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11th International

advanced automotive battery conference

19-21 JANUARY 2021

FINAL AGENDA

AdvancedAutoBat.com/Europe

2021 PROGRAMS

Tuesday and Wednesday, 19-20 January

SYMPOSIA

- CHEMISTRY
- ENGINEERING
- RECYCLING

Wednesday and Thursday, 20-21 January

CONFERENCES

- HYBRID & ELECTRIC VEHICLES
- RAW MATERIALS

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TUTORIALS*

*Separate registration required

WEDNESDAY 20 JANUARY 14:30-16:00

TUT1: The Rechargeable Battery Market: Value Chain and Main Trends 2020-2030

Instructor:

Christophe Pillot, PhD, Director, Avicenne Energy

This tutorial will present the 10-year automotive market forecasts from Avicenne and other analysts (micro|Hybrid|P-HEV|EV). Other coverage will include car makers' strategies and advanced energy storage (advanced lead acid|supercap|NiMH|LIB). Additionally, LIB design for P-HEV & EV markets (cylindrical, prismatic, pouch|wounded, stacked, Z fold cells) and LIB cell, module & pack cost structure will be discussed.

WEDNESDAY 20 JANUARY 16:30-18:00

TUT2: Materials for Next-Generation Batteries

Instructor:

George Crabtree, PhD, Director, Joint Center for Energy Storage Research (JCESR), Argonne National Laboratory

This tutorial will cover the materials and performance challenges for next-generation batteries for electric vehicles and the electricity grid. The needs and use cases for storage in these two applications will be analyzed, and the possibilities of advanced lithium-ion, lithium-sulfur, and multivalent batteries for vehicles will be presented. Lithium and magnesium anodes, wide electrochemical window electrolytes, and high-voltage cathodes will receive special attention.

New discovery approaches based on materials simulation and statistical learning will be discussed.

THURSDAY 21 JANUARY 10:00-11:30

TUT3: Solid-State Batteries: Solid Electrolytes, Electrode Interfaces, and Full Cells

Instructor:

Juergen Janek, PhD, Professor, Solid State Ionics & Electrochemistry, Justus Liebig University Giessen

This tutorial will give an overview on the status of solid-state battery development. The scientific basis for solid-state batteries will be explained in detail. The different types of solid electrolytes (oxides, sulfides, polymers) will be introduced, and recent trends will be highlighted.

THURSDAY 21 JANUARY 12:00-13:30

TUT4: LiB and Raw Material Market Overview

Instructor:

Sachiya Inagaki, Senior Executive Manager, Industrial Technology Unit, Yano Research Institute Ltd.

This tutorial gives an overview on the LiB markets(xEV, ESS, and IT) and its material markets (cathode, anode, electrolyte, and separator). You can understand their market trend, such as market size, manufactures share, supply chain relationship, technology trend, and some topics related to the market.

THURSDAY 21 JANUARY 14:00-15:30

TUT5: Li-Ion Cell Design and Manufacturing: Processes, Equipment and Quality Control

Instructor:

James Kaschmitter, CEO, SpectraPower LLC

This tutorial will begin with an overview of Li-ion cell design for performance and manufacturability, including contrasting the performance and characteristics of commonly used materials. The tutorial will then lead into a detailed review of Li-ion cell manufacturing from incoming raw materials through final cell formation, aging and shipment. Manufacturing processes, equipment and production line costs will be contrasted for cylindrical, prismatic and pouch cells. Samples of commonly used cell components will be displayed. Quality control procedures will be described for each step of the cell manufacturing process, including a discussion on how to optimize cell performance, yields and safety. Attendees can expect to leave this tutorial with an understanding of how commercial Li-ion cells are designed and produced.

LITHIUM BATTERY CHEMISTRY

Recent Advancements in Battery Chemistries

TUESDAY 19 JANUARY

SILICON ANODES

9:00 Automotive Solutions For High-Energy Electrodes

Franz Nietfeld, Senior Manager Li Ion Battery Development, BEV & PHEV, Daimler

9:20 Automotive Solutions for High-Energy Electrodes

Kurt Kelty, Vice President, Automotive, Sila Nanotechnologies, Inc.

Sila will introduce an innovative nanocomposite silicon-based anode powder that completely replaces graphite and offers 5x higher gravimetric capacity and enables 20% higher Wh/L today over state-of-the-art lithium-ion. The unique features of this micron-scale anode material include high first cycle efficiency, very low volume changes during each cycle and very low lifetime electrode swell. It's 100% compatible with existing lithium-ion factories and is manufacturable at global scale using commodity precursors.

9:40 Enabling Strategies for High-Loading Si-Anodes

Egbert Figgemeier, PhD, Senior Manager, IEK 12, Helmholtz Institute Muenster

During the last decade, silicon has turned out to be the most promising element for boosting the capacity of anodes for lithium ion batteries. Nevertheless, in commercial cells blends of silicon with graphite are applied reflecting the inherent challenges when trying to stabilize the battery performance over time and usage. The presentation summarizes the most promising and most recent strategies to overcome these challenges by pre-lithiation and electrolyte additives.

10:00 Session Break - View Our Virtual Exhibit Hall

10:20 Transformational Solid State Battery Technology Lionano SE

Alex Yu, Ph.D., Specialty Polymer SSE: The Path to Next Generation EV Batteries, Lionano SE Inc

Dr. Yu of Lionano SE Inc. will discuss the company's efforts to transform battery technology to enable safe, affordable, and manufacturable products for e-Mobility, including the development and performance of the company's segment-leading polymer-based solid-state LPE™ electrolyte

11:00 Newly Developed Denka Acetylene Black to Replace Carbon-Nanotubes in xEV LiB Cells? Denka

Akira Yoda, MA, Battery and Conductive Materials Development, Denka Company Limited

Conductive agents with high conductivity, purity, and a low additive amount are a major factor to increase the energy density of LiB for xEV.To support the next generation of xEV LiB cells, Denka newly developed an acetylene black which has superior battery performance than carbon nanotubes.

11:40 MODERATED Q&A: Session Wrap-Up

Moderator: Martin Winter, PhD, Director & Professor, Electrochemical Energy Technology, University of Muenster

Panelists:

Egbert Figgemeier, PhD, Senior Manager, IEK 12, Helmholtz Institute Muenster

Akira Yoda, MA, Battery and Conductive Materials Development, Denka Company Limited

12:10 Session Break - View Our Virtual Exhibit Hall

CATHODE

12:40 Talk Title to be Announced

Heiko Urtel, Vice President, Global R&D Battery Materials, BASF SE

13:00 Energy Density Limitations in Present Cathode Materials

Karin Kleiner, Assistant Researcher & Chair, Tech Electrochemistry, Technical University of Munich

Charging layered oxides such as NCMs means storage of energy in a metal-oxygen host structure – it proceeds via a reversible oxidation of Ni and hybridization with O. Once Ni-O hybrid states are formed, irreversible reactions set. The lack of ionic Ni limits the reversible capacity. Moreover, the degree of hybridization, which varies with the Ni content, triggers the electronic structure and thus the operation potential of the cathodes.

13:20 Talk Title to be Announced

Juergen Janek, PhD, Professor, Solid State Ionics & Electrochemistry, Justus Liebig University Giessen

13:40 Crystallite Surface Engineering in Polycrystalline High Nickel Cathode Materials CAMX Power

Kenan Sahin, President, CAMX Power

CAMX has been focused on high nickel cathode materials for over a decade, engineering the interior of the secondary particle, having received global patents for the inventions. We will present in more detail our paths to lower cobalt, improve temperature performance, reduce impedance growth, mitigate cracking, and expand SOC operation.

14:00 Session Break - View Our Virtual Exhibit Hall

2:20 CO-PRESENTATION: Talk Title to be Announced

Kolja Beltrop, PhD, CTO. E-Lyte Innovations GmbH

Andy Sharratt, PhD, Chemistry Fellow, Koura R&T, Runcorn

14:40 Application of Advanced Carbon Materials in Lithium-Ion Battery Electrodes

Persefoni E. Kechagia, PhD, Manager R&D, Energy Materials, Cabot Corporation

Through a broad portfolio of advanced carbons that includes carbon nanotubes (CNT), carbon black, (CB), and carbon nanostructures (CNS) Cabot Corp. has brought world leading solutions for lithium-ion battery (LIB) cathodes. Advanced purification technology enables meeting stringent purity requirements of conductive carbon additives (CCA) for LIB applications. Through electrochemical testing of model cells, we demonstrate improvements in conductivity, low temperature, and cycling performance when formulating with Cabot's CCAs.

