehicle manufacturers.

Background & Context

All-solid-state batteries are globally recognized as a next-generation energy storage technology, poised to act as a 'game-changer' for accelerating the growth of the electric vehicle (EV) market. They hold the potential to fundamentally resolve critical challenges associated with conventional liquid-electrolyte lithium-ion batteries, such as safety, limited range, and charging speed. This promise has spurred intense development competition among automotive manufacturers and technology firms worldwide. ProLogium's move from laboratory achievements to actual product supply at a GWh scale represents a crucial transition, expected to have a substantial impact across the industry. Particularly, compliance with Chinese standards enhances the company's competitive edge in the world's largest EV market.

Strategic Significance & Outlook

ProLogium's initiation of GWh-scale mass production offers an attractive option for EV manufacturers, potentially accelerating the market introduction of vehicles equipped with all-solid-state batteries. Attention will now turn to how ProLogium's technology is adopted by automakers and what specific performance benefits it delivers in actual vehicles. Furthermore, anticipated cost reductions and efficiency improvements from mass production will likely further catalyze the widespread adoption of all-solid-state batteries. ProLogium's success will serve as a vital benchmark for other solid-state battery developers, intensifying technological innovation and market competition.

Source: https://news.metal.com/en/newscontent/104098497-solid-state-prologium-starts-mass-production-of-gen-35-all-solid-state-cells-at-381-whkg

Collected: September 04, 2026 | Automated Research System (Gemini API)

#17 Chery to Invest $1.5 Billion in Solid-State Batteries, Initiate Vehicle Road Tests in 2026, Targeting 400 Wh/kg Rhino Battery for 2027 Production Vehicles

Published September 04, 2026 BigGo Finance China

OVERVIEW

Chinese automaker Chery Automobile announced plans to invest 10 billion yuan (approx. $1.5 billion) and deploy 1,200 engineers to commence road testing of all-solid-state batteries in 2026. The company's Rhino Battery lineup includes all-solid-state cells achieving an energy density of 400 Wh/kg, roughly double that of current EV batteries. Chery is focusing on sulfide-based solid electrolytes and high-nickel ternary cathodes, aiming for vehicle validation in 2027, thereby aggressively advancing early commercialization of solid-state battery technology.

IN DEPTH

Chery Automobile, a leading Chinese automaker, has unveiled ambitious plans and a significant investment strategy for the commercialization of all-solid-state battery technology. The company is committing substantial capital and human resources to achieve mass production within the next few years.

Key Findings

- **$1.5 Billion Investment and Engineering Force:** Chery plans to invest 10 billion yuan (approximately $1.5 billion USD) over two years, dedicating 1,200 engineers to the development and testing of all-solid-state batteries. This massive investment underscores the company's strong commitment to the technology.
- **Vehicle Road Tests to Commence in 2026:** The company announced that it will begin road testing vehicles equipped with all-solid-state batteries in 2026. This marks a crucial step towards real-world performance validation and refinement.
- **Unveiling 400 Wh/kg Rhino Battery:** Chery's new 'Rhino Battery' lineup features all-solid-state cells that achieve a high energy density of 400 Wh/kg. This performance is approximately double that of current mainstream EV batteries, promising significantly extended driving ranges.
- **Targeting 2027 for Vehicle Validation:** Chery has set a clear timeline, aiming to initiate vehicle validation of its all-solid-state batteries in 2027, indicating a focused effort for rapid market introduction.

Technical & Clinical Details

Chery's Rhino Battery integrates a sulfide-based solid electrolyte with a high-nickel ternary cathode. Sulfide-based solid electrolytes are considered a leading technical route for all-solid-state batteries due to their high ionic conductivity and favorable mechanical properties. This configuration significantly reduces the risks of dendrite formation and thermal runaway associated with liquid electrolytes, thereby enhancing safety and battery lifespan. An energy density of 400 Wh/kg implies that an EV with, for instance, a current range of 600km could achieve the same range with a smaller, lighter battery pack, or potentially extend its range to around 1,200km with a comparable pack size. This technological leap has the potential to reduce EV costs, weight, and dependence on extensive charging infrastructure.

