

INDUSTRY OVERVIEW

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Major global economies have established clear targets in laws or regulation policies to achieve carbon neutrality or net-zero emissions by around 2050. Carbon neutrality and net-zero targets are poised to significantly reshape the global energy supply by accelerating the transition from fossil fuels, such as oil, coal, and natural gas, to renewable energy sources. As a core technology supporting the energy transition, lithium-ion batteries are being widely applied in key areas such as electrified transportation, energy storage and grid regulation. They facilitate the electrification of transportation, such as replacing traditional ICE vehicles to reduce carbon emissions, provide vital energy storage to ensure the stable output of green energy sources like wind and solar and ensure power supply and demand balance and maintain grid stability. As such, lithium-ion battery and its materials, such as electrolyte and cathode, serve as essential pillars in building a low-carbon, safe, and efficient energy system, playing an irreplaceable role.

OVERVIEW OF THE GLOBAL AND CHINA’S LITHIUM-ION BATTERY INDUSTRY

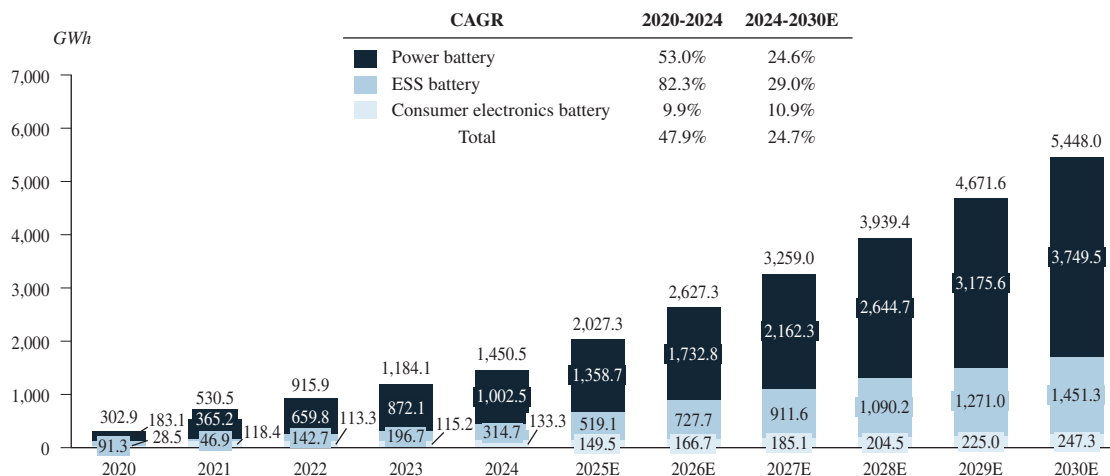
Overview of lithium-ion battery

Lithium-ion battery is a type of rechargeable battery that stores and releases energy through the reversible intercalation of lithium ions between the cathode and anode during charge and discharge cycles. Depending on the end-use application scenarios, lithium-ion batteries exhibit varying performance characteristics, including energy density, cycle life, safety, C-rate and operating temperature range. In terms of application, lithium-ion batteries are generally classified into three major categories: power batteries (primarily for EV), energy storage batteries (primarily for ESS), and consumer electronics batteries (primarily for mobile phones, laptops and other portable devices).

Market size of lithium-ion battery industry

Global lithium-ion battery market has shown explosive growth between 2020 and 2024, with market size rising rapidly from 302.9 GWh in 2020 to 1,450.5 GWh in 2024, achieving a CAGR of 47.9%. As the world accelerates its energy transition, the lithium-ion battery market is expected to continue expanding. Global lithium-ion battery market size is expected to reach 5,448.0 GWh in 2030 with a CAGR of 24.7% from 2024 to 2030. This expansion is principally driven by the electrification of various transportation sectors – including passenger vehicles, commercial vehicles, vessels, and machinery, the growing demand for renewable energy storage systems, and the widespread proliferation of consumer electronic devices.

Market size¹ of lithium-ion battery by downstream application, Global, 2020-2030E



Note:

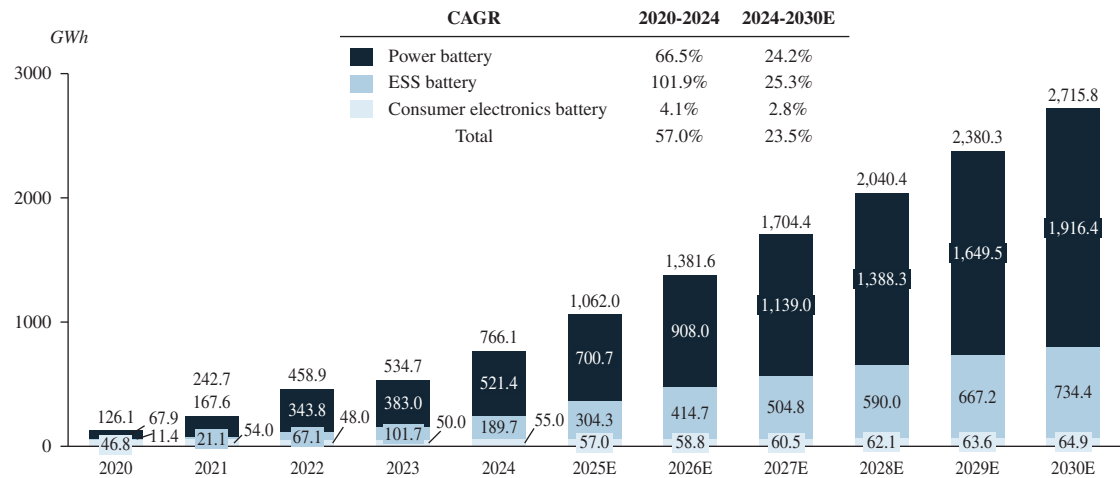
1. Market size is calculated based on end-user battery installations.

Source: CIC

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China’s lithium-ion battery market is projected to sustain robust growth from 2020 to 2030. Power batteries are expected to serve as the primary growth driver, with market size increasing from 67.9 GWh in 2020 to 521.4 GWh in 2024, and further reaching 1,916.4 GWh by 2030. ESS batteries are also anticipated to experience rapid expansion, rising from 46.8 GWh in 2020 to 189.7 GWh in 2024, and subsequently to 734.4 GWh by 2030, thereby emerging as a significant new contributor to overall lithium-ion battery demand.

Market size¹ of lithium-ion battery by downstream application, China, 2020-2030E



Notes:

1. Market size is calculated based on end-user battery installations.

Source: CIC

At the same time, overseas markets are also experiencing rapid growth. The market size of lithium-ion battery in the Europe increased from 85.4 GWh in 2020 to 256.4 GWh in 2024 and is expected to reach 1,109.9 GWh in 2030 with a CAGR of 27.7%. The market size of lithium-ion battery in the United States increased from 52.8 GWh in 2020 to 227.5 GWh in 2024 and is expected to reach 996.0 GWh in 2030 with a CAGR of 27.9%.

Market Drivers

- Rapid expansion of the power battery market:**
 - Accelerating adoption of EV: The PV segment has experienced steady growth, mainly driven by an increasingly diversified product portfolio, enhanced intelligent features, and rising consumer demand, further supported by favorable policy incentives and emerging cost advantages. The electrical architecture of EV is more adaptable to the hardware and software systems required for intelligent features. As the global automotive industry advances steadily toward electrification, automakers are launching an increasing number of intelligent and electrified vehicle models. The CV segment has experienced rapid growth, mainly driven by its enhanced cost-effectiveness with technological advancements, supportive regulation incentives and increasing number of CV models. The increasingly well-developed battery charging and swapping network for EV has also significantly enhanced the convenience of using EV. Global shipment volume of EV increased from 8.3 million in 2020 to 32.8 million in 2024, representing a CAGR of 40.8%, and is projected to reach 87.7 million by 2030, with a CAGR of 17.8%. Global EV penetration rate, measured as a percentage of EV shipment volume against total vehicle shipment volume, increased from 4.1% in 2020 to 19.9% in 2024, and is expected to reach 56.1% by 2030.

