

Conference Program

#ALTA2018



ALTA 2018

**Nickel-Cobalt-Copper
Uranium-REE-Lithium
and Gold-PM**

Conference & Exhibition
***and* In Situ Recovery (ISR) Symposium**

19-26 May 2018

Pan Pacific Hotel, Perth, Australia

◆ 23rd annual event ◆

Thank you to our Co-Sponsors and Partners



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



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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.

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Chairman's Welcome



A very warm welcome to our 23rd annual conference to our returning regulars and those joining us for the first time. There are over 300 attendees from 29 countries, providing you with a great opportunity for networking and gaining new contacts.

We have another great program for you, and hope you all gain valuable technical insights and ideas. This year the program reflects the current upsurge in industry activity relating to the move towards EVs and renewable energy. Also, we are delighted to include an inaugural symposium on ISR in partnership with CSIRO, a technology attracting increasing interest beyond its established application to uranium recovery.

Very special thanks to all our Keynotes and Presenters for your time and effort. Thanks also to our Session and Panel Chairs who play such an important role during the conference.

We greatly value our sponsors and exhibitors, who make varied and valuable industry resources available to you. Please take the opportunity to meet with their representatives who will be pleased to discuss how they can assist you in your areas of interest. The lunches, session breaks and social events will be held in the exhibition, giving you the opportunity to visit all the booths.

We hope you enjoy the conference, and look forward to a great week together.



Alan Taylor
Managing Director/Metallurgical Consultant
ALTA Metallurgical Services

Important Information

Please check the **Delegate Portal** regularly for program updates and announcements.

Conference Papers are available from the Delegate Portal during the conference. Visit the registration desk if you did not receive your password. The final e-proceedings and short course manuals will be sent to registered delegates in July.

Be sure to take advantage of our **unique open panel discussion** at the end of each conference.

Daily Catering, including arrival coffee, morning tea, lunch and afternoon tea, along with the Welcome Reception and Happy Hour will be held in the exhibition. If you have pre-registered special dietary requirements, there is a separate catering station in the exhibition.

The **conference dinner** will be held in Grand River Ballroom on Tuesday evening. Please visit the desk if you would like to book one of the limited remaining tickets. If you have pre-registered special dietary requirements, please identify yourself to staff during the dinner.

Complimentary Wi-Fi is available in the conference centre courtesy of **Lanxess**. Instructions and passwords are in your satchels.

There is a **special offer** of 25% off all ALTA short course manuals and 2017 proceedings. Purchase online using discount code "ALTA2018" or via the order form in the program (offer expires 30 June).

ALTA 2019 will be held here in Perth 18-25 May. Secure your place in the program early and take advantage of the 50% discount registration fee for Presenters. The Call for Papers is on the back page of the program.

About the Conference

ALTA 2018 is one of the world's premier annual metallurgical events, now in its **23rd year**, and a leading platform for metallurgical innovation. The emphasis of the program is practical, and the theme that runs through the conference is the various aspects of project development.

ALTA is even bigger this year with the addition of an In Situ Recovery (ISR) Symposium organised in partnership with **CSIRO Minerals**. The Uranium-REE-Lithium sessions and Uranium Ore Processing short course are organised in cooperation with the **International Atomic Energy Agency**.

Held over eight days in Perth, it comprises three technical conferences, a symposium, three short courses, and a trade exhibition. It features highly-focused programs, topical forums and presentations by key international speakers.

This event is an outstanding platform for exposing the latest worldwide developments in plant operations, process technology, new projects, testwork and scale-up, process modelling and control systems, application of mineralogy and geometallurgy, R&D, equipment, reagents, materials, tailings disposal and environmental alleviation.

The program includes **100 papers** from **27 countries** [View abstracts](#)

PROGRAM OVERVIEW							
Saturday 19 May	Sunday 20 May	Monday 21 May	Tuesday 22 May	Wednesday 23 May	Thursday 24 May	Friday 25 May	Saturday 26 May
SHORT COURSE	SHORT COURSE	CONFERENCE SESSIONS					SHORT COURSE
A-Z of Copper Ore Leaching	SX and its Application to Copper, Uranium & Nickel- Cobalt	Nickel-Cobalt-Copper Including Hydromet Processing of Copper, Nickel & Cobalt Sulphides Forum & Panel		In Situ Recovery (ISR) Symposium <i>in parallel with NCC Sessions</i>	Uranium-REE-Lithium Including Lithium Processing Forum & Panel <i>in parallel with</i> Gold-PM Including Refractory & Complex Gold Ores Forum & Panel		Uranium Ore Processing
		Welcome Reception	Conference Dinner		Happy Hour		
EXHIBITION							

Keynote and Opening Speakers

Conference Opening	Dr Stephen Grocott , Chair, AMIRA International Ltd and Chief Technical Development Officer, CleanTeQ Limited (Australia) <i>What Is Changing in The Global Minerals Industry - Delivering Value by Leveraging Resources</i>
Nickel-Cobalt-Copper Keynote	Dr Kathy Sole , Kathryn C. Sole Consulting (South Africa); John Parker, Process Ideas (South Africa); Peter Cole, Peter Cole Metallurgical Services (South Africa); Michael B. Mooiman, Franklin Pierce University, (USA) <i>Flowsheet Options for Cobalt Recovery in African Copper-Cobalt Hydrometallurgy Circuits</i>
Dinner Address	Alan Taylor , Metallurgical Consultant/Managing Director, ALTA (Australia) <i>A Metallurgist's Musings, Speculations and What-ifs on Future Industry Driving Forces and Trends</i>
ISR Symposium Keynote	Wayne Heili , Managing Director and CEO, Peninsula Energy Limited (USA) <i>Key Lessons Learned from the Application of ISR to Uranium</i>
Uranium-REE-Lithium Opening	Dr Brett Moldovan , Uranium Production Specialist, Division of Nuclear Fuel Cycle and Waste Technology, Department of Nuclear Energy, International Atomic Energy Agency <i>The Challenges of Operating a Uranium Mill in the Modern Era</i>
Uranium-REE-Lithium Keynote	Dr Julian Hilton , Chairman, Aleff Group (UK) <i>Constructive disruption: Leveraging Key Intangibles for Smarter Uranium Projects</i>
Gold-PM Keynote	Dr James Wang , Deputy Executive Director, State Key Laboratory of Comprehensive Utilization of Low Grade and Refractory Gold Ores, Zijin Mining Group (China) <i>Treatment of Refractory Gold Ores in China</i>

Program Overview

Saturday 19 May to Saturday 26 May



Conference Venue: Pan Pacific Hotel, 207 Adelaide Terrace, Perth

Saturday 19 May

8:30am	Registration Arrival Tea & Coffee	Foyer 5
9:00am	Short Course: A-Z of Copper Ore Leaching	Meeting Room 5

