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AGENDA

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# ALTA

29  
YEARS

Innovation in Mining & Metallurgical Processing

19-22 May 2025 | Pan Pacific Hotel  
Perth, Western Australia



19-20 May  
**Nickel-Cobalt-Copper**



21-22 May  
**Critical Battery  
Minerals**

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# ALTA

19-22 May 2025  
Pan Pacific Hotel  
Perth, Western Australia

# Your Invitation to Join Us in Australia

The annual ALTA conference was established in Australia by metallurgical consultant Alan Taylor in 1995. The conference is a world-class annual metallurgical meeting and a leading platform for innovation for more than a quarter century.

The ALTA conference is well-known for providing exceptional opportunities to share ideas and develop new connections. The carefully crafted programs are practically oriented, and the themes running through the conference reflect key current and developing technology trends.

A very special thanks to our invited world-class speakers for their key participation and contributions. In addition, we greatly value our sponsors, exhibitors, and delegates who make ALTA an annual must-attend meeting, and many attendees are long-term ALTA regulars.

In 2024, the ALTA conference became a part of Cambridge EnerTech, a leading provider of global energy storage conferences and exhibitions. The conference founder, Alan Taylor, remains actively involved in the continued growth of the conference.

We look forward to welcoming you to Australia and furthering the continued innovation in mining and metallurgical processing globally.

Sincerely,

**Craig Wohlers**  
General Manager  
Cambridge EnerTech

**Alan Taylor**  
Managing Director  
JO-AL Consulting



# Short Courses

19 MAY

MONDAY 19 MAY 18:15-19:45

## SC1: Battery Recycling Methods & Markets

*Instructor:*

*Steve Sloop, PhD, President, OnTo Technology LLC*

By 2030 the battery manufacturing industry is on course to reach \$120 billion worldwide. This tutorial will comprehensively address technologies of pyrometallurgy, hydrometallurgy, hybrid approaches, and direct recycling. The instructor will introduce these and discuss them in light of cost goals and market realities.

## SC2: Lithium Methods & Markets

*Instructors:*

*Adrian Griffin, Chairman, Charger Metals*

*Andrew Nissan, PhD, Senior Director, Battery Strategic Sourcing, Lyten*

This short course will examine lithium with a global perspective—it will examine current and emerging metallurgical processing techniques from various mineral sources as well as pricing and market demand within global supply chain.

*\* Separate registration required for short courses*

## HOTEL & TRAVEL INFORMATION

### Conference Venue and Hotel

Pan Pacific Perth  
207 Adelaide Terrace,  
Perth, WA 6000



For hotel reservations, please go to the  
Travel Page of [ALTAmet.com.au](https://www.altamet.com.au)



19-20 May 2025

# Nickel-Cobalt-Copper

MONDAY 19 MAY

7:00 Presenter Briefing

7:30 Registration Open

7:30 Arrival Tea and Coffee

## GLOBAL MARKET DEMAND

8:30 Organiser's Remarks

*Craig Wohlers, General Manager, Cambridge EnerTech*

8:40 Chairperson's Remarks

*David Dreisinger, PhD, Interim CEO & Co-Founder, Atlas Materials, Canada*

8:45 Nickel in Energy Transition

*Richard Matheson, Director, Market Development, Nickel Institute, Australia*

Nickel is critical in energy generation and delivery. It can be found at the heart of almost all new energy technologies and applications related to mitigating the effects of climate change. The presentation will examine the current uses of nickel and the opportunities for nickel to help solve challenges facing technologies such as wind, solar, geothermal, and nuclear. Carbon capture and hydrogen production will also be explored.

9:15 Drivers of the Energy Transition—What to Watch for in the Nickel, Cobalt, and Copper Markets

*Harry Fisher, Senior Consultant, Benchmark Mineral Intelligence Ltd., Australia*

## DEEP SEA NODULE MINING AND PROCESSING

9:45 Processing of Sea Nodules: A Techno-Economic Evaluation of Selected Options

*Michael Dry, PhD, Owner, Arithmetek, Canada*

This paper will be an evaluation of the processing of sea nodules. It will examine the application to sea nodules of HPAL and RKEF technologies from the laterite industry, the Caron process using natural gas or hydrogen, a reductive route using and regenerating sulphur dioxide, and a theoretical route using and regenerating hydrogen sulphide. The approach will entail process and cost modelling of each of the options considered.