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- Increase in battery capacity per vehicle: EV manufacturers’ continue to increase adoption of higher battery capacity per vehicle to enhance driving range and overall performance. The increase in the battery energy capacity per vehicle has contributed to the growth in EV battery shipments.
- Emergence of diversified application scenarios: With technological advancement and innovation, power batteries’ applications have gradually expanded to emerging fields such as machinery, vessels, eVTOL, intelligent applications such as robotics, further driving growth in demand for power batteries.
- ***Rise of the energy storage market:***
 - Continued growth in global electricity consumption: The global demand for electricity continues to rise, driven by global economic development, population growth, and accelerating electrification. Global electricity demand reached approximately 26,000 TWh in 2024, and will reach 31,000 TWh in 2030. Furthermore, AI advancements are driving surging demand for computing power and electricity consumption of data centers. Global data center electricity consumption is expected to reach approximately 2,600 TWh in 2030.
 - Deployment of renewable energy: Wind and solar power have become the primary approach of global clean energy transformation. Global installed capacity of wind and solar power increased from 1,520.4 GW in 2020 to 3,257.8 GW in 2024, representing a CAGR of 21.0%, and is projected to reach 7,871.5 GW by 2030, with a CAGR of 15.8%. The share of wind and solar power in global cumulative installed power capacity rose from 19% in 2020 to 32% in 2024, and is projected to exceed 50% by 2030. However, their power generation are unstable and volatile. Energy storage, serving as a flexible grid-balancing resource in power systems, has become increasingly critical for renewable energy integration, power supply-demand balancing, and grid stability. Furthermore, many countries have introduced policies to guide and support the development of renewable energy and energy storage industries, and to improve power system and market development.
 - Improved cost competitiveness: In recent years, the expenses associated with ESS have decreased considerably due to technological advancements, the maturation of supply chains, and economies of scale. These factors have improved the cost efficiency of energy storage solutions, leading to a swift increase in demand for ESS batteries.
- ***Stable growth and evolution of the consumer electronics battery market:*** Mainstream consumer electronics, including mobile phones, laptops and tablets, continue to demonstrate steady global demand, supported by the rising adoption of AI applications and the relatively low penetration rates in certain emerging markets. At the same time, the proliferation of emerging device categories driven by technology upgrade, such as consumer service robots and smart wearables, is expanding the use cases for consumer batteries, thereby contributing to sustained market growth.

OVERVIEW OF THE GLOBAL AND CHINA’S LITHIUM-ION BATTERY MATERIALS INDUSTRY

High-performance lithium-ion batteries, serving as key energy storage carriers, feature high energy density, ultra-fast charging, wide operating temperature range, enhanced safety and extended cycle life, making them fundamental components of the new electricity system and essential enablers of a low-carbon society. The core materials of lithium-ion battery cells primarily include electrolyte, cathode materials, anode materials, separator, and other auxiliary materials such as adhesive.

In lithium-ion battery cells, raw materials typically account for 70%-80% of total costs, with cathode materials being the largest contributor, followed by anode materials, electrolytes, separators and other auxiliary materials. The cost structure varies depending on the cathode chemistry. For LFP cells, cathode materials generally account for 30%-40% of raw material costs, anode materials 20%-30%, electrolytes 10%-15%, separators around 10%, and other auxiliary materials approximately 20%. For ternary lithium-ion battery cells, cathode materials typically account for 40%-50% of raw material costs, anode materials 10%-20%, electrolytes 10%-15%, separators around 10%, and other auxiliary materials roughly 20%.

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The primary market driver for both the lithium-ion battery electrolyte industry and the broader lithium-ion battery materials sector is the growth in lithium-ion battery shipments. As demand for electric vehicles, energy storage systems, and portable electronics continues to rise, the shipment volume of lithium-ion batteries expands correspondingly, directly boosting the consumption of key materials such as electrolytes, cathode and anode materials. The increasing adoption of lithium-ion batteries acts as the fundamental catalyst for the development and expansion of the entire lithium-ion battery supply chain.

OVERVIEW OF THE GLOBAL AND CHINA’S LITHIUM-ION BATTERY ELECTROLYTE INDUSTRY

Overview of lithium-ion battery electrolyte

Electrolyte functions as the medium for lithium-ion transport within the battery and is required to possess high ionic conductivity, low electronic conductivity, and strong chemical and thermal stability. A typical lithium-ion battery electrolyte consists of three core compositions: solute, solvents and functional additives, together accounting for approximately 90.0% of the electrolyte’s total cost. Among these, solute, such as LiPF_6 , represent the largest share, typically accounting for 40%-50% of total electrolyte costs, followed by solvents at 30-40%, and additives at 10-20%.

- **Solute:** provides lithium ions for transport between the cathode and anode during charge and discharge, supporting conductivity and electrochemical performance. LiPF_6 , as the primary solute in lithium-ion battery electrolytes, plays a critical role in enabling stable and efficient ion transport. LiFSI , as the novel solute, is increasingly adopted in electrolyte formulations for its superior thermal stability, high ionic conductivity, and wide electrochemical window, enabling enhanced battery performance under high-voltage operation, fast-charging conditions, and across wide temperature ranges. Globally, LiFSI accounted for 0.4% of electrolyte by volume in 2020, increased to 1.9% in 2025, and is expected to reach 4.1% by 2030.
- **Solvent:** serves as the transport medium for lithium ions, mainly including DMC, DEC and EMC.
- **Additives:** though used in small amounts, are key to improving electrolyte stability and battery performance, and serve as a core differentiator for electrolyte and materials manufacturers. Common additives include VC, DTD and FEC.

The importance of lithium-ion battery electrolyte

Electrolytes play a critical role in determining the overall performance, efficiency and safety of lithium-ion batteries. The industry is undergoing a trend toward customization, with formulations increasingly tailored to specific application scenarios and battery technologies. Their formulation directly influences several key parameters:

- **Energy Density:** Electrolytes that exhibit superior stability under high-voltage conditions, greater ionic conductivity and lower density enable maximized utilization of the cell’s designed capacity during charge and discharge cycles. High-performance electrolytes effectively reduce polarization and internal resistance, leading to improved energy utilization efficiency. These benefits are particularly pronounced under high-rate or high-voltage operating conditions.
- **Cycle Life:** Its stability under high voltage and elevated temperatures, along with its film-forming ability and interfacial compatibility, directly determines the battery’s long-term reliability. Strong film formation decreases the consumption of active lithium and electrolyte, thereby mitigating capacity fade.
- **Safety:** High-quality electrolytes possess excellent thermal stability, low flammability, and superior interfacial compatibility, effectively suppressing thermal runaway and mitigating the rate of temperature rise, thereby significantly enhancing the intrinsic safety of lithium-ion batteries.

