

## Conference Report

[ALTA 2020 Online](#), our 25th anniversary and first online event, attracted a record attendance of **650 participants** from **48 countries**. The conference was held over three weeks, from 9-27 November to suit the online format.

It featured one of our best technical programs over the five conferences reflecting the core ALTA focus of innovation. The five keynote addresses were outstanding with senior industry identities addressing key industry technical topics. Our trademark panels were better than ever and the three additional short courses were a first-class addition to our program.

We thank each of our opening speakers, keynote speakers and presenters, with a special shout-out to those who participated from other time zones. We also thank our exhibitors, sponsors, co-sponsors and partners who made the journey with us transitioning to the virtual world, after the postponement of our regular face-to-face conference in May.



A unique benefit of the online format is that the entire event including presentations, papers, short courses, recorded panel discussions and webinars will remain available to new attendees from around the globe until 12 March. This includes free visitor passes to access recorded webinars and the virtual expo.

The event was opened by Conference Founder and Chair, [Alan Taylor](#), Managing Director and Metallurgical Consultant, ALTA Metallurgical Services, on Tuesday 10 November.

## Week One

Week One included our world leading three-day **Nickel-Cobalt-Copper Conference**, sponsored by [Solvay](#), with 41 presentations and a panel discussion, together with two short courses and three webinars.

The conference commenced with the Opening Address by [Dr Jacques Eksteen](#), Chief Operating Officer and Research Director, Future Battery Industries CRC (Australia), who laid out the research-based strategy for establishing Australia as a leading player in the emerging global battery Industry. [John Neale](#), Technical Specialist, Mintek (South Africa), followed with the Keynote Address on the progress achieved and future potential of bioleaching of nickel and cobalt. The on-demand presentation includes the live Q&A session.

Topics for the **technical sessions** included EV implications; battery precursor products; nickel laterite HPAL operations and projects; developments in alternative laterite processes; heap leaching; nickel-cobalt and copper process innovations; harvesting and processing of deep sea nodules; filtration and dry stacking; ion exchange and solvent extraction; and a final forum with presentations on the hydromet processing of Ni-Co-Cu sulphides.

The conference finale was an hour-long **panel discussion** and Q&A, chaired by ALTA's Alan Taylor, on the **hydromet processing of Ni-Co-Cu sulphides** – an area of increasing industry interest due to the projected demand of the EV and battery industries. Topics discussed and debated included the increasing role of hydromet processing for producing battery precursor products; challenges for meeting the stringent specifications for battery precursors; potential role for bioleaching for nickel, cobalt and copper; recovery of cobalt from pyritic ores; prospects for new laterite projects given the high capex of currently proven processes; prospects for commercialisation of new laterite processes such as chloride and nitric acid leaching; deep sea nodules as an alternative source of battery metals; effects of water availability and management on future ore processing; and future uptake of dry stacking.



**Panellists** (left to right): Hermann Scriba, LinNiCo (Australia); Dr Chris Ward, IGO (Australia); Dr Bryn Harris, NMR360 (Canada); John Neale, Mintek (South Africa); Dr Richard Macoun, Consultant (Australia); Alan Taylor, ALTA Metallurgical Services (Australia) Andrew Tong, Cobalt Blue (Australia); Damian Connelly, METS Engineering (Australia); Dr Mike Dry, Arithmetek (Canada).

The recorded panel discussion is available to delegates until March and will then be made available to the industry via the [ALTA Free Library](#).

Week One included two short courses and three webinars, which are all now available for on-demand viewing.

Alan Taylor kicked-off the event with his “**A-Z of Copper Ore Leaching**” short course which has been presented around the world for many years and is kept current with annual updates. The “**The Art of HPAL - The Way to Success**” short course was presented by former Sumitomo executives Dr Naoyuki Tsuchida and Fumio Iwamoto (Japan) and delegates jumped at the opportunity to learn from these knowledgeable presenters.

[BASF](#), long-time ALTA sponsor, presented a webinar for delegates and visitors “*Pilot and Full-Scale Trials for BASF LixTRA™ Leaching Aid Reagent*”. [JordProxa](#) offered two webinars on “*Crystallisation for Battery Chemicals: Chemistry, Purity and Energy Efficiency*”: Part 1: Fundamentals of Crystallisation and Part 2: What Makes Lithium Flowsheet Different?

## Week Two

The second week featured the **Uranium-REE** and **In-Situ Recovery** conferences, with 14 and 16 presentations respectively. Both conferences included a panel discussion on a key industry topic. The week's program also included uranium and SX focused short courses. The conferences and uranium ore processing short course were organised in cooperation with the [International Atomic Energy Agency](#) (IAEA).

