



Nickel-Cobalt-Copper, Uranium-REE-Lithium  
and Gold-PM Conference *and* ISR Symposium

*Sharing ideas, innovations, technologies and projects*

## Conference Report

The 23<sup>rd</sup> annual ALTA conference was held  
19-26 May in Perth, Australia

**ALTA 2018 was a huge success!** This year's ALTA conference had the highest attendance on record with **377 delegates** from **29 countries**, a massive 55% increase on 2017. We were excited to welcome **213 new people** attending their first ALTA conference. They joined the many previous attendees and ALTA regulars for this world-leading annual metallurgical event.

We thank all participants for contributing to the success of the conference.

The event was opened by Conference Founder and Chair, **Alan Taylor**, Metallurgical Consultant/Managing Director, ALTA Metallurgical Services.

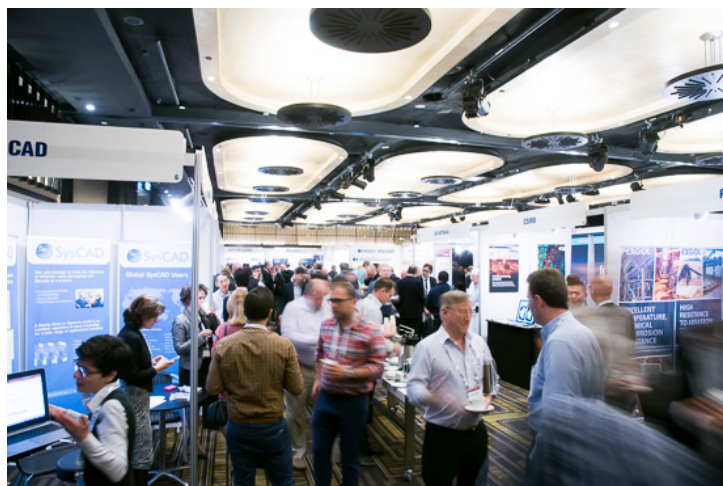


Thank you to our 26 sponsors, partners and co-sponsors for their support of the conference.

The parallel exhibition included 34 exhibitors, which was attended by **90 visitors** in addition to conference attendees, via free passes made available to the public.

Delegates and visitors alike made the most of networking opportunities in the exhibition during program breaks, and the Welcome Reception and Happy Hour functions.

**Alan Taylor** gave his address "*A Metallurgist's Musings, Speculations and What-ifs on Future Industry Driving Forces & Trends*" to 180 dinner guests.



The conference commenced with the Opening Address by **Dr Stephen Grocott**, Chair, AMIRA International Ltd and Chief Technical Development Officer, CleanTeQ Limited (Australia). His presentation "*What Is Changing in The Global Minerals Industry - Delivering Value by Leveraging Resources*" is available from [ALTA Free Library](#), along with all other opening and keynote presentations.

Dr Grocott concluded that the time is right for a step-change in industry collaboration to solve our biggest challenges and capture our most attractive opportunities; though collaboration is not easy, particularly peer-to-peer collaboration. He described his paper as a cloudy crystal ball look at the greatest of these challenges and the collaborative effort required, and how AMIRA International can contribute to capturing the value and mitigating the risks.







The **Nickel-Cobalt-Copper Sessions** kicked-off with the **Keynote Address** by **Dr Kathy Sole**, Kathryn C. Sole Consulting (South Africa): *"Flowsheet Options for Cobalt Recovery in African Copper-Cobalt Hydrometallurgy Circuits"*.

Dr Sole noted that many African Copperbelt operations have traditionally focused on copper production using hydrometallurgical processes from which cobalt is recovered from copper SX raffinate. However, due to the increasing cobalt demand, dedicated cobalt leaching, which typically requires reductive conditions, is now being considered.

Her paper assessed technical and economic advantages and limitations of various approaches to the hydrometallurgical processing of cobalt in an African context.

This was followed by presentations by **Carlos Risopatron**, International Copper Study Group (ICSG) (Portugal), on *"World Copper Mine Supply and Capacity Trends; Challenges for Copper Concentrate Miners, Smelters, Refineries, Byproducts and Waste Disposal"*, and **Larry Moore**, FM Global (USA), on *"Using Process Safety Management to Manage Risk in Mineral and Metals Processing Facilities"*.

Other topics included treatment of nickel-cobalt laterites, including scandium production; filtration and dry stacking of tailings; pressure leach circuit equipment; nickel sulphate production using crystallisation; metal recovery by cementation/, SX and EW, hydrometallurgical processing technology; materials of construction; and hydromet processing of nickel, cobalt and copper sulphides.