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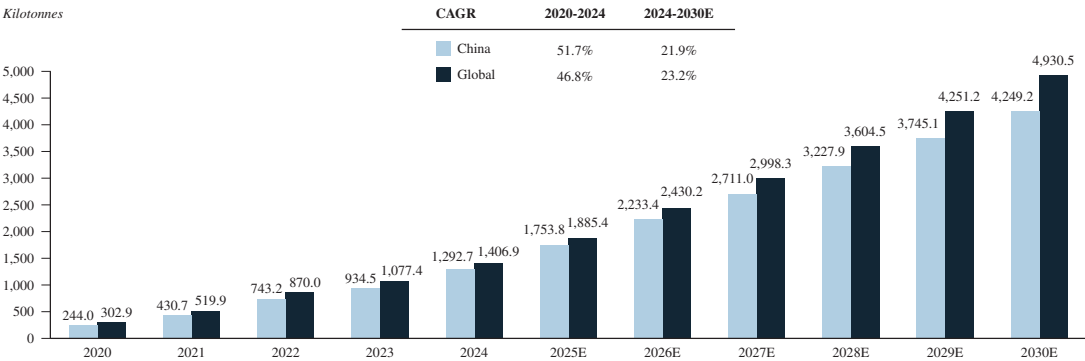
- **C-rate:** High C-rate performance requires electrolytes with high lithium-ion mobility, low interfacial impedance, and excellent thermal stability to ensure rapid ion transport and stable interfacial reactions under fast charging and discharging conditions.
- **Operating temperature range:** High-quality electrolytes, characterized by high fluidity at low temperatures and strong chemical stability at elevated temperatures, ensure efficient lithium-ion transport and interfacial stability across a wide operating temperature range. These properties enhance the performance and reliability of lithium-ion batteries under extreme temperature conditions.

Shipment volume of lithium-ion battery electrolyte industry

As one of the four core components of lithium-ion batteries, the electrolyte market has also grown rapidly. Global lithium-ion battery electrolyte shipment volume increased from 302.9 kilotonnes in 2020 to 1,406.9 kilotonnes in 2024 with a CAGR of 46.8%. China, as the largest producer of lithium-ion battery electrolytes, dominates shipment volume worldwide. China’s lithium-ion battery electrolyte shipment volume increased from 244.0 kilotonnes in 2020 to 1,292.7 kilotonnes in 2024, representing a CAGR of 51.7%. The electrolyte market will continue to grow rapidly, driven by increasing demand from green transportation, energy storage and consumer electronics and, advancements in high-performance electrolyte technologies. Global lithium-ion battery electrolyte shipment volume is expected to reach 4,930.5 kilotonnes and China’s lithium-ion battery electrolyte shipment volume is expected to reach 4,249.2 kilotonnes in 2030, with a CAGR of 23.2% and 21.9% respectively. The rapid expansion of overseas markets is primarily driven by leading lithium-ion battery enterprises actively implementing internationalization strategies, accelerating capacity deployment in regions such as Europe and United States.

In additions, the booming development of the solid-state battery industry is driving the demand for solid-state electrolytes. The global solid-state electrolyte market is expected to grow from approximately RMB10 billion in 2030 to around RMB116 billion in 2040, with a CAGR of 27.5% during this period. It is further projected to reach RMB334 billion by 2050 with a CAGR of 11.1%.

Shipment volume of the lithium-ion battery electrolyte industry,
Global and China, 2020-2030E



Future trends

- **Upgrading toward higher performance and customization:** The expansion and upgrading of the lithium-ion battery industry constitute the primary drivers of growth in the electrolyte market. As lithium-ion battery applications diversify and material systems evolve, electrolyte requirements are becoming increasingly differentiated. Breakthroughs in advanced solute and additives are enabling significant improvements in high energy density, long cycle life, outstanding safety, fast-charging capability and wide operating temperature range. Electrolyte products are shifting from standardized formulations to scenario-specific, system-integrated, and performance-tailored solutions, positioning customization as a key industry trend.

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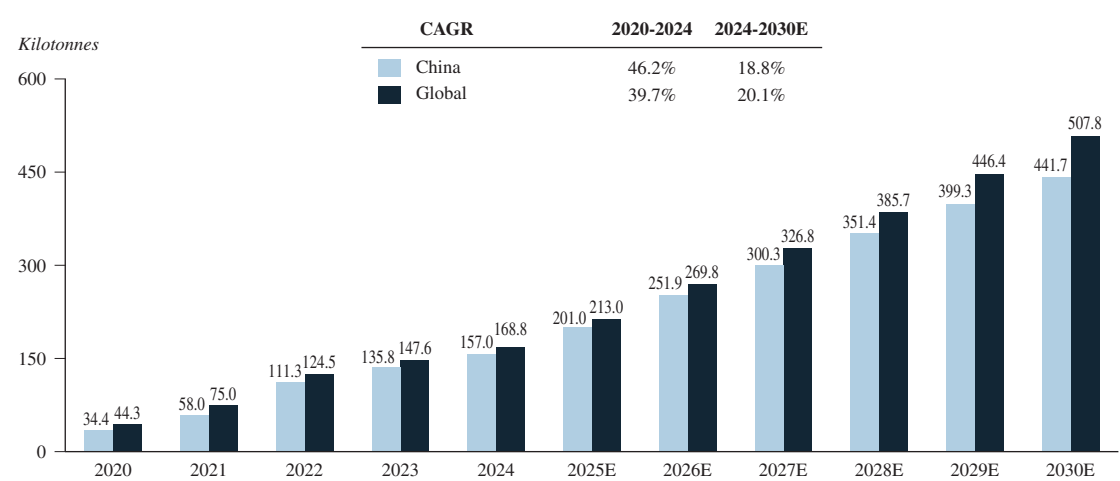
- **Overseas manufacturing expansion by Chinese enterprises:** As the global lithium-ion battery industry chain accelerates its international expansion and the localization requirement of production and supply chains increases, particularly with large-scale capacity expansions in Europe, North America, and Southeast Asia, there is a growing demand for localized supply of lithium-ion battery and its key materials including electrolytes. Leveraging advanced formulation technologies and manufacturing capabilities, Chinese lithium-ion battery value chain is accelerating overseas expansion.
- **Increasing industry concentration:** Driven by rising technical barriers, prolonged customer certification cycles, and growing overseas localization requirements, the industry concentration is steadily increasing. Companies with advanced formulation development, strong customer stickiness, and global delivery capabilities are poised to continuously expand market share.

LiPF₆ and LiFSI, as two core compositions in lithium-ion battery electrolytes, play a crucial role in electrolyte performance and have both benefited from the rapid development of the lithium-ion battery electrolyte industry.

Shipment volume of the LiPF₆ industry

Global and China’s LiPF₆ market has experienced rapid growth in recent years. From 2020 to 2024, global LiPF₆ shipments surged from 44.3 kilotonnes to 168.8 kilotonnes, with a CAGR of 39.7%, reflecting strong market demand expansion. It is projected that global market will further expand to 507.8 kilotonnes by 2030, with a CAGR of 20.1%. China’s LiPF₆ shipment volume increasing from 34.4 kilotonnes in 2020 to 157.0 kilotonnes in 2024, achieving a CAGR of 46.2%. It is expected that China’s LiPF₆ shipment volume will grow at a CAGR of 18.8%, reaching 441.7 kilotonnes by 2030.

