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13th INTERNATIONAL aaabc advanced automotive battery europe conference

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xEV Battery
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2023 Conference Programs

Pre-Conference Tutorials: MONDAY, 19 JUNE 2023

Symposia: TUESDAY AND WEDNESDAY, 20 AND 21 JUNE 2023

 **Chemistry**

 **Engineering**

 **Recycling**

 **Manufacturing**

Conferences: WEDNESDAY AND THURSDAY, 21 AND 22 JUNE 2023

 **xEV Battery Technology**

 **Global Battery Raw Materials**

 **EV Technology for Heavy Duty**

 **Battery Intelligence**

TOP REASONS TO ATTEND

- » Learn first-hand about the technical and business directions from major automakers currently active in the European market
- » Hear key global market outlook data on the forecasted consumption trends for China, Japan, Korea, Europe and the United States
- » Meet leading energy storage technologists from all automakers active in the European market
- » Discuss fast-charging solutions coming to the market to support electrification goals for the coming decade
- » Get an in-depth international overview of the lead industry including current trends, competitive analysis and examination of

the key players and their strategies for market growth

- » Discover the latest technological advancements in high specific energy batteries with long cycle life and low cost
- » See how key players are overcoming challenges to commercialization for the specialty EV battery market while assessing consumer demand and competing technologies
- » Understand the many facets of the international battery raw materials market, including advances in mining and processing with an emphasis on sourcing and cost control strategies by manufacturers
- » Network at the largest international gathering of advanced energy storage technology developers and integrators in Europe

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19 JUNE 2023 | MAINZ, GERMANY

TUTORIALS*

*All Access or separate registration required

MONDAY 19 JUNE 8:30-10:00

TUT1: Improving the Energy Density of Batteries with Silicon-Based Anodes

Instructor:

Dee Strand, PhD, CSO, R&D, Wildcat Discovery Technologies, Inc.

The key challenges in the use of silicon-based anodes, as well as progress in the implementation of silicon and what can we expect in the future. The latest improvements in other battery components are required to maximize the benefit of silicon-based anodes.

TUT2: 21st Century Battery Raw Materials

Instructors:

Daisy Jennings-Gray, Senior Price Analyst, Benchmark Mineral Intelligence
Caspar Rawles, Chief Data Officer, Benchmark Mineral Intelligence

A 90-minute deep-dive and Q&A with Benchmark Mineral Intelligence analysts into the lithium, cobalt, and graphite anodes. A raw material evolution in the way these specialty chemicals are mined, processed, and sold – with the emergence of exchange-traded models and long-term contracts – is occurring.

TUT3: BMS & Charging (instructor will be presenting virtually)

Instructor:

Sheldon Williamson, PhD, Professor & Canada Research Chair, Electrical & Computer & Software Engineering, University of Ontario Institute of Technology

This tutorial will focus on intelligent state estimation and control in lithium-ion battery management systems for transportation electrification applications.

MONDAY 19 JUNE 10:30-12:00

TUT5: Cell & Pack Design for xEVs

Instructor:

Kevin Konecky, Battery and Energy Storage Systems Consultant, Total Battery Consulting

This tutorial will give an overview of battery systems design. An overall product development process will be discussed for a typical system.

TUT6: xEV Lithium-ion Recycling Methods

Instructors:

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

Steve Sloop, PhD, President, OnTo Technology LLC

This tutorial will comprehensively address technologies of pyrometallurgy, hydrometallurgy, hybrid approaches, and direct recycling. The instructor will introduce these and discuss them in light of cost goals and market realities.

TUT7: Battery Safety and Abuse Tolerance Validation

Instructor:

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

This training incorporates Shmuel De-Leon's and other experiences on battery safety representing over 26 years of work in the field. The motivation behind the training is to provide attendees with the knowledge needed to safely handle the batteries in their organization and to support reduction in safety events.

TUT8: In-Depth Analysis of the Chinese xEV Battery Industry

Instructor:

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

This tutorial will try to provide a whole picture of the Chinese EDV battery market including policies & regulations, future forecasts, competitive analysis, battery technology strategies, upstream supply chain, and positioning for foreign enterprises.

MONDAY 19 JUNE 13:00-14:30

TUT9: Solid-State Batteries

Instructor:

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

This tutorial will give an overview of the status of solid-state battery development. The scientific basis for solid-state batteries will be explained in detail.

TUT10: Na-ion Batteries: Materials and State of the Art

Instructor:

Philipp Adelhelm, PhD, Professor, Institute of Chemistry, Humboldt-University Berlin

This tutorial gives an overview on Na-ion battery development with the focus on materials (anode, cathode) and electrolytes.

TUT11: Battery Intelligence – Part 1

Instructor:

Kevin Wood, PhD, Senior Solutions Engineer, Voltaiq Inc

This tutorial will cover machine learning and how it can be used in lifecycle prediction and anomaly detection. Also discussed is the critical need for battery data for intelligent machine learning algorithm development.

TUT12: The Rechargeable Battery Market: Value Chain and Main Trends

Instructor:

Fabrice Renard, Senior Advisor, Avicenne Energy

This tutorial will present the 10-year automotive market forecasts from Avicenne and other analysts (microHybrid|P-HEV|EV).

MONDAY 19 JUNE 15:00-16:30

TUT13: Developing Optimal Lithium Rechargeable Cell Data Sheets

Instructor:

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

Cell data sheets provided by battery manufacturers describe cell functions, performance, operational limits and safety prohibitions. This tutorial will focus on how to prepare and read an optimal lithium rechargeable data sheet and how to define and test each parameter.

TUT14: Battery Intelligence – Part 2

Instructor:

Kevin Wood, PhD, Senior Solutions Engineer, Voltaiq Inc

In this tutorial, we present open-access battery data and data science tools that will enable the battery community to develop innovative machine learning (ML) models to unlock the significant advances needed in battery yield, energy density, and lifetime that the industry is calling for.

TUT15: Li-ion Cell Design and Manufacturing: Processes, Equipment and Quality Control (instructor will be presenting virtually)

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 to a detailed review of Li-ion cell manufacturing from incoming raw materials through final cell formation, aging, and shipment.

TUT16: Li-ion Battery Safety & Thermal Runaway (instructor will be presenting virtually)

Instructor:
Ahmad A. Pesaran, PhD, Chief Energy Storage Engineer, National Renewable Energy Laboratory

This tutorial/seminar is provided by Dr. Ahmad Pesaran with 25+ years of experience in lithium-ion battery R&D&D including safety testing and modeling with perspectives of his participation at USABC Technical Advisory Committee. He will provide the audience with information and understanding needed to handle Li-ion batteries safety in both their work at their companies and in products they deliver to the market.



“ People show what will be the future, but it’s also dealing with practical questions, it’s not just a dream. ”

- Muriel Desaeger, PhD,
Toyota Motor Europe

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TUESDAY 20 JUNE

7:30 Registration and Morning Coffee**8:30 Organizer's Remarks**

Victoria Mosolgo, Conference Producer, Cambridge EnerTech

SOLID ELECTROLYTE BATTERIES: QUO VADIS**8:35 Chairperson's Remarks**

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

8:40 Solid-State and Other Next-Gen Batteries: If and When?

Nicolo Campagnol, PhD, Solution Manager, Battery Insights, McKinsey & Co.

Overview of the current next-gen (silicon and lithium metal anode) trends both in the West as in China. Reality check of the status of these techs/companies, focusing on both the advantages and potential limitations. Forecast of when these products could be online and the risk for displacement of the current ones (e.g., graphite).

9:00 High-End Sustainable Battery Pack Concept with Solid-State Cells

Florian Pampel, MSc, RWTH Aachen University

In this publication, a premium battery with a lithium metal anode cell and a highly integrated pack concept for maximum performance is modeled. Measurements on a prototype cell are used to investigate the extent to which solid-state batteries can outperform existing technologies. Also addressed will be expected costs, which will be critical to market penetration.

9:20 Opportunities and Potentials for New Battery Technologies – Will Li-ion Battery Technology Dominate the Electric Passenger Car Market in the Long Term?

Ines Miller, Team Lead Battery Cells, E Mobility, P3 Automotive GmbH

Increasing demand for more powerful batteries are pushing current Li-ion technology to its limits. Recent developments are attracting high media attention and cell manufacturers are working on the realization and implementation of next battery technologies. The presentation will evaluate the market readiness and competitiveness of future technologies; e.g., high-silicon anodes, solid-state but also Na-ion in comparison to Li-ion battery technology with respect to performance, safety, scalability, and cost aspects.

9:40 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Nicolo Campagnol, PhD, Solution Manager, Battery Insights, McKinsey & Co.

Florian Pampel, MSc, RWTH Aachen University

Ines Miller, Team Lead Battery Cells, E Mobility, P3 Automotive GmbH

10:00 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing
10:50 BASF Cathode Active Materials: Tailored Solutions Addressing the Market Needs

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

An Update on the Most Recent Developments for Cathode Active Materials at BASF

11:10 Sodium-ion Battery for High Power Automotive Applications

Asmae El Mejdoubi, PhD, Product Manager, R&D, Tiamat SAS

The chemical characteristics and the cell performances will be detailed in the presentation; it will also summarize the product development for automotive applications and the TIAMAT industrialization roadmap.

11:30 Scaling-Up High-Performing Solid Electrolytes for a Solid-State Battery Value Chain in Europe

Valérie Buisette, PhD, Head, Solid State Battery Materials Program, Solvay

Inorganic Electrolytes are the key enablers in the emergence of all solid-state batteries. Nowadays, Sulfidic electrolytes are envisaged as the most promising candidates, with high Lithium conductivity and processability advantages. The presentation will illustrate challenges and key success factors in scaling-up high performing Sulfidic electrolyte materials, and Solvay's commitment to build a sustainable value chain for solid state batteries in Europe.

11:50 MODERATED Q&A: Session Wrap-Up

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

Panelists:

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

Asmae El Mejdoubi, PhD, Product Manager, R&D, Tiamat SAS

Valérie Buisette, PhD, Head, Solid State Battery Materials Program, Solvay

12:10 Networking Lunch**13:10 Dessert Break in the Exhibit Hall with Poster Viewing**
SILICON ANODES**13:40 Chairperson's Remarks**

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

13:45 Umicore Progress in Si-Anode Materials: To Be the First European Silicon Anode Player at Scale

Jean-Sébastien Bridel, Senior Scientist, Research & Development, Umicore

Umicore has been researching and developing its silicon anode materials for the last 12 years. Today, we are convinced our current silicon-carbon composite (Si/C) is the right answer for the next-generation EV battery system with using high-energy density cells. We are moving to the next stage to become the first European Si-anode player at scale for EV customers.

14:05 Presentation to be Announced**14:25 Extreme Fast Charging with a Silicon-Dominant Anode a Holistic Approach**

Yorai Amit, PhD, Cell Integration & Design Team Leader, StoreDot Ltd.

The presentation will describe the unique holistic development approach that was employed in order to exceed the goal of 300Wh/Kg and 1000 consecutive extreme fast charging cycles while maintaining the battery's health, in different form factor pouch cells, from 1Ah to 30Ah. While Si-rich anodes present a pathway to fast charging, they are prone to fast deterioration and low cycle life.

14:45 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Jean-Sébastien Bridel, Senior Scientist, Research & Development, Umicore

Yorai Amit, PhD, Cell Integration & Design Team Leader, StoreDot Ltd.

15:05 Refreshment Break in the Exhibit Hall with Poster Viewing**15:30 Progress in Liquid Electrolyte Development for Lithium Metal Anodes**

Dee Strand, PhD, CSO, R&D, Wildcat Discovery Technologies, Inc.

This talk will discuss progress in performance of liquid electrolytes for use with lithium metal anodes. Rapid capacity fade and electrolyte consumption can occur with liquid electrolyte cells that contain lithium metal anodes. However, these problems can be mitigated with advanced formulations. The effect of cycling protocol can also be quite dramatic and will be reviewed in this presentation.

15:50 Enabling the Trifecta of Long Range, Low Cost, and Fast Charge with Lithium Metal Batteries*Peter Frischmann, PhD, Co-Founder & CEO, Sepion Technologies*

Sepion brings a differentiated approach to replacing graphite anodes with lithium metal by combining the latest in nanoscience, polymer chemistry, and cell engineering to safely unlock a 40% increase in electric vehicle range with a gigafactory-compatible solution.

16:10 Amped Up on Power and Safety for Battery Separators*Wei-Ting Yeh, Ph. D., Deputy Director, Advanced Battery Materials Division, BenQ Materials Corporations*

High-safety and high-power batteries are a must-have for EVTOL, UAV, and HEV. In this presentation, we demonstrate a novel separator with superb high-temperature mechanical strength below 250°C, low DCIR in batteries, works for high-speed winding or stacking, and requires no modifications to your production process.