Background & Context

All-solid-state batteries are widely recognized as the next pivotal technology in the electric vehicle industry, driving an intense global development race among automakers. They promise to surpass traditional liquid-electrolyte lithium-ion batteries in safety, energy density, and charging speed, positioning them as a 'game-changer' to further accelerate EV adoption. The announcement of such substantial investment and a clear roadmap by a major automaker like Chery signals that the practical realization of all-solid-state batteries is becoming increasingly tangible. Notably, China, with strong government backing, is advancing all-solid-state battery technology as a national strategy to bolster the competitiveness of its domestic EV industry.

Strategic Significance & Outlook

Chery's planned road tests in 2026 and vehicle validation target for 2027 suggest that all-solid-state battery technology is not a distant future prospect but is rapidly approaching implementation. If the company's 'Rhino Battery' can demonstrate its projected high performance and safety as planned, Chery stands to gain a significant competitive edge in the EV market. However, challenges such as scalability in mass production, cost reduction, and ensuring long-term reliability under diverse operating conditions remain critical hurdles for commercial success. Chery's bold move is expected to influence other automakers and battery suppliers, intensifying the solid-state battery development race.

Source: https://finance.biggo.com/news/41d4258a-7c28-498a-b65d-7d6f5dc23db1

Collected: September 04, 2026 | Automated Research System (Gemini API)

#18 China's Sulfide Solid Electrolyte Production Lags, Reaching Only 20% of Annual Target Amidst 24% Price Drop and 5.82% Operating Rate in August 2026

Published September 04, 2026 Shanghai Metals Market (SMM) China

OVERVIEW

From January to August 2026, China's cumulative production of sulfide solid electrolyte (LPSC) reached 70 tons, a 119.7% increase year-on-year. However, this constitutes only 19.6% of the annual target of 360 tons, with the August operating rate plummeting to a mere 5.82%. This oversupply in production capacity and low utilization has severely impacted the market, causing product prices to drop by over 24%. The situation indicates that while solid-state batteries are highly anticipated, the supply chain for key materials is still significantly ahead of actual market demand.

IN DEPTH

In August 2026, China's market for sulfide solid electrolytes (LPSC) presented a complex picture, characterized by increased production volumes alongside a significant price decline. This scenario underscores the challenges within the supply chain for the commercialization of all-solid-state battery technology.

Key Findings

- **Cumulative Production Rises, but Annual Target Missed:** From January to August 2026, China's cumulative production of sulfide solid electrolytes reached 70 tons, marking a substantial 119.7% increase compared to the same period last year. However, this volume represents only 19.6% of the ambitious annual forecast target of 360 tons.
- **Low Operating Rate and Sharp Price Drop:** The operating rate for August alone stood at an exceptionally low 5.82%, indicating significant idle production capacity across the industry. Consequently, the price of sulfide solid electrolyte (LPSC) plummeted by over 24%.

Technical & Clinical Details

Sulfide solid electrolytes are considered a leading candidate for all-solid-state batteries due to their high ionic conductivity and relatively good processability. They are deemed crucial for developing safer, higher-energy-density batteries for electric vehicle (EV) applications, surpassing the performance of conventional liquid-electrolyte lithium-ion batteries. However, the current market dynamics suggest that the supply chain for this advanced material is expanding ahead of actual demand. The significant discrepancy between annual targets and actual output, coupled with an operating rate as low as 5.82%, points to potential technical challenges in manufacturing processes or, more likely, a limited demand for electrolyte materials because the widespread adoption of all-solid-state batteries has not yet fully commenced. The sharp price drop reflects an imbalance between supply and demand, possibly indicating an over-investment in early-stage technology.

