From Technology to IP Business Intelligence

SAMPLE

Li-ion Battery Cathode Active Material Recycling

Patent Landscape Analysis

2025

KnowMade
Patent & Technology Intelligence

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ONE-HOUR PRESENTATION

The author of the report is available to address any questions you may have.

A **one-hour online presentation** of the report is included with your purchase. This session offers the opportunity for a direct interaction with the author, including a presentation of the results and a dedicated Q&A session.

Feel free to contact the author to schedule a meeting.

Contact us

KNOWMADE is a technology intelligence and IP strategy consulting company specializing in the analysis of patents and scientific publications. We assist innovative companies, investors, and research organizations in understanding the competitive landscape, anticipating technological trends, identifying opportunities and risks, improving their R&D, and shaping effective IP strategies. Our highly qualified analysts transform patent information and scientific literature into actionable insights to support decision-making in R&D, innovation, investment, and intellectual property.

MAIN PATENT ASSIGNEES MENTIONED IN THIS REPORT

From China:

Brunp Recycling technology, Central South University, Institute of Process Engineering-CAS, GEM (Jingmen Gelinmei New Materials), Narada Power Source, Beijing Institute of Technology, Tianqi Lithium, Guoxuan High Tech Power Energy / Gotion, Keyking Recycling, BGRIMM Technology Group, RSK Advanced materials, Zhuzhou Smelter Group, EVE Energy, Lanzhou University of Technology and others

From Europe:

Umicore, BASF, CEA, Blue Solutions, Veolia, Aurubis, Fortum, Metso, Fraunhofer and others

From Japan:

Eneos Group, Sumitomo Metal Mining, Dowa Holdings, TMC (Town Mining Corporation), Asaka Riken, Toyota, Mitsubishi materials, Kobe Steel, Mitsui Mining and Smelting, Sumitomo Chemical/Tanaka Chemical, Hitachi and others

From South Korea:

SK Group, LG Chem/LG Energy Solution, KIGAM (Korea Insttitue of Geoscience and Mineral Resources), EcoPro, RIST (Research Institute of Industrial Science and Technology), Posco, Cosmochemical, KIST (Korea Institute of Science & Technology), Dongwoo Fince Chem and others

From USA:

Ascend Elements, Worcester Polytechnic Institute, OnTo Technology, Albemarle, Lockheed Martin/UT Battelle, Cirba Solutions, Coherent, University of California, Libus987, Urban Mining, 24M technologies, 6K inc. Aleon Metals, Aqua Metals, Li-Cycle and others

From the Rest of the World:

CSIR (Council of Scientific and Industrial Research), Attero Recycling, Conicet, Gelion Technologies, Green Li-ion, Indiana Institute of Technology, Frontier Lithium, Hydro-Québec and others

INTRODUCTION

Context & objectives of the report

- The rapid adoption of electric vehicles (EVs), renewable energy storage systems, and portable electronics has fueled an exponential increase in the demand for **Lithium-ion batteries**. The interest in critical raw materials such as lithium, cobalt, nickel, and manganese, increased, to instate a more sustainable supply chain and increase the independence of materials-scarce countries from critical minerals suppliers. This concentration of supply, coupled with environmental concerns and evolving regulatory frameworks, has intensified the need for sustainable end-of-life management strategies, particularly the **recycling of spent Li-ion batteries and their cathode materials**.

- **Cathode materials** represent the most valuable and resource-intensive components of Li-ion batteries. These include layered oxides like NMC ($LiNiMnCoO_2$), NCA ($LiNiCoAlO_2$), and LCO ($LiCoO_2$); polyanion materials such as LFP ($LiFePO_4$) and LMFP ($LiMnFePO_4$); and spinels like LMO ($LiMn_2O_4$). Each chemistry presents unique challenges and opportunities for recovery and reuse. Efficient recycling not only reduces reliance on virgin mining but also lowers the environmental footprint of battery production, contributing to the circular economy goals set by governments and industries.

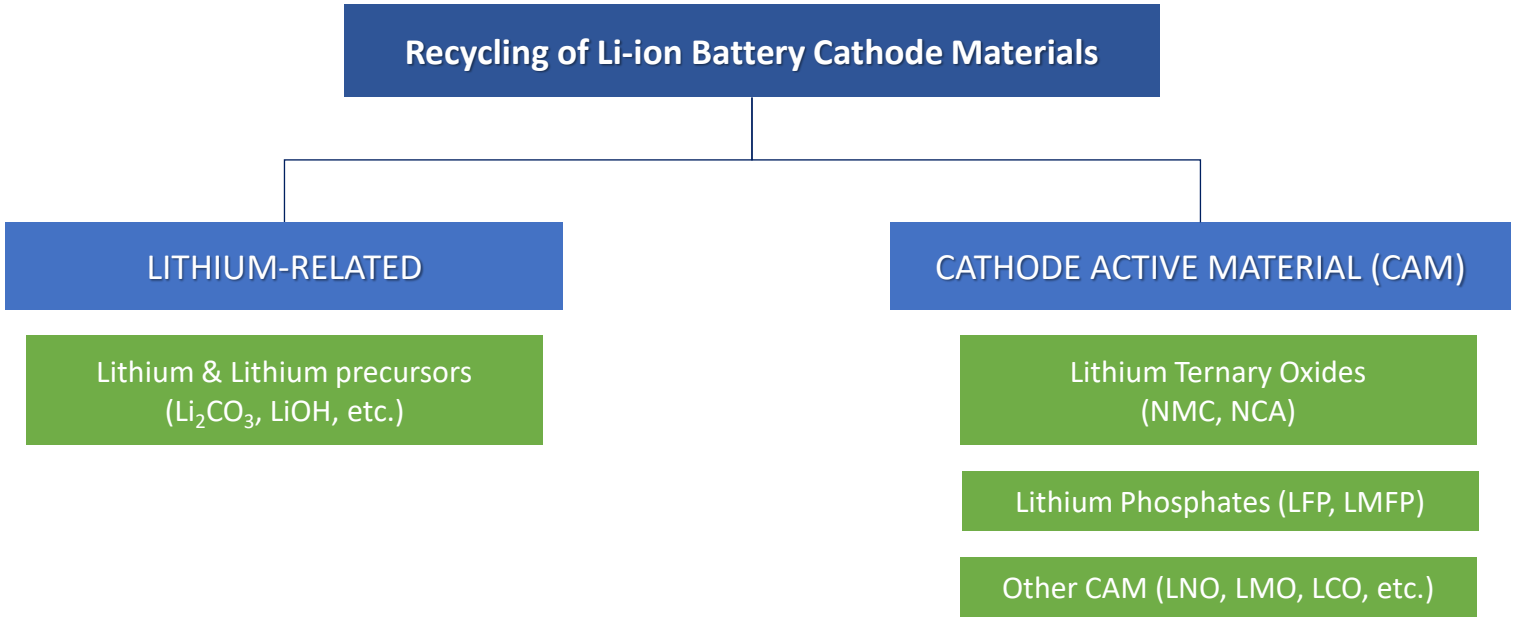
- In this context, the present report aims to provide a **comprehensive analysis of the patent landscape** related to the **recycling of cathode active materials (CAM) from Li-ion batteries**.
  The general objectives of the present report are:
  - to identify and map the key IP players in each chosen technological segment (Li & Li precursors, Li ternary oxides, Li phosphates, other CAM).
  - to assess the geographical distribution of patent families, legal status of patent applications, helping stakeholders understand strategic positioning and navigate their competitive environment.