15:00 Printable Lithium: The Next Step in Energy Density Improvements

Marina Yakovleva, Director, R&D and New Business Development, Livent

With the energy density of battery cells playing an increasingly important role in accelerating EV adoption, Livent's Printable Lithium Technology paves the way for next generation advanced lithium ion batteries and enables rechargeable lithium anode batteries.

15:20 Advanced Lithium Batteries for Accelerating EV Adoption & Powering the Future

Halle Cheeseman, PhD, Program Director, ARPA-E

Over the last ten years, ARPA-E has invested over $250 million and funded 100 projects relating to advanced battery technology. During his presentation Dr. Cheeseman will highlight the accomplishments of recent projects relating to electric vehicles that have focused on lithium solid state battery technology. In addition, future paths for development will be considered and presented.

16:00 MODERATED Q&A: Session Wrap-Up

Moderator: Martin Winter, PhD, Director & Professor, Electrochemical Energy Technology, University of Muenster

Panelists:

Heiko Urtel, Vice President, Global R&D Battery Materials, BASF SE

Karin Kleiner, Assistant Researcher & Chair, Tech Electrochemistry, Technical University of Munich

Juergen Janek, PhD, Professor, Solid State Ionics & Electrochemistry, Justus Liebig University Giessen

Kenan Sahin, President, CAMX Power

Kolja Beltrop, PhD, CTO. E-Lyte Innovations GmbH

Andy Sharratt, PhD, Chemistry Fellow, Koura R&T, Runcorn

Persefoni E. Kechagia, PhD, Manager R&D, Energy Materials, Cabot Corporation

Marina Yakovleva, Director, R&D and New Business Development, Livent

Halle Cheeseman, PhD, Program Director, ARPA-E

16:50 Interactive Roundtable Discussions - View Our Virtual Exhibit Hall

Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers.

ROUNDTABLE 1: Basic Science Research and Advanced Lead Batteries for Automotive Energy Storage Systems Batteries

Matthew Raiford, Manager, Consortium For Battery Innovation

ROUNDTABLE 2: Battery Pack System Cost and Safety - Will Future xEV Battery Packs Increase in Complexity or Simplify and How Will Cost and Safety Be Impacted?

Kevin Konecky, Director, Battery Systems, Fisker, Inc.

ROUNDTABLE 3: Li-Ion Cell Design and Manufacturing: Processes, Equipment and Quality Control

James Kaschmitter, CEO, SpectraPower LLC

ROUNDTABLE 4: How Can Calorimetry Help in Battery Research?

Carlos Ziebert, PhD, Head of Calorimeter Ctr, Thermophysics & Thermodynamics Grp, Karlsruhe Institute of Technology

17:50 Close of Day

WEDNESDAY 20 JANUARY

9:00 Saft's Advanced & Beyond Lithium-Ion Technologies for Mobility Applications

Patrick Bernard, PhD, Director, Research, SAFT

Saft is developing new Li-ion products reflecting market needs: LTO cell for heavy cycling applications, phosphate-based technology for safety critical applications, NMC/Gr-Si-based cells for high-energy applications. Future materials will allow the development of next generations of Li-ion technologies: HV phosphates, LNMO, Li-rich rocksalts and titanium niobium oxide. Beyond conventional Li-ion batteries, Saft has launched a large program of R&D and industrialization on solid state technologies.

9:40 Talk Title to be Announced

Ian Ellerington, Head, Technology Transfer, Faraday Institution

10:00 Improving Manufacturing Efficiencies and Safety for Lithium-Ion Batteries

Zhillian Zhou, PhD, Senior Group Leader, Coatings R/D OEM Deco, Auto Coatings R/D OEM Deco Auto, PPG

Due to growing health & safety concerns, regulations, and restrictions of NMP, a formulated NMP-Free cathode binder product has been developed. This formulated NMP-Free cathode binder product significantly improves operation safety and regulatory compliance while improving manufacturing efficiency and operational flexibility with better or equal battery performance.

10:40 MODERATED Q&A: MODERATED Q&A:Session Wrap-Up

Moderator: Ian Ellerington, Head, Technology Transfer, Faraday Institution

Panelists:

Patrick Bernard, PhD, Director, Research, SAFT

William Brunat, PhD, Global Technical Director, Product Development & Mobility, Coatings R/D OEM Deco Auto, PPG

11:10 Session Break - View Our Virtual Exhibit Hall

11:30 Close of Lithium Battery Chemistry Symposium

PLENARY KEYNOTE SESSION PANEL: EMERGING TECHNOLOGIES AND INDUSTRY PERSPECTIVES

11:45 Plenary Solutions Theatre *(Sponsorship Opportunities Available)*

This panel session will feature a series of short podium presentations on emerging technologies and industry perspectives in vehicle electrification. Each speaker will have 7-8 minutes to present. After all speakers have presented, there will be a moderated Q&A between the speakers and attendees. The presentations are not meant to be a corporate or specific product pitch. Each speaker will focus on a technology and solution framed around a problem or issue related to the expanding market of advanced vehicles and how their organization is solving it.

A 360° Wiew of Battery Solutions by Arkema

Thomas Fine, Global Market Manager Battery, High Performance Polymers, Arkema

Inside and outside the battery cell, Arkema has the market leading technology portfolio of specialty materials for battery systems to increase efficiency, safety and reliability. Despite the impressive progress in lithium ion energy storage technologies achieved today, the challenges faced by battery systems remain significant in terms of energy densities, cost optimization and improved safety performance and durable cycle life. Our solutions help to optimize a better performance and improve the battery energy density, duration, weight reduction and recharging time. Our market-leading portfolio of solutions for battery cover applications inside and outside the cell, from cell to module and battery pack assembly up to battery system integration into the vehicle. We offer you a 360° view on Arkema Battery Solutions in few minutes.

Rising to the Technical Challenges of Automotive LiB Applications with Johnson Matthey's High

Dr Neil Collins, Technology Director, Battery Materials, Johnson Matthey

A global leader in sustainable technologies, JM's vision is for a world that is cleaner and healthier today and for future generations. By applying cutting edge science, Johnson Matthey Battery Materials are creating solutions together with customers that make a real difference to the world around us. Our commitment meeting customer needs is illustrated by our long-term experience in Life Power® LFP manufacturing, Fuel-cell Technology and Johnson Matthey's 40+ years of serving the autocatalyst industry.

11:59 JSR Binders for Environmentally Friendly Manufacturing of New Generation Li-ion Batteries

Stella Deheryan, Application Manager, Emerging Technologies, JSR Micro NV

JSR is a research-oriented organization that pursues close collaborations with leading innovators in a number of industries that are key to the present and future welfare of human society: energy storage, life sciences, electronic materials, display and optical materials. In the energy storage field JSR provides high quality aqueous binders, paving the way to environmental-friendly and cost-effective manufacturing. Our water based binders have superior adhesion and can be used in lower concentrations leading to increased battery rate and cycle life performance. JSR has aqueous binders suited for both anode and cathode chemistries. Our products have excellent compatibility with materials for new generation Ni-rich cathodes and high energy anodes.

12:06 Enabling Next-Gen Li-ion Batteries with sALD

Sandeep Unnikrishnan, Program Manager, High Performance Batteries, Holst Centre

Interfacial engineering is seen as the key to enable more reliable and durable Li-ion batteries. A stable artificial SEI on the high-voltage cathode side and on the anode side are crucial for long-term cyclability of the battery. Compared to pre-passivation of active materials, post-passivation of electrode foils has the benefit of lower interfacial electronic impedance. In this presentation, an innovative high throughput scalable technology will be presented that can do atmospheric pressure, gas-phase passivation of electrode foils for next-generation battery applications.

Safer Batteries!

Peter Kritzer, Dr. rer. nat., E-Mobility & Batteries, Freudenberg FST GmbH

Increased energy density on cell & system level as well as new trends of "Super Charging" result in greater safety challenges. The presentation will show two system components designed to contribute to the improvement of battery safety: a) DIAvent - Overpressure valves with reversible capabilities. and b) Heat Shields - thermal barriers counteracting thermal propagation as well as mechanically balancing the cell modules. Additional innovative concepts will be explored aimed to enhance the safety of future battery systems. To best achieve the targets of each individual battery system, it is highly recommended that specific joint development is needed.