16:30 MODERATED Q&A: Session Wrap-Up*Moderator: Martin Winter, PhD, Director & Professor, Electrochemical Energy Technology, University of Muenster**Panelists:**Dee Strand, PhD, CSO, R&D, Wildcat Discovery Technologies, Inc.**Peter Frischmann, PhD, Co-Founder & CEO, Sepion Technologies**Wei-Ting Yeh, Ph. D., Deputy Director, Advanced Battery Materials Division, BenQ Materials Corporations***INTERACTIVE BREAKOUT DISCUSSIONS****16:50 Transition to Breakout Discussions****17:00 Interactive Breakout Discussions**

Interactive Breakout Discussions are informal, moderated discussions with brainstorming and interactive problem-solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic.

TABLE 1: Innovations in Recycling Battery Materials & Second Life*Moderator: Steve Sloop, PhD, President, OnTo Technology LLC***TABLE 2: Li-ion NMC Fast Charging New Cells for E-Mobility***Moderator: Shmuel De-Leon, CEO, Shmuel De-Leon Energy Ltd.***TABLE 3: Battery Pack System Cost and Safety – Will Future xEV Battery Packs Increase in Complexity or Simplify and How Will Cost and Safety Be Impacted?***Moderator: Kevin Konecky, Battery and Energy Storage Systems Consultant, Total Battery Consulting***TABLE 4: Battery Raw Materials Supply Chain***Moderator: Tom Van Bellinghen, Vice President, Marketing & OEM Value Chain, Rechargeable Battery Materials, Umicore***TABLE 5: Cell Design and Maximizing Performance at Optimal Cost in Minimal Time***Moderator: Michael Schoenleber, Co-Founder & CTO, Batemo GmbH***TABLE 6: Benefits of Wireless Communication Technology in Battery Management Systems***Moderator: Stefan Goede, Head of Research & Development, Co-Founder, Munich Electrification GmbH***TABLE 7: Opportunities and Potential for New Battery Technologies***Moderator: Ines Miller, Team Lead Battery Cells, E Mobility, P3 Automotive GmbH***TABLE 8: Battery CO2 Footprint Legislation – What Does That Mean for the Supply Chain?***Moderator: Wenzel Prochazka, PhD, Senior Product Manager Electrification Systems, NXP Semiconductors Austria GmbH***TABLE 9: Advances in Sodium-ion Battery Materials***Moderator: Philipp Adelhelm, PhD, Professor, Institute of Chemistry, Humboldt-University Berlin***TABLE 10: Silicon Anodes and Cells***Moderator: Martin Sandor, Senior Director of Marketing, Enevate***18:00 Networking Reception in the Exhibit Hall with Poster Viewing**
(Sponsorship Opportunity Available)**19:00 Close of Day****WEDNESDAY 21 JUNE****8:00 Registration and Morning Coffee****SOLID-STATE****8:45 Chairperson's Remarks***Martin Winter, PhD, Director & Professor, Electrochemical Energy Technology, University of Muenster***8:50 Boosting Battery Performance with a Semi-Solid-State Electrolyte***Raimund Koerver, Director of Innovation, Factorial Energy*

Solid or semi-solid electrolytes (SEs) in batteries have the potential to fulfill the growing demand for energy storage solutions that offer high energy and power densities. With Factorial Energy's recent 100Ah battery cell concept announcement, the company is becoming a promising option for use in next-generation electric vehicles. Factorial's semi-solid-state batteries have demonstrated high performance at ambient temperatures and aim to address battery safety concerns.

9:10 Phase Transformation and Microstructural Evolution of CuS Electrodes in Solid-State Batteries Probed by *in situ* 3D X-Ray Tomography*Philipp Adelhelm, PhD, Professor, Institute of Chemistry, Humboldt-University Berlin*

Copper sulfide (CuS) is a naturally occurring mineral and has been used as cathode active material (CAM) in Li primary batteries in the past. The ideal discharge reaction ($2\text{Li} + \text{CuS} \rightarrow \text{Li}_2\text{S} + \text{Cu}$) theoretically provides 560 mAh/g (CuS) and 961 Wh/kg. Here, we discuss the unique reasons why CuS can be an attractive CAM for rechargeable Li-SSBs despite the large volume change during cycling. 10.1002/aenm.202002394, 10.1002/aenm.202203143.

9:30 Advanced Electrolytes for Li Metal Batteries*Venkataraman Thangadurai, PhD, Professor, Chemistry, University of Calgary*

In this talk, I plan to discuss the recent development in solid-state electrolytes, especially Li-based garnets, and interface modifications that are critical for solid-state battery development.

9:50 Solid-State Batteries*Juergen Janek, PhD, Professor, Solid-State Ionics & Electrochemistry, Justus Liebig University, Giessen*

In this presentation, the current status of sulfide-based SSBs and the recent development of halide solid electrolytes will be briefly discussed, as well as the potential need for targeted design of cathode active materials for SSBs

10:10 LMFP: Cell Performance and Manufacturing Technology*Hana Huang, Manager, Sales Division, HCM Co., LTD.*

LMFP has attracted more attentions because of the advantages such as high safety, longer cycle life and high voltage. We believe that LMFP will become one of the key materials in Lithium-ion battery industry. In this talk, I will introduce who we are, and the insight into collaboration strategies and manufacturing technology. From the aspect of R&D, I will talk about LMFP/NMC composite batteries, and our synthesized LMFP which has a discharge capacity of 150 mAh/g with excellent rate capability (>15C) and lifetime >5000 cycles.

10:30 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Philipp Adelhelm, PhD, Professor, Institute of Chemistry, Humboldt-University Berlin

Venkataraman Thangadurai, PhD, Professor, Chemistry, University of Calgary

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

Raimund Koerver, Director of Innovation, Factorial Energy

Hana Huang, Manager, Sales Division, HCM Co., LTD.

Shih-Chieh Liao, PhD, Chief Technical Advisor, Research & Development, HCM Co., LTD.

10:50 Coffee Break in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

11:20 Cathodes

Chirranjeevi Balaji Gopal, PhD, Co-Founder & Chief Product Officer, Product & Engineering, Mitra Chem

11:40 Scaling-Up Commercial Batteries with High-Capacity Si Anodes

Ashok Lahiri, CTO, Technical Advisor & Co-Founder, ENOVIX Corp.

Silicon has long been heralded as the next important anode material since it can theoretically store more than twice as much lithium as graphite anodes.

Ashok will share how stacked cell architecture solves the four technical problems of silicon, producing a 100% active silicon anode battery designed to deliver high-energy density, as well as how Enovix is scaling-up in order to power the technologies of the future

12:00 Transforming Batteries for Optimized Performance, Cost, and Sustainability

Nicolò Brambilla, CTO, Nanoramic Laboratories

Neocarbonix at the Core is an electrode technology platform that that is fluorine-free, unlocking a variety of benefits. Neocarbonix enables batteries with up to 35% higher energy density and 27% lower production costs, all while remaining compatible with existing manufacturing equipment. It also eliminates toxic NMP solvent and reduces CO2 emissions by 25%, helping manufacturers stay ahead of the latest safety and sustainability standards.

12:20 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Chirranjeevi Balaji Gopal, PhD, Co-Founder & Chief Product Officer, Product & Engineering, Mitra Chem

Ashok Lahiri, CTO, Technical Advisor & Co-Founder, ENOVIX Corp.

Nicolò Brambilla, CTO, Nanoramic Laboratories

12:40 Networking Lunch**14:00 Dessert Break in the Exhibit Hall with Poster Viewing** (Sponsorship Opportunity Available)**14:30 Close of Symposium**



BATTERY ENGINEERING

Building Better Batteries

TUESDAY 20 JUNE

7:30 Registration and Morning Coffee

8:30 Organizer's Remarks

Victoria Mosolgo, Conference Producer, Cambridge EnerTech

SAFETY & REGULATIONS

8:35 Chairperson's Remarks

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

8:40 Performance and Safety Requirements in the New Battery Regulation

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

The new Battery Regulation will limit EU sales to sufficiently sustainable batteries. For this purpose, the regulation covers the entire battery life cycle, from the extraction of raw materials to industrial production to end-of-life disposal. The European Commission's Joint Research Centre supports the development of the related requirements or test procedures scientifically. In this presentation, requirements related to performance and safety will be presented and discussed from a technical perspective.

9:00 Bio-Based Barriers for the Prevention of Thermal Runaway Propagation in High-Energetic Lithium-ion Battery Packs

Bruno Bausch, PhD, Center for Solar Energy and Hydrogen Research, ZSW

Due to the constant increase in energy density of lithium-ion batteries, safety concerns in case of a thermal runaway event become more critical. Thermal runaway propagation (TP) can destroy an entire LIB pack, rapidly releasing energy. A solution for TP that minimally affects the pack remains one of the main unsolved safety-related issues in battery systems. This presentation proposes an eco-friendly barrier that prevents thermal propagation between 50Ah LIB cells.

9:20 Test Results of Pouch Cells That Were Differently Aged

Gregor Gstrein, PhD, Project Senior Scientist, Graz University of Technology

9:40 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Gregor Gstrein, PhD, Project Senior Scientist, Graz University of Technology

Bruno Bausch, PhD, Center for Solar Energy and Hydrogen Research, ZSW

10:00 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

ARKEMA

10:50 Physics-Informed, Data-Driven, Predictive Simulations of Battery Remaining Useful Life

Anna G. Stefanopoulou, PhD, William Clay Ford Professor of Technology, Professor Mechanical Engineering, Professor of Electrical and Computer Engineering, University of Michigan

The prediction of Remaining Useful Life (RUL) forecasts future battery performance and is often confused with the estimation of battery State-of-Health (SOH) that describes the calculated present state of capacity and cell resistance. I will highlight advances in identifying degradation mechanisms and simulating RUL beyond the warranty of the primary use for determining vehicle resale value, vehicle-to-grid benefits, and decisions on repurposing or recycling.

11:10 Efficient Cell Aging Characterization

Helmut Grassberger, Application Engineer, AVL List

State-of-the-art cell aging characterization takes 1.5 years and requires 40 cells. The current approach is using Design-of-Experiments, applying one current profile per cell from Beginning-of-Life until End-of-Life. The approach suggests pre-aging of cells and changing current profiles per cell with an advanced DoE approach to reduce the time needed by 60% and the number of cells needed by 30%, with the same result quality as the aging model.

11:30 Streamlining Battery Data Analytics through Advanced Battery Cyclers

Andy Lozowski, PhD, New Product Development, New Product Development, Bitrode Corporation

Battery data analytics is the cornerstone of the development and cycle life of any battery energy storage system as it can facilitate important stages such as cell characterization, modeling, and battery management system design and implementation. In this presentation, we will introduce Bitrode Digital Cycler (BTDC), the next generation of battery cyclers and discuss how it is designed to streamline and expedite battery data analytics and the overall battery development process.

11:50 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Anna G. Stefanopoulou, PhD, William Clay Ford Professor of Technology, Professor Mechanical Engineering, Professor of Electrical and Computer Engineering, University of Michigan

Helmut Grassberger, Application Engineer, AVL List

Andy Lozowski, PhD, New Product Development Fellow, New Product Development, Bitrode Corporate

12:10 Networking Lunch

13:10 Dessert Break in the Exhibit Hall with Poster Viewing

BRENTTAG

CELL DESIGN

13:40 Chairperson's Remark's

Tim Holme, PhD, CTO, QuantumScape Battery Corporation

13:45 Cell Design on Target – Maximum Performance at Optimal Cost in Minimal Time

Michael Schoenleber, Co-Founder & CTO, Batemo GmbH

We will present a digital cell design approach, which starts the design process from the physical model of an existing cell, where the complete thermal and current-voltage behavior is correctly digitally represented. From that point of very low model uncertainty but realistic level of complexity, cell design parameters can be systematically changed and their sensitivity on different cell performance indicators like capacity, peak power, or fast-charging capability can be studied.

14:05 A Battery Diagnosis and Prognosis System for eVTOL Aircraft Battery Pack

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

For electric aircraft, the fundamental premise of safety, plus the need to monitor, identify and isolate or mitigate battery failure is different from road electric vehicles. However, the tightly regulated aircraft usage case opens a few novel approaches to realise a comprehensive diagnostic and prognostic system. Here I will present recent progress in developing a battery functional safety diagnostic and prognostic system at WMG, in collaboration with aerospace OEMs.

14:25 Leading the Charge: How Solid-State Battery Technology will Accelerate the Clean Energy Transition

Tim Holme, PhD, CTO, QuantumScape Battery Corporation

Solid-state lithium metal battery technology is designed to overcome these limitations with the potential to charge faster, last longer on a single charge, be safer, and have a longer useful life compared to conventional lithium-ion batteries. During this talk, QuantumScape Co-Founder and Chief Technology Officer, Tim Holme, will delve into the promise of the solid-state lithium-metal battery cell design.

