#The Number One Conference For Battery Electric Vehicle Powetrain Professionals

How To Increase Range, Functional Capacity, Prevent Thermal Runaway And Accelerate Charging

Selecting The Right Thermal Management Design, Configuration And Parameters, For The Models Battery Chemistry, Applications And Operating Conditions

Evolution Of New Battery Technologies, Vehicle Platforms & Architectures

Application of Design Considerations & Safety Requirements for Battery Technology & Systems, Thermal Management Optimization, NHV, Powertrain Architecture & Components, HV Electronics & Control Modules

JOIN THE LARGEST AUTOMOTIVE BATTERY THERMAL MANAGEMENT SYSTEMS & MATERIALS EVENT EVER!

Directly Addressing The Key Challenges, Technology Strategies And Engineering Solutions To Optimise Battery Life And Range

- Adoption of advanced thermal management technologies to keep the battery within optimal operating temperature while reducing energy demand
- Possibilities for greater standardization across EV industry, addressing critical safety compliance and crash issues
- How to optimize high voltage electrical architecture and systems effectively to reduce costs and maximize efficiency

KEY SPEAKERS INCLUDE

Terry Solberg
Global Technology Head, Thermal Products
Henkel

Steve Perry
EPE Thermal & Climate Systems
FORD

Professor Rajit Gadh
Director, SMERC, CAEV, Esmart Areas: Smart Grid, EV & Smart EV Charging, Microgrid, Autonomous Vehicle
UCLA

Dr Prahit Dubey, PH.D
Technical Lead, Thermal Engineering
Romeo Power Technology

Bret Trimmer
Applications Engineering Manager
NeoGraf Solutions

Dr John Warner
Chief Customer Officer, American Battery Solutions Inc.

Matthew Keyser
Group Manager III-Mechanical Engineering, NREL (National Renewable Energy Laboratory)

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www.battery-thermal-management-usa.com
The Battery Thermal Management Innovation West Coast Congress is designed specifically to address the key challenges facing OEMs in improving battery life, range and performance.

**CONGRESS FOCUS**

The West Coast Congress will address the key challenges and current need to know learning objectives surrounding advanced battery thermal management systems, technologies, fast charging, lithium-ion and solid state batteries; to increase efficiency, range, battery health and optimize solutions for increasingly demanding advanced charging requirements.

- Key Trends and Challenges Impacting Battery Thermal Management Needs & Solutions
- More Powerful Batteries to Improve the Energy-Storing Capabilities of Electric Cars; A Matching Capability in Thermal Management Systems
- Where is the market going from a voltage standpoint and what effect will that have on the battery architecture and vehicle design?
- How Can Thermal Management Increase the Range of a Battery?
- Testing for The Future of EV’s: As the Demand for More Efficient and Sophisticated EV’s Increases So Must the Underpinning Technology
- Thermal Management of The Battery Pack for EV Safety
- Battery Pack Design & Material Selection
- Battery Systems and Packaging Integration
- The Next Generation of Innovative Solutions for Packaging the Thermal Management System
- Exploring Different Cooling Circuit Layouts Including Separate and Mixed Architecture
- New Technologies & Techniques for Simplifying and Taking Complexity out of Cooling Processes
- Advanced Material Solutions to Protect the Battery and Assist with thermal management
- Advanced Materials and Solutions to Limit Thermal Run Away
- Thermal Criteria for Best Performance and Longevity
- How Can Energy in An Impact Be Managed to Protect the Batteries?
- What Are the Strategies and Options for Dealing with Battery End of Life?
- Solid-State Technology – What Are the Thermal Management Implications
- Thermal Performance Optimisation & System Integration
- Fast Charging & Batteries of The Future: What Will Be the Impact of Fast Charging on Battery Thermal Management?
- Improving Energy Density and Performance of EV Battery Packs with Thermal Management Materials and Coatings
- The Role of Thermal Interface Materials in Battery Systems (TIMs)
- A Complete System Solution for Battery Management
- Wireless Charging for xEV’s: A Crucial Step Forward to Cable-Free Electro Mobility
- How to Best Connect Simulation and Testing to Get Much Closer to Reality
- Integration and optimisation of Battery Vehicle Structures

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7:20AM Registration And Morning Breakfast Networking

8:00AM Thermal Management Solutions To Optimize Battery Safety And Performance
- How can an optimal thermal management strategy be developed and what are the next-generation objectives?
- Assessing current technologies/methods for thermal conductivity and insulation technology
- Implementing thermal management to optimize battery life
- How close are we to consolidating an industry standard in thermal management architecture?
- How to effectively measure and evaluate thermal management solutions
- The role of material science in thermal management
- Thermal energy recovery systems

8:20AM Tackling The Heat Generation Factors To Consider When Designing A Thermal Management System
- Effectively managing the dangers of thermal runaway and its consequences
- The latest thermal insulation systems tackling heat generation issues:
  - Insulation characteristics; effective fire retardants and self-extinguishing materials
  - New breakthroughs in material science and their role in thermal management
  - Main parameters to be considered: Best practices in achieving temperature homogeneity
  - How to manage external temperature variation & thermal shock - advanced thermal insulation systems
  - Thermal Management System and Thermal Management Material Innovations