Sunday 20 May

8:30am	Registration Arrival Tea & Coffee	Foyer 5
9:00am	Short Course: SX and its Application to Copper, Uranium & Nickel-Cobalt	Meeting Room 5
2:00-5:00pm	Exhibitor Bump-In	Golden Ballroom
3:00-6:00pm	Registration	Foyer 1

Monday 21 May

7:30am	Presenter Briefing	Goldsworthy
7:30am	Registration	Foyer 1
8:00am	Arrival Tea & Coffee	Golden Ballroom
9:00am	Nickel-Cobalt-Copper Sessions	Grand River Ballroom
5:30-7:30pm	Welcome Reception	Golden Ballroom

Tuesday 22 May

7:30am	Presenter Briefing	Goldsworthy
8:30am	Arrival Tea & Coffee	Golden Ballroom
9:00am	Nickel-Cobalt-Copper Sessions	Grand River Ballroom
6:30-10:00pm	Conference Dinner	Grand River Ballroom West

Wednesday 23 May

7:30am	Presenter Briefing	Boardroom
8:30am	Arrival Tea & Coffee	Golden Ballroom
8:45am	ISR Symposium	Hammersley
9:00am	Nickel-Cobalt-Copper Sessions	Grand River Ballroom

Thursday 24 May

7:30am	Presenter Briefing	Goldsworthy
7:30am	Registration	Foyer 1
8:00am	Arrival Tea & Coffee	Golden Ballroom
9:00am	Uranium-REE-Lithium Sessions	In parallel with Gold-PM Grand River Ballroom East
9:00am	Gold-PM Sessions	In parallel with Uranium-REE-Lithium Grand River Ballroom West
6:00-7:00pm	Happy Hour	Golden Ballroom

Friday 25 May

7:30am	Presenter Briefing	Goldsworthy
8:00am	Arrival Tea & Coffee	Golden Ballroom
8:30am	Uranium-REE-Lithium Sessions	In parallel with Gold-PM Grand River Ballroom East
9:00am	Gold-PM Sessions	In parallel with Uranium-REE-Lithium Grand River Ballroom West

Saturday 26 May

8:30am	Registration Arrival Tea & Coffee	Foyer 5
9:00am	Short Course: Uranium Ore Processing	Meeting Room 5

A-Z of Copper Ore Leaching

Meeting Room 5

8:30am **Registration | Arrival Tea & Coffee** (Foyer 5)

9:00am **Session 1**

10:30am **Morning Tea** (Foyer 5)

10:45am **Session 2**

12:15pm **Lunch** (Monterey's Restaurant)

1:15pm **Session 3**

2:45pm **Afternoon Tea** (Foyer 5)

3:00pm **Session 4**

4:30pm **Close**

Course Presenter

Alan Taylor, Metallurgical Consultant/Managing Director, ALTA Metallurgical Services (Australia)

40+ years' experience in the metallurgical, mineral and chemical processing industries in Australasia, New Zealand, North and South America, Africa, Asia and Europe. He has worked in metallurgical consulting, project development, engineering/construction, plant operations, plant start-up and technology development. Projects and studies include copper, gold/silver, nickel/cobalt, uranium, base metals, phosphates and alumina. [Detailed CV](#)

Course Outline

Leachability of minerals, review of commercial processes, developments and trends:

- Leachability of copper minerals and importance of gangue minerals
- Chemistry of oxide and sulphide copper minerals
- Commercially applied leaching processes
- Process outline, history and status
- Developments and trends

Leaching of copper sulphide concentrates:

- Background
- Processes applied commercially
- Processes operated at demonstration plant scale
- Processes operated at pilot plant scale
- Other process developments
- Trends

Agitated leaching of oxide ores:

- Background
- Typical Commercial Operations
- Typical Flowsheets
- Testwork, Scale-up and Equipment Sizing
- Design Criteria
- Layout
- Industry Trends

Heap leaching:

- Background
- Typical Commercial Operations
- Typical Flowsheets
- Testwork, Scale-up and Equipment Sizing
- Design Criteria
- Layout
- Industry Trends

SX and its Application to Copper, Uranium & Nickel-Cobalt

Meeting Room 5

8:30am **Registration | Arrival Tea & Coffee** (Foyer 5)

9:00am **Session 1**

10:30am **Morning Tea** (Foyer 5)

10:45am **Session 2**

12:15pm **Lunch** (Monterey's Restaurant)

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2:45pm **Afternoon Tea** (Foyer 5)

3:00pm **Session 4**

4:30pm **Close**

Course Presenters

Alan Taylor, Metallurgical Consultant/Managing Director, ALTA Metallurgical Services (Australia)

40+ years' experience in the metallurgical, mineral and chemical processing industries in Australasia, New Zealand, North and South America, Africa, Asia and Europe. He has worked in metallurgical consulting, project development, engineering/construction, plant operations, plant start-up and technology development. Projects and studies include copper, gold/silver, nickel/cobalt, uranium, base metals, phosphates and alumina. [Detailed CV](#)

SX Fire Protection presented by **Larry Moore**, Principal Engineer, Mining and Metallurgy, FM Global (USA).

Responsible for leading engineering activities in the mining and metallurgical industries globally. He consults internationally in fire protection engineering, specializing in mining, mineral processing, and metallurgical refining; oil, gas and petrochemical plants; and in explosion evaluation and analysis.

Course Outline

Advantages

Disadvantages

Basic Process

Organic Liquid Constituents: Extractants; Diluents; Modifiers

SX Contactors

SX Ancillary Facilities

Application to Copper

Application to Uranium

Application to Nickel-Cobalt

Plant Arrangement and Layout

Fire Protection

Materials of Construction

Testwork

Scale-Up and Design Criteria

Plant Operation

Performance and Risk

Industry Trends

Monday 21 May

7:30am **Presenter Briefing** (Goldsworthy)

7:30am **Registration** (Foyer 1)

8:00am **Arrival Tea & Coffee** (Golden Ballroom)

Nickel-Cobalt-Copper Sessions (Grand River Ballroom)

Sponsored by



Welcome and Opening Address

9:00am **Welcome**

Alan Taylor, Managing Director, ALTA Metallurgical Services (Australia)

Sponsor Welcome

Owen Tinkler, Business Development Director, Solvay (USA)

9:10am **Opening: What Is Changing in The Global Minerals Industry - Delivering Value by Leveraging Resources**

Dr Stephen Grocott, Chair, AMIRA International Ltd and Chief Technical Development Officer, CleanTeQ Limited (Australia)

Session Chair: **Mark Benz**, President, MRB International Consulting Ltd (Canada)