  This insights will support R&D, investment, and policy decisions in the evolving field of Li-ion battery recycling.

INTRODUCTION

Scope of the report

- This report provides a detailed picture of the **patent landscape** related to **recycling of Li-ion battery cathode materials**, covering the main active materials (Li Ternary oxides, Li Phosphates, Other Cathode Active Materials) plus Lithium & Lithium precursors.
- We have selected and analyzed more than **6,100 patents and patent applications** published **worldwide** up to **December 2024**, representing more than **3,900 patent families** (inventions) relevant to the scope of this report.
- The patent search strategy has been implemented using advanced search equations in the patent database and by a cautious patent selection performed by the analyst to get the most relevant corpus.
- More details are available in METHODOLOGY part.



INTRODUCTION

Reading guide: find the right information in the report

Report sections ↓ / Your concern → / Information you get ↘

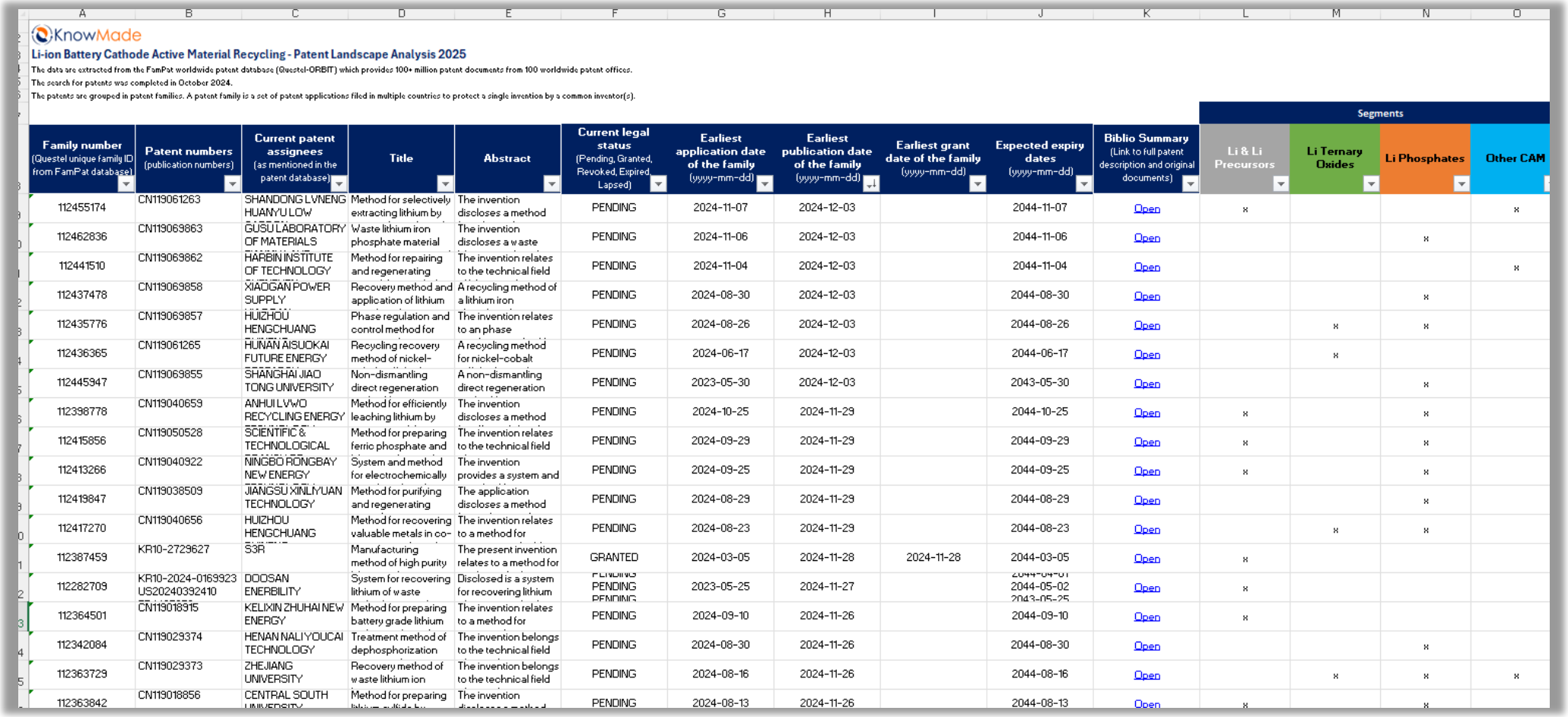
	TECHNOLOGY *For R&D teams, engineers, scientists*	IP *For IP teams, patent attorneys*	MARKET *For executives, business developers*	PLAYER *Zoom in a competitor / partner*
PATENT LANDSCAPE OVERVIEW • **Ranking of players** (enforceability, current activity, geo/tech coverage, prior-art contribution, etc.) • **Patent filings dynamics per player** • **IP collaborations** (co-filings, IPR transfers) • **Patent litigation/oppositions**	Innovators	Main patent owners IP risks/opportunities	Ecosystem (competitors, newcomers, partners, clients) Main trends IP vs Market	IP position vs Market position Player relationships (collaborations/ dependencies)
SEGMENTS ANALYSIS • **Patent filings dynamics per segment** • **IP leaders per segment** (enforceability, current activity, blocking potential) • **Notable patents per segment** • **Recent patenting activity per segment**	Technology trends Technology mapping	Blocking players IP risks/opportunities in each segment (FTO, litigation, licensing)	Benchmarking Markets of interest Future developments	IP position and level of investment in each segment Key IP developments
IP PROFILE OF KEY PLAYERS • **Patent portfolio summary** (portfolio size, IP activity evolution, patents legal status, geo/tech coverage, strengths/weaknesses, etc.) • **Key patents** • **Recent patenting activity**	Current R&D activities Technology roadmap	Blocking patents Geo/Tech coverage Link between patents and products	Future products Potential partners Potential targets	R&D investment level Key inventions Current IP activities Strengths / Weaknesses