14:45 MODERATED Q&A: Session Wrap-Up

Moderator: Tim Holme, PhD, CTO, QuantumScape Battery Corporation

Panelists:

Michael Schoenleber, Co-Founder & CTO, Batemo GmbH

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

15:05 Refreshment Break in the Exhibit Hall with Poster Viewing**15:30 Increasing Battery Systems Performance**

Kevin Konecky, Battery and Energy Storage Systems Consultant, Total Battery Consulting

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.

15:50 Overcharging – Fast Charging

Yatish Patel, PhD, Research Associate Mechanics of Materials, Mechanical Engineering, Imperial College, London

A novel parametrisation testing technique is presented. It's then parametrised using this testing technique and compared to a model parametrised using current common testing techniques. This comparison is conducted using a WLTP (worldwide harmonised light vehicle test procedure) drive cycle. As part of the validation, the experiments were conducted at different temperatures and repeated using two different temperature control methods: a climate chamber and a Peltier element temperature control method.

16:10 Presentation to be Announced**16:30 MODERATED Q&A: Session Wrap-Up**

Moderator: Tim Holme, PhD, CTO, QuantumScape Battery Corporation

Panelists:

Kevin Konecky, Battery and Energy Storage Systems Consultant, Total Battery Consulting

Yatish Patel, PhD, Research Associate Mechanics of Materials, Mechanical Engineering, Imperial College, London

**INTERACTIVE BREAKOUT DISCUSSIONS****16:50 Transition to Breakout Discussions****17:00 Interactive Breakout Discussions**

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TABLE 3: Battery Pack System Cost and Safety – Will Future xEV**Battery Packs Increase in Complexity or Simplify and How Will Cost and Safety Be Impacted?**

Moderator: Kevin Konecky, Battery and Energy Storage Systems Consultant, Total Battery Consulting

TABLE 4: Battery Raw Materials Supply Chain

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

TABLE 5: Cell Design and Maximizing Performance at Optimal Cost in Minimal Time

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

TABLE 6: Benefits of Wireless Communication Technology in Battery Management Systems

Moderator: Stefan Goede, Head of Research & Development, Co-Founder, Munich Electrification GmbH

TABLE 7: Opportunities and Potential for New Battery Technologies

Moderator: Ines Miller, Team Lead Battery Cells, E Mobility, P3 Automotive GmbH

TABLE 8: Battery CO2 Footprint Legislation – What Does That Mean for the Supply Chain?

Moderator: Wenzel Prochazka, PhD, Senior Product Manager Electrification Systems, NXP Semiconductors Austria GmbH

TABLE 9: Advances in Sodium-ion Battery Materials

Moderator: Philipp Adelhelm, PhD, Professor, Institute of Chemistry, Humboldt-University Berlin

TABLE 10: Silicon Anodes and Cells

Moderator: Martin Sandor, Senior Director of Marketing, Enevote

18:00 Networking Reception in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

19:00 Close of Day**WEDNESDAY 21 JUNE****8:00 Registration and Morning Coffee****BATTERY SYSTEMS INTEGRATION****8:45 Chairpersons Remarks**

Stefan Goede, CTO, Co-Founder, Munich Electrification GmbH

8:50 Presentation to be Announced**9:10 The Crucial Role of Battery System Integration**

Vaneet Kumar, Vice President, European R&D Center, SVOLT Energy Technology Europe GmbH

SVOLT is driving the future growth of automotive batteries through innovation, a robust supply chain, technology-enabled, and scale-up production. SVOLT likes to share views on the integration of digital technologies to improve battery design.

9:30 Understanding, Modelling, Validating, and Predicting Lithium-ion Battery Degradation

Gregory J. Offer, PhD, Professor in Electrochemical Engineering, Imperial College London

This presentation covers understanding lithium-ion battery degradation, how to model it, and how close those models are getting to usefully predict lifetime. We will describe our efforts to model lithium plating, SEI layer growth, positive electrode (cathode) decomposition, unequal degradation *in silicon* carbon composite electrodes, particle cracking, electrolyte consumption and cell dry-out, and how multiple degradation mechanisms are coupled with each other and contribute towards accelerated degradation (the knee point/cliff-edge/etc).

9:50 Performance Optimization for Battery Cell, Module, and Pack Testing

Gerald Sammer, PhD, Principal Business Development Manager, Integrated & Open Development Platform, AVL List GmbH

This presentation explains AVL's approach on how to optimize a battery lab operation with a comprehensive methodology supported by a dedicated software solution open for any test equipment vendor.

10:10 Predictive Performance: Visualizing a Lifetime of Mechanical Loads within a Battery Module

John Williams, Vice President, Technical Services, Aspen Aerogels

The power of visualization can transform module design and the strategy for mitigating thermal propagation. Aspen Aerogels has developed a kinematic model to help battery engineers better understand how cells and cell-to-cell barriers interact mechanically from beginning-of-life (BOL) to end-of-life (EOL). This presentation will cover thermal and mechanical considerations, and cover the use of Monte Carlo simulations to understand tolerance stacks.

10:30 MODERATED Q&A: Session Wrap-Up

Moderator: Stefan Goede, CTO, Co-Founder, Munich Electrification GmbH

Panelists:

Vaneet Kumar, Vice President, European R&D Center, SVOLT Energy Technology Europe GmbH

Gregory J. Offer, PhD, Professor in Electrochemical Engineering, Imperial College London

Gerald Sammer, PhD, Principal Business Development Manager, Integrated & Open Development Platform, AVL List GmbH

John Williams, Vice President, Technical Services, Aspen Aerogels

10:50 Coffee Break in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

11:20 Next-Generation Intelligent Battery Management System with Enhanced Safety for Transportation Electrification

Sheldon Williamson, PhD, Professor & Canada Research Chair, Electrical & Computer & Software Engineering, University of Ontario Institute of Technology

With the increasing incidence of fire and catastrophic failure of electric vehicles, the necessity of an advanced battery management system and safety framework became crucial. The talk will focus on the importance of intelligent state estimation and control in lithium-ion battery management systems for transportation electrification applications. The current issues and challenges will be also discussed to highlight the scope of future research and development.

11:40 Benefits of Wireless Communication Technology in Battery Management Systems

Stefan Goede, CTO, Co-Founder, Munich Electrification GmbH

The topic of wireless communication within battery management systems has gained traction in recent years. Several battery and vehicle makers have announced the successful implementation of wireless communication within their battery packs. This talk covers the requirements, technology, benefits, and challenges of wireless communication systems within battery packs.

12:00 SafeCore - An Internal Fuse to Help Prevent Thermal Runaway

Dan Squiller, CEO, Amionx

SafeCore is a material that is coated on the current collector of the battery which acts like a fuse when current, temperature or voltage thresholds are reached. SafeCore was developed for a project with the U.S. military where a battery pack a soldier would wear was able to sustain a direct hit from a bullet without going into thermal runaway. SafeCore is effective in protecting against both internal short and overcharge.

12:20 MODERATED Q&A: Session Wrap-Up

Moderator: Stefan Goede, CTO, Co-Founder, Munich Electrification GmbH

Panelists:

Sheldon Williamson, PhD, Professor & Canada Research Chair, Electrical & Computer & Software Engineering, University of Ontario Institute of Technology

Dan Squiller, CEO, Amionx

12:40 Networking Lunch**14:00 Dessert Break in the Exhibit Hall with Poster Viewing**

(Sponsorship Opportunity Available)

**14:30 Close of Symposium**



BATTERY RECYCLING

Advanced Recycling Methods for Sustainable
Battery Materials Supply

TUESDAY 20 JUNE

7:30 Registration and Morning Coffee

8:30 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

EXPANDING GLOBAL RECYCLING MARKETS

8:35 Chairperson's Remarks

Steve Sloop, PhD, President, OnTo Technology LLC



8:40 KEYNOTE PRESENTATION: A View on the Future of Battery Recycling in the European Market Context

Kurt Vandeputte, PhD, Senior Vice President, Battery Recycling Solutions, Umicore

The future of closed battery material loops is regional. This talk will highlight a number of market drivers that are expected to be specific for Europe and that will likely impact the way circularity of batteries will materialize in Europe.

9:00 Creating a Sustainable Lithium-ion Battery Supply Chain

Manfred Schmidt, Vice President, Global Accounts - EMEA, Li-Cycle

The global shift to electric vehicles (EVs) is essential when it comes to tackling climate change, and it's equally important to remember that the lithium-ion batteries within EVs will need to be properly recycled at end-of-life. This presentation will discuss Li-Cycle's recycling approach-- a low-cost, safe, and environmentally friendly process -- which recycles all types of Li-ion batteries, with an unparalleled recovery rate of up to 95% of all materials.

9:20 Future Scenarios for LIB Recycling in Each Region (Europe/US/China/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, by considering multiple scenarios for the LIB recycling market.

9:40 MODERATED Q&A: Session Wrap-Up

Moderator: Steve Sloop, PhD, President, OnTo Technology LLC

Panelists:

Kurt Vandeputte, PhD, Senior Vice President, Battery Recycling Solutions, Umicore

Manfred Schmidt, Vice President, Global Accounts - EMEA, Li-Cycle

Akihito Fujita, Senior Manager, Research & Consulting, Nomura Research Institute America, Inc.

10:00 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing



10:50 Battery Recycling: Market Overview and Discussion of Current and Future Technologies

Victoria Hugill, Battery Research Analyst, Research, Rho Motion

This presentation will cover the growth of the battery recycling market and the development of new technologies. Considering the relative infancy of the battery recycling industry, we will discuss how it might catch up and maintain pace with the electrification markets, especially as battery formats and chemistries evolve.

11:10 European and North American Lithium-ion Battery Recycling

Emilio Soberon, Principal Consultant, Battery Materials, SFA-Oxford

This presentation shows the technology and market outlook for lithium-ion battery recycling in North America and Europe. Highlights include costs breakdown per black mass production and refining technology, volumes expected for metals used in cathode active materials, regulation outlook for North America and Europe, and geographical distribution of players in North America and Europe.

11:30 Reinforcing the Battery Circular Economy with Innovative Refining and Recycling Technologies

YeoJoong Yoon, Head, Business Planning, Advanced Materials Business Division, Korea Zinc



Korea Zinc has embodied technologies and knowhows to recover target metals from various types of feedstocks based on the conventional massive non-ferrous metal refining business. Particularly in EOLB recycling area, Korea Zinc establishes Integrated value chain of Li-ion battery materials by building integrated factory of "Battery Recycling, Precursor and Copper foil". Korea Zinc will provide local closed-loop eco system.

11:50 MODERATED Q&A: Session Wrap-Up

Moderator: Steve Sloop, PhD, President, OnTo Technology LLC

Panelists:

Victoria Hugill, Battery Research Analyst, Research, Rho Motion

Emilio Soberon, Principal Consultant, Battery Materials, SFA-Oxford

YeoJoong Yoon, Head, Business Planning, Advanced Materials Business Division, Korea Zinc

12:10 Networking Lunch

13:10 Dessert Break in the Exhibit Hall with Poster Viewing



EXPANDING GLOBAL RECYCLING MARKETS

13:40 Chairperson's Remarks

Manfred Schmidt, Vice President, Global Accounts - EMEA, Li-Cycle

13:45 Building Local and Circular Lithium-ion Recycling Solutions and Networks

Christian Lafrance, Manager, Business Development, Lithion Recycling

A key factor to create a more sustainable battery supply chain is to implement recycling solutions as close as possible to battery manufacturing capacity and close to large EV estimated end-of-life locations. This reality demands flexibility from recyclers in order to propose solutions that will reflect the needs of tomorrow.

14:05 The Most Economically Compelling Ways of Returning Recycled Battery Materials Back to the Lithium-ion Battery Supply Chain

Tomasz Poznar, PhD, Vice President, Strategy, Ascend Elements



OEMs and advanced battery manufacturers are seeking innovative ways to return used lithium-ion battery materials back to the EV battery supply chain. A circular battery economy is the goal, but there are several different ways to achieve it -- some more efficient and economically compelling than others. This presentation will compare the predominant methods of lithium-ion battery recycling and cathode manufacturing with an eye toward greater efficiency, increased value and lower carbon emissions.

RECYCLING METHODS

14:25 Influence of Over-Discharge on the Recycling Process of Lithium-ion Batteries

Alexandra Kaas, Research Associate, Mechanical Process Engineering and Mineral Processing, Freiberg University of Mining and Technology

To ensure safety during the recycling process lithium-ion batteries should be discharged. Discharging can be done to different levels like over-discharge

and over-discharging into reversal. During over-discharging, different effects can occur; e.g., formation of copper dendrites or coating of the separator with active material. To examine how over-discharging influences recycling, different battery types with different chemistries (NMC, NCA, LFP) were investigated.