Keynote Address

9:50am **Keynote: Flowsheet Options for Cobalt Recovery in African Copper-Cobalt Hydrometallurgy Circuits**

Dr Kathy Sole, Kathryn C. Sole Consulting (South Africa); John Parker, Process Ideas (South Africa); Peter Cole, Peter Cole Metallurgical Services (South Africa); Michael B. Mooiman, Franklin Pierce University, (USA)

10:30am **Morning Tea**

Main Sessions

11:00am **World Copper Mine Supply and Capacity Trends; Challenges for Copper Concentrate Miners, Smelters, Refineries, Byproducts and Waste Disposal**

Carlos Risopatron, International Copper Study Group (ICSG) (Portugal)

11:30am **Using Process Safety Management to Manage Risk in Mineral and Metals Processing Facilities**

Larry J Moore, FM Global (USA)

Ni-Co Laterites and Scandium

12:00pm **The Ramu Nickel Operation: Improve Product Quality Through Optimizing Process Control**

Gao Yong Xue (President), Ramu Nickel Limited (Papua New Guinea); Peter Jolly, Consultant (Australia)

12:30pm **Lunch** Sponsored by **BASF**

Session Chair: **Mike Miller**, Consultant, SNC-Lavalin (Australia)

1:30pm **Development of an HPAL Project and Potential Scandium Recovery**

Emre Ege, Mete Yeşil, A. Safer İplikçioğlu, Egemad (Turkey)

2:00pm **Owendale Scandium Project – Project Update and Metallurgical Testwork Overview**

Boyd Willis, Boyd Willis Hydromet Consulting (Australia); Chad Czerny, Paul Carter, SGS Minerals Metallurgy (Australia)

2:30pm **Use of Predictive Modelling to Optimise the Solvent Extraction Process Design for CleanTeQ's Sunrise Nickel-Cobalt Project**

Simon Donegan, Sunil Jayasekera, Stephen Grocott, CleanTeQ (Australia); Andrew Bekle, Solvay (Australia); Bill Szolga, Solvay (USA)

3:00pm **Afternoon Tea**

3:30pm **A Holistic Approach to Pre-Concentrate Nickel in Laterite Ores**

Saeed Farrokhpay, Université de Lorraine/University of Queensland (France/Australia); Lev Filippov, Université de Lorraine (France)

4:00pm **Laterite and the Commodity Price Cycle**

Mike Dry, Arithmetek Inc. (Canada)

Filtration

4:30pm **Dewatering and Washing of Nickel Laterite Tailings**

Andrew Hawkey, Francesco Kaswalder, Davide Cavalli, Diemme Filtration (Aqseptence Group) (Australia/Italy)

5:00pm **Managing Ultrafine Solids at Poseidon Nickel's Mt Windarra Minesite**

Mark Mullett, Veolia Mining and Metallurgy (Australia); David Ralph, Murdoch University (Australia); Michael Rodriguez, Poseidon Nickel (Australia)

5:30-7:30pm **Welcome Reception** (Golden Ballroom)

Sponsored by **NobelClad**

Tuesday 22 May

7:30am **Presenter Briefing** (Goldsworthy)

8:30am **Arrival Tea & Coffee** (Golden Ballroom)

Nickel-Cobalt-Copper Sessions (Grand River Ballroom)

Sponsored by



Session Chair: Andrew Bekle, MEP Technical Sales Representative/New Business Development South East Asia, Solvay (Australia)

Pressure Leach Equipment

9:00am **Dynamics of Piston Diaphragm Pumps in Autoclave Feed Applications**

Erik Vlot, Weir Minerals (Netherlands)

9:30am **Protective Surface Treatment and Technology Roadmap for HPAL and POx Applications – Velan Update**

Fadila Khelfaoui, Luc Vernhes, Craig Bekins, Nicolas Lourdel, Duke Tran, Velan (Canada); Fabrice Pougoum, Polytechnique Montreal (Canada); Dominique Poirier, National Research Council of Canada (Canada); Gary Lantzke, Callidus Welding Solutions (Australia)

10:00am **Implementing an SSV Standard Practice for the Hydrometallurgy Industry**

Ross Waters, CGIS (Canada)

10:30am **Morning Tea**

Nickel Sulphate

11:00pm **The Production of High Purity Nickel Sulfate Hexahydrate Suitable for Lithium Ion Batteries by Evaporative Crystallisation**

John Warner, Stuart Bradbury, Nipen Shah, Jord International (Australia)

Cementation / SX/EW

11:30am **Cleanmetals Presentation of Metals Cementation in an Agitated Fluidized Bed (Copper Example)**

Guillaume Lefort, Dominique Richon, Cleanmetals SA (Switzerland)

12:00pm **Ameliorating the Impact of Colloidal Silica on Copper SX – The MMG Sepon Example**

Liz Brown, Jimmy Lim, Leonardo Paliza, MMG LXML Sepon (Laos); Kevin Rees, Nigel Thiel, MMG Limited (Australia); Sasha Boskovic, Andrew Coveney, Huntsman Performance Products (Australia)

12:30pm **Lunch** Sponsored by **BASF**

Session Chair: Graham Seal, Sales Manager Lightnin, SPX Flow Technology Australia Pty Ltd (Australia)

1:30pm **The Impact of Polymeric Clarifying Agents on the Phase Disengagement and Kinetics of Solvent Extraction**

Jack Bender, Mitchell Catling, John Milligan, Brenda Delgado, BASF Mining Solutions (USA)

2:00pm **Development, Design and Implementation of Outotec's VSF X Solvent Extraction Technology**

Tuomas Hirsi, Rami Saario, Outotec (Finland) Oyj (Finland); Mark Weatherseed, Outotec (Australia)

2:30pm **Design and Material Selection Considerations for Solvent Extraction and Electrowinning Plants**

Bernadette Currie, Ausenco (Australia); Graeme Miller, Miller Metallurgical International Limited (Australia)

3:00pm **Afternoon Tea**

3:30pm **Application of Lagrange Energy Methods to Development of Acid Mist Control Technologies for Base Metals Electrowinning**

Sabdiel Mella, Jorge Mella, Randy Vergara, Zeryan Guerra and Fernando Guerrero, SAME S.A. (Chile)

Hydrometallurgy

4:00pm **The Feasibility of Lead Metal Production at LeadFX's Paroo Station Lead Mine**

David Dreisinger, InCoR Technologies Limited/InCoR Energy Materials Limited (Canada); Ken Baxter, Mario Di Cristofaro, Hermann Scriba, SNC-Lavalin (Australia); Nick Waters, InCoR Energy Materials Limited (Australia); Andrew Worland, Tom Cooper, LeadFX Inc (Australia); Neil Bourne, David Potts, Roy Hampson, ALS Global Metallurgical Services (Australia)