INTRODUCTION

Excel database

SAMPLE

This report includes an extensive **Excel database** with the **3,900+ patent families** (inventions) selected and analyzed in this study. This **useful patent database** allows for **multi-criteria searching** and includes patent publication numbers, **hyperlinks to an updated online database** (original documents, legal status, etc.), priority date, title, abstract, patent assignees, and **segments** (Li & Li precursors, Li ternary oxides, Li phosphates, other CAM).



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Li-ion Battery Cathode Active Material Recycling - Patent Landscape Analysis 2025

The data are extracted from the FamPat worldwide patent database (Questel-ORBIT) which provides 100+ million patent documents from 100 worldwide patent offices.
The search for patents was completed in October 2024.
The patents are grouped in patent families. A patent family is a set of patent applications filed in multiple countries to protect a single invention by a common inventor(s).

											Segments			
Family number (Questel unique family ID from FamPat database)	Patent numbers (publication numbers)	Current patent assignees (as mentioned in the patent database)	Title	Abstract	Current legal status (Pending, Granted, Revoked, Expired, Lapsed)	Earliest application date of the family (yyyy-mm-dd)	Earliest publication date of the family (yyyy-mm-dd)	Earliest grant date of the family (yyyy-mm-dd)	Expected expiry dates (yyyy-mm-dd)	Biblio Summary (Link to full patent description and original documents)	Li & Li Precursors	Li Ternary Oxides	Li Phosphates	Other CAM
112455174	CN119061263	SHANDONG LVNENG HUANYU LOW	Method for selectively extracting lithium by	The invention discloses a method	PENDING	2024-11-07	2024-12-03		2044-11-07	Open	x			x
112462836	CN119069863	GUSU LABORATORY OF MATERIALS	Waste lithium iron phosphate material	The invention discloses a waste	PENDING	2024-11-06	2024-12-03		2044-11-06	Open			x	
112441510	CN119069862	HARBIN INSTITUTE OF TECHNOLOGY	Method for repairing and regenerating	The invention relates to the technical field	PENDING	2024-11-04	2024-12-03		2044-11-04	Open				x
112437478	CN119069858	XIAOGAN POWER SUPPLY	Recovery method and application of lithium	A recycling method of a lithium iron	PENDING	2024-08-30	2024-12-03		2044-08-30	Open			x	
112435776	CN119069857	HUIZHOU HENGCHUANG	Phase regulation and control method for	The invention relates to an phase	PENDING	2024-08-26	2024-12-03		2044-08-26	Open		x	x	
112436365	CN119061265	HUNAN AISUOKAI FUTURE ENERGY	Recycling recovery method of nickel-	A recycling method for nickel-cobalt	PENDING	2024-06-17	2024-12-03		2044-06-17	Open		x		
112445947	CN119069855	SHANGHAI JIAO TONG UNIVERSITY	Non-dismantling direct regeneration	A non-dismantling direct regeneration	PENDING	2023-05-30	2024-12-03		2043-05-30	Open			x	
112398778	CN119040659	ANHUI LVWO RECYCLING ENERGY	Method for efficiently leaching lithium by	The invention discloses a method	PENDING	2024-10-25	2024-11-29		2044-10-25	Open	x		x	
112415856	CN119050528	SCIENTIFIC & TECHNOLOGICAL	Method for preparing ferric phosphate and	The invention relates to the technical field	PENDING	2024-09-29	2024-11-29		2044-09-29	Open	x		x	
112413266	CN119040922	NINGBO RONGBAY NEW ENERGY	System and method for electrochemically	The invention provides a system and	PENDING	2024-09-25	2024-11-29		2044-09-25	Open	x		x	
112419847	CN119038509	JIANGSU XINLIYUAN TECHNOLOGY	Method for purifying and regenerating	The application discloses a method	PENDING	2024-08-29	2024-11-29		2044-08-29	Open			x	
112417270	CN119040656	HUIZHOU HENGCHUANG	Method for recovering valuable metals in co-	The invention relates to a method for	PENDING	2024-08-23	2024-11-29		2044-08-23	Open		x	x	
112387459	KR10-2729627	S3R	Manufacturing method of high purity	The present invention relates to a method for	GRANTED	2024-03-05	2024-11-28	2024-11-28	2044-03-05	Open	x			
112282709	KR10-2024-0169323 US20240392410	DOOSAN ENERBILITY	System for recovering lithium of waste	Disclosed is a system for recovering lithium	PENDING PENDING PENDING	2023-05-25	2024-11-27		2044-04-01 2044-05-02 2043-05-25	Open	x			
112364501	CN119018915	KELIXIN ZHUHAI NEW ENERGY	Method for preparing battery grade lithium	The invention relates to a method for	PENDING	2024-09-10	2024-11-26		2044-09-10	Open	x			
112342084	CN119029374	HENAN NALIYOUCAI TECHNOLOGY	Treatment method of dephosphorization	The invention belongs to the technical field	PENDING	2024-08-30	2024-11-26		2044-08-30	Open			x	
112363729	CN119029373	ZHEJIANG UNIVERSITY	Recovery method of waste lithium ion	The invention belongs to the technical field	PENDING	2024-08-16	2024-11-26		2044-08-16	Open		x	x	x
112363842	CN119018856	CENTRAL SOUTH UNIVERSITY	Method for preparing lithium sulfide by	The invention discloses a method	PENDING	2024-08-13	2024-11-26		2044-08-13	Open	x		x	