Shipment volume of the LiPF₆, Global and China, 2020-2030E



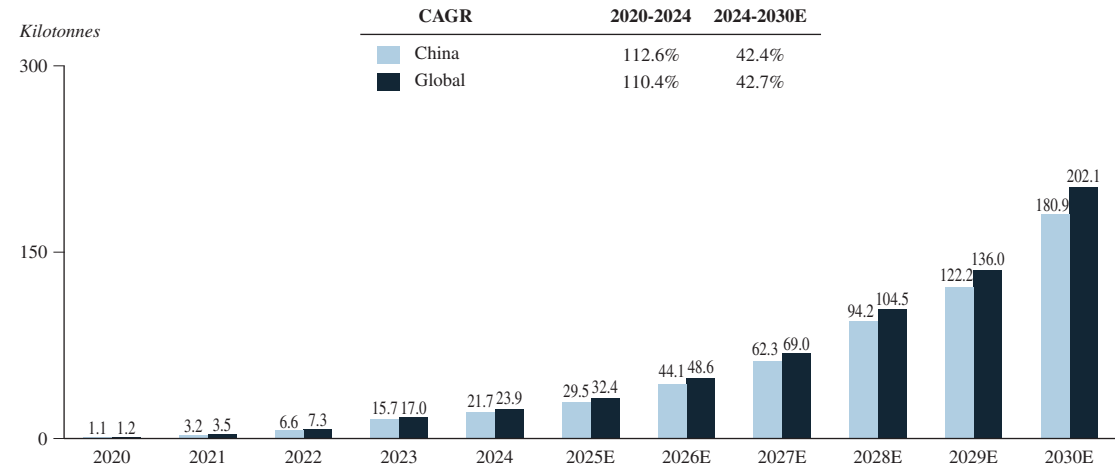
Source: CIC, GGII

Shipment volume of the LiFSI industry

Global LiFSI shipments surged from 1.2 kilotonnes in 2020 to 23.9 kilotonnes in 2024, reflecting a remarkable CAGR of 110.4% which highlights the rapid adoption and expanding applications of LiFSI as a high-performance solute in electrolytes. Global LiFSI market is projected to reach 202.1 kilotonnes by 2030, with a CAGR of 42.7%. China’s LiFSI shipment volume increased from 1.1 kilotonnes in 2020 to 21.7 kilotonnes in 2024, achieving a CAGR of 112.6%. By 2030, China’s LiFSI market is expected to reach 180.9 kilotonnes, growing at a CAGR of 42.4%.

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Shipment volume of the LiFSI industry, Global and China, 2020-2030E



Source: CIC, GGII

Competitive landscape of the lithium-ion battery electrolyte industry

In 2024, the Company ranked as the world’s largest lithium-ion battery electrolyte supplier by shipment volume, with total shipments reaching 502.7 kilotonnes, accounting for 35.7% of the global market. The Company has retained its position as the world’s largest lithium-ion battery electrolyte supplier for 9 consecutive years.

The top five lithium-ion battery electrolyte companies in terms of shipment volume, Global, 2024

Ranking	Company	Shipment volume, 2024, thousand tons	Global market share, 2024
1	The Company	502.7	35.7%
2	Company A ¹	219.9	15.6%
3	Company B ²	193.9	13.8%
4	Company C ³	74.6	5.3%
5	Company D ⁴	70.0	5.0%
CR5		1,061.0	75.4%
Global Total		1,406.9	100.0%

Notes:

- Established in 1994, Company A is a listed company engaged in automobiles, rail transit, new energy, and electronics. It is a leading enterprise in Chinese EV industry, with total revenue exceeding RMB770.0 billion in 2024.
- Established in 1996, Company B is a listed company and a global leader in electronic chemicals and functional materials, engaged in the production of battery chemicals, organic fluorochemicals, capacitor chemicals and semiconductor chemicals, with total revenue exceeding RMB7.0 billion in 2024.
- Established in 2017, Company C is a listed company engaged in the R&D, production and sales of lithium-ion battery materials and advanced chemical materials, with total revenue exceeding RMB2.0 billion in 2024.
- Established in 2004, Company D is an unlisted company specialized in lithium-ion battery materials, and is among the early enterprises in China engaged in the R&D and production of power lithium-ion battery electrolytes.

Source: CIC

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The Company ranked as the world’s largest supplier of LiPF₆ by shipment volume in 2024, with total shipments reaching 63.5 kilotonnes, accounting for 37.6% of the global market.

The top five LiPF₆ companies in terms of shipment volume, Global, 2024

Ranking	Company	Shipment volume, 2024, thousand tons	Global market share, 2024
1	The Company	63.5	37.6%
2	Company E ¹	43.3	25.7%
3	Company F ²	23.0	13.6%
4	Company G ³	10.5	6.2%
5	Company H ⁴	10.0	5.9%
CR5		150.3	89.0%
Global Total		168.8	100.0%

Notes:

1. Established in 1999, Company E is a listed high-tech enterprise focused on the R&D and industrialization of fluorine-, lithium- and silicon-based materials and energy systems, with total revenue exceeding RMB8.0 billion in 2024.
2. Established in 1996, Company F is a listed company specialized in lithium hexafluorophosphate and related fluorine chemicals, as well as small household appliances, with total revenue exceeding RMB2.0 billion in 2024.
3. Established in 2013, Company G is an unlisted, vertically integrated enterprise specialized in fluorite mining and in the production of lithium hexafluorophosphate and electrolyte materials for lithium-ion batteries.
4. Established in 2002, Company H is a listed company with principal businesses in active pharmaceutical ingredients, pharmaceutical intermediates and new energy materials such as lithium hexafluorophosphate, with total revenue exceeding RMB1.0 billion in 2024.

Source: CIC

The Company ranked as the world’s largest supplier of LiFSI by shipment volume in 2024, with total shipments reaching 12.2 kilotonnes, accounting for 51.2% of the global market.

The top five LiFSI companies in terms of shipment volume, Global, 2024

Ranking	Company	Shipment volume, 2024, thousand tons	Global market share, 2024
1	The Company	12.2	51.2%
2	Company I ¹	3.0	12.6%
3	Company J ²	2.8	11.7%
4	Company K ³	1.5	6.3%
5	Company B	0.8	3.3%
CR5		20.3	85.1%
Global Total		23.9	100.0%

Notes:

1. Established in 2019, Company I is an unlisted company specialized in the R&D and production of fluorine-containing lithium-ion battery additives and related advanced materials, with total revenue exceeding RMB170.0 million in 2024.
2. Established in 2016, Company J is an unlisted high-tech enterprise focused on the R&D, production and sales of advanced lithium-ion battery electrolytes, advanced lithium salts and functional additives for new energy applications.
3. Established in 1996, Company K is a listed company engaged in display materials, new energy battery materials and silicon materials, and provides CDMO services for innovative pharmaceuticals, with total revenue exceeding RMB670.0 million in 2024.

Source: CIC

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OVERVIEW OF THE GLOBAL AND CHINA’S LITHIUM-ION BATTERY CATHODE MATERIAL INDUSTRY

Overview of the lithium-ion battery cathode materials

Cathode materials are key components of lithium-ion batteries and play a decisive role in determining energy density, cycle life, safety performance. Cathode materials can be categorized based on their chemical composition into LFP, ternary materials, LCO and LMO. Among them, LFP, with its advantages in safety, long cycle life, and low cost, is widely adopted in both EV and ESS. Global shipment volume of LFP cathode materials increased from 143.0 kilotonnes in 2020 to 2,480.0 kilotonnes in 2024 and is expected to reach 9,422.8 kilotonnes in 2030 with a CAGR of 24.9% during the period. The market share of LFP cathode materials in the global lithium-ion battery cathode materials market increased from 18.8% in 2020 to 69.7% in 2024, and is expected to further rise to 72.1% by 2030.

In LFP cathode materials, lithium carbonate and FePO_4 account for approximately 55% and 25% of the cost respectively, constituting the primary components of the raw material cost structure.