4:30pm **Corrosion Protection in Hydrometallurgical Ore Processing Plants: Materials – Application – Maintenance**

Dave Barnett, TIP TOP Oberflächenschutz Elbe GmbH (Germany)

6:30pm Drinks **Conference Dinner** (Grand River Ballroom West)

Sponsored by **Jord International**

7:00pm Dinner

10:00pm

Close

Address: A Metallurgist's Musings, Speculations and What-ifs on Future Industry Driving Forces & Trends

Alan Taylor, Managing Director, ALTA Metallurgical Services (Australia)

Wednesday 23 May

7:30am **Presenter Briefing** (Boardroom)

8:30am **Arrival Tea & Coffee** (Golden Ballroom)

Nickel-Cobalt-Copper Sessions (Grand River Ballroom)

Sponsored by



Session Chair: John Riordan, Process Manager, Minnovo Pty Ltd (Australia)

Hydrometallurgy (Cont)

9:00am **Autogenic Reagent Generation for Purification of Process Liquors: Case Studies**

Bonginkosi Nkosi, Conny Sehlola, Mintek (South Africa)

9:30am **Thickener Design, Control and Development**

Mike Miller, SNC-Lavalin (Australia)

10:00am **Evaluation of the Channelling Effect of Gravity Dominated Packed Beds Pertaining to Heap Leaching Hydrodynamics**

W. Ashane M. Fernando, I.M. Saman K. Ilankoon, Monash University (Malaysia)

10:30am **Morning Tea**

Hydromet Processing of Copper, Nickel & Cobalt Sulphides Forum

11:00am **Comparative Analysis of Lixiviant/Oxidant Systems for Chalcopyrite Leaching from Coarse Samples at Elevated Temperature**

Tania Hidalgo, Curtin University/CSIRO (Australia); Laura Kuhar, CSIRO (Australia); Andreas Beinlich, Andrew Putnis, Curtin University, (Australia)

11:30am **The Use of Additives in the Leaching of Primary Copper Sulfides in Acidic Ferric Sulfate Media Under Recycle Solution Conditions Observed in Heap Leaching**

Aleksandar N. Nikoloski, Glen P. O'Malley, Murdoch University (Australia)

12:00am **Review of Sequence Assay Schemes for Copper Speciation and its use in GlyLeach™**

Frank Trask, Mining and Process Solutions (Australia)

12:30pm **Lunch** Sponsored by **BASF**

Session Chair: Alan Taylor, Managing Director, ALTA Metallurgical Services (Australia)

1:30pm **Copper Cobalt Gold Project Flowsheet Development**

Damian Connelly, Brett Morgan, Josh Brown, Mineral Engineering Technical Services Pty Ltd (METS) (Australia)

2:00pm **CESL Cobalt Process Development – Comparison of Cobalt Product Economics**

Justin Wu, Teck Resources Limited (Canada)

2:30pm **Leaching of Cobalt Bearing Nickel Sulfide and Furnace Converter Mattes with Alkaline Glycine, and Subsequent SX and IX**

Jacques Eksteen, Elsayed Oraby, Lurika Lombard, Lauren Di Prinzio, WASM, Curtin University (Australia)

3:00pm **Afternoon Tea**

3:30pm **Process Update on Dynamic Heap Bioleaching of a Black Schist Ore**

Sarita Ahoranta, Harri Natunen, Antti Arpalahti, Terrafame (Finland)

4:00pm **The Mondo Minerals Nickel Sulfide Bioleach Project: Maximising Value Through Gold Recovery**

Arto Laukka, Janne Seppälä, Mondo Minerals Nickel Oy (Finland); John Neale, Mintek (South Africa); Pieter van Aswegen, P Met. Consulting cc. (South Africa); Stephen Barnett, Consultant (UK); Antti Taskinen, Krista Koistinen, Geological Survey of Finland (Finland)

4:30pm **Hydromet Processing of Copper, Nickel & Cobalt Sulphides Panel Discussion and Q&A**

Panel Chair: Lourdes Valle, Principal Process Engineer, BHP Billiton (Australia)

Conference Close

In Situ Recovery (ISR) Symposium

In parallel with Nickel-Cobalt-Copper Sessions

Wednesday 23 May



Organised in partnership with **CSIRO Minerals**

Wednesday 23 May

7:30am **Presenter Briefing** (Boardroom)

7:30am **Registration** (Foyer 1) | **Arrival Tea & Coffee** (Golden Ballroom)

ISR Symposium (Hammersley)

Sponsored by



8:45am **Opening and Sponsor's Welcome**

Dr Dave Robinson, Technology Leader In Situ Recovery and Processing, CSIRO Mineral Resources/Mining3

Session Chair: Dr Dave Robinson, Technology Leader In Situ Recovery and Processing, Mining3 (Australia)

8:50am **Keynote Address: Key Lessons Learned from the Application of ISR to Uranium**

Wayne Heili, Managing Director and CEO, Peninsula Energy Limited (USA)

9:30am **Supporting Good Practice and Development of Uranium In Situ Leach Mining Worldwide – IAEA Involvement**

Peter Woods, Brett Moldovan, International Atomic Energy Agency (IAEA), Austria

10:00am **Application of ISL Technology for Recovery of Metals from Remnant Low-Grade Ores Post Block Cave Mining**

John O'Callaghan, Brigitte Seaman, Newcrest Mining Limited (Australia)

10:30am **Morning Tea**

Session Chair: Dr Laura Kuhar, Research Team Leader, CSIRO (Australia)

11:00am **Optimization of Low-Grade Uranium In-Situ Leaching in a Roll-Front Deposit, Kazakhstan**

Anthony Le Beux, Olivier Regnault, Gilles Joubert, Orano, (France); Cesar Garcia Vasquez, Nicolas Fiet, Katco (Kazakhstan)

11:30am **Predictive Simulation and Optimization of Uranium In Situ Recovery Using 3D Reactive Transport Simulation at the Block Scale**

Vincent Lagneau, MINES ParisTech, PSL Research University (France); Olivier Regnault, Anthony Le Beux, Orano, Paris La Défense (France)

11:50am **Modeling of Gold Recovery Through In-Situ Leaching Using Multi-Component Reactive Transport**

Ali Karrech, M. Attar, M. Elchalakani, University of Western Australia (Australia); E.A. Oraby, J.J. Eksteen, Curtin University (Australia); A.C. Seibi, University of Louisiana (USA)

12:10pm **In-Situ Recovery. Opportunities, Challenges and Solutions**

Maxim Serebkin, CSA Global Pty Ltd (Australia); Igor Solodov, ARMZ Holding (Russia)

12:30pm **Lunch** Sponsored by **BASF**

Session Chair: Dr Dave Robinson, Technology Leader In Situ Recovery and Processing, Mining3 (Australia)