INTRODUCTION

Online database with all patents analyzed in the report

Method for removing fluorine in positive electrode leachate of lithium batteries

Abstract

Disclosed is a method for removing fluorine in a positive electrode leachate of lithium batteries, comprising: adding acid and an oxidizing agent to battery powder for leaching, and removing impurities from the obtained leachate to obtain a fluorine-containing solution; adding dawsonite to the fluorine-containing solution, and meanwhile adding sulfuric acid, stirring for reaction at a certain temperature, and performing solid-liquid separation to obtain fluorine-removed solution and filter residues; and washing the filter residues to obtain crude sodium hexafluoroaluminate. According to the present invention, the dawsonite is used for removing fluorine from waste lithium batteries, the dawsonite has good selectivity, does not react with nickel, cobalt, manganese, lithium and the like in the solution, and only reacts with fluorine ions in the solution, so that the purpose of selectively removing fluorine is achieved, and the loss of nickel, cobalt, manganese and lithium metals in the solution is avoided. According to the fluorine removal reaction equation, one mole of aluminum can be combined with six moles of fluorine, the fluorine removal capacity is large, and sodium ions in the solution are consumed during fluorine removal, thereby reducing the concentration of the sodium ions in the solution, and improving the quality of the nickel-cobalt-manganese sulfate solution product.

Images (21)

$$\eta=\frac{C_1V_1-C_2V_2}{C_1V_1}\times 100\%$$

Classifications

Claims

(WO2023/071353)

1. A method of removing fluorine from a positive electrode leach solution of a lithium battery, comprising the steps of: providing an anode leach solution comprising a lithium battery;

S1: leaching the battery powder with acid and oxidizing agent, and removing the resulting leach solution to obtain a fluorine-containing solution;

S2: To the fluorine-containing solution was added sodium silicoaluminite, while sulfuric acid was added, the reaction was stirred at a temperature, and the solid liquid was separated to obtain a defluorine-removing liquid and a filter residue, which was washed to obtain crude sodium hexafluoroaluminate.

2. The method of claim 1, wherein in step S1, the removing comprises a step of adding sodium fluoride to remove calcium and magnesium.

3. The process according to claim 1, wherein in step S2, the sodium silicoaluminite is prepared by mixing aluminum powder with sodium hydroxide solution, filtering to obtain a metaaluminic acid solution,

WO2023071353 A1

GRANTED ALIVE

Earliest priority date : 2021-10-26

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Assignee HUNAN BRUNP RECYCLING TECHNOLOGY · HUNAN BRUNP EV RECYCLING · GUANGDONG BRUNP RECYCLING TECHNOLOGY · HUNAN BRUNP AUTOMOBILE RECYCLING

Inventor OUYANG SHIBAO · LI CHANGDONG · QIAO YANCHAO · CHEN RUOKUI · RUAN DINGSHAN · CAI YONG

Protected countries MA · CN · MX · HU · DE · GB · ES · US

Patent family overview Applications · Publications · Legal status

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of recycling waste battery, and specifically, to a method for removing fluorion in cathode leaching solution of a lithium battery.