Featured projects in the **Ni-Co-Cu Sessions** and **Hydromet Processing of Sulphides Forum** included an update of the Ramu Nickel laterite HPAL operation, PNG; development of the Owendale scandium from laterite HPAL project, NSW, Australia; development of the Sunrise Nickel-Cobalt HPAL project, NSW, Australia; Mt Windarra minewater purification project, WA, Australia, and Laroo Station hydromet production of lead from lead carbonate ore project, WA, Australia.

Updates of the Terrafame cold climate polymetallic heap bioleaching operation, Finland; and the Mondo Minerals nickel sulphide tank bioleaching operation, Finland, including the addition of a gold recovery circuit were presented.

The **Hydromet Processing of Copper, Nickel & Cobalt Sulphides Panel** discussion, was chaired by **Lourdes Valle**, Principal Process Engineer, BHP (Australia).

A wide range of topics were discussed and debated by the panel and delegates, including drivers and future prospects for hydromet processes; overcoming the challenges of hydromet processing of sulphides; making economics of hydromet processes competitive with concentrators and smelters; addressing the increasing demand for cobalt; potential Achilles heel of hydromet processing; commercial status of heap leaching of low grade chalcopyrite ores; and the effect of availability of skilled people.

A summary of the panel discussion will be published in the coming weeks.







The inaugural **ISR Symposium**, organised in partnership with **CSIRO Minerals**, was held in parallel with the Wednesday conference sessions. The Symposium was opened by **Dr Dave Robinson**, Technology Leader In Situ Recovery and Processing, CSIRO Minerals and Mining3.

The quality of the presentations was excellent, and the standard was set early with the Keynote Address from **Wayne Heili**, Managing Director and CEO, Peninsula Energy Limited (USA) who focussed on four key lessons he has learnt from his years in the uranium ISR industry: “Low pH ISR production leads the way”; “In ISR, grade is not king”; “Lixiviant selection is a key factor”, and “Groundwater restoration can be achieved”.

The **Uranium-REE-Lithium Sessions**, organised in cooperation with the International Atomic Energy Agency, were opened by **Dr Brett Moldovan**, Uranium Production Specialist, IAEA (Austria) with a presentation on “The Challenges of Operating a Uranium Mill in the Modern Era”.

Dr Moldovan concluded that primary producers must continuously look for innovation, optimisation and collaboration with operational peers and researchers to maintain profitability in times of low uranium spot pricing. His presentation focused on key aspects for producers to consider in order to advance innovation, improve efficiencies and ultimately reduce operating costs, whilst maintaining safety performance and high environmental and social standards.



**Dr Julian Hilton**, Chairman, Aleff Group (UK) followed with the Uranium Keynote Address: “*Constructive Disruption: Leveraging Key Intangibles for Smarter Uranium Projects*”.

Dr Hilton stated that uranium, as an energetic resource, is at a decisive, even existential, cross-roads. He proposed that when the policy, market and communications perspectives converge for the uranium industry and the nuclear power industry it serves, the transformative outcome is necessarily disruptive in nature and led by intangibles rather than technology.

He concluded that there is a need for a renegotiated social licence to operate based on shared values and a fresh, compelling narrative of uranium as an energy source, focused perhaps on small, smart modular reactors.

The **Uranium-REE** session topics included heap bioleaching; in-situ leaching in China; IX and SX developments; uranium precipitation from alkaline solution; by-product uranium to avoid starting a new mine; scandium recovery; recovery of REE by mineral processing; REE recovery by CCIX, and REE IX developments.

Featured projects included; Xiangshan heap leaching Project, China; pilot plant for Honeymoon in-situ uranium project, SA, Australia; in-situ operations, China; Tummalapalle Uranium Operation, India; Browns Range REE pilot plant, WA, Australia; and process development for Iveland district REE mineral deposit, Norway.







The conference was book-ended by three practically-oriented technical short courses presented by **Alan Taylor**. “A-Z of Copper Ore Leaching”, “SX and its Application to Copper, Uranium & Nickel-Cobalt” and “Uranium Ore Processing”. The SX Fire Protection section of the SX course was presented by **Larry Moore**, FM Global (USA).

The three weekend short courses were very well attended by 54 people from 14 Countries. Attendees included senior experienced industry professionals as well as newcomers seeking an introduction to the various topics.

ALTA short course manuals, seven in total, are available for purchase and immediate download from [Publications](#). All short course manuals are kept current with annual updates.



Conference photographs are available from [ALTA 2018](#).