### Uranium-REE Conference

**Martin Fairclough**, Uranium Specialist, Uranium Resources and Production, IAEA (Austria) opened the 16th annual ALTA uranium conference with a review of unconventional uranium resources. [Darryl Butcher](#), Director, BDB Process (Australia), presented the Keynote Address in which he reviewed membrane technology as a process tool, followed by a live Q&A session, now included in the on-demand recording.

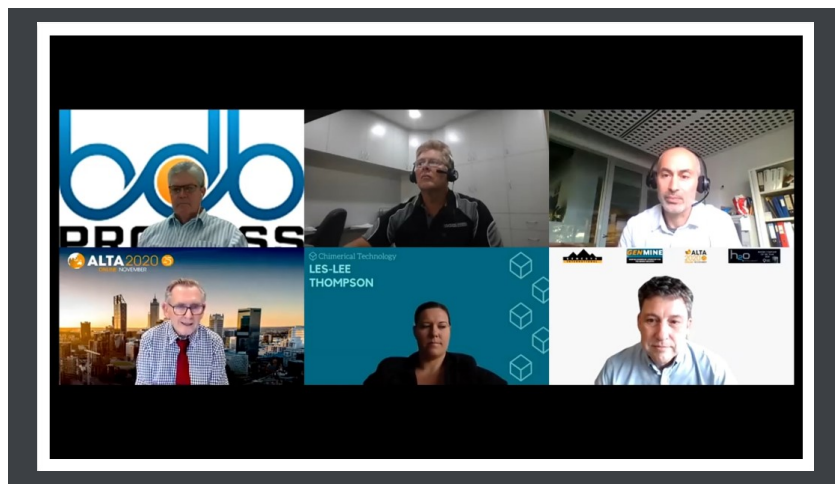
**Technical sessions** covered by-product vanadium recovery; REE processing developments; REE projects; REE processing simulation; REE supply criticality assessment; testing of IX resins; uranium project development; uranium environmental modelling; and a final forum with presentations on the application of membranes to uranium and REE processing.

The forum theme of **application of membranes**, a potential game-changer for uranium processing, was continued in a one-hour **panel discussion** with audience Q&A, chaired by ALTA's **Alan Taylor**. Topics addressed included lessons learned from commercial uranium applications; potential for upgrading leach solutions; testwork and scale-up for commercial applications; potential for use in REE processing; clarification of membrane feed solutions; prevention of scale formation and descaling; membrane life and effect on economics; and possible future developments in membrane materials.

**Panellists** (left to right): Darryl Butcher, BDB Process (Australia); Mark Peacock, BMS Engineers (Australia); Adrian Manis, ANSTO Minerals (Australia), Alan Taylor, ALTA Metallurgical Services (Australia); Les-Lee Thompson, Chimerical Technology (South Africa); Stephen Chesters, Genesys International (UK)

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Thank you to our U-REE sponsor [ANSTO Minerals](#)

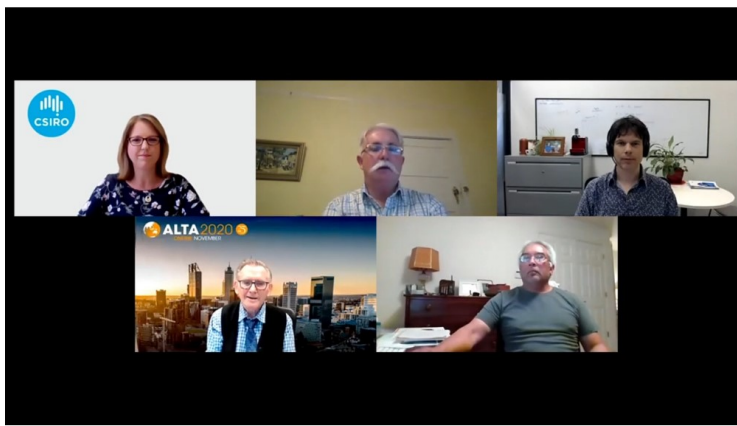


## In-Situ Recovery Conference

The third annual **ALTA ISR Conference**, an event co-organised with [CSIRO](#), provides a global focal point for ISR development. The conference was opened with a Keynote Address by [Leon Faulkner](#), Managing Director, EnviroCopper (Australia) on opportunities and challenges for copper ISR using the Kapunda Project under development in South Australia as example. The live keynote Q&A session is included in the on-demand presentation.

**Session topics** were permeability enhancement; directional drilling and hydraulic fracturing; application of ISR in hard rock mining, options for underground leach systems; coarse particle leaching amenability tests; ISR project permitting challenges; new ground water monitoring technology; modelling and process optimisation; economic modelling; and a forum with presentations on the application of ISR to copper.

