Battery and Thermal management session

- Battery pack design and optimization
- Plastics in battery structural components
- Fire safety considerations
- Crash safety considerations for battery packs
- Thermal system design and optimization
- Solutions for thermal insulation or electrical isolation

Session Chairs

Dr. Jeffrey Helms
Celanese Corp.

Dhanendra Nagwanshi
SABIC

Program Schedule (Wednesday, May 4, 2022)

	Hall- I		
10.30 am	Bold New Solutions for EV Battery Packs *The presenters will highlight, in particular, novel engineering solutions for structural battery components (such as covers, trays, module housings, and crash protective side members) using flame retardant thermoplastics and plastic-metal hybrid designs. The session will also touch on thermoplastic solutions for related automotive/EV electrical applications.*		*Dave Sullivan* ***SABIC***
11.00 am	Introduction of a Battery Enclosure Thermal Runaway Material Screening Program *To enable the use of polymer materials in battery enclosures, it is necessary to understand and evaluate their capability relative to system requirements such as thermal runaway mitigation. A small-scale test method was developed to bridge the gap between conventional torch test methods and full-scale prototyping. This method combines the effects of pressure, temperature, and ablative media representative of a real-world thermal runaway event.*		*Amanda Nummy* ***Hyundai***
11.30 am	Light Weight Sheet Molded Compound Battery Enclosures *In this presentation, a dedicated microstructure that can capture the material anisotropy will be introduced. It will demonstrate how the fiber orientation, governed by the molding process and predicted by Moldex3D, will affect the structural part's performances.*		*Dustin Souza* ***Hexagon***
	Lunch		
1.30 pm	Santoprene for Use in Battery Thermal Management and EV Cooling Applications *This presentation details the fit for Santoprene ™ in battery thermal management systems based on a variety of configuration possibilities. Along with current commercial use cases and expansion of fit into alternative material replacement, we discuss various testing results we have accumulated over the years and fit for use conclusions to offer to both Tier Suppliers and OEM's for consideration.*		*Paul Zwick* ***Celanese***
2.00 pm	Thermoplastic solutions for Electric Vehicle Battery Pack *A generic battery pack is considered to assess the feasibility of thermoplastic solutions for the battery pack components such as enclosures, module housings, etc. Different design concepts using thermoplastic materials and the corresponding structural performance are compared with incumbent aluminum solutions and summarized in this paper.*		*Soma S Bobba* ***SABIC***
2.30 pm	Novel Hexagonal Boron Nitride Fillers in Thermally Conductive Polymers and Thermal Interface Materials *Hexagonal Boron Nitride (hBN) has unique properties which makes it an ideal filler to increase thermal conductivity of polymers while maintaining electrical insulation. Recent advancements have been made in hBN particle morphology and methods of processing them have been optimized, making it a strong contender as the industry develops thermally conductive polymer solutions.*		*Zubair Nawaz* ***3M***
	Break		
3.30 pm	Advanced Composite Materials for EV Battery Enclosure Application *The presentation discusses an advanced SMC resin system and the composite materials designed for the application. The resin system's thermal degradation behavior was studied using thermal gravimetric analysis method. A summary of the thermal, mechanical and FR properties demonstrate that Arotran 2502 resin based composite materials offer excellent overall properties for manufacturing EV battery covers.*		*Dr. June Wu* ***INEOS***
4.00 pm	Thermal Management System Objectives and Trends for Battery Electric Vehicles *This presentation begins with an overview of BEV thermal management system objectives and performance criteria. Common points of differentiation between ICE and BEV thermal systems are also highlighted to focus the discussion on specific BEV-centric requirements. Building on this foundation, a connection will then be drawn between BEV thermal systems and material performance needed for high performing systems..*		*Eric Rask* ***ITW***
4.30 pm	Bio-based Material Solutions for Battery & Thermal Management Applications *Arkema's polyamide 11 combines the trusted performance of polyamides with the sustainable benefits of a bio-based material. PA11 has quickly been identified as a unique product to answer new demands. On top of this, it also offers the possibility to dramatically reduce the carbon footprint of EV, and to ease the recycling of end-of-life parts. During this presentation, we will also present the innovation for new PA11 products.*		*Desiree Maurer* ***Arkema***

Battery and Thermal management session

- Battery pack design and optimization
- Plastics in battery structural components
- Fire safety considerations
- Crash safety considerations for battery packs
- Thermal system design and optimization
- Solutions for thermal insulation or electrical isolation

Session Chairs

Dr. Jeffrey Helms
Celanese Corp.