1:30pm **Testing the Feasibility of Electrokinetic In Situ Leaching**

Evelien Martens, Henning Prommer, CSIRO Land and Water/University of Western Australia (Australia); Xianwen Dai, Paul Breuer, CSIRO Mineral Resources (Australia); Andy Fourie, University of Western Australia (Australia)

2:00pm **Seismic Ore Body Characterisation and ISR Monitoring**

Andrej Bóna, Curtin University (Australia); Anton Egorov, Curtin University/Lomonosov Moscow State University (Australia/Russia)

2:20pm **Real Time Sensing Technology for Leaching Processes**

Miao Chen, Mikko Vepsäläinen, Kathie McGregor, Justin Spangaro, CSIRO Mineral Resources (Australia)

2:40pm **Laboratory Testwork to Support the Development of Uranium ISR Operations**

Mark Maley, Bob Ring, ANSTO Minerals (Australia)

3:00pm **Afternoon Tea**

Session Chair: Dr Laura Kuhar, Research Team Leader, CSIRO (Australia)

3:30pm **Chemistry in the Service of ISR**

Richard Macoun, BASF Mining Solutions (Australia)

4:00pm **In-Situ Bioleaching in 512 Uranium Deposit, NW-China**

Zhanxue Sun, Jinhui Liu, Yipeng Zhou, Yajie Liu, Weijun Shi, Gongxin Chen, Xuegang Wang, East China University of Technology, (China)

4:30pm **In Situ Metal Recovery: A Role for Microbiology**

Frank F. Roberto, Newmont USA Limited (USA); D. Barrie Johnson, Bangor University (Wales)

5:00pm **Geomimetics: Nature Informing ISR From Au-Bearing Sulphides and Ni Laterites**

Steven Micklethwaite, Scarlett Southall, Andrew Friedrich, Joel Brugger, Monash University (Australia)

5:30pm **Q&A Open Discussion**

Symposium Close

Uranium-REE-Lithium Sessions

In parallel with Gold-PM Sessions

Thursday 24 May to Friday 25 May

Organised in cooperation with the **International Atomic Energy Agency (IAEA)**



Thursday 24 May

7:30am	Presenter Briefing (Goldsworthy)
7:30am	Registration (Foyer 1)
8:00am	Arrival Tea & Coffee (Golden Ballroom)
Uranium-REE-Lithium Sessions (Grand River Ballroom East) <div> Sponsored by </div>	
Welcome and Opening Address	
9:00am	Welcome Alan Taylor, ALTA Metallurgical Services (Australia)
	Sponsor Welcome Mike Dry, Consulting Partner, OLI Systems (USA)
9:10am	Opening Address: The Challenges of Operating a Uranium Mill in the Modern Era Dr Brett Moldovan, Uranium Production Specialist, Division of Nuclear Fuel Cycle and Waste Technology, Department of Nuclear Energy, International Atomic Energy Agency (IAEA) (Austria)
	<i>Session Chair: Simon Ballestrin, Project Manager/Lead Process Metallurgical Engineer, GPA Engineering (Australia)</i>
Keynote Address	
9:50am	Keynote Address: Constructive Disruption: Leveraging Key Intangibles for Smarter Uranium Projects Dr Julian Hilton, Chairman, Aleff Group (UK)
10:30am	Morning Tea
Uranium Leaching	
11:00am	Technological Innovation and Development of In-Situ Leaching Uranium in China Yahui Tan, Wensheng Liao, Yan Jiang, Beijing Research Institute of Chemical Engineering and Metallurgy (BRICEM) (China)
11:30am	Column Bioleaching in a Volcanic Rock Type Uranium Deposit, Southeast-China Gongxin Chen, Zhanxue Sun, Yajie Liu, Jinhui Liu, Weijun Shi, Xuegang Wang; East China University of Technology (China)
Uranium IX / Precipitation	
12:00pm	Comparison of WBA and High Capacity SBA Resins for the Recovery of Uranium from Saline Leach Liquors James Quinn, Karin Soldenhoff, Tomasz Safinski, ANSTO Minerals (Australia); Keith Bowles, BOSS Resources Ltd (Australia)
12:30pm	Lunch Sponsored by Purolite
	<i>Session Chair: Dr James Quinn, Senior Hydrometallurgist, ANSTO Minerals (Australia)</i>
1:30pm	Development of an Efficient Precipitation Process for Product Recovery from Leach Liquor of a Low-Grade Dolostone Hosted Uranium Ajoy Kumar Singh, T.S. Nikhilesh Iyer, A.K. Sharma, Vivekanand. Kain and Madangopal Krishnan, Bhabha Atomic Research Centre (India)
2:00pm	Bifunctional Ligands for High Selective Extraction and Recovery of Uranium(VI) from Acidic Media Including Phosphoric Solutions Guilhem Arrachart, Raphaël Turgis, Antoine Leydier, Stéphane Pellet-Rostaing, ICSM-UMR 5257, CEA, CNRS, University of Montpellier, ENSCM (France); Gilles Bernier, Manuel Miguiditchian, CEA, SMCS, LCPE (France)
REE	
2:30pm	Advances on Scandium Recovery Beyond State of the Art Bengi Yagmurlu, MEAB Chemie Technik GmbH/RWTH Aachen (Germany); Wenzhong Zhang, Risto Koivula, University of Helsinki (Finland); Dzenita Avdibegovic, Mercedes Regadio, Koen Binnemans, KU Leuven (Belgium); Carsten Ditttrich, MEAB Chemie Technik GmbH (Germany); Bernd Friedrich, RWTH Aachen (Germany)
3:00pm	Browns Range Heavy Rare Earths – Driving the EV Evolution George Bauk, Northern Minerals (Australia)
3:30pm	Afternoon Tea
4:00pm	Recovery of Rare Earth Elements from a Norwegian Deposit Erik Larsen, Håkon Havskjold, Ida Røysi, Kurt Aasly, Przemysław B. Kowalczyk, Norwegian University of Science and Technology (Norway)
4:30pm	Rare Earth and Precious Metals Recovered by CCIX – Continuous Countercurrent Ion Exchange Yvan De Busscher, Filip Rochette, PuriTech Ltd (Belgium)
5:00pm	Molecular Systems for Rare Earth Elements Extraction from Phosphoric Acid Medium Stéphane Pellet-Rostaing, Guilhem Arrachart, Sandrine Dourdain, Marcoule Institute for Separation Chemistry (ICSM) (France)
5:30pm	Scale: An Emerging Project for European Scandium Supply Carsten Ditttrich, MEAB Chemie Technik GmbH (Germany); Bengi Yagmurlu, MEAB Chemie Technik GmbH/RWTH Aachen (Germany)
6:00-7:00pm	Happy Hour (Golden Ballroom) Sponsorship available