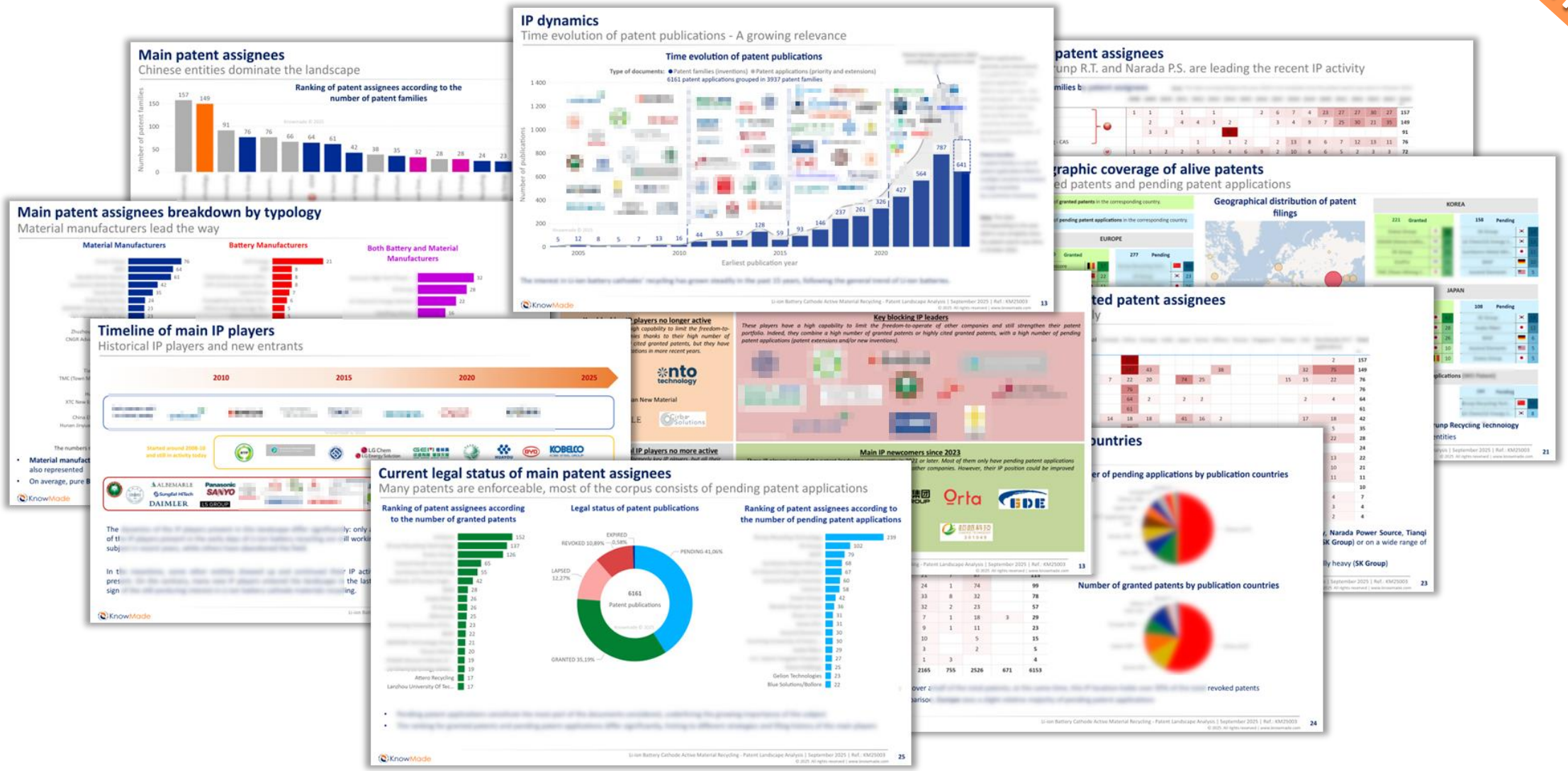
BACKGROUND

[0002] Due to the high energy density, long cycle life, no memory effect, high rated voltage, and low self-discharge rate, lithium batteries have been widely used in mobile phones, notebook computers and new energy vehicles, and are known as the development direction of energy storage battery in the future. With th continuous development of the global economy, the demand for lithium batteries will further increase. It is expected that the global lithium battery production growth rate will remain 10% or more every year. Howeve lithium batteries have a service life. According to statistics, the total number of discarded batteries all over world in 2020 will exceed 25 billion, with a mass of 500,000 tons. Therefore, the recycling and treatment of discarded lithium batteries has also become an urgent problem to be solved.

[0003] Since the lithium battery itself contains an electrolytic solution comprising lithium hexafluorophosphate, and sodium fluoride is added to remove impurities such as calcium and magnesium when leaching and recovering metals such as nickel, cobalt, manganese and lithium, it is inevitable that fluorion will be introduced into the leaching solution of waste lithium batteries. At present, there are few reports on the process of removing fluorion in the leaching liquid of waste lithium batteries. In the traditiona process, the nickel, cobalt and manganese is first extracted from the waste lithium battery with an extracta