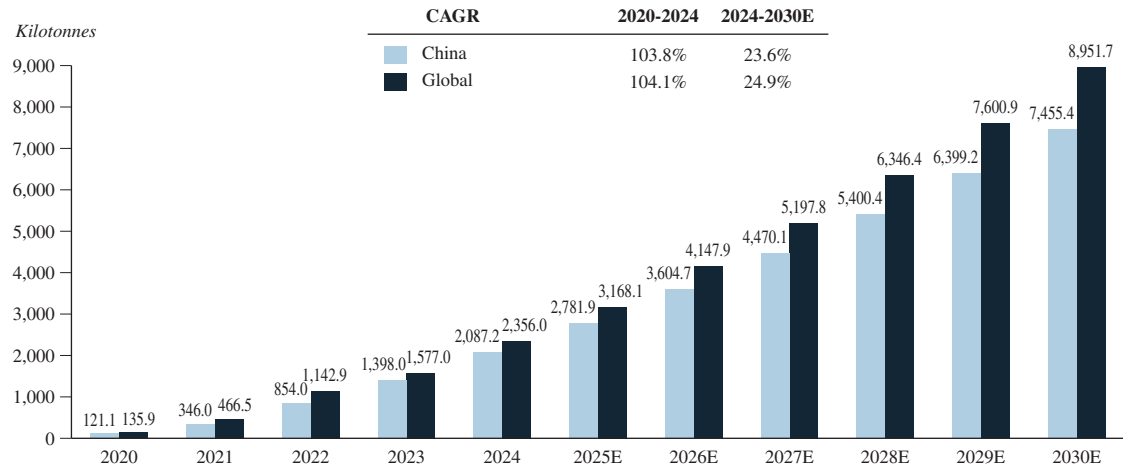
Introduction of FePO_4

FePO_4 , as the critical precursor in the synthesis of LFP cathode materials, exerts a decisive influence on the electrochemical performance of the final cathode product. Fundamental quality attributes including the Fe/P molar ratio, particle morphology, specific surface area, and impurity ion concentration, directly impact key performance metrics such as specific capacity, cycle life, and low-temperature performance of the LFP cathode material.

Shipment volume of the FePO_4

As a key raw material in the process for manufacturing LFP cathode materials, FePO_4 has experienced rapid growth over the past five years. Global shipments increased from approximately 135.9 kilotonnes in 2020 to around 2,356.0 kilotonnes in 2024 and are projected to reach 8,951.7 kilotonnes by 2030, representing a CAGR of 24.9% between 2024 and 2030. In China, Iron phosphate shipment volumes are expected to rise from 2,087.2 kilotonnes in 2024 to 7,455.4 kilotonnes by 2030, with a CAGR of 23.6% during the same period.

Shipment volume of the FePO_4 , Global and China, 2020-2030E



Source: CIC, GGII

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Competitive landscape of the FePO₄ industry

The Company ranked as the world’s third largest supplier of FePO₄ by shipment volume in 2024, with total shipments reaching 95.5 kilotonnes, accounting for 4.1% of the global market.

The top five FePO₄ companies in terms of shipment volume, Global, 2024

Ranking	Company	Shipment volume, 2024, kilotonnes	Global market share, 2024
1	Company M ¹	682.0	28.9%
2	Company N ²	220.0	9.3%
3	The Company	95.5	4.1%
4	Company O ³	80.0	3.4%
5	Company P ⁴	79.0	3.4%
CR5		1,156.5	49.1%
Global Total		2,356.0	100.0%

Notes:

- Established in 2016, Company M is a listed company specialized in the R&D, production and sales of lithium-ion battery cathode materials, primarily focusing on lithium ferro phosphate and ternary materials, with total revenue exceeding RMB20.0 billion in 2024.
- Established in 2010, Company N is a listed company specialized in the R&D, production and sales of lithium-ion battery cathode materials, with a core focus on lithium ferro phosphate, and total revenue exceeding RMB7.0 billion in 2024.
- Established in 2014, Company O is a listed integrated service provider of new energy materials, with core products including ternary precursors and tricobalt tetroxide, and total revenue exceeding RMB40.0 billion in 2024.
- Established in 1986, Company P is a listed company and leading global manufacturer of chemical intermediates, engaged in the production of lithium-ion battery phosphates, with total revenue exceeding RMB2.0 million in 2024.

Source: CIC

OVERVIEW OF THE GLOBAL AND CHINA’S LITHIUM-ION BATTERY AUXILIARY MATERIAL INDUSTRY

Overview of the lithium-ion battery adhesives

Adhesives used in lithium-ion batteries are essential materials in the battery manufacturing process. They are widely applied in the assembly and packaging of cells, modules, and battery packs, serving multiple functions including structural bonding, thermal conduction and dissipation, sealing and waterproofing, as well as flame retardant protection. Based on their functions, lithium-ion battery adhesives can be primarily categorized into structural adhesives and binders.

Structural adhesive for lithium-ion battery packs refers to a specialized adhesive material used in the manufacturing and assembly process of lithium-ion battery packs. It is mainly applied to bond and secure battery modules to the housing, between modules, and other structural components. Its core function is to provide reliable structural support and long-lasting mechanical strength, while also offering comprehensive properties such as thermal conductivity, flame retardancy, sealing, waterproofing, and shock resistance.

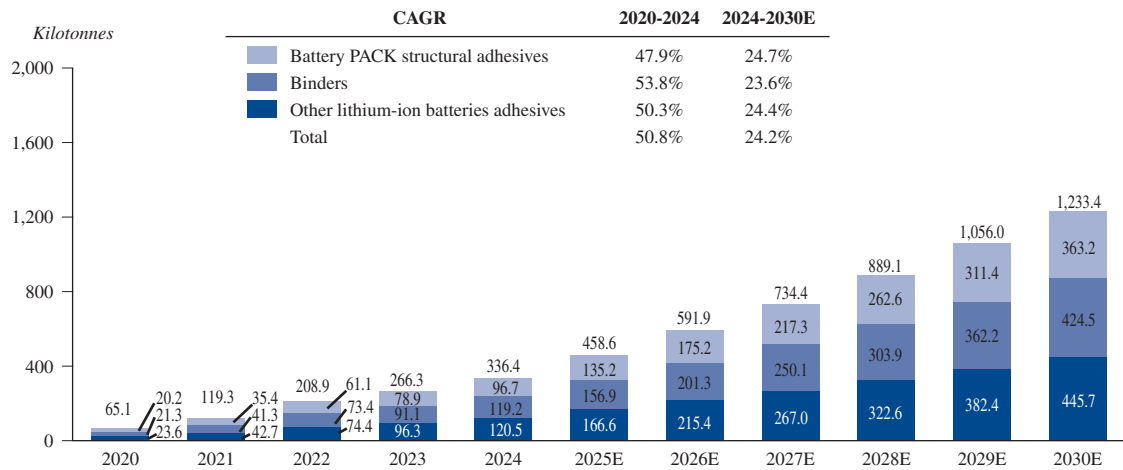
Binders for lithium-ion batteries are primarily used to bond the active materials of the cathode and anode to the current collectors. The main function of the binder is to ensure the structural stability of the active materials during processes such as coating, drying, calendaring, and charge-discharge cycles, preventing detachment, pulverization, or delamination from the current collectors, thereby enhancing the battery’s cycle life, safety, and energy density. Based on polarity and solvent systems, common binders include water-based types (such as SBR and CMC) and solvent-based types (such as PVDF).

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Market size of the lithium-ion battery adhesives

Global lithium-ion battery adhesives market increased from 65.1 kilotonnes in 2020 to 336.4 kilotonnes in 2024 with a CAGR of 50.8% and is expected to reach 1,233.4 kilotonnes in 2030 with a CAGR of 24.2%. Global lithium-ion battery PACK structural adhesives market has shown explosive growth between 2020 and 2024, with market size rising rapidly from 20.2 kilotonnes in 2020 to 96.7 kilotonnes in 2024, achieving a CAGR of 47.9% from 2020 to 2024 and is projected to reach 363.2 kilotonnes by 2030, with a CAGR of 24.7% from 2024 to 2030. In 2024, the company ranked as the world’s third-largest producer of lithium-ion battery PACK structural adhesives, with a 9.6% market share by shipment volume. Global lithium-ion battery binders market increased from 21.3 kilotonnes in 2020 to 119.2 kilotonnes in 2024 with a CAGR of 53.8% and is expected to reach 424.5 kilotonnes in 2030 with a CAGR of 23.6%.