Background & Context

China has been aggressively promoting the strengthening of its battery supply chain as a national strategy, in line with the expansion of its electric vehicle (EV) market. All-solid-state batteries, with their potential to fundamentally improve EV range, safety, and charging speed, have attracted accelerated investment from the government and numerous companies. The expansion of sulfide solid electrolyte production capacity was predicated on anticipating this future demand. However, current data suggests that the commercialization of all-solid-state batteries remains in its nascent stages, with large-scale demand yet to materialize. This situation highlights the risks faced by material suppliers building production capacity and the inherent time lag between technological maturity and market establishment.

Strategic Significance & Outlook

The existing oversupply in sulfide solid electrolyte production capacity suggests that the widespread adoption of all-solid-state batteries may still be some time away. In the short term, price declines are likely to persist, potentially forcing material manufacturers to re-evaluate their investments and business strategies. Nevertheless, the long-term proliferation of all-solid-state batteries is considered inevitable, and the current 'investment-first' approach can be interpreted as laying the groundwork for a massive future market. The focus will now shift to the establishment of mass production technologies, cost reduction for all-solid-state batteries, and when specific EV models from automotive manufacturers will begin to incorporate this technology on a large scale. These factors are expected to gradually improve the market supply-demand balance for sulfide solid electrolytes.

Source: https://news.metal.com/en/newscontent/104097936-august-sulphide-electrolyte-analysis-production-hits-a-new-high-but-why-is-the-operating-rate-still-languishing-smm-analysis

#19 Geely to Pilot 1,000km Range, 500 Wh/kg All-Solid-State Battery in 2027, Eyeing Integration into Volvo Vehicles

Published September 03, 2026 The Cool Down China

OVERVIEW

Chinese automotive giant Geely announced plans to commence pilot testing of an all-solid-state battery in 2027, targeting a 1,000km (621 miles) range and an energy density of approximately 500 Wh/kg. This advanced technology is currently undergoing real-world validation and could eventually be integrated into its subsidiary Volvo vehicles. This move underscores the rapid acceleration of Chinese companies in EV technology development, demonstrating their potential to surpass traditional automakers like Toyota.

IN DEPTH

Chinese automotive titan Geely is making a powerful statement in the race for next-generation battery technology within the electric vehicle (EV) market. The company has announced plans to initiate pilot testing of its all-solid-state battery technology in 2027, setting a clear trajectory towards its practical implementation.

Key Findings

- **Pilot Testing of All-Solid-State Battery in 2027:** Geely is scheduled to begin pilot tests for its groundbreaking all-solid-state battery in 2027, marking a pivotal step towards commercial readiness and real-world application.
- **Targeting 1,000km Range and 500 Wh/kg Energy Density:** The planned all-solid-state battery aims to achieve an impressive driving range of up to 621 miles (approximately 1,000km) on a single charge and an energy density of around 500 Wh/kg. This represents a significant performance leap compared to current EV batteries.
- **Potential Integration into Volvo Vehicles:** The developing solid-state battery technology may eventually be integrated into EVs manufactured by Volvo, a premium brand under the Geely umbrella. Such integration would significantly impact the global automotive market.
- **Highlighting Chinese EV Tech Acceleration:** This announcement emphasizes the rapid pace at which Chinese companies are advancing in electric vehicle technology development, showcasing their potential to lead or even surpass established automakers like Toyota.

Technical & Clinical Details

The 500 Wh/kg energy density targeted by Geely is roughly double that of current mainstream liquid-electrolyte lithium-ion batteries. This advancement would not only drastically extend EV driving ranges but also enable smaller and lighter battery packs, thereby increasing design flexibility for vehicle manufacturers. All-solid-state batteries, by utilizing a solid electrolyte, inherently eliminate the risks of leakage and thermal runaway associated with liquid electrolytes, leading to significantly enhanced safety. Geely's statement that the technology is in the real-world validation stage suggests that development has moved beyond laboratory benchmarks to actual vehicle integration and performance evaluation under stringent driving conditions. This comprehensive testing will verify battery durability, charge-discharge cycle life, and stability across extreme temperature ranges.