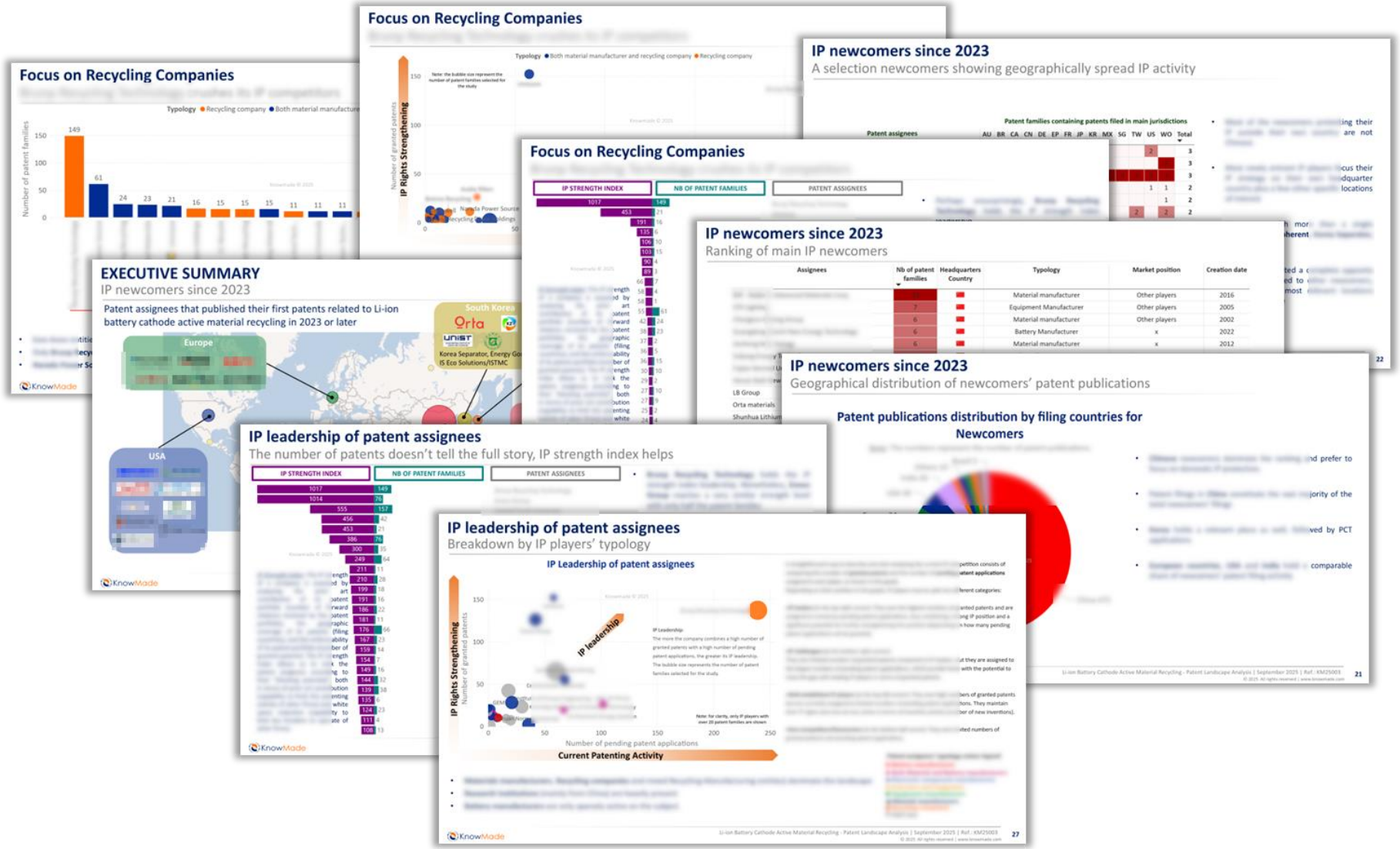
PATENT LANDSCAPE OVERVIEW

General trends, main patent assignees, new entrants, IP leaders, IP strategies



PATENT LANDSCAPE OVERVIEW

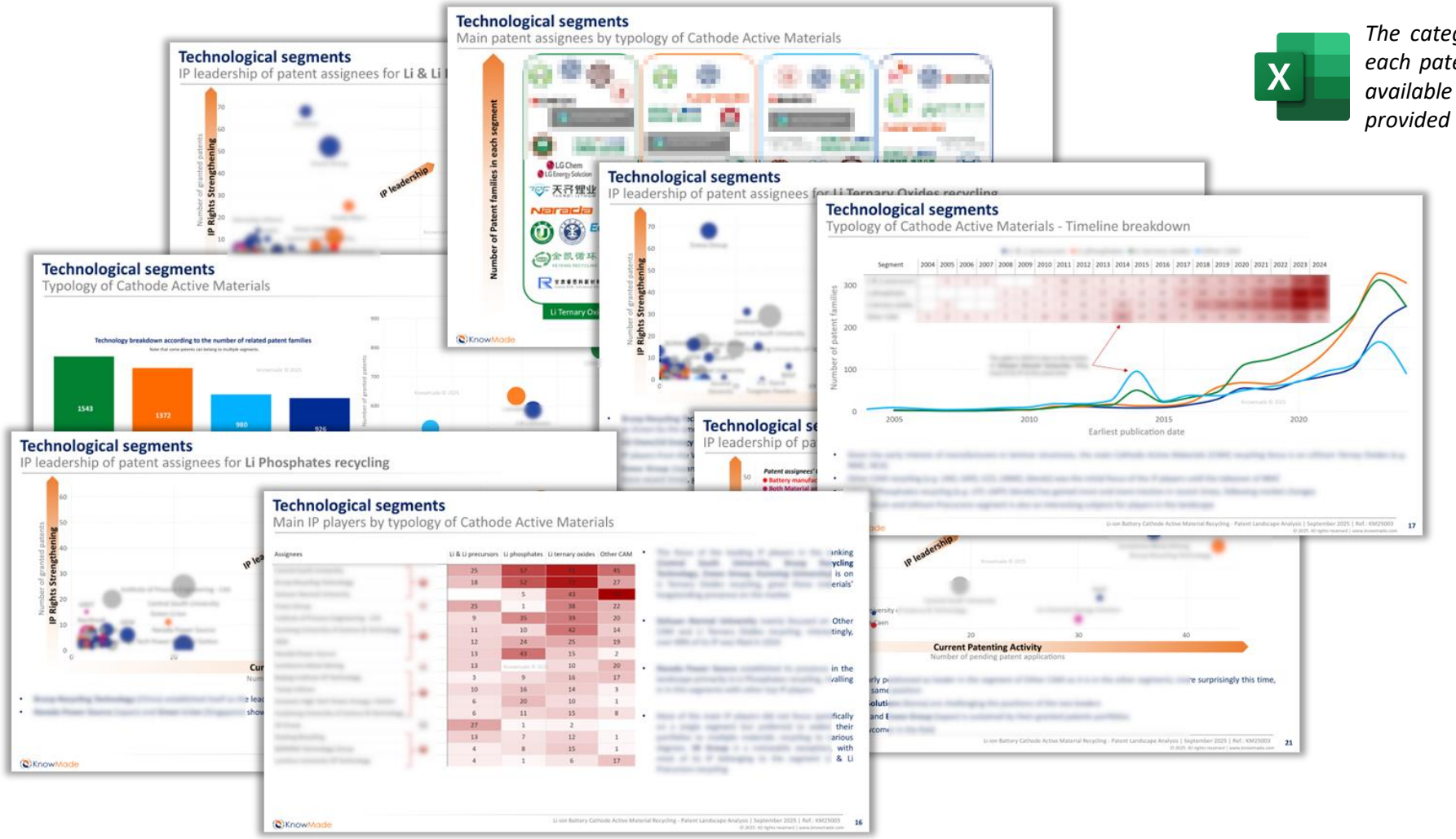
IP leaders, Focus on recycling companies, Focus on IP newcomers



PATENT LANDSCAPE BY SEGMENTS

IP dynamics, main IP players, and IP leaders by cathode active materials

The patents selected for this report have been categorized into 4 technical segments:
Li & Li precursors, Li ternary oxides, Li phosphates, other CAM



The categories to which each patent belongs are available in the Excel file provided with the report

FOCUS ON IP PLAYERS BY HEADQUARTERS COUNTRIES

IP dynamics, IP leaders, and IP newcomers by cathode active materials

Chinese IP Players

Japanese IP Players

South Korean IP Players

IP profiles

Brunp
Central South University
Gelinmei New Materials
Narada Power Source
Tianqi Lithium
Gotion
Keyking Recycling
BGRIMM
RSK Advanced Materials
EVE Energy
Botree Recycling
BJR
CPS Lighting

IP profiles

Eneos Group, Sumitomo Metal Mining, Dowa Holdings, Asaka Riken, JFE Group, Kawasaki Heavy Industries

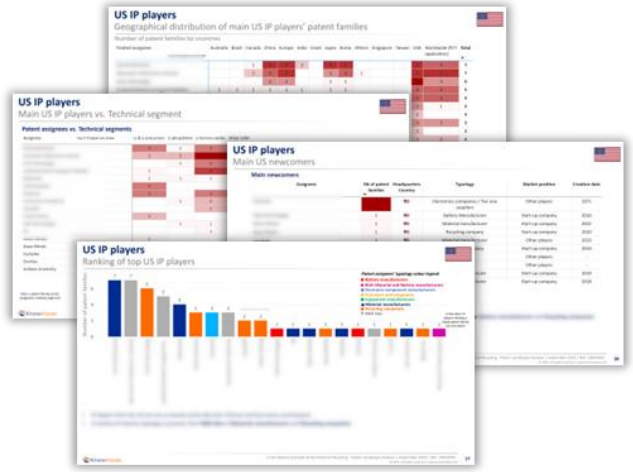
IP profiles

SK Group, LG Chem/LGES, EcoPro, Orta Materials, Korea Separator, Korea Zinc

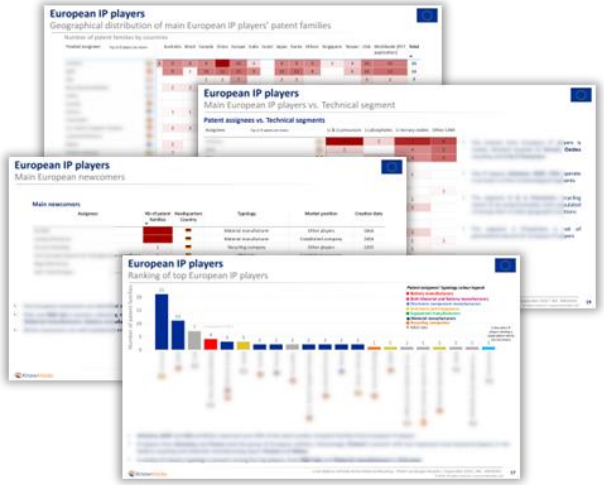
FOCUS ON IP PLAYERS BY HEADQUARTERS COUNTRIES

IP dynamics, main IP players, and IP leaders by cathode active materials

US IP Players



European IP Players



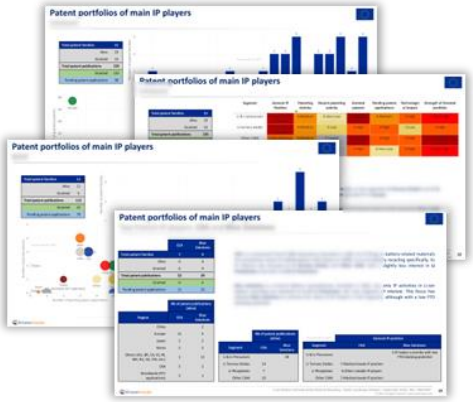
Other IP Players

IP profiles

Ascend Elements, OnTo Technology, Lockheed Martin/UT Battelle, Albemarle, Urban Mining, Coherent, Aqua Metals