10:15 KEYNOTE PRESENTATION: Developments in the Processing of Sea Nodules

*Colin Seaborn, PhD, Chief Metallurgist, Ocean Minerals LLC, Australia*

The seabeds of the world's oceans have millions of tonnes of polymetallic nodules containing copper, nickel, cobalt, manganese, and iron. These are formed at greater than 4000 metres depth by progressive precipitation of elements on a nucleus (often a fish bone). These nodules cannot be readily upgraded by beneficiation. This presentation will discuss both hydrometallurgical and pyrometallurgical processes that are being developed for products, including for electric vehicles.

10:45 Morning Tea in the Exhibit Hall with Poster Viewing



## SOLVENT EXTRACTION METHODS

11:15 Organic-Phase Preloading and Enhanced Dispersion Separation in an SX Process

*Hannu Laitala, Chief Metallurgist, Hydrometallurgy, Metso Corp., Finland*

Organic phase preloading is a commonly used process step. Organic phase preloading has been done in a certain way. However, organic phase preloading can be optimised. In mixer settlers dispersion phase, separation is almost always done by the aid of gravity only. Some development points to degrease the size of the current settlers are discussed.

11:45 Optimising Cobalt Recovery and Impurity Management in Battery Recycling Using Cyanex 272: An Updated Solvent Extraction Approach

*Leslie Miller, Senior Application Engineer, OLI Systems, United States*

This paper presents an updated solvent extraction model for cobalt recovery from battery recycling using Cyanex 272, focusing on impurity control. The developed thermodynamic database, integrating experimental and theoretical data, accurately predicts cobalt partitioning and minimises impurity co-extraction. Process simulation optimises key conditions such as pH and temperature, maximising cobalt recovery and purity. The updated model enhances recycling efficiency, lowering costs and reducing environmental impact.

12:15 Practical Use of CFD Modeling and Pilot Testing for High Pressure Autoclave Mixing Performance Optimization

SPXFLOW

*Shuyuan Xu, APAC Mixing Tech & Proposal Manager, Engineering, SPX Flow*

This presentation will demonstrate the role mixers plays in HPAL process through discussion of real-life examples. This will be done by utilizing CFD to compare different mixing solutions with respect of velocity/energy distribution, acid concentration distribution and residence time distribution. The latest results of Large Eddy Simulations in an HPAL application will be shared and finally the latest results of impeller wearing resistance Pilot testing with CFD verification will be reviewed to complete the discussion on the importance of mixers in HPAL.

12:45 Networking Luncheon (Sponsorship Opportunity Available)

## SOLVENT EXTRACTION METHODS

13:40 Chairperson's Remarks

*Leslie Miller, Senior Application Engineer, OLI Systems, United States*

13:45 Experience with Iron Transfer across Some Copper Solvent Extraction Plants of the Democratic Republic of Congo

*Godfrey Mitshabu, Hydrometallurgy Consultant, BASF South Africa (Pty.) Ltd., Democratic Republic of Congo*

In addition to inadequate SX plant design, challenges in DRC SX operations over the past 16 years were mostly associated with the presence of colloidal silica, high TSS, and Mn. Contrary to many solvent extraction plants in the Americas and other parts of the world, iron has not been an impurity of concern. Amongst others, these include the reductive conditions of agitation leaching required to leach cobalt ores.



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# Nickel-Cobalt-Copper

## LEACH METHODS

### 14:15 The Atlas Materials Low-Carbon Process for Treatment of Nickel-Saprolite Ores: Options for Byproduct Recovery for Cement and Magnesium Markets

*David Dreisinger, PhD, Interim CEO & Co-Founder, Atlas Materials, Canada*

The Atlas Materials Process uses hydrochloric acid leaching of nickel-saprolite ores to extract nickel, cobalt, and magnesium into solution. The process is designed to be “zero waste” with the leach and purification residue suitable as an SCM material. Nickel and cobalt form a mixed hydroxide precipitate to support battery salt manufacturing. The options for magnesium recovery from solution as inorganic products and magnesium metal will be reviewed.