Background & Context

All-solid-state batteries are widely anticipated as a 'game-changer' for accelerating electric vehicle (EV) adoption, spurring fierce development competition among leading automakers and battery companies worldwide. Their potential to surpass conventional liquid-electrolyte lithium-ion batteries in safety, energy density, and charging speed makes them a highly coveted technology. The announcement by a major automaker like Geely, complete with specific performance targets and timelines for pilot testing, indicates that this technology is likely to enter the market in the near future. This development signifies the emergence of a formidable competitor to established players like Japan's Toyota, which has also been a frontrunner in solid-state battery development.

Strategic Significance & Outlook

If Geely commences pilot testing of a 1,000km-range, 500 Wh/kg all-solid-state battery in 2027, it will profoundly impact the EV market. The successful integration of this technology into Volvo vehicles would further boost the presence of Chinese battery technology in European and North American markets. However, the path from pilot testing to mass production and market launch still involves numerous challenges, including cost reduction, scaling up manufacturing processes, and establishing long-term reliability. Geely's bold move could usher in significant shifts in the pace of solid-state battery commercialization and the global automotive industry's power dynamics.

Source: https://www.thecooldown.com/green-tech/geely-pilot-solid-state-battery-volvo/

Collected: September 04, 2026 | Automated Research System (Gemini API)

#20 QuantumScape Shares Plunge 96%, Solid-State Battery Commercialization Remains Unclear with Delays from 2024 to 2029 Target

Published September 02, 2026 The Motley Fool USA

OVERVIEW

QuantumScape, a solid-state battery developer, has seen its stock price fall 96% from its peak since going public via SPAC merger in 2020. Despite initial plans to commercialize its first battery by 2024, the company has yet to commercialize a product or generate meaningful revenue as of September 2026. Latest statements indicate commercial readiness not expected until 2029, a significant delay disappointing investors and highlighting the challenges in practical implementation and market entry.

IN DEPTH

QuantumScape, once heralded as a pioneer in solid-state battery technology, is now facing a challenging period, struggling to meet investor expectations. The company has experienced significant delays from its original commercialization targets, leading to a substantial decline in its stock value.

Key Findings

- **Stock Price Plunges 96% from Peak:** QuantumScape's stock price has dropped by 96% from its peak valuation following its public listing via a SPAC merger in 2020. This reflects the market's stern assessment of the technical and commercialization hurdles the company faces.
- **Repeated Delays in Commercialization Goals:** Initially, the company planned to commercialize its first all-solid-state battery by 2024. However, as of September 2026, it has neither commercialized a product nor generated meaningful revenue.
- **No Commercial Readiness Anticipated Until 2029:** The latest statements from QuantumScape indicate that the company does not expect to be ready for commercialization until 2029. This represents a delay of at least five years from its initial projections.

Technical & Clinical Details

QuantumScape is developing an all-solid-state battery technology characterized by a ceramic-based solid electrolyte and an anode-free design. This technology is posited to offer high energy density and superior safety, with the potential to significantly extend EV driving ranges and enable rapid charging. However, the manufacturing process for all-solid-state batteries is inherently complex. Key challenges include controlling the interface resistance between the solid electrolyte and electrodes, ensuring consistent quality during large-scale manufacturing, and achieving cost reductions. QuantumScape's ongoing delays underscore the immense difficulty in overcoming these technical hurdles and maturing the technology to a mass-producible level. There remains a considerable gap between laboratory-scale prototyping and meeting the stringent quality and cost demands of automotive manufacturers.

Background & Context

All-solid-state batteries are garnering immense anticipation from both the battery and automotive industries as the next-generation technology for electric vehicles (EVs). They are believed to offer advantages over conventional liquid-electrolyte lithium-ion batteries in terms of safety, energy density, and lifespan, prompting numerous companies to enter the development race. QuantumScape, with investments from companies like Volkswagen, was once considered a highly promising startup. However, its experience illustrates just how challenging the transition from groundbreaking R&D to full-scale commercialization can be. The automotive industry, in particular, demands high reliability and long product lifecycles, necessitating cautious and thorough evaluation periods for new technologies.