IP profiles

Umicore, BASF, CEA, Blue Solutions, Fortum, Metso



ORDER FORM

Li-ion Battery Cathode Active Material Recycling

Patent Landscape Analysis – September 2025

Ref.:KM25003

SHIP TO
Name (Mr/Ms/Dr/Pr):
_____
Job Title:
_____
Company:
_____
Address:
_____
City:
_____
State:
_____
Postcode/Zip:
_____
Country:
_____
VAT ID Number for EU members:
_____
Tel:
_____
Email:
_____
Date:
_____

PAYMENT METHODS

Check

To pay your invoice using a check, please mail your check to the following address**:**

KnowMade S.A.R.L.
2405 route des Dolines, Le Drakkar,
06560 Valbonne Sophia Antipolis
FRANCE

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To pay your invoice using a bank money wire transfer please contact your bank to complete this process. Here is the information that you will need to submit the payment:

Payee: KnowMade S.A.R.L.
Bank: Banque Populaire Méditerranée, CAP 3000 Quartier du lac, 06700 St Laurent du Var, France
IBAN: FR76 1460 7003 6360 6214 5695 139
BIC/SWIFT: CCBPFRPPMAR

Paypal

In order to pay your invoice via PAYPAL, you must first register at www.paypal.com. Then you can send money to the KnowMade S.A.R.L. by entering our E-mail address contact@knowmade.fr as the recipient and entering the invoice amount.

RETURN ORDER BY

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1.1 The Contracting Parties undertake to observe the following general conditions when agreed by the Buyer and the Seller. Any additional, different, or conflicting terms and conditions in any other documents issued by the buyer at any time are hereby objected to by the seller, shall be wholly inapplicable to any sale made hereunder and shall not be binding in any way on the seller.

1.2 This agreement becomes valid and enforceable between the Contracting Parties after clear and non-equivocal consent by any duly authorized person representing the Buyer. For these purposes, the Buyer accepts these conditions of sales when signing the purchase order which mentions "I hereby accept KnowMade's Terms and Conditions of Sale". This results in acceptance by the Buyer.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email or to the Buyer's address. In the absence of any confirmation in writing, orders shall be deemed to have been accepted.

2. MAILING OF THE PRODUCTS

2.1 Products are sent by email to the Buyer:

- within [1] month from the order for Products already released; or
- within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in progress.

2.2 Some weeks prior to the release date the Seller can propose a pre-release discount to the Buyer.

The Seller shall by no means be responsible for any delay in respect of article 2.2 above, and including in cases where a new event or access to new contradictory information would require for the analyst extra time to compute or compare the data in order to enable the Seller to deliver a high quality Products.

2.3 The mailing of the Product will occur only upon payment by the Buyer, in accordance with the conditions contained in article 3.

2.4 The mailing is operated through electronic means either by email via the sales department. If the Product's electronic delivery format is defective, the Seller undertakes to replace it at no charge to the Buyer provided that it is informed of the defective formatting within 90 days from the date of the original download or receipt of the Product.

2.5 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity to the order. Any claim for apparent defects or for non-conformity shall be sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to produce sufficient evidence of such defects.

2.6 No return of Products shall be accepted without prior information to the Seller, even in case of delayed delivery. Any Product returned to the Seller without providing prior information to the Seller as required under article 2.5 shall remain at the Buyer's risk.

3. PRICE, INVOICING AND PAYMENT

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effective price is deemed to be the one applicable at the time of the order.

3.2 Payments due by the Buyer shall be sent by cheque payable to KnowMade, PayPal or by electronic transfer to the following account:

Banque Populaire Méditerranée, CAP 3000 Quartier du lac, 06700 St Laurent du Var, France
BIC or SWIFT code: CCBPFRPPMAR
IBAN: : FR76 1460 7003 6360 6214 5695 139

To ensure the payments, the Seller reserves the right to request down payments from the Buyer. In this case, the need of down payments will be mentioned on the order.

3.3 Payment is due by the Buyer to the Seller within 30 days from invoice date, except in the case of a particular written agreement. If the Buyer fails to pay within this time and fails to contact the Seller, the latter shall be entitled to invoice interest in arrears based on the annual rate Refi of the «BCE» + 7 points, in accordance with article L. 441-6 of the French Commercial Code. Our publications (report, database, tool...) are delivered only after reception of the payment.

3.4 In the event of termination of the contract, or of misconduct, during the contract, the Seller will have the right to invoice at the stage in progress, and to take legal action for damages.

4. LIABILITIES

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for choosing the Products and for the use and interpretations he makes of the documents it purchases, of the results he obtains, and of the advice and acts it deduces thereof.

4.2 The Seller shall only be liable for (i) direct and (ii) foreseeable pecuniary loss, caused by the Products or arising from a material breach of this agreement

4.3 In no event shall the Seller be liable for:

a) damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of profits, business interruption and loss of programs or information) arising out of the use of or inability to use the Seller's website or the Products, or any information provided on the website, or in the Products;

b) any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations thereof.

4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 All the Products that the Seller sells may, upon prior notice to the Buyer from time to time be modified by or substituted with similar Products meeting the needs of the Buyer. This modification shall not lead to the liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product initially ordered.

4.6 In the case where, after inspection, it is acknowledged that the Products contain defects, the Seller undertakes to replace the defective products as far as the supplies allow and without indemnities or compensation of any kind for labor costs, delays, loss caused or any other reason. The replacement is guaranteed for a maximum of two months starting from the delivery date. Any replacement is excluded for any event as set out in article 5 below.