14:45 MODERATED Q&A: Session Wrap-Up

Moderator: Manfred Schmidt, Vice President, Global Accounts - EMEA, Li-Cycle
Panelists:

Christian Lafrance, Manager, Business Development, Lithion Recycling

Tomasz Poznar, PhD, Vice President, Ascend Elements

Alexandra Kaas, Research Associate, Mechanical Process Engineering and Mineral Processing, Freiberg University of Mining and Technology

15:05 Refreshment Break in the Exhibit Hall with Poster Viewing

15:30 Direct Recycle Cathode-Healing and Battery Deactivation to Improve Cost and Safety of the Value Chain

Steve Sloop, PhD, President, OnTo Technology LLC

OnTo will share recent developments that improve the accessibility of energy storage for everyone. These include cathode-healing, direct recycling applications to sustainable lithium-ion materials, and deactivation/rendering safe end-of-life batteries. Cathode-healing is an innovative approach to recycling materials independent of battery chemistry. Battery deactivation renders batteries inert to improve cost and safety of transportation and storage. Dr. Sloop will update the progress with deactivation and cathode-healing of lithium-ion batteries.

15:50 What Is the Best Setup for Recycling of Manufacturing Scrap and Used Batteries in Europe?

Jodok Reinhardt, CEO, Librec AG

What are the challenges for battery and car manufacturers regarding compliant, cost- and CO₂-efficient collection, and recovery of valuable manufacturing scrap and batteries? We show available recycling technologies, recovery rates, capacities, and competitive landscape in Europe. We present research on most efficient setup and resulting business model that combines collection, upcycling, recycling, and refining scrap and batteries as a service for battery and car manufacturers.

16:10 Interplay of Battery Recycling and Regional Battery Manufacturing

Chloe Herrera, Analyst, Energy Storage Innovation, Lux Research

With the recent flurry of policy around battery material strategy and increasing battery recycling infrastructure, this talk will discuss what that means for deglobalizing battery manufacturing. It will discuss implications of cell chemistries, battery recycling technology, and expected volumes for battery recycling in the future.

16:30 MODERATED Q&A: Session Wrap-Up

Moderator: Manfred Schmidt, Vice President, Global Accounts - EMEA, Li-Cycle
Panelists:

Steve Sloop, PhD, President, OnTo Technology LLC

Jodok Reinhardt, CEO, Librec AG

Chloe Herrera, Analyst, Energy Storage Innovation, Lux Research

INTERACTIVE BREAKOUT DISCUSSIONS

16:50 Transition to Breakout Discussions

17:00 Interactive Breakout Discussions

Interactive Breakout Discussions are informal, moderated discussions with brainstorming and interactive problem-solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic.

TABLE 1: Innovations in Recycling Battery Materials & Second Life

Moderator: Steve Sloop, PhD, President, OnTo Technology LLC

TABLE 2: Li-ion NMC Fast Charging New Cells for E-Mobility

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

TABLE 3: Battery Pack System Cost and Safety – Will Future xEV Battery Packs Increase in Complexity or Simplify and How Will Cost and Safety Be Impacted?

Moderator: Kevin Konecky, Battery and Energy Storage Systems Consultant, Total Battery Consulting

TABLE 4: Battery Raw Materials Supply Chain

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

TABLE 5: Cell Design and Maximizing Performance at Optimal Cost in Minimal Time

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

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Moderator: Philipp Adelhelm, PhD, Professor, Institute of Chemistry, Humboldt-University Berlin

TABLE 10: Silicon Anodes and Cells

Moderator: Martin Sandor, Senior Director of Marketing, Enevate

18:00 Networking Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

19:00 Close of Day

WEDNESDAY 21 JUNE

8:00 Registration and Morning Coffee

COST-EFFECTIVE RECYCLING

9:00 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

9:05 Chairperson's Remarks

Jodok Reinhardt, CEO, Librec AG

9:10 Influence of the Cell Type on the Recycling Process of Lithium-ion Batteries

Christian Wilke, Research Associate, TU Bergakademie Freiberg

The EU plans to increase the recycling rates by 2025 and 2030. To recover more valuable materials, mechanical recycling route will become more important and the cell format and chemistry will have an influence on mechanical recycling. Therefore, the mechanical processing of different cell formats (prismatic, cylindrical, pouch) and chemistries (NMC, NCA, LFP) was investigated and the impact on the energy consumption, material recovery rate, and product quality was compared.

9:30 Novel Recycling Solution for Sustainable and Carbon-Neutral Battery Future

Xue Wang, PhD, Co-Founder, Suzhou Botree Cycling Sci & Tech Co., Ltd

This presentation will give an overview of the lithium battery market and its recycling market especially in China, our research on battery recycling and regeneration technologies for both LFP and ternary lithium battery, and introduce a self-developed ultra-short separation system via a hydro-metallurgical process for high nickel EV battery, a direct recycling method for various spent electrodes, carbon assessment system for battery whole life, etc.

9:50 Lowest Cost, Lowest Energy Usage: Direct Recycling to the Rescue!

Chao Yan, PhD, CEO and Founder, Princeton NuEnergy, Inc.

Let's re-examine lithium-ion battery recycling technology decisions essential for the industry to maximize cost efficiencies, minimize energy usage, waste, and CO₂ emissions, and keep critical materials at home. Direct Recycling eliminates low-value processing, transportation steps, and hazardous chemicals. Will investments in "Hydro" become stranded? Let's talk about the best way forward.



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

Moderator: Jodok Reinhardt, CEO, Librec AG

Panelists:

Christian Wilke, Research Associate, TU Bergakademie Freiberg

Xue Wang, PhD, Co-Founder, Suzhou Botree Cycling Sci & Tech Co., Ltd

Chao Yan, PhD, CEO and Founder, Princeton NuEnergy, Inc.

10:50 Coffee Break in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

11:20 Sustainability-Focused Technology Assessment of Lithium and Post-Lithium Batteries – Resource Criticality, Recycling, and Prospective Life Cycle Assessment

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

More than 1.200 GWh of annual production capacity is announced for battery gigafactories only in Europe. This rapidly growing demand raises questions about resource availability and the circularity of the battery sector. Na-ion batteries could help to alleviate the resource problem. CATL announced the production of a Na-based battery system by 2023. To increase the understanding of environmental implications of Na-ion battery technology, a prospective full LCA is conducted.

11:40 The Battery Passport – How Technology Enables Supply Chain Transparency and Allows for Demonstrating Recycling Quota

Jessica Green, Strategy Manager, Circular

As early as 2026 each industrial and electric vehicle battery registered in the EU will need an electronic record or “battery passport” that is registered on the European Electronic Exchange System. Providing proof of sustainability information, recycling efficiencies, compliance on responsible sourcing, and sustainable government procurement, amongst other data.

12:00 MODERATED Q&A: Session Wrap-Up

Moderator: Jodok Reinhardt, CEO, Librec AG

Panelists:

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

Jessica Green, Strategy Manager, Circular

12:40 Networking Lunch**14:00 Dessert Break in the Exhibit Hall with Poster Viewing** (Sponsorship Opportunity Available)

◆ NUVVON

14:30 Close of Symposium



HIGH-PERFORMANCE BATTERY MANUFACTURING

Global Production of Safe, Efficient, Higher Energy Density Batteries

TUESDAY 20 JUNE

7:30 Registration and Morning Coffee

GLOBAL MARKET OPPORTUNITIES IN BATTERY MANUFACTURING

8:50 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

8:55 Chairperson's Remarks

Michael Lain, PhD, Lead Engineer, WMG, University of Warwick

9:00 Preparation for the Near Future: Market & Technical Planning of the Asian xEV LIB Manufacturers

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

This presentation will provide an overview of the above cellmakers' planning, especially cover both the technical comparison, market, and product segmentation to show the future development in Asian xEV LIB Manufacturers.

9:20 Developing a Global Manufacturing Roadmap for Commercial-Scale Silicon Battery Technology

Rick Costantino, PhD, Co-Founder and CTO, Group14 Technologies

As OEMs race to electrify fleets in time, Group14 co-founder and CTO Rick Costantino will discuss why a cornerstone of manufacturing and delivering enough batteries worldwide is localizing supply chains with drop-in factories. Rick will pull the curtain back on how Group14 is scaling its footprint in the global market by means of its modular manufacturing approach, with strategic partnerships and sustainability top-of-mind.

9:40 MODERATED Q&A: Session Wrap-Up

Moderator: Michael Lain, PhD, Lead Engineer, WMG, University of Warwick

Panelists:

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

Rick Costantino, PhD, Co-Founder and CTO, Group14 Technologies

10:00 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

ARKE/MA

10:50 Scaling-Up New Technologies: The Path towards a Competitive Localized Supply Chain for Batteries

Roderik Colen, PhD, CEO, Powall

One of the key problems of the new developing technologies, which aim for cost-efficiency and environmental turnover, is their scalability. Replacing traditional post-treatment methods during cathode manufacturing with a dry, gas-phase nanocoating process can significantly enhance process efficiency. Besides introducing our nanocoating technology as an affordable and greener alternative to existing methods, we will showcase our recent advances in scaling up the production capacity to an industrial scale.

ADVANCES IN CELL MANUFACTURING

11:10 Foreign Metallic Particle Contamination in EV Cell Manufacturing

Matthew Gordon, PhD, Staff Software Engineer, Energy and Materials, Toyota Research Institute

Foreign metallic particles (FMPs) pose major safety risks to EV battery manufacturers. Particles as small as 100 microns can cause cell failure and thermal runaway, and can remain dormant in cells for hundreds of cycles before failure. We will discuss the physics of FMP contamination and thermal runaway, and strategies for risk mitigation.

11:30 Next Generation of High Performance Batteries -No trade-off on Every Functional Aspect

Nan-Hung Lester Yeh, PhD, Research & Development Manager, Advanced Battery Technologies, E-One Moli Energy CORP.

MOLICEL®

11:50 MODERATED Q&A: Session Wrap-Up

Moderator: Michael Lain, PhD, Lead Engineer, WMG, University of Warwick

Panelists:

Roderik Colen, PhD, CEO, Powall

Matthew Gordon, PhD, Staff Software Engineer, Energy and Materials, Toyota Research Institute

Nan-Hung Lester Yeh, PhD, Research & Development Manager, Advanced Battery Technologies, E-One Moli Energy CORP.

12:10 Networking Lunch

13:10 Dessert Break in the Exhibit Hall with Poster Viewing

BRENNTAG

13:40 Chairperson's Remarks

Roderik Colen, PhD, CEO, Powall

13:45 Earth-Abundant Cathode Active Materials: Research and Development Efforts at Argonne National Laboratory

Eungje Lee, Staff Scientist, Chemical Sciences & Engineering, Argonne National Laboratory

This presentation will explore research and development efforts at Argonne National Laboratory focused on enabling new designs in high-Mn, low-Ni, Co-free cathodes towards diversifying the portfolio of viable materials for commercial applications.

14:05 Achieving High-Yield Cell Production with Reduced Process Development Time and Costs

Shunsuke Amagai, Founder & Co-CEO, Beff

The rapid growth of LiB market and expectations for further energy density improvements are placing stringent demands on battery manufacturers. However, there is lack of mass production experience and knowledge on the production floor, and there are hurdles to overcome in order to mass-produce batteries as planned. Beff focuses on developing production technology and exploring new technologies to solve these challenges, providing solutions to reduce development time and costs.

14:25 Is This a Good Coating? Characterisation Challenges for the Intermediate Process Steps during Lithium-ion Cell Manufacture

Michael Lain, PhD, Lead Engineer, WMG, University of Warwick

Battery development can be accelerated if the products from intermediate process stages can be successfully characterised, and the results used to optimise the preceding steps. The talk will survey the options at each key stage, with greater details on some specific examples arising from our recent work on volumetric resistivity and coating morphology.

14:45 MODERATED Q&A: Session Wrap-Up

Moderator: Roderik Colen, PhD, CEO, Powall

Panelists:

Eungje Lee, Staff Scientist, Chemical Sciences & Engineering, Argonne National Laboratory

Shunsuke Amagai, Founder & Co-CEO, Beff

Michael Lain, PhD, Lead Engineer, WMG, University of Warwick

15:05 Refreshment Break in the Exhibit Hall with Poster Viewing

15:30 Needs and Trends in LIB Manufacturing

Tim Wicke, Research Associate, Fraunhofer Institute for Systems & Innovation Research

Our presentation summarizes the latest developments in LIB manufacturing, but sets priority on the future. In addition to possible innovations in battery materials or cell formats, we are focusing on production processes and

therefore presenting the most important innovations of different processing technologies and giving a brief technology assessment of individual approaches. The technology assessment is interdisciplinary and ecological, economic and environmental aspects are taken into account.