Strategic Significance & Outlook

QuantumScape's commercialization delays and stock price decline serve as a stark reminder to investors that bringing all-solid-state battery technology to market remains a formidable challenge. The new target of 2029 implies that the company requires further time and significant capital investment for technology development. Investors will closely watch whether QuantumScape can achieve technical breakthroughs and introduce competitive products within this extended timeframe. Conversely, these delays could also present opportunities for new entrants to the solid-state battery market and for competitors pursuing different technological approaches. While the future of all-solid-state batteries remains promising, the path to widespread adoption is still arduous.

Source: https://www.fool.com/investing/2026/09/02/quantumscape-is-down-x-from-its-high-is-2027-final/

#21 Xpeng's Humanoid Robot 'Iron' Shifts from All-Solid-State to Semi-Solid Batteries Due to Mass Production Schedules and Cost Challenges

Published September 03, 2026 CnEVPost China

OVERVIEW

Chinese EV maker Xpeng has reportedly decided to pivot its humanoid robot 'Iron' from an all-solid-state battery strategy to a solid-liquid hybrid (semi-solid) battery for its mass production version. This strategic shift is primarily attributed to the industrialization of all-solid-state battery technology not keeping pace with Xpeng's ambitious production timelines, coupled with unresolved challenges in cost, performance stability, and manufacturing consistency. The decision underscores the persistent complexities in commercializing advanced battery technologies.

IN DEPTH

Xpeng, a prominent Chinese electric vehicle (EV) manufacturer, has reportedly announced a significant change in its battery strategy for the upcoming mass-production version of its humanoid robot, 'Iron.' The company is said to be pivoting from its initial plan to use all-solid-state batteries to a solid-liquid hybrid, or semi-solid, battery solution.

Key Findings

- **Strategic Shift to Semi-Solid Batteries:** Xpeng has reportedly abandoned its plan to use all-solid-state batteries for its 'Iron' humanoid robot's mass-production version, opting instead for semi-solid batteries. This decision reflects the realistic challenges inherent in commercializing advanced battery technologies.
- **Production Schedule and Technical Challenges Cited:** The primary reasons for this pivot are believed to be the inability of all-solid-state battery industrialization to align with Xpeng's demanding production schedule, alongside persistent unresolved issues concerning cost, performance stability, and manufacturing consistency.

Technical & Clinical Details

All-solid-state batteries, by virtue of eliminating liquid electrolytes, promise superior safety, higher energy density, and longer lifespans, positioning them as a truly next-generation battery technology. However, their manufacturing process is highly complex, facing significant technical hurdles such as controlling the interface resistance between the solid electrolyte and electrodes, ensuring quality consistency in large-scale production, and achieving cost reductions. Semi-solid batteries, conversely, combine a solid electrolyte with a small amount of liquid electrolyte. This approach allows them to capture some advantages of all-solid-state batteries while still leveraging aspects of existing lithium-ion battery manufacturing processes, acting as a viable compromise. Xpeng's shift suggests a pragmatic assessment that all-solid-state batteries, in terms of stability, reliability, and critically, mass-producibility, could not meet the stringent operational requirements and timeline set for the 'Iron' robot. While semi-solid batteries may offer slightly lower energy density compared to pure solid-state, their lower manufacturing complexity facilitates quicker market deployment.

Background & Context

All-solid-state batteries are envisioned as the ideal power source for high-performance applications like EVs and robots. However, their commercialization continues to confront numerous technical and economic challenges. While many companies pursue R&D, most maintain a cautious approach towards integrating them into actual products. Xpeng's 'Iron' robot, emblematic of the company's innovation drive, attracted significant attention regarding its chosen power source, as it would set a precedent for the industry. This reported strategic pivot indicates a realistic appraisal that all-solid-state battery technology may not yet be mature enough for large-scale commercial deployment. Concurrently, it suggests that semi-solid batteries are strengthening their role as a transitional technology or a practical option for specific niche markets, offering a bridge to full solid-state solutions.