Market size of the lithium-ion battery adhesives, Global, 2020-2030E



Source: CIC, GGII

Key entry barriers for the lithium-ion battery materials industry

- **R&D capabilities:** The lithium-ion battery materials industry demands a deep, systematic comprehension of fundamental materials science, chemical systems and application transformation. It requires enterprises to possess original R&D capabilities built upon long-term interdisciplinary accumulation across chemistry, materials science and related fields, with the ability to continuously innovate in order to maintain technological leadership. For new entrants, breakthroughs in core technologies require platform-based R&D system and sustainable innovation capability.
- **Engineering and scalability:** The lithium-ion battery materials industry is driven by the rapid evolution of downstream battery technologies and application scenarios, resulting in frequent iterations of formulation and key materials. This requires enterprises not only to possess the engineering capabilities to rapidly translate laboratory achievements into commercial-scale implementation, but also to effectively control costs while maintaining performance advantages. At the same time, sufficient financial strength is important to support R&D investment, production expansion, and supply chain integration. Capabilities such as integrating upstream lithium-ion battery material supply chains and implementing material recycling and reusing are critical to achieve optimal operation efficiency under cost-competitive conditions. Enterprises demonstrating leadership in these areas are able to maintain a strong competitive position in the industry.

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- ***Efficient production system:*** The manufacture of lithium-ion battery materials requires vertically integrated, continuous, circular, digitalized and intelligent production models to ensure consistent product performance and delivery reliability. Enterprises are also required to produce customized, high-performance electrolytes, and to respond rapidly to market demands. Building and operating such an efficient and stable production system requires significant capital investment and long-term operational expertise, which constitutes a substantial barrier to entry for new market participants.
- ***Continuous product expansion and application deployment:*** The industry features broad applications and rapid technological evolution, with novel materials continuously emerging, including solid-state electrolytes, thermosetting and thermoplastic materials, fluorine-based extinguishing agents and coolants etc. Enterprises that prioritize continuous development of new products and expansion into emerging high-potential application fields are better positioned to capture growth opportunities, strengthen their market presence, and maintain strong competitive advantages as the industry evolves.
- ***Customer relationship:*** Downstream customers include global battery manufacturers and automakers, most of which require rigorous and lengthy supplier qualification processes as well as strict production and management standards. Establishing stable, trust-based relationships with leading global customers requires not only sustained recognition of the enterprises’ technology and product quality, but also their capability to jointly drive product and application innovation with customers. In addition, with the rapid growth of EV, lithium-ion battery markets, and the increasing localization trend of production and supply chains worldwide, the global market presents significant growth opportunities. Customers prefer to choose suppliers with proven technical capabilities, stable cooperative relationships, local production deployment and reliable, high-quality supply chain performance.

Market challenges and threats for the lithium-ion battery materials industry

- ***Shortage of high-end technical talent:*** The lithium-ion battery materials industry is highly dependent on high-end R&D talent, particularly in the core fields of materials science, electrochemistry, and battery engineering. Such talent not only requires a solid theoretical foundation but also extensive experimental experience and research capabilities to drive innovation in new materials, processes, and high-performance battery solutions. However, the current supply of high-end R&D talent in the industry is insufficient, mainly due to a limited total number of professionals, a lack of multidisciplinary expertise, and the long training cycle required for senior engineers and scientists, which constrains companies’ capabilities in key technology development and innovation.
- ***Instability of raw material prices:*** The lithium-ion battery materials industry faces ongoing challenges due to fluctuations in the prices of key raw materials such as lithium, cobalt, and nickel. These price changes create uncertainty in procurement planning, production budgeting, and overall cost management. Companies must continuously adjust sourcing strategies, optimize supply chains, and manage operational expenses to mitigate the impact of raw material volatility. Persistent fluctuations can affect short-term financial performance and influence strategic decisions regarding product pricing, capacity expansion, and investment in new technologies, making it a continual market challenge.

OVERVIEW OF THE GLOBAL AND CHINA’S LITHIUM-ION BATTERY RECYCLING INDUSTRY

Overview of the lithium-ion battery recycling industry

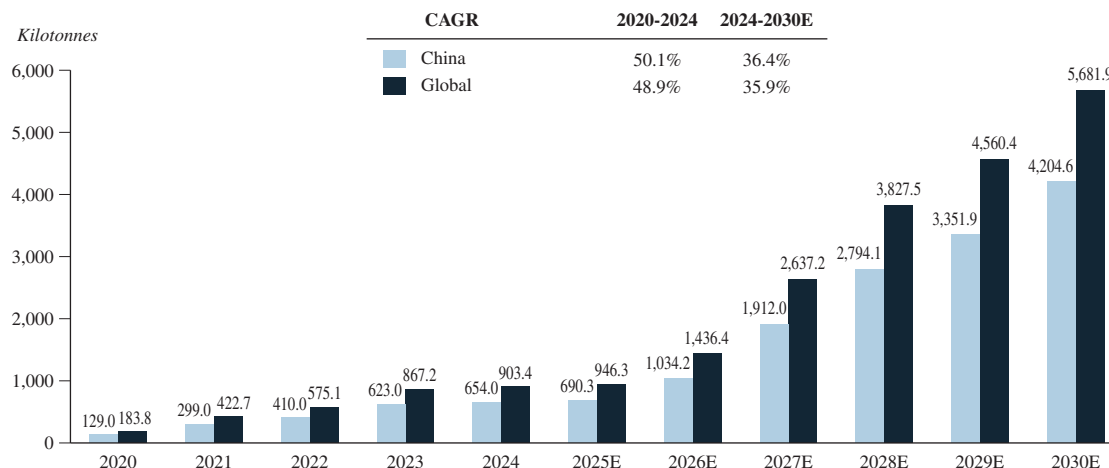
Lithium-ion battery recycling refers to the centralized recycling of retired lithium-ion batteries, to reuse the battery or extract valuable metal elements such as lithium, cobalt, and nickel in the battery through physical, chemical and other recycling processes. As the shipment volume of lithium-ion battery and the sales volume of EVs continue to rise year by year, lithium-ion batteries are about to face large-scale retirement. Lithium-ion battery recycling is the necessary way to achieve sustainable development of the value chain.

INDUSTRY OVERVIEW

Market size of the lithium-ion battery recycling industry

As the EV market rapidly expands, addressing the disposal of a large volume of lithium-ion batteries has become an urgent issue. The recycling of lithium-ion batteries is a critical component in achieving a climate-neutral circular economy. Globally, the market size of the lithium-ion battery recycling industry is expected to increase from approximately 903.4 kilotonnes in 2024 to 5,681.9 kilotonnes in 2030, reflecting a CAGR of 35.9%. Market size of the lithium-ion battery recycling industry in China is projected to grow from 654.0 kilotonnes in 2024 to 4,204.6 kilotonnes in 2030, with a CAGR of 36.4%.

Market size of the lithium-ion battery recycling industry, Global and China, 2020-2030E



Source: CIC

OVERVIEW OF THE GLOBAL AND CHINA'S SPECIALTY CHEMICALS INDUSTRY

Specialty chemicals are particular chemical products that provide a wide variety of effects on which many other industry sectors rely. Specialty chemicals include daily chemicals, agrichemicals, cleaning materials, construction chemicals, elastomers, fragrances and flavors, food additives, lubricants, paints, polymers, textile auxiliaries and etc. The Company's specialty chemicals business is mainly focused on daily chemicals, as well as silicone, rubber additives, and certain advanced materials.