15:50 Digital Optimisation of Battery Materials

Keri Goodwin, PhD, Chief Technologist, Formulation, CPI

Presentation focused on digital development and optimisation of battery materials and formulations. CPI utilises its automated formulation capability to rapidly screen novel solvents, binders, and active material combinations to down-select the optimal ratios for electrode coatings. Case studies relating to green solvent selection and use of process modelling and soft sensors will be presented.

16:10 Standard Factory at PowerCo

Kai Wörner, PhD, Head, Global Manufacturing, Operations, PowerCo SE

In his presentation, Kai Wörner, Head of Global Manufacturing at PowerCo SE, will be talking about the main building blocks of the standard factory at PowerCo. He will be sharing insights about the key innovations of the concept. Additionally Kai Wörner will give an overview about chances and limits of standardization.



16:30 MODERATED Q&A: Session Wrap-Up

Moderator: Roderik Colen, PhD, CEO, Powall

Panelists:

Tim Wicke, Research Associate, Fraunhofer Institute for Systems & Innovation Research

Keri Goodwin, PhD, Chief Technologist, Formulation, CPI

Kai Wörner, PhD, Head, Global Manufacturing, Operations, PowerCo SE

INTERACTIVE BREAKOUT DISCUSSIONS

16:50 Transition to Breakout Discussions

17:00 Interactive Breakout Discussions

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18:00 Networking Reception in the Exhibit Hall with Poster Viewing
(Sponsorship Opportunity Available)

19:00 Close of Day

WEDNESDAY 21 JUNE

8:00 Registration and Morning Coffee

ADVANCES IN CELL MANUFACTURING

9:05 Chairperson's Remarks

Tim Wicke, Research Associate, Fraunhofer Institute for Systems & Innovation Research

9:10 Sustainable Low Dew Point Solutions for Battery Manufacturing

André Meyer, Head of Key Applications, Automotive & Battery, Munters GmbH

This session delivers basic information on dry rooms, which are mandatory for battery production and R&D. It will also focus on sustainable and regulatory aspects of a dry room project; e.g., the GreenPowerPurge technology for 30% energy savings on dry rooms.

9:30 Step Change in Automotive Joining – Precision Power Laser

David Kilburn, MBA, Director, Flexible Automation, Lincoln Electric

A newly developed method for battery housing production that decreases costs, improves first pass yields and will accelerate the adoption of large scale automotive battery implementation.



9:50 Reducing Costs of Cell Cycling During High Volume Production to Monitor the Output Quality of a Gigafactory

Albert Groebmeyer, Strategic Portfolio Planner, Keysight Technologies GmbH

A key parameter for measuring the quality of cell production is the cell's cycle life. In a Gigafactory, this requires large capital investment and operational costs (energy) to run this long-term quality check on a cell sampling basis, which can take weeks or months to test each cell. We will show a novel approach for capital equipment to implement a cell cycling quality gate providing space and energy consumption savings



10:10 Speed to Market – The Race to Build Your New Gigafactory

David Verner, Executive Vice President, Industrial, Gresham Smith & Partners

There is a waiting list for almost every electric vehicle model. Automakers are racing to meet consumer demand and speed to market is key to their business success. This means more battery plants must be built just as fast. To meet this need, your planning team must understand and overcome the challenges of delivering a large-scale technically complex manufacturing complex.

10:30 MODERATED Q&A: Session Wrap-Up

Moderator: Tim Wicke, Research Associate, Fraunhofer Institute for Systems & Innovation Research

Panelists:

André Meyer, Head of Key Applications, Automotive & Battery, Munters GmbH

David Kilburn, MBA, Director, Flexible Automation, Lincoln Electric

David Verner, Executive Vice President, Industrial, Gresham Smith & Partners

Albert Groebmeyer, Strategic Portfolio Planner, Keysight Technologies GmbH

10:50 Coffee Break in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

11:20 Accelerated, Energy-Reduced and Enhanced Quality – BearLITE Processing for Battery Electrodes Production

Kai Baer, PhD, Managing Director & President, adphos Innovative Technologies GmbH

BearLITE-processing allows strong improved performance, energy-reduced enhanced quality electrodes production. BearLITE-process is already widely proven for different water-based as well as solvent-based potential anode and cathode slurries.

11:40 Digital Transformation in the Battery Industry

Philipp Wunderlich, Director & Head of Battery Consulting, Accenture

Modern Gigafactories require modern solutions– the digital transformation is becoming increasingly relevant for Europe's growing battery industry, because we get the chance to innovate and build new manufacturing plants with state-of-the-art Industry 4.0 technologies.

12:00 Manufacturing Carbon Nanotubes at Gigafactory Scale in the US and Europe

Mike Fetcenko, Chairman, CHASM Advanced Solutions

The technical advantages of carbon nanotubes for battery applications is globally recognized. Commercial application, however, has been hindered by the practical obstacles of scaling manufacturing close to gigafactories in US and Europe at viable cost. CHASM Advanced Materials has developed a scalable, low cost manufacturing process which produces tunable and high purity CNT materials for Li-Ion batteries. This talk introduces CHASM's unique approach, performance results and production status.

12:20 MODERATED Q&A: Session Wrap-Up

Moderator: Tim Wicke, Research Associate, Fraunhofer Institute for Systems & Innovation Research

Panelists:

Kai Baer, PhD, Managing Director & President, adphos Innovative Technologies GmbH

Philipp Wunderlich, Director & Head of Battery Consulting, Accenture

Mike Fetcenko, Chairman, CHASM Advanced Solutions

12:40 Networking Lunch**14:00 Dessert Break in the Exhibit Hall with Poster**

Viewing (Sponsorship Opportunity Available)

**14:30 Close of Symposium**



xEV BATTERY TECHNOLOGY, APPLICATION, AND MARKET

Driving the Future Growth of Electric Vehicles Globally

WEDNESDAY 21 JUNE

12:40 Registration Open

14:30 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

MARKET EXPANSION OF xEVs AND THEIR BATTERIES

14:35 Chairperson's Remarks

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



14:40 KEYNOTE PRESENTATION: PowerCo Strategy and Product Development Status

Soonho Ahn, PhD, CTO, PowerCo SE

This presentation will cover the PowerCo's product development status and market strategy.



15:00 KEYNOTE PRESENTATION: Battery Technologies for Automotive Applications - Trends and Challenges

Peter Lamp, PhD, Head, Research Battery Technology, BMW Group

This presentation will cover BMW's development strategy on the next and future generation battery cells.

15:20 Accelerate Cell Qualification with The Battery Index

Mark Willey, Senior Vice President, Customer Success & Partnerships, Voltaiq, Inc

Qualifying cells is key to developing state-of-the-art electrified vehicle platforms which demand cutting-edge technologies to stay competitive. We provide an agile framework OEMs can use to accelerate their cell qualification process, enabling them to reach product launch timelines with the most competitive and highly performing new technologies available. We also provide a case study exemplifying the utility of the database in accelerating engineering and engineering design decisions for the automotive industry.

15:40 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Soonho Ahn, PhD, CTO, PowerCo SE

Peter Lamp, PhD, Head, Research Battery Technology, BMW Group

Mark Willey, Senior Vice President, Customer Success & Partnerships, Voltaiq Inc.

16:00 Refreshment Break in the Exhibit Hall with Poster Viewing

16:30 xEV Batteries Go Circular – An Update

Roland Matthé, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Stellantis

Stellantis is progressing in the transformation towards electric propulsion. Progress in battery cell and pack performance is made. Increasing production volumes will result in significant increase in the demand on raw materials and will require reuse of materials recovered in battery recycling when batteries have reached end-of-life. As sustainability is the driver for electrification, all steps along the process need to be evaluated and optimized.

VOLTAIQ

16:50 Understanding and Analyzing Battery Pack Energy Density

Andy Oury, Engineering Technical Leader, Battery Packs, General Motors

When engineering or benchmarking complex systems, it's critical to focus on the right metrics. This is no less true with battery design than with anything else. Mr. Oury will discuss the different transfer functions that incrementally reduce cell-level energy density as cells are integrated into modules and packs, and will propose a method for energy density benchmarking across disparate battery designs.

17:10 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Roland Matthé, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Stellantis

Andy Oury, Engineering Technical Leader, Battery Packs, General Motors

17:50 Networking Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

19:00 Close of Day

THURSDAY 22 JUNE

8:00 Registration and Morning Coffee

8:40 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

MARKET EXPANSION OF xEVs AND THEIR BATTERIES

8:45 Chairperson's Remarks

Roland Matthé, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Stellantis

8:50 Lithium-Metal-Polymer Solid-State Batteries for Automotive Applications

BlueSolutions

Sofia Peticarari, Electrochemistry Innovations Manager, Blue Solutions

Solid electrolyte batteries are foreseen as a key innovation in order to support electrification and an always growing in-vehicle energy density. This ultimately translates for EV owners to higher autonomies. Satisfying customers also mean achieving fast-charging system and allowing wide temperature range operation. The presentation will disclose the current development status of Blue Solutions which is on the path of delivering a breakthrough for EVs with its GEN4 cells. Based on a 12-year industrial experience and with more than 3 million cells produced, Blue Solutions allies real field experience with advanced research into bringing the right product, to the passenger mobility, by the end of the decade.

9:10 10 Years of Automotive Battery Cell Design – A Statistical and Market Analysis

Christoph Neef, PhD, Senior Scientist, Fraunhofer Institute for Systems and Innovation Research ISI

Automotive LIB cells have undergone major advancements on all levels, from materials to cell structure in the last years. Based on a unique database on vehicle sales and EV battery properties, we present a statistical analysis of the last 10 years of EV battery market, showing developments in the most important cell design parameters like cell format and energy density leading to cutting edge concepts.

9:30 Impacts of the New EU Batteries Regulation on the Development of the Battery Eco-System in Europe

Pau Sanchis, Senior EU Affairs & Policy Manager, Eurobat, Association of European Automotive and Industrial Battery Manufacturers

Batteries are a cornerstone to become carbon neutral by 2050. The EU Institutions have been negotiating the legislation that will regulate the whole life cycle of a battery. They finally have agreed to ambitious targets and tight timelines for the collection of batteries, material recovery, and recycling efficiencies that will impact the industry. This proposal, hence, is based on the outcome of the Batteries Regulation legislative process.

9:50 The European Battery Value Chain: Status, Opportunities and Challenges, with Natural Resources and Policy in Focus.

Ilka Von Dalwigk, Policy Manager, European Battery Alliance

Europe leads the world on environmental reform, through the EU's taxonomy to reduce CO2 emissions by 55% in 2030 vs. 1990 and a net zero 2050 target, with the European Green Deal's €1.8 trillion of finance supporting an energy transition needed to reach them. This presentation will address the European battery industry status and outlook, and its opportunities and challenges, with a policy context.

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

Moderator: Roland Matthé, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Stellantis

Panelists:

Christoph Neef, PhD, Senior Scientist, Fraunhofer Institute for Systems and Innovation Research ISI

Pau Sanchis, Senior EU Affairs & Policy Manager, Eurobat, Association of European Automotive and Industrial Battery Manufacturers

Ilka Von Dalwigk, Policy Manager, European Battery Alliance

Sofia Perticarari, Electrochemistry Innovations Manager, Blue Solutions

10:30 Coffee Break in the Exhibit Hall with Poster Viewing**xEV BATTERY TECHNOLOGY****11:05 New Requirements and New Solutions for Multi-Functional Venting Units**

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

Multi-functional venting units are essential components in holistic battery safety concepts, enabling pressure equalization between pack interior and environment in regular operation, as well as effective overpressure release during thermal runaway, even reducing the risk of battery fires. With an increasing variety in battery pack designs and cell chemistries, the functionality of venting units must be adapted accordingly. This presentation will show current trends and solutions in venting unit engineering.

11:25 Fast Charging Meets No-Thermal-Propagation Requirements: Concepts for New Cell Technologies, High Performance Cooling, and Thermal Propagation-Safe Design

Bernhard Brunnsteiner, PhD, Chief Engineer, Simulation & Digital Svcs, AVL List GmbH

Current and future battery developments are facing amongst others the following two main challenges: thermal safety and fast charging capability. These two challenges require a smart design solution combining an efficient cooling system with low thermal resistance and high cooling power, with a design considering a thermal propagation safe design. AVL will show design and cooling system innovation to address these challenges.