Thursday 24 May

7:30am **Presenter Breakfast** (Goldsworthy)

7:30am **Registration** (Foyer 1)

8:00am **Arrival Tea & Coffee** (Golden Ballroom)

Gold-PM Sessions (Grand River Ballroom West)

Sponsored by



9:00am

Welcome

Allison Taylor, Conference & Exhibition Manager, ALTA Metallurgical Services (Australia)

Sponsor Welcome

Gregory Mann, Business Director, Koch Knight, Asia-Pacific Operations (Australia)

Session Chair: Dr Jacques Eksteen, Chair: Extractive Metallurgy, Director: Gold Technology Group, Curtin University (Australia)

Keynote Address

9:15am

Keynote Address: Treatment of Refractory Gold Ores in China

Dr James Wang, Deputy Executive Director, State Key Laboratory of Comprehensive Utilization of Low Grade and Refractory Gold Ores, Zijin Mining Group (China)

Main Sessions

10:00am

Minimising the Exposure to Hazardous Contaminants in Gold Rooms

Lindy Nield, Daisy Tristante, Department of Mining, Industry, Regulation and Safety (DMIRS) (Australia)

10:30am

Morning Tea

Gold Analysis

11:00am

Development and Operation of PhotonAssay System for Rapid Analysis of Gold in Mineral Ores

James Tickner, Chrysos Corporation Ltd/CSIRO/University of Wollongong (Australia); Rhys Preston, Dirk Treasure, Chrysos Corporation Ltd (Australia)

11:30am

Optimization of an Industrial Gamma-Activation Assay System for the Analysis of Gold and Rare Earth Metal Ores

Alexander Sokolov, Vladimir Gostilo, Elena Hasikova, Baltic Scientific Instruments (Latvia); Mikhail Demsky, CORAD (Russia)

Process Development / Optimisation

12:00pm

Possible Applications of Ore Sorting in Gold Mining and Processing Operations – An Economic Analysis

Tony Parry, Tony Parry & Associates (Australia)

12:30pm

Lunch Sponsored by Purolite

Session Chair: Dr Stephen La Brooy, Principal Process Engineer, Ausenco (Australia)

1:30pm

Transitioning from Single Stage SAG Mill Through to Fine Crushing and Ball Milling

Damian Connelly, Mineral Engineering Technical Services Pty Ltd (METS) (Australia)

2:00pm

Bulk Materials Science; The Key to Taking Heap Leach Performance from Good to Great

Grant Wellwood, Jenike & Johanson Pty Ltd (Australia)

2:30pm

Site Based Cyanide Production using New Generation Plasma

Pradeep Shukla, Victor Rudolph Nauts, University of Queensland (Australia); Geoff Duckworth, Christopher Dunks; Synergen Met Pty Ltd (Australia)

3:00pm

Modern Carbon Management: 'Gold in the Bank not your Tailings Dam'

Tim Bell, Wayne Lodge, Gekko Systems (Australia); William Staunton, WASM, Curtin University (Australia)

3:30pm

Afternoon Tea

4:00pm

Optimizing B2Gold's Masbate Carbon Circuit using CIP/CIL Modelling

Tyler Cray, Chris Fleming, SGS Canada Inc. (Canada), John Rajala, B2Gold Corp. (Canada), Ray Mead, Aileen Insalada, B2Gold Corp. (Philippines)

4:30pm

Validation of a New Technology for Gold Recovery from Carbon Fines

Olga Bazhko, Mintek (South Africa); Presented by Jakolien Strauss, Mintek (South Africa)

5:00pm

Carbon Kiln Sizing Testwork

Jeffrey K Claflin, Earendil Pty Ltd (Australia); Stephen LaBrooy, Malcolm Guthrie, Aaron M Claflin, Ausenco (Australia)

5:30pm

Economic Appraisal of Mine Tailings at Mintails Gold Mine, South Africa

Ntiyiso Ally Mahlaule, Khumbudzo Tshiwandalani, University of Venda (South Africa)

6:00-7:00pm

Happy Hour (Golden Ballroom)

Sponsorship available

Uranium-REE-Lithium Sessions

In parallel with Gold-PM Sessions

Thursday 24 May to Friday 25 May

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Friday 25 May

7:30am **Presenter Briefing** (Goldsworthy)

8:00am **Arrival Tea & Coffee** (Golden Ballroom)

Uranium-REE-Lithium Sessions (Grand River Ballroom East)

Sponsored by



Session Chair: Dr Mike Dry, Consulting Partner, OLI Systems (USA)

By Product Uranium

8:30am **Opportunities for Producing Uranium Without Developing a New Mining Operation**

Alan Taylor, ALTA Metallurgical Services (Australia)

9:00am **Department of Radionuclides During Copper Concentrates Metathesis Reactions**

Kelly Byrne, William Hawker, Metallurgical Engineering Program, The University of Queensland (Australia)

Lithium Processing Forum

9:30am **Design Considerations for Lithium Pilot Plants**

Adam Whalley, Paul Martin, Zeton Inc. (Canada)

10:00am **A Guide for Ion Exchange Resins Used in Lithium Concentrate Purification**

Stefan Neufeind, LANXESS Deutschland GmbH (Germany); R.Bhavaraju, LANXESS Pty Ltd (Australia)

10:30am **Morning Tea**

11:00am **What is Battery Grade Lithium Carbonate?**

Grant Harman, Lithium Consultants Australasia, (Australia)

11:30am **Removal of Minor and Trace Impurities from Lithium Leach Liquors**

Stephen La Brooy, Andrea McGlynn, Ausenco (Australia); Grant Harman, Lithium Consultants Australasia (Australia)

12:00pm **Mitigating Innovative Plant Start-Up Risks**

Andrea Langridge, Scott Brindley, Alan Langridge, Jessica Frigger, Ausenco (Australia); Grant Harman, Lithium Consultants Australasia (Australia); Jeffrey Claflin, Earendil Pty Ltd (Australia)

12:30pm **Lunch** Sponsored by **Purolite**

Session Chair: Johanna van Deventer, Technical Sales Manager, Purolite (South Africa)

1:30pm **The Sonora Lithium Project – Molding Success from Clay**

Alan Langridge, Andrea McGlynn, Ausenco (Australia); Jeffrey Claflin, Earendil Pty Ltd (Australia)

2:00pm **Aqueous Chemistry of Lithium Production**

Mike Dry, Arithmetek Inc. (Canada); A.J. Gerbino, OLI Systems Inc. (USA)

2:30pm **Lepidolite Processing Using Sulphation Baking: A Comparison Against Conventional Processing Flowsheets**

Adam J. Roper, Christopher S. Griffith, ANSTO Minerals (Australia)