12:40 MODERATED Q&A: Session Wrap-Up

12:40 Talk Title to be Announced

Thomas Fine, Global Market Manager Battery, High Performance Polymers, Arkema

12:40 Talk Title to be Announced

Dr Neil Collins, Technology Director, Battery Materials, Johnson Matthey

12:40 Talk Title to be Announced

Stella Deheryan, Application Manager, Emerging Technologies, JSR Micro NV

12:40 Talk Title to be Announced

Sandeep Unnikrishnan, Program Manager, High Performance Batteries, Holst Centre

12:40 Talk Title to be Announced

Peter Kritzer, Dr. rer. nat., E-Mobility & Batteries, Freudenberg FST GmbH

13:05 Session Break - View Our Virtual Exhibit Hall

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Shmuel De-Leon Energy Ltd

BATTERY ENGINEERING

Building Better Batteries

TUESDAY 19 JANUARY

BATTERY SAFETY

9:00 Safety Implications of Emissions from Li-Ion Batteries

Natalia Lebedeva, PhD, Scientific Project Officer, Energy Storage, European Commission

Emissions of gases, liquids and solids from Li-ion batteries under various conditions, including battery fire, are outlined. Potential implications on safety of electric vehicles and road infrastructure are discussed.

9:20 Battery Safety and Performance Testing from a Policy Perspective

Andreas Pfrang, Scientific Officer, Joint Research Center, European Commission

The Joint Research Centre's battery testing laboratory in Petten, NL assesses battery safety and performance tests also for providing technical evidence for legislative purposes. Technical support includes, e.g., the development of a thermal propagation test procedure for electric vehicle safety or assessment of possible options for evaluation of sustainability of batteries. An overview of JRC's battery testing activities is given and selected findings on battery safety and performance are presented.

9:40 Battery Failure Behaviour: Abuse Testing under Varying Crush Speed

Bhavya Kotak, Research Associate, Safe Electromobility, Technische Hochschule Ingolstadt

Despite various standards available for EV battery testing, there have been few severe accidents noticed recently which has resulted in reservations by the EV consumer, hindering the deployment of the EV. Therefore, it's essential to investigate the speed at which batteries are crushed in an EV to identify its failure behaviour and look into the safety of EV consumer and the need for the harmonisation of multifarious globally available standards.

10:00 Session Break - View Our Virtual Exhibit Hall

10:20 Quantitative Degradation Diagnostic: A Differential Model

Jingyi Chen, PhD, Research Associate, Faculty of Engineering, Imperial College London

Often battery health is gauged by the capacity fade. However, degradation mechanisms of batteries are complex and cannot be sufficiently represented by a single figure of merit. We investigated using differential voltage (DV, dV/dQ) and incremental capacity (IC, dQ/dV) to calculate the extent of losses in lithium inventory (LLI) and active materials (LAM), in anode and cathode. The model provides a time-efficient method for on-board diagnostics with simplified parameterisations.

10:40 Thermal Runaway: Enhancing Battery System Safety for New Legal Requirements

Michael Harenbrock, Principal Expert, Engineering Electric Mobility, MANN+HUMMEL GmbH

In Thermal Runaways, gas released from battery cells can lead to catastrophic fires. The presentation will highlight how the release of hot, metallic particles from destroyed cell cans can be captured by function-added venting units, thus preventing ignition. An outlook will be given on future evolution of venting units and Thermal Runaway detection by sensor technology.

New Generation of Kilns for Heat Treatment of Battery Electrodes ONEJOON

Arian Esfehanian, PhD, Technical Consulting Manager, Product Development & Management, ONEJOON GmbH

As price, quality and carbon footprint are playing an increasingly important role in the future of e-mobility, new kiln concepts are needed to reach these targets. The currently available kilns cannot provide the required performance for the heat treatment of the electrode raw materials (cathode or anode) or even solid-state battery systems.

See how Onejoon's advanced kiln concepts provide revolutionary improvements in the heat treatment technology of cathode, anode, and solid electrolyte material systems. They help manufacturers to not only improve the quality, but also to reduce production costs by increasing capacity and saving energy and raw materials. You will also get insight on how we use simulations and production intend trials to define a suitable scale up concept for newly developed materials to get from lab to industrial scale production.

11:40 MODERATED Q&A: Session Wrap-Up

Moderator: Michael Harenbrock, Principal Expert, Engineering Electric Mobility, MANN+HUMMEL GmbH

Panelists:

Natalia Lebedeva, PhD, Scientific Project Officer, Energy Storage, European Commission

Andreas Pfrang, Scientific Officer, Joint Research Center, European Commission

Bhavya Kotak, Research Associate, Safe Electromobility, Technische Hochschule Ingolstadt

Jingyi Chen, PhD, Research Associate, Faculty of Engineering, Imperial College London

Arian Esfehanian, Technical Consulting Manager, Product Development & Management, ONEJOON GmbH

12:10 Session Break - View Our Virtual Exhibit Hall

BMS & SMARTER BATTERIES

12:40 Evolution of Battery Management to Battery Intelligence

Alexandre Collet, CTO, Engineering & Product Development, Ion Energy

We are seeing batteries become smart and connected, thanks to telematics. This necessitates the need for a battery intelligence platform to make sense of the huge volume of data being collected and processed by the BMS. Such a platform can empower the BMS to adapt to new situations autonomously and take advantage of the computing power available on the cloud.

13:00 Smart Sensing Batteries

Yue Guo, PhD, Professor, Institute for Future Transport & Cities, Center for Advanced Low Carbon Propulsion Systems, Coventry University

13:20 Available Discharge Energy of Non-Aqueous Electrochemical Energy Storage Cells vs. Discharge Current

Christoph Nebl, Tech Head of Institute C ECOS Carissma, Safe Electromobility Research Group, Technische Hochschule Ingolstadt

Knowing the basic characteristics of a cell with just a few current and voltage measurements enables us to answer the fundamental questions of battery system developers. The self-developed empirical equation allows easy determination of the available discharge energy of lithium-ion batteries that helps to design and check the suitability as energy storage systems e.g. for hybrid electric vehicles.

13:40 Improvements in Direct Electrolyte Leak Testing of Lithium-Ion Batteries INFICON

Yessica Brachthäuser, PhD, Application Engineer, Leak Detection Tools, INFICON GmbH

Valuable customer feedback and intensive cooperation with research institutes were used for further development of INFICON's ELT3000 leak tester for hard case and pouch lithium ion battery cells. Within this presentation, we will briefly remind the working principle of direct electrolyte leak testing before focusing on the integration of the leak detector into production areas and showing real test data from the field.

14:00 Session Break - View Our Virtual Exhibit Hall

THERMAL MANAGEMENT

14:20 Battery Thermosiphon Refrigerant Cooling

Leila Sharifian, PhD, Manager, Advanced Powertrain, Toyota Motor Europe

MBD applied for efficient development, design & optimization of cooling systems. An innovative 0D/1D model developed to predict two-phase flow separation. Battery temperature is estimated in different conditions.

14:40 Thermal Management of Lithium-Ion Batteries

Gregory J. Offer, PhD, Senior Lecturer Mechanics of Materials, Mechanical Engineering, Imperial College London

Cooling batteries effectively is essential for safety, and can improve performance & lifetime, and reduce cost. We will show how most batteries are designed poorly, how a simple measurement the Cell Cooling Coefficient can be used to compare cells, and how cells & packs should be designed in the future. Results from a recent Faraday Institution project on cell design will also be presented.

15:00 Keep It Cool! – A Thermal Simulation Study of the TESLA Model 3 Cell

Michael Schoenleber, Co-Founder & CTO, Batemo GmbH

15:20 Electro-Thermo-Mechanical Behaviours of Laser Joints for Electric Vehicle Battery Interconnects

Anup Barai, Assistant Professor, Energy & Electrical Systems Group, University of Warwick

An automotive battery pack used in EV comprises several hundred to a few thousand individual Li-ion cells when cylindrical cells are used to build the battery pack. These cells are connected in series and/or parallel to deliver the required power and capacity to achieve the designed vehicle driving range. This triggers the need for suitable joining methods capable of providing mechanical strength together with the required electrical and thermal performances.

16:00 MODERATED Q&A: Session Wrap-Up

Moderator: Michael Schoenleber, Co-Founder & CTO, Batemo GmbH

Panelists:

Alexandre Collet, CTO, Engineering & Product Development, Ion Energy

Yue Guo, PhD, Professor, Institute for Future Transport & Cities, Center for Advanced Low Carbon Propulsion Systems, Coventry University

Christoph Nebl, Tech Head of Institute C ECOS Carissma, Safe Electromobility Research Group, Technische Hochschule Ingolstadt

Yessica Brachthäuser, PhD, Application Engineer, Leak Detection Tools, INFICON GmbH

Leila Sharifian, PhD, Manager, Advanced Powertrain, Toyota Motor Europe

Gregory J. Offer, PhD, Senior Lecturer Mechanics of Materials, Mechanical Engineering, Imperial College London

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ROUNDTABLE 4: How Can Calorimetry Help in Battery Research?