11:45 Grain Boundary Enriched Cathode Products gNMC & gNCA with Cobalt Ladders: Cost and Performance Comparisons

Kenan Sahin, PhD, President & Founder, CAMX Power

The CAMX Power invented and patented grain boundary enrichment of high nickel cathode materials (GEMX) allows for lower Cobalt while maintaining and even improving performance. We will present cost and performance profiles for gNMC and gNCA with 15%, 10%, and 5% Cobalt, which may be useful for supplying different EV models. This product family approach could make choosing a cathode composition easier for a planned EV model.

**12:05 Hybrid UltraCapacitor Technology and its Applications for xEVs**

Wei Sun, PhD, Senior Vice President, Research & Development Center, GMCC Electronic Technology WUXI LTD

To improve power density, cycle life and low temperature performance for lithium-ion batteries (LiB), GMCC has developed Hybrid UltraCapacitor (HUC) cells with a novel hybrid electrochemical system that combines the scientific principles of electrical double layer capacitors (EDLC) and LiB.

The HUC cell features a very high discharge rate (>100C@RT and >10C@-40 Celsius) and extremely high cycle life (>30000), making it suitable for 12 V backup power supply of electric vehicles.

12:25 MODERATED Q&A: Session Wrap-Up

Moderator: Roland Matthé, Technical Fellow, Global Battery Systems; Manager, Electrical Architecture, Stellantis

Panelists:

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

Bernhard Brunnsteiner, PhD, Chief Engineer, Simulation & Digital Svcs, AVL List GmbH

Kenan Sahin, PhD, President & Founder, CAMX Power

Wei Sun, PhD, Senior Vice President, Research & Development Center, GMCC Electronic Technology WUXI LTD

12:25 Networking Lunch**13:25 Dessert Break in the Exhibit Hall with Poster Viewing – Last Chance for Viewing****xEV BATTERY TECHNOLOGY****14:00 Chairperson's Remarks**

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

14:05 Next-Gen EV Batteries Based on Immersion Cooling and a New Fluid

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

What is the best compromise regarding the KPIs Energy Densities (Wh/ltr/Wh/kg), Safety, Fast Charging capabilities, Lifetime, and Cost based on a skateboard platform of an EV-car? This presentation will show new design approaches based on an immersion-cooled battery and a new fluid with high fire resistance. Test results regarding cooling performance at a fast charging profile will be given. Furthermore, safety test results show new possibilities to prevent thermal propagation.

14:25 Immersion Cooling of Li Ion Batteries – Enabling High Power Charging, Performance, Safety and Long Battery Life

Christopher Wolter, PhD, Senior Technologist PD Driveline & EV Fluids, Driveline Technology Center, Castrol Germany GmbH

Main hurdles when it comes to convincing customer to switch to fully electric vehicles are range anxiety, charging time and safety. Immersion Cooling, also known as direct liquid cooling, enables sustained High Power Charging (HPC) of more than 250 kW resulting in charging times as short as a conventional refueling process of an ICE car.

14:45 Immersion Cooling: Safe, Fast, and Cool

Gerard Quoirin, PhD, Product Engineer, Battery Specialist, Battery Fluids, TotalEnergies Lubricants

Immersion cooling of a lithium battery is a good solution to control the heat generated by the cells during rapid charging or intensive use. It also seems that thanks to this technology: it is almost impossible to have a major failure of the battery: a fire or the propagation of a thermal runaway of the cell. Thanks to our work, we can demonstrate that this is indeed the case.



15:05 MODERATED Q&A: Session Wrap-Up

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

Panelists:

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

Christopher Wolter, PhD, Senior Technologist PD Driveline & EV Fluids, Driveline Technology Center, Castrol Germany GmbH

Gerard Quoirin, PhD, Product Engineer, Battery Specialist, Battery Fluids, TotalEnergies Lubricants

15:25 Coffee Break**AUTOMOTIVE LOW-VOLT ENERGY STORAGE SYSTEMS****15:40 Low Voltage Battery Development for the Next-Gen xEVs**

Christian Kuper, Manager, Li-ion Modeling & Requirements, Clarios

The strong transition towards electrified vehicles confronts batteries for low voltage power-nets with a significantly changed set of requirements. While the 12V batteries for BEV and PHEV can be reduced in size and capacity compared to traditional starter batteries, they have to comply to specific performance and functional safety requirements. In particular, low temperature fallback load support maintaining a narrow voltage window poses a specific challenge to the battery technology.

16:00 48V mHEV Batteries – Boundary Conditions and Example for Application

Horst Mettlach, Global Tech Specialist Propulsion Electrification, Stellantis

EU CO₂ emission reduction targets are the main motivation for introduction of mHEV with 48V batteries in Europe. Depending on the 48V mHEV hybrid architecture P0 to P4, different functions like pure electric driving, in addition to regenerative braking and boosting need to be enabled by the 48V battery. The paper will describe the different requirements, the design and validation of the 48V mHEV battery for a selected application.

16:20 Advantages of Lead xEV Batteries for Functional Safety Applications

Olaf Sielemann, Director, Engineering EMEA, Clarios

Future vehicle applications, independent of the propulsion type, will have new requirements for the low-voltage power net architecture. One key element will be the stability of the low-voltage power net for autonomies driving functions. In emergency cases, a redundant energy source must be available for the safe operation of the vehicle. This presentation will carry out the advantages of lead-based batteries as a redundant energy source for those functions.

16:40 MODERATED Q&A: Session Wrap-Up

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

Panelists:

Christian Kuper, Manager, Li-ion Modeling & Requirements, Clarios

Horst Mettlach, Global Tech Specialist Propulsion Electrification, Stellantis

Olaf Sielemann, Director, Engineering EMEA, Clarios

17:00 Close of Conference



GLOBAL BATTERY RAW MATERIALS

Balancing Supply, Demand, & Costs for Battery Component Materials

WEDNESDAY 21 JUNE

12:40 Registration Open

14:30 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

BATTERY RAW MATERIALS SUPPLY

14:35 Chairperson's Remarks

Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

14:40 Brazilian Nickel's Piauí Nickel Project – Sustainable Nickel and Cobalt for a Low-Carbon Future

Anne Oxley, Technical Director, Brazilian Nickel PLC

Brazilian Nickel's Piauí Project is a nickel heap leach operation that produced its first intermediate products in 2022. These products are perfect feeds for battery cathode production. Heap leaching is a low-cost and inherently low carbon footprint process and BRN is looking at innovative ways to reduce the project's carbon footprint even further with the vision of being carbon negative.

15:00 NMC-LFP and Beyond: Effect on Raw Materials Demand

Nicolo Campagnol, PhD, Solution Manager, Battery Insights, McKinsey & Co.

The ramp up of the battery industry implies massive investment in mines and refineries. Yet, the fast pace of innovation might shift demand to different commodities while assets are being built. This presentation will inform about trends in battery chemistry and risks/opportunities which come with them.

15:20 Gotion- Vertical Integration as a Key Enabler for a Reliable and Sustainable Battery Raw Materials Supply Chain

Carsten Obermann, Project Manager, Gotion Global, Gotion GmbH

Establishing a reliable and sustainable supply chain for battery raw materials will be key in the coming years. For battery manufacturers to be competitive in markets and to comply with upcoming regulations, securing sustainable raw material supply through vertical integration is Gotion's strategy. This presentation will give an overview of Gotion's activities in the field of battery raw materials, especially tackle the topics of localization and a closed-loop supply chain.

15:40 MODERATED Q&A: Session Wrap-Up

Moderator: Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

Panelists:

Anne Oxley, Technical Director, Brazilian Nickel PLC

Nicolo Campagnol, PhD, Solution Manager, Battery Insights, McKinsey & Co.

Carsten Obermann, Project Manager, Gotion Global, Gotion GmbH

16:00 Refreshment Break in the Exhibit Hall with Poster Viewing

16:30 High Performance Sustainable Graphite Production in Europe

Bridget Catherine Deveney, Director of R&D, Vianode

This presentation discusses how Vianode is producing high-volume competitive anode materials with state-of-the-art performance outside Asia. The Vianode production in Norway offers a substantial improvement in efficiency and sustainability. The talk will also discuss the next step in anode material sustainability, graphite recycling, where Vianode is moving to pilot scale.

16:50 How Freyr Will Build a Better Battery Material Value Chain in Norway

Sachiya Inagaki, Vice President, Battery Material Supply Business, FREYR Battery Norway AS

To meet the demand from the market, battery cell manufacturers are also necessary to secure materials for this purpose. In addition to that, having a localized battery material supply chain is also important to avoid many risks in the supply chain. Above all, creating a battery supply chain in a sustainable way is crucial. I will introduce how FREYR has been setting up our local battery supply chain in Europe.

17:10 Nickel Market Fundamentals in the Post-LME Short Squeeze Era

Jason Sappor, Senior Analyst, S&P Global Commodity Insights

2022's nickel market short squeeze – which catapulted the London Metal Exchange, or LME, three-month nickel price above \$100,000 per tonne and forced the LME to temporarily suspend nickel trading. This presentation will assess the nickel market performance through to mid-2023, provide our five-year price forecast, considering factors including electric vehicle sales, battery chemistry mix, and metals supply and demand in nickel's new era.

17:30 MODERATED Q&A: Session Wrap-Up

Moderator: Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

Panelists:

Bridget Catherine Deveney, Director of R&D, Vianode

Jason Sappor, Senior Analyst, S&P Global Commodity Insights

Sachiya Inagaki, Vice President, Battery Material Supply Business, FREYR Battery Norway AS

17:50 Networking Reception in the Exhibit Hall with Poster Viewing
(Sponsorship Opportunity Available)

19:00 Close of Day

THURSDAY 22 JUNE

8:00 Registration and Morning Coffee

8:40 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

GLOBAL MARKET DEMAND

8:45 Chairperson's Remarks

Anne Oxley, Technical Director, Brazilian Nickel PLC

8:50 EV Sales Review for 2022 and the Expectations Going Forward and Implications on Battery Demand

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

This presentation will cover the EV Sales Review of 2022 as well as expectations going forward and implications on battery demand and will share the latest insights from collecting the facts in the EV industry.

9:10 EV Market & Battery Market – Impact on the Raw Material Supply Chain

Fabrice Renard, Senior Advisor, Avicenne Energy

Today less than 5% of the automotive market is Electric Vehicle. With this very small market share, xEV already consume more than 70% of the total Li-ion battery production, more than 50% of the cobalt production and more than 65% of the lithium production. With conservative xEV forecasts (15 million EV sold per year in 2030), the impact on the lithium-ion battery market and supply chain will be huge.

9:30 China Lithium Battery Market Update

Yan Chen Wang, PhD, Managing Director, Shanghai Metals Market (SMM)

The presentation will focus on the latest development in the lithium battery industry in China, including demand, raw materials supply, and prices.

9:50 Raw Material Supply – The Barrier to Transport Electrification?

Egor Prokhodtsev, PhD, Senior Research Analyst, Energy Transition & Battery Raw Materials, Wood Mackenzie

The 2020s will be a defining decade in the global effort to decarbonise the transport sector. With electric vehicles already attracting mass-market sales in turbulent economies for the automotive sector, demand for batteries and their raw materials will skyrocket as penetration targets loom on the horizon. Can the supply side keep up?

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

Moderator: Anne Oxley, Technical Director, Brazilian Nickel PLC

Panelists:

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

Fabrice Renard, Senior Advisor, Avicenne Energy

Yanchen Wang, PhD, Managing Director, Shanghai Metals Market (SMM)

Egor Prokhotsev, PhD, Senior Research Analyst, Energy Transition & Battery Raw Materials, Wood Mackenzie

10:30 Coffee Break in the Exhibit Hall with Poster Viewing**11:05 Battery Raw Material Supply Response after Shortages**

Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

What should the market expect in terms of a supply response from battery raw material producers, what is the outlook for supply, demand, and prices in these complicated and fast-moving markets? The talk will look at recent developments in battery raw materials, the impact it has had on the supply chain, and the underlying trends in lithium, cobalt, and nickel.

11:25 Current and Future Trends in Battery Raw Materials

Thomas Kavanagh, Associate Editor, Argus Media

Exploring pricing, supply, and demand trends in battery metals and cathode active materials for the previous year; examining the main upcoming trends for the year ahead and later in the decade.

11:45 Carbon and Water Neutral Lithium - SQM's Innovation Roadmap and Sustainable Development Plan

Stefan Debruyne, Mr., External Affairs, SQM

Lithium is an essential element in the global energy transition. It's critically important to stakeholders that it is mined in a sustainable and equitable way. Besides an update on SQM's progress on its Sustainable Development Plan, SQM's Innovation Roadmap toward water-neutral lithium production will be presented. Additionally, global lithium production and SQM's expansion plan will be updated.