Strategic Significance & Outlook

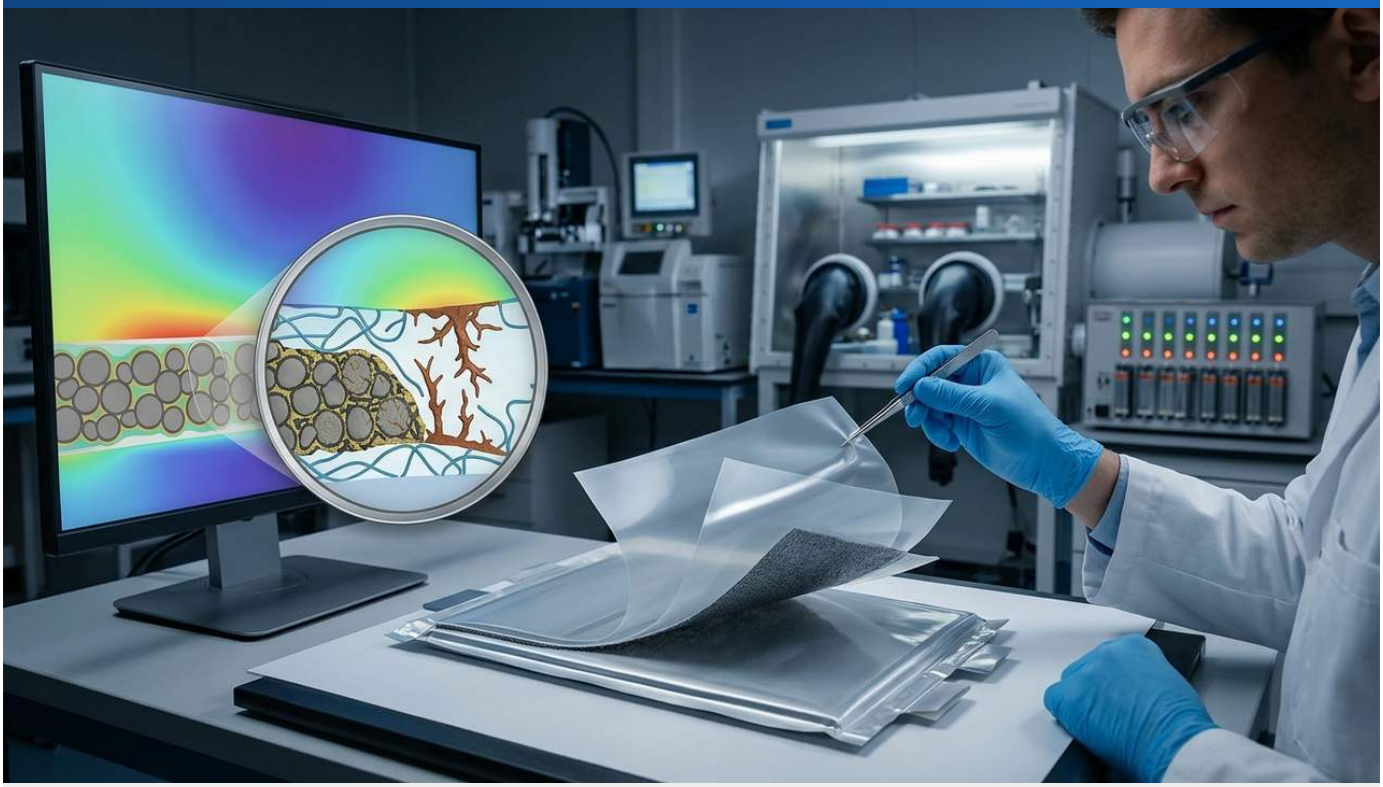
Xpeng's strategic shift implies that the widespread commercialization of all-solid-state batteries is still several years away. While the move to semi-solid batteries will likely ensure the 'Iron' robot's production schedule is met, long-term performance improvements and market competitiveness will still necessitate further innovation in all-solid-state technology. This decision offers critical insights for other robot developers and EV manufacturers on how to balance short-term practicality with long-term technological aspirations in adopting next-generation battery solutions. The all-solid-state battery industry should take Xpeng's pragmatic assessment as a lesson, requiring more careful consideration of technological maturity and market entry timing.