### 14:35 New Impeller Innovations for HPAL Applications

*Wolfgang Keller, Vice President & Head of R&D, EKATO RMT GmbH, Germany*

In HPAL autoclaves, agitators play a critical role in achieving rapid and uniform mixing of ore suspension with sulfuric acid. Despite this, deposit formation on impellers and autoclave walls remains a significant challenge, as discussed at ALTA 2024. A promising solution involves an energy-efficient impeller with a specially engineered shape to minimise deposits. This design has been rigorously tested on various scales and is now ready for large-scale implementation.

### 14:55 Processing of Nickel Laterites through Hydrochloric Acid Leaching Route

*Goutam Das, PhD, Principal Research Scientist, Processing, CSIRO*

CSIRO has developed a novel process for treating a variety of nickel laterite ores such as limonite, smectite, and saprolite through a hydrochloric acid (HCl) leaching route. This process was developed based on CSIRO's patented titanium/vanadium recovery process in HCl media. Overall process works under atmospheric conditions below 100°C using <25% w/w HCl with the provision to regenerate HCl from the barren liquor after Ni/Co recovery as mixed hydroxide.

### 15:15 Afternoon Tea in the Exhibit Hall with Poster Viewing



### 15:45 Recovering the Precious Metals Values before Copper

*Adriana Garces Granda, PhD, Technical Support Metallurgist, Draslovka, Australia*

Draslovka is developing Glycine Leaching Technology (GLT) to recover both precious metals and base metals. Glycine, the active lixiviant, can complex both metals, enabling their joint recovery. Traditional methods extract copper first via acid leaching, then gold with cyanide. Draslovka's GlyCat™ process combines cyanide and glycine, allowing gold to be extracted before copper. Testing showed an average recovery of 70% gold and 45% copper, making GlyCat™ efficient, safe, and sustainable.

### 16:15 Recovery of Base and Platinum Group Metals from Sulfide Ores Using Glycine Technology: An Integrated Process Approach

*Carlos Perea, PhD, WASM, Curtin University*

The growing demand for critical metals like nickel, copper, cobalt, and PGMs for renewable energy technologies highlights the need for sustainable recovery from low-grade sulphide ores. Traditional methods face challenges like high reagent consumption, environmental impact, and low leaching kinetics. Glycine leach technology (GTL) offers a cleaner, efficient alternative. This integrated process involves base metal leaching, PGM extraction, and PLS treatments, achieving 80-95% recovery, demonstrating its promise for greener hydrometallurgy.

### 16:45 Heap Bioleaching of Copper Ore at High Redox Potential

*Fernando Zeballos, Director, Metallurgical Projects, Compania de Minas Buenaventura SAA Peru*

### 17:15 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

### 18:15 Evening Short Courses

Recommended Courses\*

SC1: Battery Recycling Methods & Markets

SC2: Lithium Methods & Markets

\*Separate registration required.

### 18:45 Close of Day

## TUESDAY 20 MAY

### 7:00 Presenter Briefing

### 7:25 Registration Open

### 7:25 Arrival Tea and Coffee in the Exhibit Hall with Poster Viewing

## PROCESS OPTIMISATION

### 8:25 Organiser's Remarks

*Craig Wohlers, General Manager, Cambridge EnerTech*

### 8:30 Chairperson's Remarks

*Andrew Hawkey, Manager, Diemme Filtration, Australia*

### 8:35 Integrating Dynamic Scale Modelling and Discrete Element Method Modelling for Enhanced Transfer Chute Design

*Corin Holmes, General Manager, Jenike & Johanson*

Dynamic Scale Modelling (DSM) was developed in the early 1990s using Dimensional Analysis (Froude Number) as its basis. Froude Number does not scale with cohesive materials which require additional inputs to validate behaviour in scale models. These materials can be very complex to “calibrate.” This presentation speaks to the advances made in coupling DSM and Discrete Element Method (DEM) modelling to enhance transfer chute design.