8:40AM Examining The Latest Developments In Fast Charging And Impact on Battery Thermal Management Systems
- Charging challenges; overcoming the most significant barriers to market growth
- Examining the latest developments in fast and ultra-fast charging and its impact on thermal management systems
- Analyzing the standards, technological and infrastructure challenges in fast and ultra-fast charging

9:00AM What Are The Main Parameters To Be Considered In Battery-Pack Heat Management?
- Achieving homogeneity of the temperature within the battery pack in a range between 3oC - 4oC, in ambient conditions that range from -35oC to 50oC
  - Cooling Plates vs Thermally Conductive Materials
  - Controlling potential hazard related to thermal runaway
  - Thermal Life Cycle Analysis

9:20AM Specifying Thermal Management Solutions For Battery Pack Design
- How do application, materials and design for the battery assembly impact thermal management and cooling?
- What are the most effective cooling methods for different battery applications?
- What are the key selection criteria for a most efficient thermal solution?
- How is it integrated into the battery system and driveline?
- How to effectively measure and evaluate thermal management solutions?

9:40AM Simulation To Aid Design And More Accurately Predict Thermal Performance And State Of Health Of A Battery Pack
- How to harness digital technology to improve battery design
- Exploring the application of multi-scale modelling for battery pack design
- Lifespan prediction: The importance of understanding degradation
- Simulation-based validation of energy management strategies for xEVs
- A full vehicle simulation approach to optimised energy management of Evs

10:00AM Increased Virtualization In Battery Pack Design
- A scalable battery pack model – how to capture interactions between mechanical, electro-chemical and thermal disciplines and enable virtualization of the design process to increase confidence in the final product performance early in design phase.
- Coupling mechanical, thermal and electro-chemical characteristics to match design iteration.
- Deploying Modular architecture to facilitate partner developed cell model, component models etc

10:20AM Morning Networking: Refreshments Breakout

11:00AM Key Challenges In Thermal Management & Innovation Requirements
- Limiting battery heat fluctuations in battery performance: Understanding “your” battery capabilities requirements in terms of temperature variations
- Do you need to dissipate or insulate heat?
- Challenges concerning the size of the battery pack
- Thermal Management Systems (TMS) and the choice of Thermal Interface Materials (TIMs)
- Striking the balance: Cost vs performance – what are the key decision criteria?

11:20AM Matching BTMs’s To More Powerful Batteries To Improve The Energy Storing Capabilities Of BEVs
Ahmad Pesara, Chief Energy Storage Engineer at National Renewable Energy Laboratory
- How to increase power whilst maintaining thermal stability
- Increasing tolerance for operating temperatures
- What advanced thermal management solutions are required to better protect the battery itself – stability in extreme temperature variations.
- Protecting power electronics: material challenges for motors, components and connectors
- Battery insulation and lithium-ion battery separators
- New electro-chemical mechanisms that might boost the specific energy performance of future batteries

11:40PM Keynote: Next-Generation, Environment-Friendly Thermal Solutions For EV Batteries
Terry Solberg, Global Head Thermal Products at Henkel Corporation
- Innovative technologies with focus on sustainability, lightweight & efficiency
- The EV Powertrain Deployed e-Mobility Solution for (TIMs)
- Thermal conductivity and resistance
- Thermal Interface Materials (TIM)
- Fundamentals of TIM vs Thermal Resistance
- Battery Systems – Liquid Gap Filling TIMs
- Long-term reliability and testing

12:00PM Adhesive And Sealing Systems For High-Voltage Batteries In Electric Vehicles
Stephen Neuman, Global Product Manager – Battery and Electric Vehicle, Engineering Adhesives at H.B. Fuller
- A wide spectrum of adhesive systems offers the industrial designer new technology options and thermal management solutions for high-voltage batteries
- Assessing desired strengths, service considerations and the manufacturing requirements
- Further options for replacing mechanical fastenings
- Gap fillers as suitable alternatives to thermally conductive pads
- Thermal characteristics and requirements for high voltage batteries
12:20PM Engineered Single-Phase Immersion Cooling For Thermal Management of Lithium-Ion Batteries

David Sundin – Chief Scientist, Engineered Fluids

- Identifying key challenges and shortcomings of conventional methods of thermal management
- Discussion of single-phase Liquid Immersion Cooling (SLIC) Technology
- Recent demonstrations of batteries cooled with SLIC Technology
- Accelerated charge/discharge rates and extended useful life of batteries cooled with SLIC Technology

12:40PM Networking Luncheon

1:40PM Exploring Different Cooling Strategies For Fast Charging And High-Performance Electric Vehicle

Dr Prahit Dubey – Technical Lead Thermal Engineering at Romeo Power Technology

- Identifying challenges and reviewing opportunities of liquid-cooling (bottom-cooled) solutions for battery thermal management
- Deep diving into liquid-cooled (bottom-cooled) battery modules for passenger ad commercial BEVs: A review of performance advantages in high power and high heat flux applications.
- Introduction to thermal management of battery packs using novel submerged-cell cooling technology.
- Exploring submerged-cell cooling technology for high performance electric vehicles through numerical and experimental investigations, and comparing its thermal performance to bottom-cooled solution

2:00PM Fast Charging & Batteries Of The Future: What Will Be The Impact Of Fast Charging On Battery Thermal Management?