Carlos Ziebert, PhD, Head of Calorimeter Ctr, Thermophysics & Thermodynamics Grp, Karlsruhe Institute of Technology

17:50 Close of Day

WEDNESDAY 20 JANUARY

CHARGING

9:00 Low Resistance Negative Electrodes for Fast Charging Lithium-Ion Batteries

Martin Ebner, PhD, CEO, Battrion AG

9:20 Multi-Purpose Traction Motors for Integrated Charging Technology in Electric Vehicles

Narayan Kar, Professor, Electrical & Computing Engineering, University of Windsor

Integrated charging technology in electric vehicles employs existing motor powertrain components to facilitate level-3 fast battery charging capabilities with reduction in overall weight and cost of the vehicle resulting in improved driving range per charge. This beneficial feature is propelling research and development activities towards designing a high-performing, compact and cost-effective multi-purpose traction motor for integrated charging application.

9:40 Investigation of the Effects of Cell Aging on Thermal Behavior and Safety Using Battery Calorimeters

Carlos Ziebert, PhD, Head of Calorimeter Ctr, Thermophysics & Thermodynamics Grp, Karlsruhe Institute of Technology

In the last nine years, we have established battery calorimetry as a versatile characterization technique, which allows advancements for the thermal management and the safety of batteries. The primary purpose of this work was to perform a comprehensive calendaric and cylic ageing study with 116 commercial 18650 cells to determine the correlation between cell aging and the thermal runaway.

10:00 Next Generation Lithium Battery Separator (LiBS) of the BENQ Materials for High Power HEV/ PHEV Applications.

Wei-Ting Yeh, Senior Manager, BENQ MATERIALS CORPORATION

10:40 MODERATED Q&A: Session Wrap-Up

Moderator: Martin Ebner, PhD, CEO, Battrion AG

Panelists:

Narayan Kar, Professor, Electrical & Computing Engineering, University of Windsor

Carlos Ziebert, PhD, Head of Calorimeter Ctr, Thermophysics & Thermodynamics Grp, Karlsruhe Institute of Technology

Wei-Ting Yeh, Senior Manager, BENQ MATERIALS CORPORATION

11:10 Session Break - View Our Virtual Exhibit Hall

11:30 Close of Battery Engineering Symposium

PLENARY KEYNOTE SESSION PANEL: EMERGING TECHNOLOGIES AND INDUSTRY PERSPECTIVES

11:45 Plenary Solutions Theatre *(Sponsorship Opportunities Available)*
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Thomas Fine, Global Market Manager Battery, High Performance Polymers, Arkema
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Rising to the Technical Challenges of Automotive LiB Applications with Johnson Matthey's High
Dr Neil Collins, Technology Director, Battery Materials, Johnson Matthey
A global leader in sustainable technologies, JM's vision is for a world that is cleaner and healthier today and for future generations. By applying cutting edge science, Johnson Matthey Battery Materials are creating solutions together with customers that make a real difference to the world around us. Our commitment meeting customer needs is illustrated by our long-term experience in Life Power® LFP manufacturing, Fuel-cell Technology and Johnson Matthey's 40+ years of serving the autocatalyst industry.

11:59 JSR Binders for Environmentally Friendly Manufacturing of New Generation Li-ion Batteries
Stella Deheryan, Application Manager, Emerging Technologies, JSR Micro NV
JSR is a research-oriented organization that pursues close collaborations with leading innovators in a number of industries that are key to the present and future welfare of human society: energy storage, life sciences, electronic materials, display and optical materials. In the energy storage field JSR provides high quality aqueous binders, paving the way to environmental-friendly and cost-effective manufacturing. Our water based binders have superior adhesion and can be used in lower concentrations leading to increased battery rate and cycle life performance. JSR has aqueous binders suited for both anode and cathode chemistries. Our products have excellent compatibility with materials for new generation Ni-rich cathodes and high energy anodes.

12:06 Enabling Next-Gen Li-ion Batteries with sALD
Sandeep Unnikrishnan, Program Manager, High Performance Batteries, Holst Centre
Interfacial engineering is seen as the key to enable more reliable and durable Li-ion batteries. A stable artificial SEI on the high-voltage cathode side and on the anode side are crucial for long-term cyclability of the battery. Compared to pre-passivation of active materials, post-passivation of electrode foils has the benefit of lower interfacial electronic impedance. In this presentation, an innovative high throughput scalable technology will be presented that can do atmospheric pressure, gas-phase passivation of electrode foils for next-generation battery applications.

Safer Batteries!
Peter Kritzer, Dr. rer. nat., E-Mobility & Batteries, Freudenberg FST GmbH
Increased energy density on cell & system level as well as new trends of "Super Charging" result in greater safety challenges. The presentation will show two system components designed to contribute to the improvement of battery safety: a) DIAvent - Overpressure valves with reversible capabilities. and b) Heat Shields - thermal barriers counteracting thermal propagation as well as mechanically balancing the cell modules. Additional innovative concepts will be explored aimed to enhance the safety of future battery systems. To best achieve the targets of each individual battery system, it is highly recommended that specific joint development is needed.

12:40 MODERATED Q&A: Session Wrap-Up

12:40 Talk Title to be Announced
Thomas Fine, Global Market Manager Battery, High Performance Polymers, Arkema

12:40 Talk Title to be Announced
Dr Neil Collins, Technology Director, Battery Materials, Johnson Matthey

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12:40 Talk Title to be Announced
Peter Kritzer, Dr. rer. nat., E-Mobility & Batteries, Freudenberg FST GmbH

13:05 Session Break - View Our Virtual Exhibit Hall

BATTERY RECYCLING

Advanced Recycling Methods for Sustainable Battery Materials Supply

TUESDAY 19 JANUARY

RECYCLING METHODS

9:00 Solvent Extraction in Battery Recycling – Criteria for Diluent Selection

Daniel Bien, PhD, Global Fluid Technology Advisor, Performance Liquids Technology, ExxonMobil Petroleum & Chemical

Solvent extraction plays an important role in the recovery of "critical materials" like cobalt and nickel and more recently also lithium in the recycling process of batteries. The diluent impacts not only the performance but also certain aspects of sustainability of the process. The paper will present criteria and industry examples of how to select the most suitable diluent.

9:20 Recycling of Different Battery Types: A First LCA-Based Sustainability Perspective

Marcel Weil, Scientific Research Group Leader, Research for Sustainable Energy Technologies, ITAS & HIU, Karlsruhe Institute of Technology

Presently used pyro- and hydro-metallurgical processes are connected with relatively high demand in energy or materials. Thus, the environmental efforts of the recycling process and the gained environmental value of the produced secondary raw materials have to be considered to estimate the net impacts. Problematic seems the trend towards decreased material values within the batteries, which significantly influences the net impact of the recycling process.

9:40 Blueprint for a Li-Ion Battery Recycling Factory in Europe – A Must-Have for Sustainable Electric Mobility

Markus Hackmann, Managing Director, E Mobility, P3 Automotive GmbH

Following the strong growth of e-mobility, significant volumes of EOL batteries are expected to flood the market from 2025, exceeding 670 kT by 2030 – a tremendous value pool which simultaneously provides chances for sustainability. Employing efficient hydrometallurgical recycling methods allows for ecofriendly recovery of materials with reduced CO2 footprint compared to conventional mining routes, especially for localized recycling setups omitting complex logistics.

10:00 Session Break - View Our Virtual Exhibit Hall

10:20 Solvent-Based Sustainable Recycling of Lead-Acid Batteries

Ola Hekselman, Faraday Institution Entrepreneurial Fellow, Imperial College London

Solveteq and Imperial College London are developing a low-temperature technology that requires significantly less energy to recover lead and lead materials, while reducing emissions of hazardous air pollutants and production of slag. Currently, Solveteq is at the prototyping stage and first results from its feasibility studies, and our technical road map will be presented.

10:40 Improving Cost and Safety with Cathode-Healing and Whole Battery Deactivation

Steve E. Sloop, President, OnTo Technology LLC

Lithium-ion recycling is challenged by cost and safety related to reactivity of lithium and electrolytes. OnTo's deactivation eliminates flammability and residual reactivity, enabling a roadmap for safe, low-cost, end-of-life battery services essential to the industry. Deactivation coupled with cathode-healing provides safety and efficiency in material recycling that can be applied all along the manufacturing value chain. Dr. Sloop will present recent developments in application and scale of these innovative technologies.