3:00pm **Afternoon Tea** (Foyer 3)

3:30pm **The Mineralogy of a LCT Pegmatite Ore - Implications for Processing**

Mark Aylmore, Curtin University (Australia)

4:00pm **From Mantle to Motor Vehicle – The Quest for Sustainability**

Adrian Griffin, Lithium Australia (Australia)

4:30pm **Lithium Processing Panel Discussion and Q&A**

Panel Chair: Grant Harman, Consultant, Lithium Consultants Australasia (Australia)

Conference Close

Gold-PM Sessions

In parallel with Uranium-REE-Lithium Sessions

Thursday 24 May to Friday 25 May



Friday 25 May

7:30am **Presenter Breakfast** (Goldsworthy)

8:30am **Arrival Tea & Coffee** (Golden Ballroom)

Gold-PM Sessions (Grand River Ballroom West)

Sponsored by



Session Chair: Mark Martin, Business Director, Global Projects, Koch Knight LLC (USA)

Alternative Lixivants

9:00am **Processing of High Silver Gold Ores with GlyCat™ Technology**

Jacques Eksteen, Elsayed Oraby, WASM, Curtin University (Australia)

9:30am **Update on Glycine Leaching Research, Development and Commercialisation**

Tim Newton, Mining and Process Solutions (Australia)

10:00am **Comparison of Cyanide and Selective Alternative Lixivants for the Treatment of Free Milling Gold Ores**

Sazini Makamu, Mintek (South Africa)

10:30am **Morning Tea**

Refractory and Complex Gold Ores Forum

11:00am **In Situ Characterization of Sulfide Minerals During Leaching Processes**

Miao Chen, Yi Yang, CSIRO Mineral Resources (Australia)

11:30am **A Modelling Program for Natural Oxidation of Pyrite in Refractory Gold-Bearing Rock Stockpiles**

Hang Wang, Peter Dowd, Chaoshui Xu, The University of Adelaide, Australia

12:00pm **A Salt-Roast Direct Leach Approach to Chromite Rich Platinum Group Metal Ores**

Cleophae Ngoie Mpinga, Jacques Eksteen, Elsayed Oraby, WASM, Curtin University (Australia)

12:30pm **Lunch** Sponsored by **Purolite**

Session Chair: John O'Callaghan, Head of Metallurgy, Newcrest Mining Ltd (Australia)

1:30pm **Practical Insights from Fundamental Studies on Iron-Arsenic POX Residues**

Jakolien Strauss, Volha Yahorava, Mintek (South Africa)

2:00pm **Application of the HiTeCC Technology at Nordgold's Suzdal Operation to Combat Preg Robbing and Enhance Gold Recovery**

Craig van Buuren, Outotec Biomin (Pty) Ltd (South Africa); Grigori Yakovenko, Krutskikh Sergei, Gulmira Beisebayeva, Alei Financial Investment Corporation Joint Stock Company (Kazakhstan); Olga Tupikina, Nordgold (Russia)

2:30pm **Treatment Options for Processing Double Refractory Material from the Barberton Greenstone Belt in South Africa**

Sazini Makamu, Bongiwe Nkabane, Pfariso, Mintek (South Africa)

3:00pm **Afternoon Tea** (Foyer 3)

3:30pm **Çöpler Sulphide Expansion Project Construction Update**

Karel Osten, Giovanni Pattarino, Wood plc (Australia); Vic Ketcham, Anagold Madencilik (USA)

4:00pm **Continued Development of the BIOX Process for the Treatment of Refractory Gold Ores**

Jan van Niekerk, Craig van Buuren, Outotec Biomin (Pty) Ltd (South Africa); Marko Latva-Kokko, Outotec (Finland) Oy (Finland)

4:30pm **Refractory and Complex Gold Ores Panel Discussion and Q&A**

Panel Chair: Alan Taylor, Managing Director, ALTA Metallurgical Services (Australia)

Conference Close

Uranium Ore Processing

Meeting Room 5

8:30am **Registration | Arrival Tea & Coffee** (Foyer 5)

9:00am **Session 1**

10:30am **Morning Tea** (Foyer 5)

10:45am **Session 2**

12:15pm **Lunch** (Monterey's Restaurant)

1:15pm **Session 3**

2:45pm **Afternoon Tea** (Foyer 5)

3:00pm **Session 4**

4:30pm **Close**

Course Presenter

Alan Taylor, Metallurgical Consultant/Managing Director, ALTA Metallurgical Services (Australia)
40+ years' experience in the metallurgical, mineral and chemical processing industries in Australasia, New Zealand, North and South America, Africa, Asia and Europe. He has worked in metallurgical consulting, project development, engineering/construction, plant operations, plant start-up and technology development. Projects and studies include copper, gold/silver, nickel/cobalt, uranium, base metals, phosphates and alumina. [Detailed CV](#)

Course Outline

Uranium Ores and Minerals

Implications of Mineral Composition

Pre-Concentration

Pre-Roasting

Leaching Mediums

Acid Leaching of Uranium Minerals

Carbonate Leaching of Uranium Minerals

Leaching Processes

By-Product Uranium Recovery Processes

Key Process Operations and Equipment

Ion Exchange: IX Resins; IX Systems

Solvent Extraction: SX Extractants; SX Contactors

Product Recovery Processes

Testwork and Scale-Up

Keys to Successful Project Development

Grade Control

Special Health and Safety Issues

Development of an Agitated Acid Leach Project: Testwork and Scale-Up; Design Criteria; Key Project Design Issues; Plant Layout Considerations

Industry Trends



Short Courses

ALTA Metallurgical Services
Celebrating 32 Years of Service

ALTA presents seven **practically-oriented technical short courses** as a valuable introduction for newcomers and a useful refresher for old hands. Courses are kept current with annual updates.

Short Courses

A-Z of Copper Ore Leaching

Copper SX/EW Basic Principles and Detailed Plant Design

Copper Oxide Ore Heap Leaching Testwork and Scale-Up

Heap Leaching and its Application to Copper, Gold, Uranium and Nickel Ores

Solvent Extraction and its Application to Copper, Uranium & Nickel-Cobalt

Treatment of Nickel-Cobalt Laterites

Uranium Ore Processing

Participation Options

Scheduled courses (below)

Presentation at your office or via Skype

Purchase short course manuals and immediately download from [Publications](#) (discounts for 2 or more)

Scheduled Courses

19 May 2018	A-Z of Copper Ore Leaching	ALTA 2018 Perth, Australia
20 May 2018	SX and and Application to Copper, Uranium and Nickel-Cobalt	ALTA 2018 Perth, Australia
26 May 2018	Uranium Ore Processing	ALTA 2018 Perth, Australia
18 May 2019	Treatment of Nickel-Cobalt Laterites	ALTA 2019 Perth, Australia
19 May 2019	Copper SX/EW Basic Principles and Detailed Plant Design	ALTA 2019 Perth, Australia
25 May 2019	Heap Leaching and its Application to Copper, Gold, Uranium and Nickel Ores	ALTA 2019 Perth, Australia

Course Presenter

The courses are presented by **Alan Taylor**, Metallurgical Consultant and Managing Director, ALTA Metallurgical Services. Alan draws from his extensive first-hand experience with major engineering firms and as an independent consultant. He has worked on a wide variety of projects from the late 1960s through to the present time – a period which has seen the introduction of many new technical developments.