Overview of the daily chemicals industry

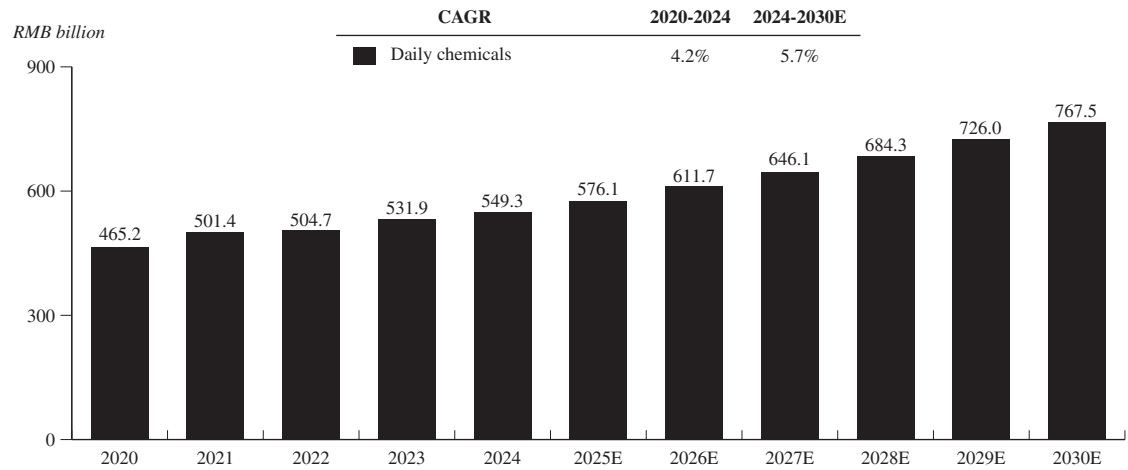
Daily chemicals refer to essential raw materials and functional additives used in the production of personal and home care products, such as detergents, skincare, haircare, and cosmetics. These materials include surfactants, emulsifiers, thickeners, humectants, preservatives, fragrances, active ingredients, and other auxiliary agents, which play critical roles in cleansing, moisturizing, emulsifying, preserving, and enhancing product efficacy and user experience. With the rising demand for safety, functionality, and sustainability, the daily chemical materials industry is shifting towards green, bio-based, and high-performance ingredients.

Market size of the daily chemicals industry

The daily chemicals market is substantial and continues to demonstrate steady growth, encompassing various segments such as surfactants and carbomers. Driven by rising living standards and increasing health awareness, demand for personal care and home care products has expanded, thereby propelling the overall development of the daily chemical materials market. The market size of daily chemicals grew from RMB465.2 billion in 2020 to RMB549.3 billion in 2024, representing a CAGR of 4.2% during the period. The global daily chemicals market is expected to maintain stable growth, with projections estimating the market size to reach RMB767.5 billion by 2030, further solidifying its position as a key pillar within the daily chemicals industry.

INDUSTRY OVERVIEW

Market size of the daily chemicals market, Global, 2020-2030E



Source: CIC

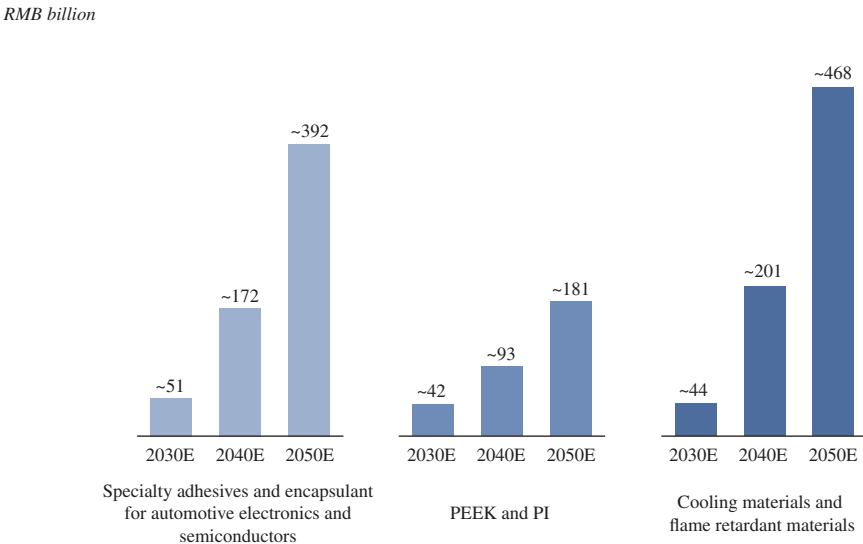
Competitive landscape of the daily chemical materials industry

Carbomer and amphoteric surfactants are two of the principal materials in the daily chemicals industry. Carbomer is a high-performance polymer commonly used as a thickener and stabilizer, while amphoteric surfactants are surface-active agents that carry both positive and negative charges depending on pH. In 2024, the company ranked as the world’s second-largest producer of carbomer, with a 9.7% market share by shipment volume, serving a strong international customer base. The company is also the world’s third-largest producer of amphoteric surfactants with a 10.6% market share by shipment volume.

OUTLOOK OF THE CERTAIN ADVANCED MATERIAL

With the accelerated development of new technologies and new economy, the demand landscape of advance materials are undergoing profound transformation. The widespread adoption of AI is continuously driving product performance enhancement and application upgrades, thereby unlocking new growth opportunities. At the same time, the rise of the new energy and semiconductor industries has fueled broad applications of advanced materials, including specialty adhesives and encapsulant for automotive electronics and semiconductors, high-performance polymer materials (such as PEEK and PI), as well as high-efficiency cooling materials and flame-retardant materials etc. These materials are rapidly penetrating into emerging fields such as intelligent driving, eVTOL, semiconductor, advanced engineering materials and AI thermal management, offering the industry a broader development prospect.

Market size of the certain advanced materials market, Global, 2030-2050E



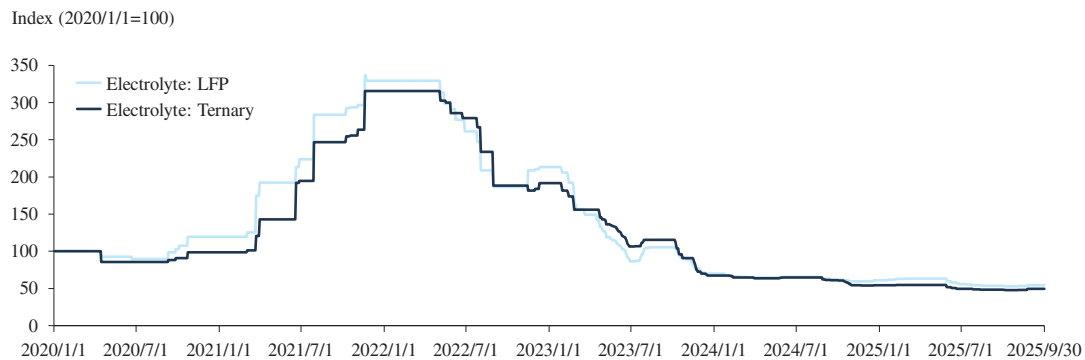
Source: CIC

INDUSTRY OVERVIEW

PRICE ANALYSIS

Electrolytes are primarily categorized into LFP-type and ternary-type formulations. During the period from 2020 to September 2025, the price of LFP electrolyte recorded a peak of RMB112.8 thousand per ton and a low of RMB17.7 thousand per ton, while the price of ternary electrolyte recorded a peak of RMB121.5 thousand per ton and a low of RMB18.4 thousand per ton. Electrolyte prices rose from 2020 to 2022, driven by surging raw material costs and supply shortage of key materials such as lithium carbonate and LiPF_6 , but dropped sharply from 2023 onward as upstream capacity expansion improved the supply of electrolyte raw materials, with capacity and supply growth outpacing downstream market demand growth, amid intensifying market competition that further exerted pressure on prices.