### 9:05 Internal Protective Linings in Flash and Pressure Vessels: Latest Developments in Materials and Application

*Daniel Keßler, PhD, Managing Director, DSB Säurebau*

This paper provides an overview of the latest advancements in internal protective linings for flash and pressure vessels used in High Pressure Acid Leaching (HPAL) and Pressure Oxidation (POX) applications. Recent developments in lining materials, including high-resistance alloys, rubber linings, and bricks, are examined, with emphasis on durability, cost-efficiency, and installation techniques. Practical implications for improving vessel longevity and minimising maintenance in aggressive leaching environments are highlighted.

### 9:35 Achieving High-Purity Battery-Grade Nickel and Cobalt Sulphate through Well-Designed Crystallisation Process Plant

*Chris Madin, Manager, JordProxa*

With the focus from battery manufacturers on ever-increasing purity requirements—making batteries perform better and more safely, it is valuable for this industry to understand the critical process involved in achieving the high purity, and what factors limit purity of the battery-grade nickel and cobalt precursors.



19-20 May 2025

# Nickel-Cobalt-Copper

**10:05 Sponsored Presentation** (*Opportunity Available*)

**10:35 Morning Tea in the Exhibit Hall with Poster Viewing**

**11:05 Autoclave Control Theory: Seeing into the Black Box**

*Rob Mock, Director R&D, NOVA Hydromet*

Autoclave process feedback control is highly logical but also mathematically complex and often nonintuitive. Misconceptions often lead to tripping, underutilisation of equipment, process variability, equipment failure, and downtime resulting in very costly losses. For that reason, skillfully applied process control theory solutions typically have a very short payback period. This presentation will give several autoclave-related control-theory applications, along with conceptual mathematics and historical autoclave anecdotes.

**11:35 Process Optimisation Using Advanced Modelling**

*Jess Page, Group Technical Manager, Data Analytics, WGA Wallbridge Gilbert Aztec, Australia*

In this showcase project, our objectives were to support incremental production gains through application of innovative technology. Chemical engineering and machine learning techniques were leveraged to create a model that was validated against two years of operational data. When deployed in real-time, the "best" control set points are chosen from thousands of potential operational scenarios and recommended to the operators, to enable faster reaction to PLS changes.

**12:05 Technical and Economic Aspects of Modern Nickel Product Options and the Impact on Project Design**

*Brett Muller, Managing Director, Simulus Group*

The relatively recent growth in nickel product options provides project developers with a wider suite of saleable options than ore, intermediate, or refined metal that have traditionally been considered. Options including nickel sulphate and precursor active material (pCAM) may bring forward considerations such as project funding or offtake partners in the project development cycle, as the customer for an intermediate product becomes the competition for pCAM sales.

**12:35 Networking Luncheon** (*Sponsorship Opportunity Available*)

## PROCESS OPTIMISATION

**13:30 Chairperson's Remarks**

*Rob Mock, Director R&D, NOVA Hydromet*

**13:35 Final-Stage Letdown for Battery Metals Autoclaves: Valve or Choke?**

*Tatiana Tagieva, MIEAust, Senior Application Specialist, NOVA Hydromet*

Multistage stepped letdown using multiple flash tanks is a common feature of battery metals autoclaves. Designers will specify either a letdown control valve or a fixed choke for the final-stage flash tank. The fixed choke configuration might provide capital cost savings, but the implications on letdown control, throughput, and life-cycle costs are more nuanced. This presentation will review decision-related criteria to help you judge between the two.

## MINE WASTE STREAM AND TAILINGS REPROCESSING

**14:05 Value Recovery and Dewatering—Tailings Processing with Resin-in-Leach and ATA**

*Adam Fischmann, PhD, Principal Chemist, Hydrometallurgy, Clean TeQ Water*

Fine-grained tailings are well-suited to metal recovery by resin-in-leach by pairing continuous ion exchange with the right lixiviant. ATA dewatering transforms the barren slurry into a readily filterable material for stacked storage.

**14:35 Modelling of Filtration Properties of Tailings Based on Quantitative Phase Analysis**

*Andrew Hawkey, Manager, Diemme Filtration, Australia*

Large-scale mining operations produce a great deal of mineral tailings. We develop quantitative relationships between the mineral phase contents and the filterability parameters. Predicting the behaviour of the material during the filtration process would allow the design a filtration plant with improved performance in terms of energy, time, and volume of water recovered. With this approach, better control, optimisation, and tuning of the process can be achieved.