**ALTA 2018** conference proceedings are available for purchase from [Publications](#).

Opening and Keynote papers are available from the [ALTA Free Library](#), along with a selection of other conference papers. Panel discussion notes will be published as [MetBytes](#).

---

## **ALTA 2019 Nickel-Cobalt-Copper, Uranium-REE, ISR, Gold-PM, Lithium Conference & Exhibition**

18-25 May, Perth, Australia

We are now receiving abstracts for **ALTA 2019**. The conference will feature Forums and Panel discussions on *Pressure Acid Leaching*, *Developments in IX*, *In Situ Recovery (ISR)*, *Lithium Processing*, and *Fit-for-Purpose Gold-PM Leach Systems*.

The event will include dedicated day sessions for **In Situ Recovery (ISR)** and **Lithium** in response to delegate demand and industry activity. Each day session will have an expanded number of presentations (up to 15). The In Situ Recovery (ISR) sessions are organised in partnership with **CSIRO Minerals**. The Gold-PM sessions are organised in partnership with the **Curtin Gold Technology Group**, Western Australian School of Mines.

Three short courses are scheduled: *Treatment of Nickel-Cobalt Laterites*, *Copper SX/EW Basic Principles and Detailed Plant Design*, and *Heap Leaching & its Application to Copper, Gold, Uranium & Nickel Ores*

Conference website: <http://www.altamet.com.au/conferences/alta-2019/>



**ALTA 2018**  
19 - 26 May  
Perth, Australia

**Nickel-Cobalt-Copper, Uranium-REE-Lithium  
and Gold-PM Conference *and* ISR Symposium**

*Sharing ideas, innovations, technologies and projects*

A special thank you to our sponsors, exhibitors, co-sponsors and partners.

## Sponsors

**EKATO**

**PEXGOL**  
X-LINKED PIPING SOLUTIONS

**LANXESS**  
Energizing Chemistry

**NobelClad**

**STEULER  
KCH**

**BASF**  
We create chemistry

**KOCH KNIGHT**

**SOLVAY**  
Solutions for the future

**FLSMIDTH**

**jord** | IDEAS ENGINEERED

**WEIR**  
Minerals

**mining3**  
TRANSFORMING MINING

**OLI**  
systems, inc.

**Purolite**

## Exhibitors

**EKATO**

**PEXGOL**  
X-LINKED PIPING SOLUTIONS

**REMA  
TOP**

**TURTLE  
TOUGH  
SENSORS**

**SPXFLOW**

**CSIRO**

**STEULER  
KCH**

**ALS  
Metallurgy**

**KOCH KNIGHT**

**CG  
IS**  
The World's Best Values

**THE SIMULUS GROUP**

**SGS**

**MINTEK**

**Diemme  
Filtration**  
A brand of  
Aseptance Group

**SysCAD**

**CORE**

**MEXTRAL**  
A brand of Agilent

**Italmatch Chemicals**

**KERAMOS**  
MINING AND PROCESSING SUPPLIES

**wood.**

**BUREAU  
VERITAS**

**MOGAS**  
SEVERE SERVICE BALL VALVES

**AuTec**  
INNOVATIVE EXTRACTIVE SOLUTIONS

**Teck**

**PLA**  
PROCESS ANALYSERS

**Ausenco**

**Ansto**  
Minerals

**SUNRESIN**

**METZ**

**matec  
pacific**

**GOVERNMENT OF  
WESTERN AUSTRALIA**  
Department of  
Mines, Industry Regulation  
and Safety

**PROCESS IQ**

**MPS** MINING & PROCESS SOLUTIONS

**Curtin University**

**YORK Process Systems**  
A JOHNSON CONTROLS COMPANY

**ALTA**

## Co-Sponsors and Partners

**TMS**  
The Minerals, Metals & Materials Society

**SAIMM**  
THE SOUTHERN AFRICAN INSTITUTE  
OF MINING AND METALLURGY

**IAEA**  
International Atomic Energy Agency

**CSIRO**

**Government of Western Australia**  
Department of Mines, Industry Regulation and  
Geological Survey of Western Australia

**XXIX  
IMPC 2018**  
SEPTEMBER 15-21, 2018  
MOSCOW, RUSSIA  
[www.impc2018.com](http://www.impc2018.com)

**MEI**

**IM** International  
mining

**MINING**  
MONTHLY

**COPPER**  
WORLDWIDE

**PERTH  
CONVENTION  
BUREAU**

**Tourism**  
WESTERN AUSTRALIA

**GOVERNMENT OF  
WESTERN AUSTRALIA**