Source: https://cnevpost.com/2026/09/03/xpeng-iron-shifts-to-semi-solid-batteries/

Collected: September 04, 2026 | Automated Research System (Gemini API)

#22 Tri-Layer Solid Electrolyte Method Boosts Lithium-Metal Battery Safety and Longevity: Polydopamine-Coated LLZO and Triblock Polymer Network Suppress Dendrites

Published September 04, 2026 Tech Xplore Global



OVERVIEW

Researchers have developed a novel tri-layer solid electrolyte combining polydopamine-coated lithium lanthanum zirconium oxide (LLZO) ceramic particles within a triblock polymer network, aiming for safer and longer-lasting lithium-metal batteries. This innovative composite material significantly enhances mechanical strength and effectively suppresses lithium dendrite growth. This breakthrough contributes to realizing high-energy-density, yet safe and durable, next-generation lithium-metal batteries.

IN DEPTH

A groundbreaking tri-layer solid electrolyte has been developed, promising a dramatic improvement in the safety and lifespan of lithium-metal batteries, a key next-generation battery technology. This advancement represents a significant step towards enabling high-energy-density power sources.

Key Findings

- **Development of a Tri-Layer Solid Electrolyte:** Researchers have engineered an innovative tri-layer solid electrolyte by integrating polydopamine-coated lithium lanthanum zirconium oxide (LLZO) ceramic particles within a flexible triblock polymer network.
- **Enhanced Mechanical Strength and Dendrite Suppression:** This composite material significantly improves mechanical strength compared to conventional electrolytes and effectively suppresses the growth of lithium dendrites. Dendrite suppression is critical for safety, as dendrites can cause internal shorts and lead to battery fires.
- **Enabling Safer, Longer-Lasting Lithium-Metal Batteries:** This new electrolyte addresses fundamental issues of safety and longevity that have plagued lithium-metal batteries, contributing to the realization of highly reliable cells that maintain high energy density.

Technical & Clinical Details

The core of the developed tri-layer solid electrolyte involves LLZO particles, a lithium-ion conducting ceramic, coated with polydopamine. Polydopamine functions by uniformly covering the LLZO particle surfaces, which enhances the interfacial stability between the LLZO and the lithium metal anode. This coating facilitates more efficient lithium-ion transport. Furthermore, these coated LLZO particles are dispersed within a resilient triblock polymer network, composed of block copolymers. The triblock polymer significantly boosts the overall mechanical strength and flexibility of the electrolyte, allowing it to withstand the stresses induced by volumetric changes during battery charge and discharge cycles. This multi-layered architecture works synergistically to suppress dendrite formation on the lithium metal anode surface, both physically and electrochemically, preventing short circuits and performance degradation in the battery.

Background & Context

Lithium-metal batteries are highly anticipated as a next-generation battery technology, capable of achieving theoretically much higher energy densities than current lithium-ion batteries. This could dramatically improve the range of electric vehicles (EVs) and extend the operational time of portable electronic devices. However, the commercialization of lithium-metal batteries has been hampered by critical issues: safety concerns arising from lithium dendrite growth (leading to internal shorts and fires) and short cycle life. Previous research often focused on single solid electrolyte materials. This novel tri-layer composite electrolyte approach is innovative in its attempt to resolve these complex, intertwined challenges simultaneously by combining the advantages of different materials. This breakthrough provides new impetus and direction for the broader field of all-solid-state battery research.

Strategic Significance & Outlook

The newly developed tri-layer solid electrolyte significantly advances the path toward safer and longer-lasting lithium-metal batteries. If commercialized, this technology could enable EVs to travel greater distances on a single charge while providing inherently safer battery systems. Future research will likely focus on scaling up the manufacturing process for this electrolyte, reducing costs, and conducting long-term performance and stability validations in actual battery cells. This material technology holds the potential to accelerate the practical implementation of all-solid-state batteries and contribute to the realization of a sustainable energy society.