11:00 Sponsored Presentation *(Opportunity Available)*

11:40 MODERATED Q&A: Session Wrap-Up

Moderator: Sascha Nowak, PhD, Head of Analytics & Environmental, Electrochemical Energy Technology, University of Münster

Panelists:

Daniel Bien, PhD, Global Fluid Technology Advisor, Performance Liquids Technology, ExxonMobil Petroleum & Chemical

Marcel Weil, Scientific Research Group Leader, Research for Sustainable Energy Technologies, ITAS & HIU, Karlsruhe Institute of Technology

Markus Hackmann, Managing Director, E Mobility, P3 Automotive GmbH

Ola Hekselman, Faraday Institution Entrepreneurial Fellow, Imperial College London

Steve E. Sloop, President, OnTo Technology LLC

12:10 Session Break - View Our Virtual Exhibit Hall

12:40 Possible Dangers in Handling and Storing of Lithium-Ion Batteries during Recycling

Sascha Nowak, PhD, Head of Analytics & Environmental, Electrochemical Energy Technology, University of Münster

The widespread use of lithium-ion batteries in a multitude of industrial and private applications has led to the need for recycling and reutilization of their constituent components. However, due to their high voltage, high stored energy and reactive components, LIBs can present a specific and significant hazard potential. Here, in this work, we focus on the chemical-based potential hazards with regard to the storage and transport of the cells.

13:00 CO-PRESENTATION: Direct Recycling and Upcycling of Cathode Material with 6K's UniMelt® Plasma Platform

Aaron Bent, PhD, Technology CEO, 6K

Richard Holman, PhD, Vice President, Battery Products, 6K

6K has developed a flexible, robust, and highly scalable low-cost materials production platform based on its patented UniMelt microwave plasma systems. In this presentation, we will discuss 6K's unique process for the rejuvenation of cathode materials, restoring lost lithium, repairing mechanical cycling damage, and supplementing the chemistry to upcycle older generation cathodes to today's state-of-the-art.

13:20 Particle-Based Characterization of Lithium-Ion Battery Components in Recycling Processes by Using Automated Mineralogy

Anna Vanderbruggen, PhD Candidate, Helmholtz Institute Freiberg for Resource Technology

This research presents the development of a new analytical procedure based on individual particle characterization in order to monitor and diagnose lithium-ion battery recycling. Automated mineralogy combines high-resolution backscatter electron images with energy dispersive X-ray analysis. This method enables the acquisition of particle-based information such as elemental and phase composition, morphology, association and degree of liberation. This study compares the liberation efficiency of two recycling routes, mechanical and thermo-mechanical.

13:40 Sponsored Presentation *(Opportunity Available)*

14:00 Session Break - View Our Virtual Exhibit Hall

14:20 Recycling: Debunking the Urban (Mining) Myths

Kristof Gabriël, Commercial Director Recycling and Refinery, Umicore

With massive vehicle electrification happening within this decade, raw material demand will skyrocket. There is wide industry consensus that an effective closed loop solution (recycling metals back to their original battery

application) is a crucial part of that meeting metal demand. But this is where industry consensus usually ends. This presentation aims to debunk some of the myths that continue to exist in the recycling community.

EUROPEAN REGULATORY LANDSCAPE, TRANSPORTATION & SAFETY

14:40 The EU Regulation Impact on the Battery's Circular Economy
Claude Chanson, PhD, General Manager, Recharge
The EU Commission has proposed a number of measures to promote the production of more sustainable batteries in EU in October 2020. Some specific requirements about the minimum content of recycled materials in the new batteries may have an important impact. An analysis of consequences on the innovation and development of future batteries technologies will be presented, associated with industry recommendations.

15:00 Who Will Win the Future Traction Battery Recycling Market in the European Union?
Wenzel Prochazka, Senior Product Manager, Battery Systems, AVL List GmbH
When a battery spent its life in a traction application, it enters the stage for the recycling market. Who is running for this business with technology and possible business case? An AVL market study sheds light on the race between EU companies developing technologies and CN companies running implemented processes. If the recycling of traction batteries in Europe is a profitable, long-term business to invest into, will be discussed.

15:20 Future Scenarios for LIB Recycling in Europe, US, China and Japan
Akihito Fujita, Senior Manager, Research & Consulting, Nomura Research Institute America Inc.
Market trend, regulations, key players, and technological development surrounding LIB recycling vary greatly from region to region. Based on the future outlook of EV market in each region, we will introduce our hypothesis on the risks and business opportunities in LIB recycling. Also we will consider multiple scenarios for the LIB recycling market expansion.

16:00 MODERATED Q&A: Session Wrap-Up
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Kristof Gabriël, Commercial Director Recycling and Refinery, Umicore

16:50 Interactive Roundtable Discussions - View Our Virtual Exhibit Hall
Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers.

ROUNDTABLE 1: Basic Science Research and Advanced Lead Batteries for Automotive Energy Storage Systems Batteries
Matthew Raiford, Manager, Consortium For Battery Innovation

ROUNDTABLE 2: Battery Pack System Cost and Safety - Will Future xEV Battery Packs Increase in Complexity or Simplify and How Will Cost and Safety Be Impacted?
Kevin Konecky, Director, Battery Systems, Fisker, Inc.

ROUNDTABLE 3: Li-Ion Cell Design and Manufacturing: Processes, Equipment and Quality Control
James Kaschmitter, CEO, SpectraPower LLC

ROUNDTABLE 4: How Can Calorimetry Help in Battery Research?
Carlos Ziebert, PhD, Head of Calorimeter Ctr, Thermophysics & Thermodynamics Grp, Karlsruhe Institute of Technology

17:50 Close of Day

WEDNESDAY 20 JANUARY

COST-EFFECTIVE RECYCLING

9:00 ReCell: Working to Make Lithium-Ion Battery Recycling Profitable
Jeffrey S. Spangenberger, Director, ReCell Center, Argonne National Laboratory
There remains significant area for improvement for cost-effective electric vehicle battery recycling. Many of these batteries cost money to properly recycle, and this issue will continue to grow as battery chemistries use less cobalt. The ReCell Center is working to increase the economic attractiveness of battery recycling, and this presentation will provide background information about the center, as well as an update on its progress.

RECYCLING MARKET DEMAND

9:20 Creating a Local Critical Battery Materials Supply Chain
Kunal Phalpher, Chief Commercial Officer, Business Development & Operations, Li-Cycle Corp.
This presentation will walk through approaches to create a local supply chain by recovering critical materials from lithium-ion batteries. Kunal Phalpher will discuss the need for localizing the critical battery materials supply chain in new regions, while addressing the economic and sustainability challenges of lithium-ion battery recycling and how Li-Cycle®'s Hub-and-Spoke model is able to help overcome some of these industry challenges, particularly in light of the recent pandemic.

9:40 Beyond Comminution: Next-Generation Battery Recycling Leveraging AI, Automation & Industry 4.0
Gavin Harper, University of Birmingham
Many current approaches to EV battery recycling focus on comminution (shredding) as a preliminary treatment step. In doing so, a great deal of value is destroyed as materials are mixed together. Whilst mechanically simple, this results in additional technical complexity later in the recycling process. This talk explores the future of battery recycling and how it will employ more sophisticated disassembly, robotics and AI to recover more value from batteries.

10:00 Sponsored Presentation *(Opportunity Available)*

10:40 MODERATED Q&A: Session Wrap-Up
Moderator: Steve E. Sloop, President, OnTo Technology LLC
Panelists:
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Kunal Phalpher, Chief Commercial Officer, Business Development & Operations, Li-Cycle Corp.
Gavin Harper, University of Birmingham

11:10 Session Break - View Our Virtual Exhibit Hall

11:30 Close of Battery Recycling Symposium

PLENARY KEYNOTE SESSION PANEL: EMERGING TECHNOLOGIES AND INDUSTRY PERSPECTIVES

11:45 Plenary Solutions Theatre *(Sponsorship Opportunities Available)*
This panel session will feature a series of short podium presentations on emerging technologies and industry perspectives in vehicle electrification. Each speaker will have 7-8 minutes to present. After all speakers have presented, there will be a moderated Q&A between the speakers and attendees. The presentations are not meant to be a corporate or specific product pitch. Each speaker will focus on a technology and solution framed around a problem or issue related to the expanding market of advanced vehicles and how their organization is solving it.

A 360° Wiew of Battery Solutions by Arkema
Thomas Fine, Global Market Manager Battery, High Performance Polymers, Arkema
Inside and outside the battery cell, Arkema has the market leading technology portfolio of specialty materials for battery systems to increase efficiency, safety and reliability. Despite the impressive progress in lithium ion energy storage technologies achieved today, the challenges faced by battery systems remain significant in terms of energy densities, cost optimization and improved safety performance and durable cycle life. Our solutions help to optimize a better performance and improve the battery energy density, duration, weight reduction and recharging time. Our market-leading portfolio of solutions for battery cover applications inside and outside the cell, from cell to module and battery pack assembly up to battery system integration into the vehicle. We offer you a 360° view on Arkema Battery Solutions in few minutes.