**15:05 Afternoon Tea in the Exhibit Hall with Poster Viewing**

(*Sponsorship Opportunity Available*)

**15:35 Reprocessing of Old Refractory Tailings: A Case Study of a Zambian Mine**

*Chisulo Sakala, Konkola Copper Mines*

*Milton Simukoko, Head Metallurgical Projects, Konkola Mineral Resources*

A Zambian mine, mine's refractory copper ores from open pits, and underground mines, treat the same through concentrators and Tailings Leach Plant with overall total copper recovery 50%. Samples were collected across the Tailings Dam to determine feasibility of retreatment. Feed average 0.61% total copper, 52% cupriferous mica, 30% sulphides, and 19% malachite. Ambient temperature leaching and elevated temperature leaching showed total copper recoveries of 34.6% and 70.8% respectively.

**16:05 Plant Prototype Trials for Copper Recovery from Low-Grade Ore and Tailings**

*Pavel Spiridonov, PhD, Research Fellow, InnovEco*

The resin in moist mix (RIMM) method has been developed for the cost-effective copper recovery from fine low-grade ores and mineral waste, including tailings. The new plant prototype simulates a continuous ion exchange process that enables the processing of fine minerals (<420 microns). Copper recovery from two local minerals was achieved in the range of 90-95%. RIMM could unlock previously unprofitable small and low-grade copper deposits and tailings dams.

**16:35 PANEL DISCUSSION: Novel Trends in Nickel Cobalt and Copper Processing Methods**

*Moderator: Murdoch Mackenzie, PhD, Consultant Metallurgist, Australia*

This panel discussion will explore innovative advancements in the extraction, refining, and recycling of these critical metals. Our international panel of experts will highlight cutting-edge techniques aimed at improving efficiency, sustainability, and environmental impact. Topics will include advanced hydrometallurgy, bioleaching, and automated processing technologies. The session will also address challenges and opportunities in meeting growing demand for these metals in batteries and green technologies.

**18:00 Networking Reception and Dinner\*** (*Sponsorship Opportunity Available*)

*\*Separate registration required. See registration page for details.*

**21:30 Close of Conference**



21-22 May 2025

# Critical Battery Minerals

WEDNESDAY 21 MAY

7:00 Presenter Briefing

7:30 Registration Open

7:30 Arrival Tea and Coffee in the Exhibit Hall with Poster Viewing

**CRITICAL BATTERY MINERALS TRACK SPONSORED BY  
SEDGMAN**

**CRITICAL BATTERY MINERALS MARKET & PRODUCTION**

8:25 Organiser's Remarks

*Craig Wohlers, General Manager, Cambridge EnerTech*

8:30 Chairperson's Remarks

*Tony Parry, PhD, Senior Consultant, Nexus Bonum, Australia*

8:35 Taking the "Critical" out of Critical Battery Materials

*Adrian Griffin, Chairman, Charger Metals*

In the two years since the 2022 peak, lithium prices have dropped 85%, while nickel and cobalt prices have halved. Many critical battery materials also saw volatility. Perceived shortages turned into oversupply, as battery chemistry evolved for sustainability and better value. Processing advances improved lithium recovery, unlocking previously uneconomic deposits. A global push for sustainability is driving recycling and reshaping supply chains, increasing material availability and improving security.

9:05 Lithium for Next-Generation Batteries: From Mines to Metals

*Andrew Nissan, PhD, Senior Director, Battery Strategic Sourcing, Lyten*

Most lithium indexes and reports focus entirely on lithium carbonate and lithium hydroxide production; however, to power the next generation of cells, lithium metal is required as the anode material. To optimise lithium metal for pricing and performance, a different process flow is required from the mines to metal.

9:35 McNulty Ramp-Up Curves of Critical Mineral Projects

*Niels Verbaan, Director, Technical Services (Hydrometallurgy), Metallurgy & Consulting, SGS, Canada*

While traditional commodity projects can benchmark against existing projects to assist in derisking and generating capital and operating cost estimates, this is more difficult for critical mineral projects. This paper will present McNulty Ramp-Up Curves of recent critical mineral projects using production data out of the public domain, and where possible, provide comment on the extent of additional engineering and pilot studies carried out to de-risk these projects.