[Dr Laura Kuhar](#), CSIRO Mineral Resources (Australia), chaired the panel discussion on the **application of ISR to copper** which is becoming the next major target for ISR after uranium. The agenda covered enabling technologies, approaches and methodologies; priorities to unlock/increase future potential; main challenges to implementation; unconventional applications (e.g. remediation) and crossover of tools from other industries (e.g. oil and gas); economics and permitting; and achieving social licence to operate.



**Panellists** (left to right): Dr Laura Kuhar, CSIRO Mineral Resources (Australia); Leon Faulkner, EnviroCopper (Australia); Tom Measham, CSIRO Land and Water (Australia); Alan Taylor, ALTA (Australia); Dr Frank Roberto, Newmont (USA)

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Thank you to our ISR sponsor [EnviroCopper](#)

*Recommended reading: [Insights from ALTA ISR 2020](#) by Dr Laura Kuhar*

Week Two included two practically-oriented [short courses](#) presented by Conference Chair **Alan Taylor** on *Uranium Ore Processing* and *SX and its Application to Copper, Uranium and Nickel-Cobalt*. These courses are now available on-demand.

## Week Three

Week Three included our **Gold-PM** and **Lithium & Battery Technology** Conferences with 16 and 15 presentations respectively, each with a panel/ Q&A on a key industry topic. The week also featured two short courses and a webinar.

## Gold-PM Conference

Experienced Consulting Metallurgist, [Karel Osten](#), METTKO (Australia), opened the program of ALTA's 12th annual gold event with his Keynote Address on whether POX has it reached its full potential, or is there still room for improvement for treating refractory gold ores? The recorded presentation includes the live Q&A session.

**Session topics** included a photon assaying update; developments and projects for treatment of refractory ores including POX, BiOX, atmospheric oxidation and the MACH Reactor: applications of IX including preg-robbing conditions and copper for refractory ores, mine water treatment and recovery of palladium in silver refining; ore sorting for upgrading gold ores; and a forum with presentations on cyanide alleviation and alternative lixiviants including the ReCYN IX process, thiourea, thiocyanate, glycine, chloride and measuring solution concentrations for plant operation with new lixiviants.

The panel discussion, chaired by Keynote Speaker **Karel Osten**, followed the forum in discussing and debating the key industry issues of cyanide alleviation and alternative lixiviants, including regulatory environment for cyanide use in mining- Influence of governments and NGOs; industry practice and track record; cyanide monitoring and control-Instrumentation, analysis and site balances; cyanide recovery and recycle developments including IX, AVR, SART, thickening and dry stacking etc; alternative lixiviants and recovery methods including thiosulphate, thiourea, glycine etc.

**Panellists** (left to right): Dr David Dreisinger, University of British Columbia (Canada); Karel Osten, METTKO (Australia); Frank Trask, Mining and Process Solutions (Australia); Danielle Thompson, CSIRO Mineral Resources (Australia); Dr Paul Breuer, CSIRO Mineral Resources (Australia); Kristina Kazakoff, Clean Mining (Australia); Malcolm Paterson, GreenGold Technology (Indonesia)

The recorded discussion now available for delegates until March and will then be available to the industry via the [ALTA Free Library](#)

Thank you to our Gold-PM sponsor [Air Liquide](#)



## Lithium & Battery Technology Conference

The 4th annual conference presented by ALTA commenced with a Keynote Address by [Prof Peter Talbot](#), The Centre for Clean Energy Technologies and Practices, Queensland University of Technology (Australia) who spoke on establishing Australia's battery industry supply chain. We thank [Prof Jose Alarco](#) for stepping in for the live Q&A session, which is appended to the on-demand video presentation.

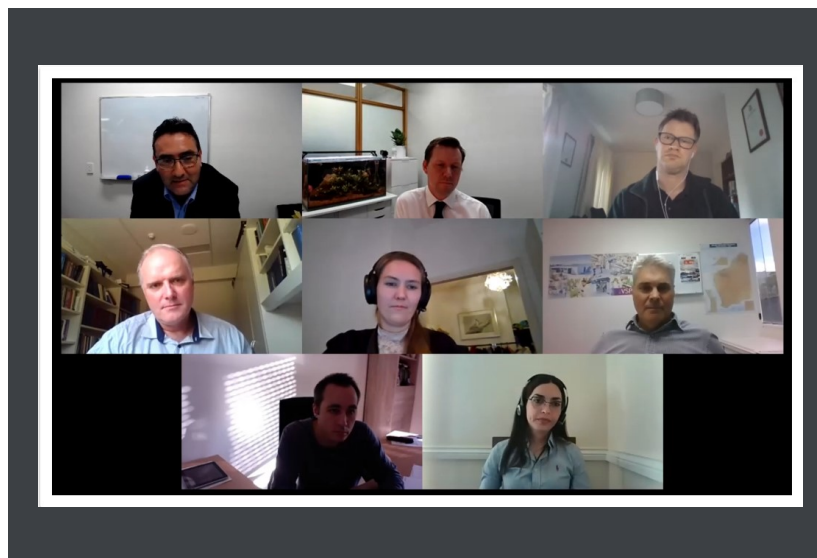
**Session topics** covered lithium process innovation; effect of impurities and challenges of producing high purity lithium concentrates; by-products from spodumene leaching; recovery of lithium from brine, use of modelling in process development; application of chelation resins and membranes; need for accurate mineralogical analysis; analysis of project failure with case history; and the forum with presentations on trends in battery technology.