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Dr Neil Collins, Technology Director, Battery Materials, Johnson Matthey
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13:05 Session Break - View Our Virtual Exhibit Hall

xEV BATTERY TECHNOLOGY, APPLICATION, AND MARKET

WEDNESDAY 20 JANUARY

13:05 Session Break - View Our Virtual Exhibit Hall

PLENARY KEYNOTE SESSION

13:35 KEYNOTE PRESENTATION: Panasonic Energy – A Gigafactory Update

Celina J. Mikolajczak, Vice President, Battery Technology, Panasonic Energy of North America

Panasonic Energy of North America (PENA) is the division of Panasonic that produces lithium-ion cells at the Gigafactory in Sparks, NV. I will provide an update on PENA's status and completed milestones.

13:55 KEYNOTE PRESENTATION: Critical Raw Materials in The Battery Raw Material Supply Chain - Current Themes and Future Thinking

Alison Saxby, Managing Director, Roskill

Many battery supply chain materials are deemed critical by governments, but their definitions and approaches vary from stimulus to safeguarding, trade distortion, to research and development. A number of levers are being deployed. This presentation will review these approaches and what they could mean in the context of new policies and plans for critical raw materials in the battery supply chain.

14:15 KEYNOTE PRESENTATION: Chinese xEV Market: Vehicle, Battery and Materials Impact

Mark H.L. Lu, PhD, Senior Industrial Analyst, Industrial Economics & Knowledge Center, Industrial Technology Research Institute

Although COVID-19 continues to affect the global electric vehicle market, Chinese NEV market has gradually returned to growth pace due to the extension of the subsidy policy and the continuous implementation of the originally planned stimulus. It is expected that in 2020, battery demand will be maintained on the same scale as in 2019. This report will discuss possible changes in Chinese xEV battery market and technology trends by 2025.

14:35 KEYNOTE PRESENTATION: Electrification at Opel – From BEV and PHEV

Roland Matthe, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Opel Automobile GmbH

14:55 Session Break - View Our Virtual Exhibit Hall

xEV BATTERY TECHNOLOGY

15:15 The Pursuit of Increasing Energy Density and Its Implications for Battery Safety

Benedikt Friess, Research Scientist and Engineer, Daimler AG

This presentation will provide an overview on state-of-the-art and future battery cell technologies and well as critical analysis of opportunities and disadvantages of upcoming cell technologies. In addition, concepts for maintaining a high-safety level at high energy densities and the presentation of in-house thermal propagation study will be discussed.

15:35 Solid-State Batteries for xEV Applications – An Academic and Industrial Perspective

Ulderico Ulissi, PhD, Battery Research Engineer, Research & Advanced Engineering, Nissan Technical Center Europe

Cell chemistries based on Solid-State Electrolytes (SSE) can be characterised by improved safety and a wide temperature stability/working range, and potentially lead to low-cost and high-energy Electrochemical Energy Storage (EES) systems. In this perspective presentation, Nissan, in partnership with a leading university, will discuss the state-of-the-art in research, and some of the challenges and opportunities toward large-scale production for xEV application.

15:15 The Secret to Avoiding Costly EV Recalls? Battery Data

voltaiq Battery Intelligence

Tal Sholklapper, PhD, CEO and Co-founder, Voltaiq

Battery cell faults dominated the news in 2020 triggering recalls and costing billions in replacement costs, fines, lawsuits and collateral brand damage. The timing couldn't have been worse. Just as OEMs were pledging huge investments to transition away from ICE's, consumers were being told not to park their car in the garage for fear they'd explode. It's time for OEMs to get proactive about battery QA. In our talk, we review how a comprehensive, data-analytics approach to qualification, production and after-sales can help OEMs and suppliers maximize battery reliability, safety and lifespan.

16:15 Session Break - View Our Virtual Exhibit Hall

16:35 Discoveries and Understanding of Materials and Cell Chemistry for xEV Batteries

Rong Hao, Manager of Materials Technology Department, BYD Lithium Battery Co. Ltd.

Materials and cell chemistry are the fundamental for xEV batteries. FinDream Battery Co Ltd. (former BYD Lithium Battery Co. Ltd.) puts a significant amount of research efforts at materials and cell chemistry level, and consequently has acquired adequate understanding towards their application in xEV batteries. In this talk, we would like to share examples of our research and discoveries, and discuss our understanding on the mechanism behind.

16:55 Glimpses into BEV Batteries on the Market – AVL Series Battery Benchmarking

Wenzel Prochazka, Senior Product Manager, Battery Systems, AVL List GmbH

AVL's series battery benchmarking program provides a database for objective comparison in technical attributes, as well as in engineering methodology, for BEV battery market competitors for clear-system, target definition of high-performing, reliable, and safe batteries. Two-hundred seventy different criteria are evaluated through AVL benchmarking metrics displayed in 8 high-level attributes. The found integrated system performance values are pointed out to support current and future development programs.

17:15 The Perfect Cathode: Checking All The Boxes

Tom Van Bellinghen, Vice President Marketing & OEM Value Chain, Rechargeable Battery Materials, Umicore

For years, the holy grail of cathode chemistry research has been unlocking the path towards high nickel compounds and associated long driving range. Recently, a whole set of new cathode requirements has surfaced and transformed the search for the overall optimal cathode material into a multi-disciplinary quest.

17:55 MODERATED Q&A: Session Wrap-Up

Moderator: Christian Rosenkranz, PhD, Vice President, Government Relations, EMEA, Clarios

Panelists:

Benedikt Friess, Research Scientist and Engineer, Daimler AG

Ulderico Ulissi, PhD, Battery Research Engineer, Research & Advanced Engineering, Nissan Technical Center Europe

Rong Hao, Manager of Materials Technology Department, BYD Lithium Battery Co. Ltd.

Wenzel Prochazka, Senior Product Manager, Battery Systems, AVL List GmbH

Tal Sholklapper, PhD, CEO and Co-founder, Voltaiq

Tom Van Bellinghen, Vice President Marketing & OEM Value Chain, Rechargeable Battery Materials, Umicore

18:25 AABE Connects - View Our Virtual Exhibit Hall

18:55 Close of Day

THURSDAY 21 JANUARY

AUTOMOTIVE LOW-VOLT ENERGY SYSTEMS

9:00 Concepts for Low-Volt Automotive Energy Storage Systems with Impact on Functional Safety

Eckhard Karden, PhD, Tech Expert, Battery & Energy Storage Technology, Ford Research Center

12V electrical power supply is often essential for vehicle functions that need to be qualified for functional safety, for example, for driver assistance or autonomous driving functions. Such new functions give rise to requirements for the 12V energy storage system, typically comprised of a commodity lead-based battery block and a standardized sensor in the terminal clamp. The talk discusses low-cost commodity solutions for such upcoming applications.

9:20 A New Generation of Charge Acceptance Optimized AGM Batteries - The Benefit and Downside in Lab and Real-World Testing.

Nadine Dehnert, PhD, Manager, EMEA Engineering Team, Clarios

A new generation of charge acceptance optimized AGM batteries – the benefit and downside in lab and real-world testing. CLARIOS is continuously working on an optimization of AGM batteries. New requirements for CO2 reduction are impacting the specifications and therefore the design on AGM batteries. Clarios develops a new range of AGM charge acceptance optimized batteries, meeting those new requirements. The presentation will cover the main targets of these engineering activities.

9:40 Current Supplier Solutions and Future OEM Requirements for 48V Batteries – Can Mild-Hybrid Systems Really Be Standardized?

Arnold Lamm, PhD, Founder & Executive Director, E Mobility, e-Technologies GmbH

Based on CO2 and pollutant emission legislations in China and Europe as well as added comfort function consumers, requirements on 48V batteries will be elaborated. Major technology trends in terms of cell chemistry, cell formats and interconnection are derived. Moreover, installation locations in the vehicle as well as resulting battery dimension trends and thermal management options will be shown.

10:00 Session Break - View Our Virtual Exhibit Hall

10:20 Development of 48V Start-Stop Power Batteries

Jiang Zhou, Vice President, Lishen Research Institute, Tianjin Lishen Battery Joint Stock Co. Ltd.