10:05 Presentation to be Announced

10:35 Morning Tea in the Exhibit Hall with Poster Viewing

*(Sponsorship Opportunity Available)*

**RARE EARTH AND OTHER CRITICAL MINERAL  
PROCESSING**

11:05 Sustainable Rare Earth Recovery: Insights from the Meteoric Caldeira Rare Earth Project Pilot Studies

*Gavin Beer, General Manager, Met-Chem Consulting*

Meteoric Resources has developed and piloted a flowsheet for recovering rare earths from the Caldeira ionic clay-hosted deposit in Minas Gerais, Brazil. This integrated process minimises CAPEX and OPEX while prioritising the highest standards of environmental stewardship.

11:35 Continuing Developments at the Boland ISR Rare Earth Project: The Vision for Low Cost, Low Impact, Domestic Rare Earth Production

*Robert Blythman, Exploration Manager, Cobra Resources plc*

Cobra Resources continues the innovation at the Boland rare earth ISR Project. Benchtop studies completed at ANSTO continue to demonstrate ISR amenability of the paleochannel-hosted rare earths, with 56% TREO recoveries from recent test work at pH3. Acid consumption is low, as are pregnant liquor impurities. Ongoing test work is expected to produce an MREC. The low-cost, low-disturbance ISR recovery process has been successfully demonstrated.

12:05 Sponsored Presentation *(Opportunity Available)*

12:35 Networking Luncheon *(Sponsorship Opportunity Available)*

**RARE EARTH AND OTHER CRITICAL MINERAL  
PROCESSING**

13:30 Chairperson's Remarks

*Gavin Beer, General Manager, Met-Chem Consulting*

13:35 Mineral Characterisation of QEM's Julia Creek Oil and Vanadium Deposits

*Elizaveta Forbes, PhD, Associate Professor, University of Queensland*

QEM Ltd is undertaking a pre-feasibility study for the development of the Julia Creek vanadium and oil shale project in Queensland. The deposit contains kerogen which can be extracted as a hydrocarbon resource, and vanadium which is hosted in the clay and oxide phases, primarily in montmorillonite. This work constitutes the mineral characterisation with a view to determining the most viable processing routes for oil and vanadium recovery.

14:05 Recovering the Unrecoverable

*Sten Soderstrom, Advisory Board Member, IPRI.Tech AG*

The PAD process enables economic recovery of high-value metals in complex mineralogies where traditional process routes are not economically viable or where metal content is encapsulated and not identified in traditional wet laboratory analysis. Worldwide commercial development is by IPRI.Tech, a Swiss organisation. The PAD process has potential application in battery minerals, mineral sands, platinum group metals, and other precious metals in processing circuits and waste dumps.

**LITHIUM PROCESSING**

14:35 From Alpha to Beta: Deciphering the Reaction Kinetics and Mechanisms of Spodumene Calcination—Review of Recent Evidence

*Bogdan Dlugogorski, PhD, Distinguished Research Professor, Science & Technology & Energy & Resources, Charles Darwin University*

Recent studies reveal the intricate mechanisms in transforming  $\alpha$ -spodumene to  $\beta$ -spodumene during calcination, a critical step for lithium extraction. The reaction involves complex reconstructive transformations with high activation energies. Existing kinetic models show significant discrepancies and limitations. This presentation reviews recent evidence to decipher these



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# Critical Battery Minerals

reaction kinetics and mechanisms, aiming to optimise the calcination process for improved efficiency and reduced environmental impact in industrial lithium production.

## 15:05 Afternoon Tea in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

## 15:35 A Review of the Application and Potential for Ore Sorting to Upgrade Lithium Ores

*Tony Parry, PhD, Senior Consultant, Nexus Bonum, Australia*

We are seeing growing interest in the use of ore sorting to achieve early-stage waste rejection and pre-concentration of lithium ores. In this presentation we discuss the rationale and potential benefits to be derived from introducing ore-sorter upgrade to lithium ores as well as the types of ore-sorting sensors finding application in this space, and sampling and test work programs required to assess viability—and finally—the current uptake in the Australian context.