**12:05 MODERATED Q&A: Session Wrap-Up**

Moderator: Anne Oxley, Technical Director, Brazilian Nickel PLC

Panelists:

Olivier Masson, Metals and Mining Analyst, Fastmarkets

Thomas Kavanagh, Associate Editor, Argus Media

Stefan Debruyne, Mr., External Affairs, SQM

12:25 Networking Lunch**13:25 Dessert Break in the Exhibit Hall with Poster Viewing – Last Chance for Viewing****GLOBAL MARKET DEMAND FOR BATTERY RAW MATERIALS****14:00 Chairperson's Remarks**

Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

14:05 Lithium in the Terawatt-Hour Era

Daisy Jennings-Gray, Senior Price Analyst, Benchmark Mineral Intelligence

This talk will explore the latest price updates and analysis from Benchmark's Lithium Price Assessment and how the latest market trends are set to impact the supply and demand outlook as the industry approaches the terawatt-hour scale.

SUPPLY CHAIN STABILITY**14:25 Challenges in Providing Access to Fluorine Chemistry to Support the Market Growth**

Lorenzo Orsini, PhD, R&D Director, Alkeemia Spa

Considering also a massive number of future developments based on fluorinated compounds, it will be necessary to provide a range of fluorination techniques to scout new technologies and to develop more sustainable manufacturing approaches.

14:45 When Will Lithium Supply Diversify?

Alex Laugharne, Principal Consultant, Consulting, CRU International

Four years on from the last lithium market bubble, a lack of diversity in supply remains. This leaves the industry exposed to volatility, and putting the energy transition at risk. We will uncover what is changing: extraction technology, resources, producers, pricing arrangements, and political intervention. Advancements that will place lithium miners and refiners in a stronger position to support the widespread adoption of Li-ion batteries.

15:05 MODERATED Q&A: Session Wrap-Up

Moderator: Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

Panelists:

Daisy Jennings-Gray, Senior Price Analyst, Benchmark Mineral Intelligence

Alex Laugharne, Principal Consultant, Consulting, CRU International

Lorenzo Orsini, PhD, R&D Director, Alkeemia Spa

15:25 Coffee Break**15:40 Addressing Supply Gaps in Battery Chemistry in Europe**

Clemens Coupette, Senior Project Lead eMobility, LANXESS Deutschland GmbH

In addition to the metals relevant for LIBs, chemistry requirements for European battery cell production are expected to be imbalanced in the coming years. Solutions are to be developed for the value chain.

16:00 The Cost Impact of a Domestic Supply Chain on Li-ion Batteries

Benjamin Campbell, Battery Analyst, Battery Solutions, E Source

This presentation will explore the impact of localizing different parts of the lithium-ion battery supply chain on battery costs. This presentation will directly quantify the costs and benefits of locally produced materials and batteries.

16:20 MODERATED Q&A: Session Wrap-Up

Moderator: Jordan Roberts, Battery Raw Materials Analyst, Fastmarkets

Panelists:

Clemens Coupette, Senior Project Lead eMobility, LANXESS Deutschland GmbH

Benjamin Campbell, Battery Analyst, Battery Solutions, E Source

16:40 Close of Conference



EV TECHNOLOGY FOR HEAVY DUTY APPLICATIONS

Commercializing Advanced High-Energy Batteries and Infrastructure for HEVs

WEDNESDAY 21 JUNE

12:40 Registration Open

14:30 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

HEAVY DUTY MARKET EXPANSION

14:35 Chairperson's Remarks

Ales Kolar, Senior Product Manager, Virtual Testing Solutions, AVL List GmbH



14:40 KEYNOTE PRESENTATION: Electrification of Heavy Duty Trucks - Customer Demands Define the Right Battery Technology

Tobias Lücking, Manager, HV Battery Development,

Daimler Truck AG

The IAA Transportation 2022 fair in Hannover showed a clear trend to electrification of commercial vehicles. The Mercedes-Benz eActros LongHaul received the "Truck Innovation Award 2023". Key component with respect to functionality and total cost of ownership for our customers is the installed long-lasting LFP battery. Based on such a "truckified" cell technology, we at Daimler Truck AG are electrifying further our global vehicle portfolio.

15:00 Battery Technologies for Heavy Duty Trucks Using Electrified Roadways

Roger Gerson, Director, Engineering & Battery Line Architect, Battery Systems, Accelera by Cummins

Battery performance requirements for heavy duty truck are primarily derived from the category of use of the truck, and the work demand of the daily mission in the context of the charging environment. Here we provide a hypothesis on battery technologies for heavy duty trucks operating in an environment of ubiquitous megawatt charging in Europe.

15:20 Next-Level Battery Solutions to Meet Demands of Heavy Duty Vehicles

Stefan Bergold, PhD, General Manager, Farasis Energy Europe GmbH

Offering high energy density combined with fast-charging and a long lifecycle will be prerequisites for battery technology solutions to succeed in the heavy duty vehicles segment. Dr Stefan Bergold, General Manager of Farasis Energy Europe, will discuss these solutions, their applications as well as development trends in his presentation and explain, how these requirements can be met.

15:40 MODERATED Q&A: Session Wrap-Up

Moderator: Ales Kolar, Senior Product Manager, Virtual Testing Solutions, AVL List GmbH

Panelists:

*Tobias Lücking, Manager, HV Battery Development, Daimler Truck AG
Roger Gerson, Director, Engineering & Battery Line Architect, Battery Systems, Accelera by Cummins*

Stefan Bergold, PhD, General Manager, Farasis Energy Europe GmbH

16:00 Refreshment Break in the Exhibit Hall with Poster Viewing

16:30 Batteries and Infrastructure Need for HD xEVs

Fernanda Marzano, PhD, Technology Leader Electrification, Research Office, Scania

Electrification is one of the pillars on Scania's sustainability journey. In order to produce safe, sustainable, and efficient solutions for our customers, we use a holistic approach to the challenge. This talk will cover some of our recent research activities on batteries and infrastructure challenges for the electrification of HD xEVs.

16:50 Performance of Batteries in an Electric Bus Fleet – Results from 1 Year of Cloud Diagnostics

Kai-Philipp Kairies, CEO, ACCURE Battery Intelligence GmbH

As bus fleets around the world are electrified, new challenges arise for operators: Battery safety and performance need to be actively managed to reach the expected level of reliability; at the same time, questions about maintenance cycles, longevity, and second-life potentials arise. Since 2021, the Berlin Transport Authority (BVG) leverages ACCURE's Safety and Performance Manager to optimise their electric bus fleet. In this presentation, real-life results are presented and discussed.

INNOVATION IN HEAVY DUTY EV APPLICATIONS

17:10 Advanced Short Circuit Protection for Batteries

Denis Gorman, Head of Batteries & High Voltage Systems, FutureMotiv

The Low Resistance of Lithium-Ion presents challenges for achieving safe, reliable short circuit protection. An advanced pyrotechnic fuse concept allows for custom configurable opening characteristics. This ensures all desired componentry is protected, whilst also facilitating post-mortem data for fuse opening and reducing the chance of nuisance opening

17:30 MODERATED Q&A: Session Wrap-Up

Moderator: Ales Kolar, Senior Product Manager, Virtual Testing Solutions, AVL List GmbH

Panelists:

Fernanda Marzano, PhD, Technology Leader Electrification, Research Office, Scania

Kai-Philipp Kairies, CEO, ACCURE Battery Intelligence GmbH

Denis Gorman, Head of Batteries & High Voltage Systems, FutureMotiv

17:50 Networking Reception in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

19:00 Close of Day

THURSDAY 22 JUNE

8:00 Registration and Morning Coffee

8:40 Organizer's Remarks

Craig Wohlers, Executive Director, Conferences, Cambridge EnerTech

8:45 Chairperson's Remarks

Sebastian Pohlmann, PhD, Vice President, Automotive, Skeleton Technologies GmbH

HEAVY DUTY MARKET EXPANSION

8:50 Comparison of Battery System Architectures in Heavy Duty Vehicles

Michal Pikula, Business Unit Director, Impact Clean Power Technology S.A.

The installation of batteries in heavy duty vehicles requires an individual approach. OEM's and battery systems manufacturers, during battery pack development, ask themselves a number of questions, such as: Does the better system have more small batteries or fewer large ones? Is it better to have one universal battery for several different vehicles or different, dedicated batteries for different vehicles. Using the example of City Buses, different approaches to battery system architectures will be presented.

9:10 Technology and Business Model Development of Battery as a Service (BaaS) for e-Micromobility

Mo-Hua Yang, PhD, Partner, Senior Expert, ExtraEnergy Consulting

E-micromobility as the solution for the first mile and last mile transportation has become an important topic to connect to the public transportation system for the net zero target for cities globally. To develop about 1 to 2 kWh standard battery can be the "game changer" as Battery as a Service (BaaS) business model.

INNOVATION IN HEAVY DUTY EV APPLICATIONS

9:30 Safety and Performance of Hydrocarbon-Based Cooling Fluids

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

There is no dissent when it comes to the advantages of immersion battery cooling. Especially performance under extreme conditions and fast charging. Hydrocarbon fluids are becoming more and more established as the coolant of choice. In this presentation, we will share more test data on the safe use of hydrocarbon coolants in this application, but also real-life performance data from the racing environment.

9:50 System Validation with Battery-in-the-Loop Configuration Using a Virtual Testing Toolchain

Ales Kolar, Senior Product Manager, Virtual Testing Solutions, AVL List GmbH

During battery pack development the testing on component testbed can be enhanced for vehicle validation tasks by creating a Battery-in-the-Loop configuration. The presentation will focus on benefits of such an augmented testbed for both battery suppliers and heavy duty OEMs. Applications and use cases will be shown, based on a modular virtual testing toolchain, which involves simulation platform & models as well as generation of model parameter & test cases.

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

Moderator: Sebastian Pohlmann, PhD, Vice President, Automotive, Skeleton Technologies GmbH

Panelists:

Mo-Hua Yang, PhD, Partner, Senior Expert, ExtraEnergy Consulting

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

Ales Kolar, Senior Product Manager, Virtual Testing Solutions, AVL List GmbH

Michal Pikula, Business Unit Director, Impact Clean Power Technology S.A.

10:30 Coffee Break in the Exhibit Hall with Poster Viewing

11:05 First Responder Emergency Response Guide Considerations for HVOR Applications

Brian Engle, Manager, Business Development, Electrification, Amphenol

The SAE J2990 Task Force has developed standard practice for documenting Emergency Response Guides for EV and fuel cell vehicles. Field incident investigations, first responder feedback, and recent research has provided further guidance for tools and resources needed as battery systems scale up for HVOR markets.

11:25 Battery Life Models for Heavy Duty Applications

Josu Olmos, Researcher, Ikerlan Technology Research Centre

Heavy-duty EVs usually require lifetime warranties between 10 and 15 years. Semi-empirical models were widely used to estimate battery ageing and development of energy management strategies. However, the battery can behave differently in the lab and in real life. The new data-driven modeling methods make possible reducing cost and time in the battery design phase as well as optimizing its usage ensuring the compliance of the required warranty period.

11:45 Electrification in Heavy Duty Applications – Energy Storage Lifetime in High Utilization Use Cases

Sebastian Pohlmann, PhD, Vice President, Automotive, Skeleton Technologies GmbH

As the average passenger car is driven only for c. 10% of its lifetime, energy storage cycle life today generally correlates with vehicle lifetime. Heavy duty applications, however, are highly utilized, with over 6000 hours of usage time over one year, resulting in significantly increased requirements for energy storage lifetime. This talk will describe the challenges and proposed solutions for both fully electrified and hybridized drivetrains in heavy duty applications.

12:05 MODERATED Q&A: Session Wrap-Up

Moderator: Sebastian Pohlmann, PhD, Vice President, Automotive, Skeleton Technologies GmbH

Panelists:

Brian Engle, Manager, Business Development, Electrification, Amphenol

Josu Olmos, Researcher, Ikerlan Technology Research Centre

12:25 Networking Lunch

13:25 Dessert Break in the Exhibit Hall with Poster Viewing – Last Chance for Viewing

INNOVATION IN HEAVY DUTY EV APPLICATIONS

14:00 Chairperson's Remarks

Brian Engle, Manager, Business Development, Electrification, Amphenol

14:05 Tailored Battery Design for Heavy Duty Trucks in Europe Based on Real-World Operating Patterns

Steffen Link, Researcher and PhD Candidate, Fraunhofer Institute for Systems and Innovation Research ISI

Understanding truck operating patterns throughout the service life is indispensable for developing and designing truck battery systems. While truck owners typically choose an appropriate battery capacity based on cost-effectiveness, truck manufacturers specify the capacity options and determine battery chemistry, format, and cell design. This presentation highlights that while truck operating profiles are highly diverse, one can find strong implications for tailored and standardized battery designs based on real-world European data.