This presentation focuses on the progress of the 21700 cell development at Tianjin Lishen Battery Company. Three types of 21700 cells, viz energy cell, power cell and fast charge cell, are being developed targeting the xEV markets. Benefits of 21700 cells will be discussed and a three-year product roadmap will be presented.

xEV GLOBAL MARKET EXPANSION

10:40 2020 Summary of European EV Market Expansion and Its Implications on Battery Demand

Viktor Irle, Co-Founder & Market Analyst, EV Volumes

This presentation will summarise what happened to the European EV market during 2020, implications of COVID-19, market growth, which new vehicles sold best, and what is to be expected for 2021 and onwards. The presentation will also discuss what is expected for battery demand going forward, with its basis on real data from vehicle registrations, both from a world perspective, but also in Europe.

11:00 A sustainable anode material supply-chain in Europe

Stian Madshus, VP Battery Materials Europe, Battery Materials, Elkem

Stian Madshus, VP Battery Materials Europe in Elkem, will argue for the importance of a localised supply-chain of sustainable synthetic graphite anode material in Europe.

11:40 MODERATED Q&A: Session Wrap-Up

Moderator: Alistair Davidson, Director, Consortium for Battery Innovation

Panelists:

Eckhard Karden, PhD, Tech Expert, Battery & Energy Storage Technology, Ford Research Center

Nadine Dehnert, PhD, Manager, EMEA Engineering Team, Clarios

Arnold Lamm, PhD, Founder & Executive Director, E Mobility, e-Technologies GmbH

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Viktor Irle, Co-Founder & Market Analyst, EV Volumes

Stian Madshus, VP Battery Materials Europe, Battery Materials, Elkem

12:10 Session Break - View Our Virtual Exhibit Hall

12:50 Funding the Future of Transport: A Financial Markets Perspective

Charles Bentley, Analyst, Equity Research, Credit Suisse Group AG

Investor perceptions around the electrification of transport and potential winners throughout the supply chain remain volatile. As technology and regulations evolve, so do expectations around adoption rates and where value will be created. From a listed corporate perspective, the focus remains harnessing growth across the supply chain globally, both organically and through M&A/strategic investments. Strong ESG fund flows provide capital raising opportunities across both public and private markets.

13:10 Increasing Battery Systems Performance and xEV Industry Trends Analysis

Kevin Konecky, Director, Battery Systems, Fisker, Inc.

Battery systems are complex systems with the battery cell as the core technology of the system, but then integrated with multiple subsystems, including mechanical, thermal, and battery management systems (BMS). This presentation will look into the different subsystems that contribute to the overall battery system performance and opportunities for improvement in next-generation battery systems. Battery system trends in the industry will be evaluated and discussed.

13:30 The EUROBAT Innovation Roadmap

Rene Schroeder, Executive Director, EUROBAT

EUROBAT will present its **"Battery Innovation Roadmap 2030"**, demonstrating the strong innovation potential of all battery technologies in the coming years to cater for the specific requirements of a multitude of applications - automotive, motive power, telecom and stationary. The Roadmap is particularly relevant given the current European Union policy discussions on the sustainability of batteries, their innovation potential as well as their relevance for job creation and growth.

14:10 MODERATED Q&A: Session Wrap-Up

Moderator: Brian M. Barnett, PhD, President, Battery Perspectives

Panelists:

Kevin Konecky, Director, Battery Systems, Fisker, Inc.

Charles Bentley, Analyst, Equity Research, Credit Suisse Group AG

Rene Schroeder, Executive Director, EUROBAT

15:00 Interactive Roundtable Discussions - View Our Virtual Exhibit Hall

Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers.

ROUNDTABLE 1: Li-Ion NMC Fast Charging New Cells for E-Mobility

Shmuel De-Leon, CEO, Shmuel De-Leon Energy Ltd.

ROUNDTABLE 2: Silicon Anodes and Cells

Benjamin Park, PhD, Founder & CTO, Enevate Corp.

- What is the maturity level of Si today for use in EVs?
- What different approaches are there with Si?
- What are the challenges and how can the industry work together to solve them?
- How does Si compare with other next-gen technologies such as solid-state/lithium metal?

ROUNDTABLE 3: Lithium Battery Recycling Logistics and Efficiency

Steve E. Sloop, President, OnTo Technology LLC

- Regarding early stage scrap materials, what can manufacturers do to improve efficiencies in house.
- What are the pro's and cons for verticalization of lithium-ion recycling within a battery manufacturing business.
- How do we improve recycling revenue with the future of low cobalt chemistries.
- What are the safety risks in recycling new (and old) scrap batteries, how do we address them effectively and at low cost.

16:00 Close of Conference

GLOBAL BATTERY RAW MATERIALS

Balancing Supply, Demand & Costs for Battery Component Materials

WEDNESDAY 20 JANUARY

13:05 Session Break - View Our Virtual Exhibit Hall

PLENARY KEYNOTE SESSION

13:35 KEYNOTE PRESENTATION: Panasonic Energy – A Gigafactory Update

Celina J. Mikolajczak, Vice President, Battery Technology, Panasonic Energy of North America

Panasonic Energy of North America (PENA) is the division of Panasonic that produces lithium-ion cells at the Gigafactory in Sparks, NV. I will provide an update on PENA's status and completed milestones.

13:55 KEYNOTE PRESENTATION: Critical Raw Materials in The Battery Raw Material Supply Chain - Current Themes and Future Thinking

Alison Saxby, Managing Director, Roskill

Many battery supply chain materials are deemed critical by governments, but their definitions and approaches vary from stimulus to safeguarding, trade distortion, to research and development. A number of levers are being deployed. This presentation will review these approaches and what they could mean in the context of new policies and plans for critical raw materials in the battery supply chain.

14:15 KEYNOTE PRESENTATION: Chinese xEV Market: Vehicle, Battery and Materials Impact

Mark H.L. Lu, PhD, Senior Industrial Analyst, Industrial Economics & Knowledge Center, Industrial Technology Research Institute

Although COVID-19 continues to affect the global electric vehicle market, Chinese NEV market has gradually returned to growth pace due to the extension of the subsidy policy and the continuous implementation of the originally planned stimulus. It is expected that in 2020, battery demand will be maintained on the same scale as in 2019. This report will discuss possible changes in Chinese xEV battery market and technology trends by 2025.

14:35 KEYNOTE PRESENTATION: Electrification at Opel – From BEV and PHEV

Roland Matthe, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Opel Automobile GmbH

14:55 Session Break - View Our Virtual Exhibit Hall

GLOBAL DEMAND FOR BATTERY RAW MATERIALS

15:15 Charging Change: Adapting OEM Supply-Chains to the Challenges of Battery Raw Materials

Jake Fraser, Senior Consultant, Battery Materials & Supply-Chain Strategy, Roskill

This presentation will cover the SCQ framework in a fast-moving market as well as the current positioning and core trade-offs in tackling battery raw material risk. In addition, optimising potential OEM and miner investment behaviours and upstream vs. downstream requirements in supplier-consumer relationships V2.0 will be covered. Finally, potential breakthrough technologies to alleviate raw material supply challenges long-term will be addressed.

15:35 How Can European and Asian Material Manufacturers Cooperate in the EV Era?

Sachiya Inagaki, Senior Executive Manager, Industrial Technology Unit, Yano Research Institute Ltd.

The huge demand for material will arise in the next few years in Europe, but there will be less material manufacturers in the EU. The EU will set up some regulations to develop a European value chain, but still need some support from Asian manufacturers who have experience with mass stable production with high quality. I will be sharing my proposal on how European manufacturers can cooperate with Asian manufacturers.

15:55 Chvaletice Manganese Project: Developing a Globally-Significant New Source of Green and Ultra-High Purity Manganese Products in Europe

Marco Romero, President & CEO, Euro Manganese Inc.

Euro Manganese Inc. is advancing steadily with the development of a strategic new source of ultra-high purity manganese products in the Czech Republic to serve Europe's rapidly emerging lithium-ion battery ecosystem. These products will assure customers impeccable provenance and a minimal environmental footprint, as they will be made by reprocessing old mining waste.

16:15 Session Break - View Our Virtual Exhibit Hall

16:35 Zero Carbon Lithium

Vincent Ledoux-Pedailles, Vice President, Vulcan Energy

Vulcan Energy Resources is aiming to become the world's first Zero Carbon Lithium™ producer, by producing a battery-quality lithium hydroxide chemical product with net zero carbon footprint from its combined geothermal and lithium resource, which is Europe's largest lithium resource, in Germany. It will fix lithium's current problems for the EU market: a very high carbon and water footprint of production, and total reliance on imports, mostly from China.

16:55 Natural Graphite Scale and Integration to Meet the Demands of Global Fleet Electrification

Joe Williams, Marketing Manager, Syrah Global DMCC

The new energy transition demands new energy minerals, at scale. Syrah Resources owns and operates the world's largest natural graphite production facility in Mozambique. Syrah has delivered a base-load of supply feeding the lithium-ion battery anode market from 2018, and has since built and commissioned a Precursor plant in the US. Syrah continues to integrate production vertically, delivering Anode Active Material in 2021. Here we present supply-chain dynamics and outlook.