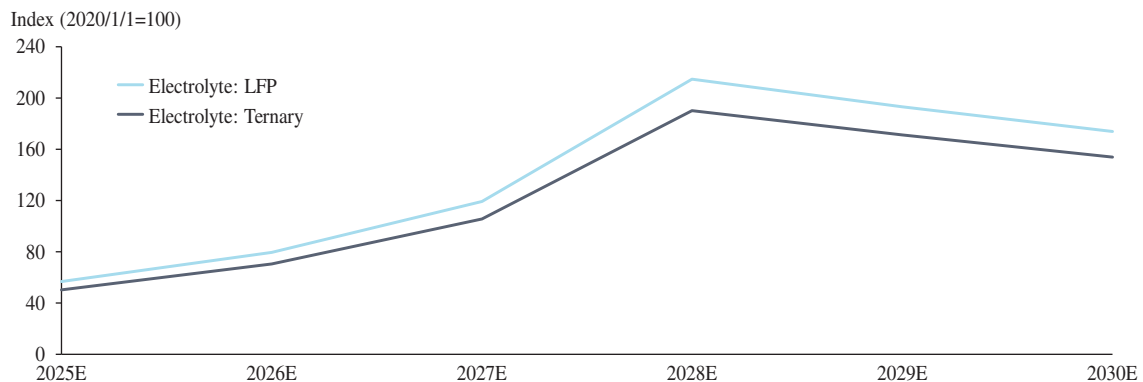
Daily average price index of electrolyte, China, 2020 – September 30, 2025



Source: CIC

During 2024–2025, electrolyte prices remained at relatively low levels, mainly due to declining raw material costs and ample market supply. In the second half of 2025, as end-market demand recovered and some raw material prices rose slightly, electrolyte prices began to stabilize and show a gradual upward trend. In the future, with the continuous expansion of downstream electric vehicle and energy storage markets and relatively slow upstream capacity growth, production is expected to struggle to meet demand. Therefore, electrolyte prices are likely to rise significantly again, exhibiting a phase of upward movement.

Price forecast of lithium-ion battery electrolyte, 2025-2030E



Source: CIC, GGII

INDUSTRY OVERVIEW

Lithium carbonate (Li_2CO_3) is one of the major raw materials for the solute in electrolytes. The significant price increase from 2020 to 2022 was primarily driven the rapid growth of downstream demand coupled with limited incremental supply of lithium carbonate. As supply gradually increased, price began to decline. During the period from 2020 to September 2025, the price of Li_2CO_3 recorded a peak of RMB590.0 thousand per ton and a low of RMB40.0 thousand per ton.

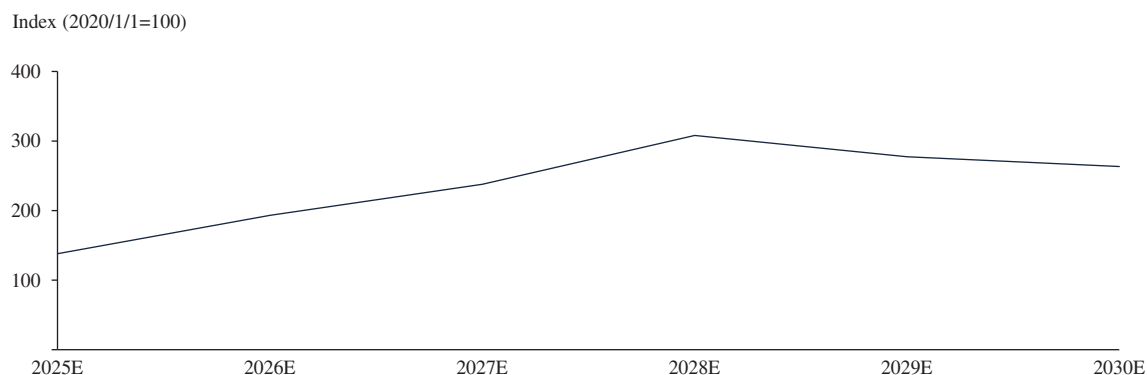
**Daily average price index of lithium carbonate (Li_2CO_3),
China, 2020 – September 30, 2025**



Source: CIC

In recent years, lithium carbonate prices have remained at low and fluctuating levels. A In the second half of 2025, lithium carbonate prices began to rise again, mainly because after 2–3 years of low prices, lithium mining companies’ enthusiasm for capacity expansion has declined, and production cannot keep pace with the growth in demand. The price of lithium carbonate undergoes daily dynamic adjustments and is highly sensitive to fluctuations in market supply and demand. Variations in upstream supply and downstream demand will both induce price volatility of the product. As a core raw material for electrolyte manufacturing, changes in lithium carbonate prices will be transmitted to the electrolyte sector, leading to a broadly consistent price trend between the two materials.

Price forecast of lithium carbonate, 2025-2030E



Source: CIC, GGII

INDUSTRY OVERVIEW

DATA SOURCES AND RESEARCH METHODOLOGY

We have commissioned CIC to conduct an analysis and report on the global lithium battery materials and specialty chemicals market. CIC is a market research and consulting firm established in Hong Kong, engaged in providing professional consulting services across various industries. We have agreed to pay CIC a fee of RMB0.54 million for the preparation of the CIC Report. We have extracted certain information from the CIC Report in this section, as well as from the sections of “Summary,” “Risk Factors,” “Business,” “Financial Information” and elsewhere in this Document. In addition, we have engaged GGII, which was commissioned by us for a fee of RMB0.15 million to prepare certain data and information in connection with the [REDACTED]. The data and information collected by CIC and GGII is independently prepared by CIC and GGII and is not subject to any influence from us or other interested parties. Unless otherwise specified, all data and forecasts contained in this section are sourced from the CIC Report and GGII.

The information and data collected by CIC have been analyzed, evaluated and verified using CIC’s internal analysis models and techniques. Primary research is conducted through interviews with key industry experts and leading industry participants. Secondary research involves analyzing data from various public data sources such as the National Bureau of Statistics of China and various industry associations. The market forecasts in the CIC Report are made based on the following key assumptions: (1) in the forecast period, the overall social, economic and political environment globally and in China is expected to remain stable; (2) in the forecast period, relevant key industry drivers are likely to continue to drive the growth of the energy storage market, such as technological advancements, supportive policies, and the increasing downstream demand; and (3) in the forecast period, there will be no extreme force majeure events or unforeseeable industry regulations that could have a drastic or fundamental impact on the market.

Established in 2017, GGII’s predecessor was a business unit under Shenzhen Gaogong Consulting Co., Ltd. GGII has been focusing on market research and consulting for emerging industries such as lithium-ion batteries, sodium-ion batteries, solid-state batteries, new energy storage, hydrogen energy and hydrogen fuel cells for more than 10 years. Data and information collected by GGII was primarily sourced from two categories: obtained by GGII through market research, cross-validation and prediction based on certain assumptions; as well as reference and citation of official websites of global government agencies, public company reports (including prospectuses, transfer instructions, annual reports, semi-annual reports, inquiry reports), and public reports issued by or authorized by other third-party institutions. Due to the research methods and data effectiveness, there may be discrepancies between the data collected by GGII and other third-party sources and the actual industry data.