Alan has 40+ years' experience in the metallurgical, mineral and chemical processing industries in Australasia, New Zealand, North and South America, Africa, Asia and Europe. He has worked in metallurgical consulting, project development, engineering/construction, plant operations, plant start-up and technology development. Projects and studies have involved copper, gold/silver, nickel/cobalt, uranium and base metals.

Since 1985, as an independent metallurgical consultant, Alan has as undertaken feasibility studies, project assessment, project development, supervision of testwork, flowsheet development, basic engineering, supervision of detailed engineering, plant commissioning and peer reviews and audits. Clients have included a variety of major and junior mining, exploration and engineering companies throughout Australia and overseas.



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		Price AUD	SALE Price	Total AUD
Short Course Manuals	A-Z of Copper Ore Leaching	\$300	\$225	
	Copper Oxide Ore Heap Leaching Testwork and Scale-Up	\$300	\$225	
	Copper SX/EW Basic Principles and Detailed Plant Design	\$300	\$225	
	Heap Leaching and its Application to Copper, Uranium and Nickel Ores	\$300	\$225	
	SX and its Application to Copper, Uranium and Nickel-Cobalt	\$300	\$225	
	Treatment of Nickel-Cobalt Laterites	\$300	\$225	
	Uranium Ore Treatment	\$300	\$225	
Conference Proceedings	2018 Nickel-Cobalt-Copper *July Delivery*	\$195	\$146	
	2017 Nickel-Cobalt-Copper	\$95	\$71	
	2018 ISR Symposium *July Delivery*	\$75	\$56	
	2018 Uranium-REE-Lithium *July Delivery*	\$125	\$94	
	2017 Uranium-REE-Lithium	\$65	\$49	
	2018 Gold-PM *July Delivery*	\$125	\$94	
	2017 Gold-PM	\$65	\$49	
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ALTA Metallurgical Services

Celebrating 32 Years of Service

ALTA Metallurgical Services (**ALTA**) was established by metallurgical consultant **Alan Taylor** in 1985, to serve the worldwide mining, minerals and metallurgical industries. **ALTA** offers a wide range of services and resources to the metallurgical industry.

Consulting

High-level metallurgical and project development consulting.

Short Courses

Practically-oriented short courses presented by Alan Taylor. Topics include treatment of nickel laterites, copper ore leaching, uranium ore processing, copper SX-EW, heap leaching and solvent extraction.

Conferences

ALTA conferences are one of the world's premier annual metallurgical events. **Next conference: [ALTA 2019](#)** is the 24th annual conference and will be held 18-25 May in Perth, Australia. The event comprises five international technical conferences, three short courses and an international trade exhibition. It features a highly-focused program, topical forums and presentations from key international speakers.

Publications

Proceedings and manuals from ALTA conferences, seminars and short courses.

MetBytes

Free technical articles offering metallurgical commentary and insights.

Free Library

Includes proceedings from 1995-2016 Nickel-Cobalt-Copper, Uranium-REE and Gold-PM conferences for free download (1340+ papers). The library will be expanded regularly, providing a major ongoing resource to the industry. A selection of papers from recent conferences are also available.



Alan has over 40 years' experience in the metallurgical, mineral and chemical processing industries in Australasia, New Zealand, North and South America, Africa, Asia and Europe. He has worked in metallurgical consulting, project development, engineering/construction, plant operations, plant start-up and technology development. Projects and studies have involved copper, gold/silver, nickel/cobalt, uranium and base metals.

Since 1985, as an independent metallurgical consultant, Alan has as undertaken feasibility studies, project assessment, project development, supervision of testwork, flowsheet development, basic engineering, supervision of detailed engineering, plant commissioning and peer reviews and audits. Clients have included a variety of major and junior mining, exploration and engineering companies throughout Australia and overseas.

Extensive experience in:	...including
<ul style="list-style-type: none">• Gold/Silver• Copper• Nickel/Cobalt• Uranium• Base Metals	<ul style="list-style-type: none">• Leaching: atmospheric, heap, in-place, bio. and pressure• Cyanidation and CIP/CIL• Solid/liquid separation• Flotation• Electrowinning and electrefining• Solvent extraction/ion exchange



Call for Papers

About the Conference

ALTA 2019 is one of the world's premier annual metallurgical events, **now in its 24th year**, and a leading platform for metallurgical innovation.

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 **Curtin Gold Technology Group**, part of Western Australian School of Mines.

The emphasis of the program is practical rather than academic, and the theme that runs through the conference is the various aspects of project development. ALTA conferences are well-known for providing exceptional opportunities for the industry to share ideas, innovations, technologies and projects, and develop new contacts and broader networks.

Held over eight days in Perth, it comprises five technical conferences, three short courses, and a trade exhibition. It features highly-focused programs, topical forums and key international speakers.

This is an outstanding platform for exposing the latest worldwide developments in plant operations, process technology, new projects, testwork and scale-up, process modelling and control systems, application of mineralogy and geometallurgy, R&D, equipment, reagents, materials, tailings disposal and environmental alleviation.

PROGRAM OVERVIEW							
Saturday 18 May	Sunday 19 May	Monday 20 May	Tuesday 21 May	Wednesday 22 May	Thursday 23 May	Friday 24 May	Saturday 25 May
SHORT COURSE	SHORT COURSE	CONFERENCE SESSIONS					SHORT COURSE
Treatment of Nickel-Cobalt Laterites	Copper SX/EW Basic Principles & Detailed Plant Design	Nickel-Cobalt-Copper Including Pressure Acid Leaching Forum & Panel		Uranium-REE Including IX Developments Panel <i>in parallel with</i> Gold-PM Including Fit-for-Purpose Leaching Systems Forum & Panel		In Situ Recovery Including Panel <i>in parallel with</i> Lithium Processing Including Panel	Heap Leaching and its Application to Copper, Gold, Uranium & Nickel Ores
		Welcome Reception	Conference Dinner		Happy Hour		
EXHIBITION							

Submit an Abstract

Visit the [ALTA 2019 website](#) and submit your abstract early to secure a place in the program.

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