17:15 Nickel and the Low Carbon Economy

Anne Oxley, Technical Director, Brazilian Nickel PLC

C-19 will definitely have an impact on the rollout of BEVs, but with cleaner air in cities being evidenced during 2020's unprecedented lockdown, this could even trigger faster BEV uptake. Miners need to produce the raw materials required in the most environmentally friendly and sustainable way possible. Brazilian Nickel's Piauí project will aim to do just this.

17:55 MODERATED Q&A: Session Wrap-Up

Moderator: Anne Oxley, Technical Director, Brazilian Nickel PLC

Panelists:

Jake Fraser, Senior Consultant, Battery Materials & Supply-Chain Strategy, Roskill

Sachiya Inagaki, Senior Executive Manager, Industrial Technology Unit, Yano Research Institute Ltd.

Marco Romero, President & CEO, Euro Manganese Inc.

Joe Williams, Marketing Manager, Syrah Global DMCC

Vincent Ledoux-Pedailles, Vice President, Vulcan Energy

18:25 AABE Connects - View Our Virtual Exhibit Hall

18:55 Close of Day

THURSDAY 21 JANUARY

GLOBAL DEMAND FOR BATTERY RAW MATERIALS

9:00 Enough Nickel for Batteries?
Denis Sharypin, Head, Market Research, MMC Norilsk Nickel
The talk will focus on Ni demand projections by industry, update on Indonesian Ni projects. Possible impact of the Indonesian export ban will be elaborated and the Ni incentive price for bringing additional Ni units to the market will be examined.

9:20 Cinderella Search – The Hunt for "Green" Nickel
Andrew Mitchell, Head of Nickel Research, Wood Mackenzie
Many growth forecasts for in the public domain already point to the challenge of producing enough nickel units required for the electrification of vehicles going forward. But if we are additionally to be selective about the nickel units to be used based on their environmental, social and governance aspects, then meeting that challenge becomes increasingly difficult.

9:40 The Outlook for Battery Raw Materials – Lithium, Cobalt, Nickel
William Adams, Head of Battery Research, Cobalt & Lithium & Battery Materials Research, Fastmarkets
The battery raw material space is changing, no more so than in these Covid-19 times. Catch up with the latest trends, thoughts and forecasts for the lithium, cobalt and nickel markets.

10:00 Session Break - View Our Virtual Exhibit Hall

10:20 What Does New Li-Ion Cell Capacity Mean for European Raw Material Demand?
Andy Leyland, Head of Advisory, Benchmark Mineral Intelligence
As Europe ramps up its plans for domestic cell manufacturing we look at what this means for upstream parts of the supply chain, including raw materials, precursors, cathode and anode supply. The EU commission have highlighted battery raw materials as a critical industry, but can Europe realistically fulfill this demand, and more importantly, will it have the capacity to process these materials?

10:40 Sustainable Lithium for a World in Motion
Stefan Debruyne, Director, Business Development, Lithium, SQM Europe
This presentation will provide an SQM introduction covering online environmental monitoring in Salar de Atacama as well as life-cycle analysis of lithium production routes and lithium market and demand outlook.

11:00 Sustainable Anode production in Norway
Christoph Frey, Chief Operating Officer - Graphite and Anode Materials, Mineral Commodities
MRC acquired Skaland Graphite located in Norway in 2019 which is the highest-grade natural flake graphite producing mine globally and the largest graphite mine in the Europe Economic Area. The Company plans to develop a vertically integrated Active Anode Material Plant in Norway, using concentrate from the Skaland mine. MRC is developing an environmentally friendly process of non-hydrofluoric graphite purification, and along with access to Norway's low-cost renewable energy is targeting production of one of Europes lowest carbon footprint active anode materials. The company will adopt a staged modular approach to Anode production, before accelerated production growth and capacity expansion incorporating graphite concentrate from MRC's Munglinup project in Australia.

11:40 MODERATED Q&A: Session Wrap-Up
Moderator: Kevin Konecky, Director, Battery Systems, Fisker, Inc.
Panelists:
Denis Sharypin, Head, Market Research, MMC Norilsk Nickel
Andrew Mitchell, Head of Nickel Research, Wood Mackenzie
William Adams, Head of Battery Research, Cobalt & Lithium & Battery Materials Research, Fastmarkets
Andy Leyland, Head of Advisory, Benchmark Mineral Intelligence
Stefan Debruyne, Director, Business Development, Lithium, SQM Europe

12:10 Session Break - View Our Virtual Exhibit Hall

GLOBAL DEMAND FOR BATTERY RAW MATERIALS

12:50 Cobalt Due Diligence and Chemical Management in the Battery Supply Chain
Adam McCarthy, President, Cobalt Institute
This presentation will discuss the main challenges facing the sustainable use of cobalt in the battery value chain, concerns over due diligence, and chemical safety. The presentation will highlight the steps the industry is taking to address these issues and provide certainty to the value chain.

13:10 Future Success Factors for European Battery Industry – Localized Value Chains, Fast Charging, Low Cost, Cell2Pack
Dennis Gallus, P3 Group
Localized European cell manufacturing will be ramped up in the upcoming years with an expected production volume of more than 290 GWh in 2025. The associated market volume of approx. 15 bn EUR for cell materials enables great market opportunities for new entrants within the European upstream material value chain for localized manufacturing.

RAW MATERIALS GLOBAL ENVIRONMENTAL IMPACT

13:30 Profitable Near-Term Solution for End of Lithium-Ion Battery Lifecycle
Michael Tamlin, COO, Neometals Ltd.
Neometals has developed a complete, modular package that extracts cobalt, lithium, nickel and other materials that can be reused in battery manufacturing. Key features are small environmental footprint, compact dimensions, low capex and good operating economics that create a profit centre from an internal scrap processing operation.

14:10 MODERATED Q&A: Session Wrap-Up
Moderator: Vincent Ledoux-Pedailles, Vice President, Vulcan Energy
Panelists:
Adam McCarthy, President, Cobalt Institute
Dennis Gallus, P3 Group
Michael Tamlin, COO, Neometals Ltd.

15:00 Interactive Roundtable Discussions - View Our Virtual Exhibit Hall
Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers.

ROUNDTABLE 1: Li-Ion NMC Fast Charging New Cells for E-Mobility
Shmuel De-Leon, CEO, Shmuel De-Leon Energy Ltd.

ROUNDTABLE 2: Silicon Anodes and Cells
Benjamin Park, PhD, Founder & CTO, Enevate Corp.
- What is the maturity level of Si today for use in EVs?
- What different approaches are there with Si?
- What are the challenges and how can the industry work together to solve them?
- How does Si compare with other next-gen technologies such as solid-state/lithium metal?

ROUNDTABLE 3: Lithium Battery Recycling Logistics and Efficiency
Steve E. Sloop, President, OnTo Technology LLC
- Regarding early stage scrap materials, what can manufacturers do to improve efficiencies in house.
- What are the pro's and cons for verticalization of lithium-ion recycling within a battery manufacturing business.
- How do we improve recycling revenue with the future of low cobalt chemistries.
- What are the safety risks in recycling new (and old) scrap batteries, how do we address them effectively and at low cost.

16:00 Close of Conference

PRICING AND REGISTRATION INFORMATION

See website for complete details including discounts for groups and On-Demand participation

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*(Includes Real-Time access to **ALL** tutorials, symposia, conferences, virtual event benefits, plus On-Demand access for one year.)*	Commercial	Academic, Government
Advance Registration Rate Until 15 January 2021	€1199	€999
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Five Tutorials	€499	€399

PROGRAM SELECTIONS

19-20 JANUARY 2021

- S1: Lithium Battery Chemistry
- S2: Battery Engineering
- S3: Battery Recycling

20-21 JANUARY 2021

- C1: xEV Battery Technology, Applications, and Market
- C2: Global Battery Raw Materials

20-21 JANUARY 2021

- TUT1: The Rechargeable Battery Market: Value Chain and Main Trends 2020-2030
- TUT2: Materials for Next-Generation Batteries
- TUT3: Solid-State Batteries: Solid Electrolytes, Electrode Interfaces, and Full Cells
- TUT4: LiB and Raw Material Market Overview
- TUT5: Li-Ion Cell Design and Manufacturing: Processes, Equipment and Quality Control

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GROUP PRICING Have your colleagues or entire team attend the virtual event. Purchase one virtual registration at full price, and participants from the same organization will receive a 25% discount when registering on the Group registration page. For more information on group discounts contact Joseph Verange at 781-247-6263.

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