Punnet Sinha – Director New Mobility at Siemens PLM & Mentor

Ultra-capacitors and their role in future powertrains: Increasing power density for enhanced vehicle performance and reduced battery size.
- New battery materials and design for greater energy density and efficiency
- Solid State batteries and their commercialisation
- Lithium-ion Innovation Developing a battery that operates optimally across a wider range of temperatures
- Battery Packing: Thermal dissipation materials for assembling the battery

2:20PM Managing The Impacts of Fast Charging On Thermal Management Of The Battery Pack

Bret Trimmer – Application Engineering Manager at NEOGRAF Solutions

- Analysing thermal management as the primary accelerator for extended driving range per charge
- The main thermal management material in use today is aluminium; which is thick, heavy and a poor conductor of heat; The challenge of using aluminium for extended driving range without the pack becoming too large and heavy to be practical
- Flexible graphite: Same heat spread as aluminium, half the thickness and half the weight
- Case study examples of graphite cooling fins from large scale marine Li-ion battery systems

2:40PM Design And Material Packaging Solutions For Battery Modules

- Thermal management and packaging solutions for battery modules
- TMS from steel and aluminium liquid cold plates to heat pipes, vapour chambers and encapsulated APG
- Evaluating Polyimide foam technology from NASA for robust packaging: resistant to flames, noise, and provides thermal runaway isolation

3:00PM Ultra Fast Charging Systems: Increasing Voltage And Current For Achieving Higher Charging Power

John Warner – Chief Customer Officer at American Battery Solutions

- Impact of UFC on Lithium-ion battery chemistries
- How do UFC manage the heat generation? How much heat is driven into the batteries?
- Strategies for managing BEEV heat generation during Ultra-Fast Charging

3:20PM Proven Silicone Solutions For EV Thermal Management – Battery And Beyond

- How Silicone materials can help you better manage the heat of your battery pack: How to scales-up your battery pack design with silicone thermal management materials
- Identifying the wide range of needs related to battery pack insulation, battery pack assembly, component assembly, gap filling, power control units and cables/connectors.
- Effective thermal management within the battery pack and across the powertrain components
- Customising an approach to battery interstitial fill, thermal interface, adhesives, potting and protective covering material to meet design specifications.

3:40PM Networking Break

4:10PM Thermal Aspects of Battery Pack Design

- Designing for the future - key elements to consider
- Analyzing the thermal impacts of increased energy density
- Comparison of different cooling methods
- Design of thermal reliable battery packs

4:30PM Improving Energy Density And Performance of EV Battery Packs With Thermal Management And Coatings

- Battery Packing: Thermal dissipation materials for assembling the battery how thermal management materials address EV limitations in range, reliability and cost benefits of using a cure-in-place liquid dispense gap filler over a pre-cured thermal pad (also called a gap pad).
- Data from internal testing, as well as third party testing on significant performance differences between fillers and pads
- Flame resistant coating which can help mitigate damage in case of fire event, and their applications conclusions and recommendations that include trade-offs on cost, manufacturability and performance

4:50PM Analysis And Modelling Of The Vehicle Thermal Management System (VTMS) For Battery Electric Vehicles

- Identifying the main challenges when developing a VTMS for Battery Electric Vehicles
- Advanced Methodology for thermal System development
- A holistic approach for VTMS Modelling
- Influence on sub-systems in vehicle performance and energy consumption

5:10PM Selecting The Best Fit And Robust Thermal Interface Material For Effective Battery Cooling

- Challenging engineering – considering handling, storage, assembly and processing
- How to select such a product? What to consider for the specific applications?
- High-performance cooling solutions for complex electronic systems

5:30PM Solid-State Technology – What Are The Thermal Management Implications

- Solid state batteries on the horizon: Which OEMs area developing and experimenting with this technology
- Identifying the future road map for a solid state battery roll out
- Exploring the issues with solid state technologies for USA automotive industry
- Analyzing the thermal management challenges associated with solid state batteries

5:50PM What Are The Strategies And Options For Dealing With Battery End Of Life

Todd Coy – Executive Vice President at KBI

- The demand for Lithium-ion batteries could quadruple by 2030. Demand for global production of the battery materials, such as lithium, cobalt, manganese and graphite could grow similarly. What are the strategies for recycling batteries?
- Lithium-ion battery recycling has many challenges including regulation.
- Regulations on vehicle and battery recyclability
- Designing for recyclability
- Packaging challenges for safe transportation and DDR
- Closing the loop modelling
- Practice examples of critical batteries in the real world

6:10PM Chairs Closing Remarks

6:20PM All Attendee Evening Drinks Reception

I Would Like To Attend