4.7 The deadlines that the Seller is asked to state for the mailing of the Products are given for information only and are not guaranteed. If such deadlines are not met, it shall not lead to any damages or cancellation of the orders, except for non-acceptable delays exceeding [4] months from the stated deadline, without information from the Seller. In such case only, the Buyer shall be entitled to ask for a reimbursement of its first down payment to the exclusion of any further damages.

4.8 The Seller does not make any warranties, express or implied, including, without limitation, those of saleability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making the Products available, the Seller cannot guarantee that any Product will be free from infection.

5. FORCE MAJEURE

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labor difficulties, equipment failure, late deliveries by suppliers or other difficulties which are beyond the control, and not the fault of the Seller.

6. PROTECTION OF THE SELLER'S IPR

6.1 All the IPR attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions.

6.2 The Buyer agreed not to disclose, copy, reproduce, redistribute, resell or publish the Product, or any part of it to any other party other than employees of its company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use the Product for purposes such as:

- Information storage and retrieval systems;
- Recordings and re-transmittals over any network (including any local area network);
- use in any timesharing, service bureau, bulletin board or similar arrangement or public display;
- Posting any Product to any other online service (including bulletin boards or the Internet);
- Licensing, leasing, selling, offering for sale or assigning the Product.

6.3 The Buyer shall be solely responsible towards the Seller of all infringements of this obligation, whether this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial consequences in their entirety.

6.4 The Buyer shall define within its company point of contact for the needs of the contract. This person will be the recipient of each new report in PDF format. This person shall also be responsible for respect of the copyrights and will guaranty that the Products are not disseminated out of the company.

7. TERMINATION

7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be borne by the Seller, following this decision.

7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.

8. MISCELLANEOUS

All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

Any notices under these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party.

The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.

9. GOVERNING LAW AND JURISDICTION

9.1 Any dispute arising out or linked to these Terms and Conditions or to any contract (orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Grasse, which shall have exclusive jurisdiction upon such issues.

9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.

KNOWMADE

Patent and Technology Intelligence

KNOWMADE PURPOSE

Turning **patent** and **scientific data** into **actionable insights** to support **decision-making** in **R&D**, **innovation**, **investment**, and **intellectual property**.

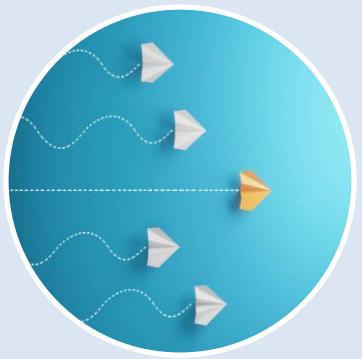
Competitive landscape | Technology trends | Opportunities / Risks | R&D and IP strategy

WHAT INFORMATION CAN YOU GET ?

INTELLECTUAL PROPERTY

For IP teams,
patent attorneys

- Risks and opportunities (FTO, litigations, licensing)
- Key patents
- Link between patents and products



TECHNOLOGY

For R&D teams,
engineers, scientists

- R&D activities
- Technological roadmap
- Position on the supply chain

MARKET

For executives,
business developers

- Identify competitors
- Compare IP with market position
- Evaluate the level of investment
- Future products & target markets

KNOWMADE OFFER

CUSTOM SERVICES
(Tailor-made analysis)

To meet your needs and budget/lead time constraints

- Specific and dedicated report.
- Prior-art search, literature review, patent landscape, freedom-to-operate, patent valuation, IP due diligence, technology scouting, monitoring service, etc.

Format
- PDF file with analyses.
- Excel file with data.
- Access to the analyst.

REPORTS
(multi-client product)

To understand the competitive landscape and explore the emerging ecosystems and new technologies

- Stand alone report
- Patent landscape.
- Overview on IP dynamics, trends and players.
- Competitor, technology and strategy analysis.
- Benchmark of patent portfolios.
- Key IP players & key patents.

Format
- PDF file with analyses.
- Excel file with patent data.

MONITORS
(multi-client product)

To track the latest R&D developments and IP activities, and to be sensitive to weak signals

- Annual subscription
- Patent monitoring service.
- Quarterly updated patent data and technology trends.
- Current R&D and IP activities.
- Early detect weak signals, opportunities and risks.
- Open discussion with analyst.

Format
- PDF file with analyses.
- Excel file with patent data.
- Direct access to the analyst.

INSIGHTS
(free article & webinar)

To get unique information about industry and technology

- Analyst point of view about industry news (product release, M&A, start-up, fund-raising, etc.) from a patent perspective.

Format
- KnowMade website

MAIN FIELDS OF EXPERTISE

SEMICONDUCTORS

- Materials & Substrates
- Power electronics
- RF & Wireless datacom
- MEMS, Sensing & Imaging
- Photonics, Lighting & Display
- Memory
- Packaging

HEALTHCARE

- New therapeutic tools
- Medical diagnostics
- Medical devices and imaging
- Drug discovery and delivery

ENERGY

- Batteries
- Fuel-cells
- Solar PV
- Power management

AGRI-FOOD

- Food processing & formulation
- Vegan food
- Next-gen packaging
- Microbiology

ENERGY
Expertise

Energy storage devices

- Batteries
- Fuel cells
- Supercapacitors
- Primary & Secondary devices
- Thin film & Microdevices
- Cylindrical, prismatic, pouch

Whole supply chain

- Active Materials
- Battery electrodes, electrolytes, separators
- Fuel cell electrodes, membranes, catalysts, gas diffusion layer, bipolar plates, electrolytes
- Battery cells / Fuel cells
- Battery packs / Fuel cell stacks
- Manufacturing & Recycling

Energy

from materials and cells to modules and systems

Key technologies

Li-ion batteries
- LTO, Li-metal, silicon anodes
- NMC, NCA, LNMO, LFP cathodes
- Solid electrolytes

Post Li-ion batteries
- Na-ion
- Li-S
- Mg-ion
- Al-ion
- Ca-ion
- Zn-ion
- F-ion
- Li-air

Fuel cells
- PEMFC
- SOFC
- MCFC
- PAFC
- AFC

All applications

- Automotive (BEV, FCEV)
- Consumer electronics
- Stationary energy storage

Power Management & Control

- Power electronics
- BMS
- Thermal management

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Patent & Technology Intelligence

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