## 16:05 Latest Developments in Direct Lithium Extraction (DLE)

*Amir Razmjou, PhD, Associate Professor, Edith Cowan University*

Advancements in Direct Lithium Extraction (DLE) technologies are transforming lithium recovery by addressing efficiency, scalability, and sustainability challenges. This presentation explores cutting-edge methods such as membranes, adsorbents, and ion exchange systems, with a focus on reducing material usage, simplifying processes, and enhancing selectivity. By leveraging innovations from advanced materials to optimised processes, these approaches aim to minimise environmental impact and support the transition to a lithium-dependent low-carbon economy.

## 16:35 The Production of High-Purity Battery-Grade Lithium Carbonate Product from Lithium Brine Sources

*Nipen Shah, PhD, Head of Sales, JordProxa*

This presentation will discuss the production of high-purity battery-grade lithium carbonate product from lithium brine sources.

## 17:05 Happy Hour in the Exhibit Hall with Poster Viewing



## 18:15 Close of Day

THURSDAY 22 MAY

## 7:00 Presenter Briefing

## 7:30 Registration Open

## 7:30 Arrival Tea and Coffee in the Exhibit Hall with Poster Viewing

## CRITICAL BATTERY MINERALS TRACK SPONSORED BY SEDGMAN

### LITHIUM PROCESSING

#### 8:25 Organiser's Remarks

*Craig Wohlers, General Manager, Cambridge EnerTech*

#### 8:30 Chairperson's Remarks

*Jamie Weaver, PhD, Research Chemist, Material Measurement Lab, NIST*

## 8:35 Lewatit Ion Exchange Resins for Lithium Applications: Removal of New Emerging Contaminants Aluminium, Silica, and Boron

*Dirk Steinhilber, PhD, Technical Marketing Manager, LANXESS Deutschland GmbH*

The growing demand for high-purity, battery-grade lithium compounds requires efficient methods for the purification of lithium concentrates. Selective chelating ion exchange resins are used for the purification of lithium concentrates for the removal of alkaline earth metals, boron, aluminium, and fluoride. Interestingly, we found that for refining of LiHCO<sub>3</sub> concentrates, the Lewatit chelating resin can be used in the H form without the need for conversion with NaOH.

## 9:05 Bulk Lithium Grade Measurement with Low Field Magnetic Resonance for Bulk Sorting and Monitoring

*Peter Coghill, PhD, Group Leader & Principal Research Scientist, Magnetic Resonance Mineral Resources, CSIRO*

In some cases, hard rock Lithium deposits are not amenable to rock-by-rock sorting or the required throughput is too high to efficiently sort the entire production stream. This talk discusses a bulk measurement technique that could be used for sorting these streams, while discussing the potential benefits and drawbacks of bulk sorting.

## 9:35 Novel Alkaline Leaching Processes for Various Lithium Minerals

*Tian Zhang, Specialist, Hydrometallurgy, Metso*

Reducing environmental impact while maintaining cost competitiveness is crucial for operators in the production of battery-grade lithium, both now and in the future. While spodumene is well-known as the primary source of lithium from hard rocks, the increasing demand for lithium has highlighted the importance of other lithium-bearing minerals. This paper presents the advancements in Metso's alkaline leaching technologies for various lithium minerals, with a particular focus on petalite processing.

## 10:05 Continuous Ion Exchange in Lithium Processing: Direct Lithium Extraction and Refinery

*Olga Yahorava, PhD, Principal Chemist, Clean TeQ Water*

Ion exchange and adsorption technologies are crucial in lithium processing, particularly for direct lithium extraction and refinery of lithium-rich streams. Utilizing a continuous countercurrent approach to lithium recovery or purification, we can take advantage of the chemistry of sorbents and ion exchangers, thus enhancing efficiency and improving water balance throughout the system. Several examples demonstrate the benefits of moving bed systems in lithium processing.

## 10:35 Sponsored Presentation (Opportunity Available)

## 11:05 Morning Tea in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

### MINE WASTE STREAM AND TAILINGS REPROCESSING

#### 11:35 Towards Critical Metal Recovery from Australia's Mine Waste

*Anita Parbhakar-Fox, PhD, Associate Professor, Sustainable Minerals Institute, The University of Queensland*

This presentation will document finding from new geometallurgical research being undertaken by the University of Queensland across Australia to identify new critical metal mine waste (i.e., tailings, waste rock, slag, metallurgical residues) resources. Sites in Queensland, New South Wales, South Australia, Tasmania, and the Northern Territories have been sampled with new deposits of Co, REE, In and Sb in particular identified.