The panel was chaired by [Dr Jacques Eksteen](#), Chief Operating Officer and Research Director Future Battery Industries CRC (Australia), who led the international expert panellists in a highly topical review of trends in battery technology and key issues in lithium processing. The agenda included Cathode Materials: are we on the right path with high nickel ternary NCM chemistries?; Anodes: siliconised graphite versus all-silicon (according to Tesla) anodes?; Electrolytes: what opportunity is there for Australian electrolyte manufacture and niche cell production?; Recycling: how should Australia position itself in the global context?; Lithium Processing: learnings from business failures in spodumene production; and optimising lithium refining: key areas and opportunities for high impact improvements in yield, waste reduction and energy efficiency.

**Panellists** (left to right): Prof Jose Alarco, Institute for Future Environments (IFE), QUT (Australia); Andrew Mackenzie, Envirostream (Australia); Dr Adam Best, CSIRO (Australia); Dr Jacques Eksteen, Future Battery Industries CRC (Australia); Prof Mari Lundström, Aalto University (Finland); Mike Vaisey, Lithium Australia (Australia); Prof Alexandre Chagnes, Université de Lorraine, CNRS, GeoRessources (France); Dr Mahdokht Shaibani, Monash University (Australia)

The recorded discussion now available for delegates until March and will then be available to the industry via the [ALTA Free Library](#)

Thank you to our Lithium & Battery Technology sponsor [ANSTO Minerals](#)



The final week of the event included two short courses and a webinar. Jenike & Johanson's "**Design of Successful Bulk Flow Systems for Hydromet Operations**" short course ran over two days and was presented by Corin Homes, Operations Manager (Australia) and Eric Maynard, Vice President and Director of Education (USA).

METS Engineering presented their popular "**Lithium Processing**" short course with Damian Connelly, Principal Consulting Engineer as the main presenter, assisted by process engineers Brett Morgan and Lu Zhang.

The webinar by [LANXESS](#) *Role of Lewatit® Ion Exchange Resins Exchange Resins in the Recovery and Purification of Metals – 'Battery Materials and Beyond* is available for on-demand viewing.

## Wrap Up

During the live closing event, the Trivia Quiz winner was announced as **Dr Laura Kuhar**, CSIRO (Australia). The Treasure Hunt was drawn live by sponsor [Brisbane Met Labs](#). The lucky winner of the Australian Sovereign 2020 Gold Proof Coin was **Tony Hendriks**, MHWirth (Germany) who generously donated the prize to Australia's WWF Bushfire Recovery Appeal.

### You can still register for ALTA 2020 Online!

We invite you to participate in your own time from the anywhere in the world. On-demand conference sessions, recorded panel discussions and short courses are [open for registration](#) with unlimited access until March 2021. Register for the sessions or short courses or book a [free visitor pass](#) to access webinars and virtual expo.

## Looking ahead to 2021

**Save the date!** [ALTA 2021](#) will be held 13-20 November at Pan Pacific Hotel, Perth.

**Submit your abstracts early** as we anticipate a high demand for program spots. **Forum and panel topics** reflecting key industry issues will be:

- Nickel-Cobalt-Copper: HPAL Design, Operation & Project Development
- Uranium-REE: Innovations in Uranium Processing
- In-Situ Recovery: Developments in ISR Permeability Enhancement
- Gold-PM: Treatment of Refractory & Complex Gold Ores
- Lithium & Battery Technology: Developments in Battery Technology and Recycling

ALTA's highly-regarded, practically oriented **short courses** to be presented by Alan Taylor:

- Treatment of Nickel/Cobalt Laterites
- Copper SX/EW Basic Principles and Detailed Plant Design
- Heap Leaching and its Application Copper, Gold, Uranium and Nickel Ores

### Book your place now!

For more information, visit the [conference website](#)

What do people say about ALTA? [Read our Testimonials](#)



**Nickel-Cobalt-Copper, Uranium-REE, Gold-PM, In Situ Recovery, Lithium & Battery Technology CONFERENCE & EXHIBITION**

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