14:25 Vehicle Electrification and Thermal Management

Ayush Lal, Senior Mechanical Engineer, Mechanical Engineering, Aptiv PLC

The presentation will give the audience a background on vehicle electrification, its current scenario, and trends in electrification. We will be discussing 800V SiC inverters as well as inverter thermal management. We will be discussing key industry players in the current scenario and the impact of electric vehicles on the environment, including how countries are trying to electrify their infrastructure.

14:45 MODERATED Q&A: Session Wrap-Up

Moderator: Brian Engle, Manager, Business Development, Electrification, Amphenol

Panelists:

Steffen Link, Researcher and PhD Candidate, Fraunhofer Institute for Systems and Innovation Research ISI

Ayush Lal, Senior Mechanical Engineer, Mechanical Engineering, Aptiv PLC

15:25 Coffee Break

CONNECTED MOBILITY

15:40 AWS for Connected Electric Mobility Ecosystem – Focus Charging Infrastructures

Karthik Manjunatha, Senior Consultant, Amazon Web Services

The adoption of electric vehicles requires a working and easy-to-use charging infrastructure that provides the optimal charge point for the customers and is profitable for the charge point operators. By combining real-time data from charge points and customer preferences, the required transparency for both sides can be achieved, including energy demand and pricing using AI/ML, on the edge and in the cloud, hence enabling further EV ecosystem growth.

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

Moderator: Brian Engle, Manager, Business Development, Electrification, Amphenol

Panelists:

Karthik Manjunatha, Senior Consultant, Amazon Web Services

16:20 Close of Conference



BATTERY INTELLIGENCE

How Smart Analysis of Your Battery Data Can Drive On-Time New Vehicle Launches, Optimal Performance, and Increased Margins

WEDNESDAY 21 JUNE

12:40 Registration Open

14:30 Organizer's Remarks

Victoria Mosolgo, Conference Producer, Cambridge EnerTech

MONITORING & SAFETY

14:35 Chairperson's Remarks

Jun Xu, PhD, Associate Professor, Mechanical Engineering & Engineering Science, University of North Carolina, Charlotte

14:40 Lithium-ion Battery State-of-Health Forecasting with Machine Learning and Vehicle Fleet Data

Friedrich von Bülow, PhD candidate, Data Science, Volkswagen

15:00 Safety Risk Classification of Lithium-ion Batteries Based on Machine Learning Methodology

Jun Xu, PhD, Associate Professor, Mechanical Engineering & Engineering Science, University of North Carolina, Charlotte

Herein, we establish a battery safety risk classification modeling framework based on a machine learning algorithm that can accurately and rapidly classify the potential safety risk level. The model can identify defective cells, cells with internal short circuits (ISCs), and cells with possible thermal runaway (TR) using a small portion of one-cycle data. Classifiers in the ML model demonstrate satisfactory performance and robustness.

15:20 Scalable and Robust Solutions to Monitor the Health, Reliability, and Safety of Electric Vehicles in the Field

Remco van der Burg, PhD, Senior Data Scientist, Mobility Solutions, TWAICE Battery Analytics Platform

The demand for actionable insights on battery pack health, safety, and aging in the mobility sector is growing exponentially. TWAICE Battery Health Package uses in-life data to assess a battery's state, eliminating costly check-up procedures. I will highlight the challenges we faced to provide a 2% performance guarantee on our SoH estimates, while covering a range of different battery types, sensor availabilities, data resolutions, and qualities of in-life mobility data.

15:40 MODERATED Q&A: Session Wrap-Up

Moderator: Jun Xu, PhD, Associate Professor, Mechanical Engineering & Engineering Science, University of North Carolina, Charlotte

Panelists:

Friedrich von Bülow, PhD candidate, Data Science, Volkswagen

Remco van der Burg, PhD, Senior Data Scientist, Mobility Solutions, TWAICE Battery Analytics Platform

16:00 Refreshment Break in the Exhibit Hall with Poster Viewing

LIFETIME & DEGRADATION

16:30 Advanced Model-Based Battery Lifetime Prediction for Vehicle Fleets

Alwin Tuschkan, Project Manager, IODP, AVL List GmbH

One use case within AVL's Battery Life Cycle Management is the Battery Lifetime Prediction for Vehicle Fleets. Combining battery know-how and machine learning methods such as Long Short-Term Memory and Federated Learning the estimation of the state of health of a battery can be improved and even a prediction of future behavior is possible. The AVL Analytics Platform enables to make use of all data from vehicle fleets.



16:50 Smart Battery Technology for Lifetime Improvement

Remus Teodorescu, PhD, Professor, IEEE Fellow, Villum Investigator, Aalborg University

The novel BMS concept of Smart Battery for transportation and grid storage with improved safety lifetime is introduced. The key feature is the bypass device, capable of cell-level load management with minimized load impact leading to pulsed current operation which is known to slow down degradation processes. An advanced AI-based lifetime optimizer capable of online training is recognizing the early signs of stress and inserts optimized relaxation time.

17:10 Synthetic Data Generation for Battery Degradation Prediction with Machine Learning

Weihan Li, Young Research Group Leader, RWTH Aachen University

We introduce a method for the synthetic generation of capacity fade curves based on limited battery test or operation data, aiming to augment the datasets used by data-driven models for degradation prediction. We validate our method by testing the performance of both a shallow machine learning and a deep learning model using different datasets incorporating realistic conditions such as cell-to-cell variations, measurement noise, varying charge-discharge conditions, and capacity recovery.

17:30 MODERATED Q&A: Session Wrap-Up

Moderator: Jun Xu, PhD, Associate Professor, Mechanical Engineering & Engineering Science, University of North Carolina, Charlotte

Panelists:

Alwin Tuschkan, Project Manager, IODP, AVL List GmbH

Remus Teodorescu, PhD, Professor, IEEE Fellow, Villum Investigator, Aalborg University

Weihan Li, Young Research Group Leader, RWTH Aachen University

17:50 Networking Reception in the Exhibit Hall with Poster Viewing

(Sponsorship Opportunity Available)

19:00 Close of Day

THURSDAY 22 JUNE

8:00 Registration and Morning Coffee

8:40 Organizer's Remarks

Victoria Mosolgo, Conference Producer, Cambridge EnerTech

MATERIALS DISCOVERY

9:05 Chairperson's Remarks

Weihan Li, Young Research Group Leader, RWTH Aachen University

9:10 Machine Learning-Driven Advanced Characterization of Battery Electrodes

Samuel J. Cooper, Senior Lecturer, Electrochemical Science & Engineering Group, Imperial College London

In this talk, Sam will explain the various microstructural characterisation and analysis methods developed by his team, including some novel machine learning approaches. He will also propose a workflow for optimising the manufacturing parameters of these materials that use generative adversarial networks and Bayesian optimisation

9:30 Studying Performance Effects of 3D Electrode Perforation with Electrochemical Impedance Simulations

Falco Schneider, PhD, Scientist, Flow and Material Simulation, Fraunhofer ITWM

Increasing the range and fast charging capabilities of EVs are key challenges for the automotive industry. However, lithium-ion batteries with high energy density electrodes and low porosities suffer from increased impedance and higher risks of lithium plating. In this work we use detailed electrochemical simulations to determine the impedance of graphite electrodes using different perforation patterns. This is realized by performing virtual impedance measurements on symmetric cells.

9:50 Modeling of Solid-State Battery Materials with Machine Learning

Artrith Nongnuch, Assistant Professor, Materials Chemistry and Catalysis, Utrecht University

Here, we give an overview of recent methodological advancements of ML techniques for atomic-scale modeling and materials design. We review applications to materials for solid-state batteries, including electrodes, solid electrolytes, coatings, and the complex interfaces involved.

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

Moderator: Weihan Li, Young Research Group Leader, RWTH Aachen University

Panelists:

Samuel J. Cooper, Senior Lecturer, Electrochemical Science & Engineering Group, Imperial College London

Falco Schneider, PhD, Scientist, Flow and Material Simulation, Fraunhofer ITWM
Artrith Nongnuch, Assistant Professor, Materials Chemistry and Catalysis, Utrecht University

10:30 Coffee Break in the Exhibit Hall with Poster Viewing**11:05 Online Control of Fast Charging of Lithium-ion Batteries Based on Monitoring of Internal Physical States Based on Physico-Chemical Models and Machine Learning**

Dirk Uwe Sauer, Professor, Electrochemical Energy Conversion and Storage Systems, RWTH Aachen University

We introduce a method for the synthetic generation of capacity fade curves based on limited battery test or operation data, aiming to augment the datasets used by data-driven models for degradation prediction. We validate our method by testing the performance of both a shallow machine learning and a deep learning model using different datasets incorporating realistic conditions such as cell-to-cell variations, measurement noise, varying charge-discharge conditions, and capacity recovery.

11:25 Thermal Management and AI-Based Battery Management System for EV Application

Saeid Habibi, PhD, Professor Mechanical Engineering, Center for Mechatronics & Hybrid Technologies, McMaster University

This study presents a comprehensive review of the latest developments and technologies in battery design, thermal management, and the application of AI in Battery Management Systems (BMS) for Electric Vehicles (EV).

11:45 MODERATED Q&A: Session Wrap-Up

Moderator: Weihan Li, Young Research Group Leader, RWTH Aachen University

Panelists:

Dirk Uwe Sauer, Professor, Electrochemical Energy Conversion and Storage Systems, RWTH Aachen University

Saeid Habibi, PhD, Professor Mechanical Engineering, Center for Mechatronics & Hybrid Technologies, McMaster University

12:25 Networking Lunch**13:25 Dessert Break in the Exhibit Hall with Poster Viewing – Last Chance for Viewing****BIG DATA****14:00 Chairperson's Remarks**

Mark Willey, PhD, Sr VP Customer Success & Partnerships, Customer Success, Voltaiq Inc

14:05 Transforming Battery Data into Actionable Business Insight for the Automotive Industry

Mark Willey, PhD, Sr VP Customer Success & Partnerships, Customer Success, Voltaiq Inc

Optimization of lifetime performance, early identification of anomalies during production, and description of the health of the fleet are just some of the imperative insights that a battery analytics solution should provide. Enterprise Battery Intelligence leverages best-in-class battery data analytics to provide OEMs with a digital thread across their battery lifecycle. We will discuss why this digital thread is business-critical and will provide use cases from the automotive industry.

14:25 Explainable Machine Learning for Lithium-ion Battery Manufacturing

Mona Faraji-Niri, PhD, Assistant Professor, Energy Systems, Energy Innovation Centre, University of Warwick

Using AI and ML for lithium-ion battery modelling while answering questions regarding the predictability and accuracy of the models at various stages of manufacturing, leave the manufacturer with a black box model hard to explain. The XAI and XML have a significant roll in shedding some light on the model by explaining how the decision is made and how the values are predicted.

14:45 From Big Data to Actionable Battery Knowledge

Eibar J. Flores, Research Scientist, SINTEF Industry

Transforming battery data into operational decisions requires not only developing accurate machine learning (ML) models but also understanding how these models make predictions in the context of expert knowledge. In this contribution, we present our recent work on explainable machine learning applied to battery research, with an outlook on how semantic technologies – e.g., ontologies – can help ingest the deluge of inputs, outputs, models, and patterns into actionable battery intelligence.

15:05 MODERATED Q&A: Session Wrap-Up

Moderator: Mark Willey, PhD, Sr VP Customer Success & Partnerships, Customer Success, Voltaiq Inc

Panelists:

Mona Faraji-Niri, PhD, Assistant Professor, Energy Systems, Energy Innovation Centre, University of Warwick

Eibar J. Flores, Research Scientist, SINTEF Industry

15:25 Coffee Break**15:40 Machine Learning Diagnostic Framework Towards Battery Digital Twins**

Haijun Ruan, PhD, Assistant Professor, Institute for Clean Growth & Future Mobility, Coventry University

Here, we develop a machine learning diagnostic framework that unveils and quantifies rapidly the degradation mechanisms of batteries aged under various conditions in 0.012 s. Rather than performing extensive aging experiments, synthetic aging datasets for network training are generated.

16:00 A Digital Twin for Inverse Design of Battery Manufacturing Processes

Alejandro A. Franco, PhD, Professor, Reactivity & Chemistry of Solids Lab, University of Picardie Jules Verne

In this lecture, I will discuss a digital twin developed in the context of ARTISTIC project¹ and which gives the promise to accelerate the optimization of the manufacturing process of LIBs.

16:20 MODERATED Q&A: Session Wrap-Up

Moderator: Mark Willey, PhD, Sr VP Customer Success & Partnerships, Customer Success, Voltaiq Inc

Panelists:

Haijun Ruan, PhD, Assistant Professor, Institute for Clean Growth & Future Mobility, Coventry University

Alejandro A. Franco, PhD, Professor, Reactivity & Chemistry of Solids Lab, University of Picardie Jules Verne

16:40 Close of Conference

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