21-22 May 2025

# Critical Battery Minerals

## LITHIUM-BATTERY RECYCLING

### 12:05 Battery Recycling: A Key Solution to the Critical Mineral Supply Crisis

*Mervyn Stevens, Vice President, Battery Minerals & Materials, Worley*

Geopolitical tensions and growing demand from the energy transition are placing significant strain on the global supply of critical minerals. Battery recycling offers a sustainable solution to ease this pressure. However, widespread adoption is hindered by several challenges. This paper analyses the current obstacles facing the battery recycling sector and explores strategies to overcome them, unlocking its full potential for securing the mineral supply chain.

### 12:35 A Techno-Economic Study Examining Selected Options for Processing Black Mass

*Michael Dry, PhD, Owner, Arithmetek, Canada*

This presentation will cover a techno-economic evaluation of various technologies for the recycling of battery metals from black mass recovered from recycled lithium-ion batteries. The approach will entail process and cost modelling for each technology examined. The options will include published hydrometallurgical and pyrometallurgical routes, plus a novel route currently under development.

### 13:05 Networking Luncheon (Sponsorship Opportunity Available)

## LITHIUM-BATTERY RECYCLING

### 14:00 Chairperson's Remarks

*Anita Parbhakar-Fox, PhD, Associate Professor, Sustainable Minerals Institute, The University of Queensland*

### 14:05 Recycling Spent Lithium Iron Phosphate (LFP) Batteries: Systematic Investigation of Pre-Treatment Schemes and Leaching Agent Efficiency

*Taufiq Hidayat, PhD, Lecturer, Institut Teknologi Bandung Indonesia*

*Zela Tanlega Ichlas, PhD, Institut Teknologi Bandung, Indonesia*

The increasing use of lithium iron phosphate (LFP) batteries is anticipated to significantly increase battery waste. This study investigates recycling spent LFP batteries through discharge, pre-treatment, and selective leaching. Discharged batteries underwent pyrolysis and shredding in three different schemes, followed by leaching with various leaching agents. Findings highlight the impact of pre-treatment and leaching agents on lithium recovery, contributing to an optimised recycling process.

### 14:35 The Future of Battery Recycling in South Korea: Government Policies, Industry Efforts, and Technological Breakthroughs

*Mooki Bae, Scientific Researcher, Korea Institute of Geoscience & Mineral Resources KIGAM*

South Korea's battery recycling industry is rapidly advancing with a focus on efficient resource recovery, eco-friendly technology, and robust end-of-life battery management systems. Supported by government policies, the industry aims to optimise metal recovery, build a circular economy, and comply with environmental standards. As global demand rises, South Korea is positioned to lead the battery recycling market, setting a sustainable model for resource management and environmental responsibility.

### 15:05 Classification of Intermediate Recycled Li-ion Battery Materials

*Jamie Weaver, PhD, Research Chemist, Material Measurement Lab, NIST*

Intermediate recycled lithium-ion battery material, called black mass, is produced from manufacturing scraps and used cells. The diversity of source materials, which include different chemistries such as LFP, NMC, and LCO, leads to variations in product quality. Establishing a harmonised classification system based on material composition could enhance market dynamics and trade while supporting a circular economy for battery materials.

### 15:35 Afternoon Tea in the Exhibit Hall with Poster Viewing

*(Sponsorship Opportunity Available)*

### 16:05 PANEL DISCUSSION: Advanced Lithium Processing Methods—Opportunities & Illusions

*Moderator: Adrian Griffin, Chairman, Charger Metals*

This panel discussion will explore the latest innovations in lithium extraction and refinement technologies. Experts will examine the potential of cutting-edge methods to meet the growing demand for lithium in electric vehicles and energy storage. The conversation will also address the challenges, economic viability, and environmental impacts, distinguishing between genuine opportunities and overhyped claims within the rapidly evolving lithium industry.

### 17:05 Close of Conference

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