Source: https://www.globalsources.com/sourcing-digest/tri-layer-solid-electrolyte-method-promises-safer-longer-lasting-lithium-metal-batteries/?source=GSOLHP_SKC_1

Collected: September 04, 2026 | Automated Research System (Gemini API)

#23 US DoE Announces $500 Million Grants for Battery Minerals and Materials: Prioritizing Next-Gen Anodes, DLE, Electrolytes, and Recycling

Published September 02, 2026 Benchmark Source USA

OVERVIEW

The U.S. Department of Energy (DoE) announced a $500 million grant program at the end of August 2026, targeting battery materials, manufacturing, and recycling. This significant funding aims to support domestic R&D and production across a wide range of battery mineral and material sectors, including next-generation anode materials, Direct Lithium Extraction (DLE) technologies, cobalt alternatives, high-performance electrolytes, and battery recycling. This initiative represents a critical strategic investment to strengthen the U.S. battery supply chain and accelerate the transition to a clean energy economy.

IN DEPTH

The U.S. Department of Energy (DoE) has unveiled a substantial grant program aimed at bolstering the nation's battery supply chain and advancing next-generation energy technologies. This investment is a crucial step for the United States to maintain competitiveness in the clean energy economy.

Key Findings

- **$500 Million Grant Program Announced:** The U.S. Department of Energy announced a major grant program totaling $500 million at the end of August 2026. This funding is dedicated to supporting advancements in battery materials, manufacturing processes, and recycling technologies.
- **Broad Focus on Critical Areas:** The grants will target a diverse array of areas across the entire battery ecosystem, including the development of next-generation anode materials, innovations in Direct Lithium Extraction (DLE) technologies, reduction or substitution of cobalt, research into high-performance electrolyte materials, and the enhancement of battery recycling efficiencies.
- **Objective to Strengthen Domestic Supply Chain:** A primary goal of this program is to reinforce domestic capabilities in the sourcing, processing, manufacturing, and recycling of battery minerals and materials, thereby reducing reliance on imports.

Technical & Clinical Details

The DoE grants are strategically focused on addressing multiple bottlenecks within battery technology. Development of next-generation anode materials aims to improve battery energy density and fast-charging capabilities, with particular emphasis on silicon- and lithium-metal-based anodes. Direct Lithium Extraction (DLE) is a vital technology for securing domestic lithium supply while minimizing environmental impact. Cobalt alternative technologies are crucial for mitigating geopolitical risks and human rights concerns within the supply chain. High-performance electrolytes, especially solid electrolytes for all-solid-state batteries, hold the potential to dramatically enhance battery safety and longevity. Investments in battery recycling technologies are indispensable for promoting the circular economy of rare metals and building a sustainable battery ecosystem.

Background & Context

With global demand for electric vehicles (EVs) and renewable energy storage systems surging, battery technology has become a cornerstone of national economic and security interests. The United States faces challenges in the resilience of its battery supply chain compared to countries like China, particularly lagging in mineral resource security, material processing, and battery manufacturing capacity. Through policies such as the Inflation Reduction Act (IRA), the U.S. government is vigorously supporting the domestic development and manufacturing of clean energy technologies, and these DoE grants are a part of that broader effort. This initiative is expected to foster collaboration among domestic research institutions, universities, and private companies to accelerate technological innovation.

Strategic Significance & Outlook

The $500 million in grants will significantly impact R&D and manufacturing capabilities within the U.S. battery industry. This is expected to accelerate the development of next-generation battery technologies and enhance the competitiveness of the U.S. clean energy sector, potentially expediting the commercialization of all-solid-state batteries and other advanced battery solutions. Technological breakthroughs achieved through these grants are also anticipated to contribute to job creation domestically and, in the long term, support U.S. energy independence and climate change mitigation efforts. However, whether these investments translate into concrete commercial success and truly enhance international competitiveness will depend on future technological progress and market dynamics.

Source: https://source.benchmarkminerals.com/article/us-department-of-energy-grants-cover-range-of-battery-minerals-and-materials

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