Dhanendra Nagwanshi
SABIC

Program Schedule (Thursday, May 5, 2022)

	Hall- III		
2.30 pm	Continuous Fiber Solution for Occupant and Battery Protection *BASF and L&L Products have recently launched several new applications using the L&L Products CCS™ (Continuous Composite Systems) and BASF Elastocoat® Polyurethane. BASF and L&L Products will review the manufacturing process, a new simulation methodology, and a recent launch of a full-size EV using this continuous fiber solution for occupant and battery protection*		*Chris Korson* ***BASF***
	Break		
3.30 pm	Lithium-ion Pack Thermal Management and Cell Venting / Thermal Runaway Physics *In this presentation, a dedicated This presentation will provide an overview of active battery pack thermal management techniques, system design and challenges. In addition, lithium ion cell failure physics and cell venting effects within the pack will be described, as well as lessons learned in the field from First and Second Responders dealing with thermal runaway challenges.*		*Brian Engle* ***Amphenol***
4.00 pm	Eco Friendly Flame Retardant Materials for Battery Applications *Based on various mayerials such as mPPE, PPfor battetry related parts, LOTTE CHEMICALS has been conducting research and provide package solutions to customers with a diverse group of materials tob e used in cells, modules, packs, process activating trays and chargers. In ordert to be applied to complex and delicate battery module/pack, we've ver focused on good flow-abiity and further endavored to improve strength/toughness.*		*Steve Vanloozen* ***Lotte Chem***
4.30 pm	Engineering Plastics developed for EV Thermal Management System *The presentation will share the view for plastic material selection as well as the latest development update on DSM PPS material offerings developed for EV thermal management systems. A PPS material performance update will include coolant aged and "at temperature" test data that may be insightful for application engineering..*		*Russ Bloomfield* ***Amphenol***

Advanced Driver Assistance Systems Session

- Plastic materials for the development of short, medium, and long-range radars used in blind spot detection, lane change assist, adaptive cruise control and autonomous emergency braking
- Material solutions for Camera systems for lane change assist, park assist, surround, autopilot and driver monitoring camera systems, including high-definition mono, stereo, tri-focal, and infrared night vision cameras
- Plastics in ultrasonic sensors for park assist applications
- Solutions for LiDAR developments in advanced vehicle autonomy levels

Session Chairs

Dr. Rodrigo Orozco
DuPont M&M

JP Wiese
SABIC Specialties

Program Schedule (Thursday, May 5, 2022)

	Hall- I		
10.30 am	Utilizing Plastic Design Flexibility for Advanced ADAS Support Structures *Sophisticated ADAS which uses an increasing number of radars, cameras, and other sensor applications requires innovative ways to fasten those sensors to the vehicle. Methods to not just secure sensors, but also offer functionality and added benefits when possible is a strong focus for Nifco. This discussion will share how Nifco is enabling plastic designs for metal-to-plastic conversion, fastening, component integration, and feature enhancement in the latest generation of ADAS support structures.*		*Collin Pittro* ***Nifco***
11.00 am	High Performance Liquid Crystal Polymer for Advanced Driver Assistance System *Reliable connectivity and effective digitalization of driver's environment using various types of antennae and sensors are critical for autonomous vehicles. Newly developed Zenite® LCP products such as plateable LCP, tunable Dk/Df LCP, conductive LCP, and high precision LCP offer unmatched performance and versatility as a perfect material solution for high performance advanced Driver Assistance System (ADAS).*		*Dr. Young Kim* ***Celanese***
11.30 am	Examination of Design & Materials for Millimeter Wave Radar Systems *As the number of vehicles equipped with advanced, high precision radar systems grow, so has the demand for high performance materials supporting the complex technologies. The polymers specified are not only required to work collaboratively, but they must also facilitate signal collection without introducing excess interference into the data processing systems. Specific attention will be paid to metal plating, precision reproduction of waveguides and dielectric performance (Dk/Df). The challenges facing high frequency sensing systems will be discussed, in addition to the unique solutions provided by thermoplastic polyetherimides (ULTEM™ and EXTEM™ resin).*		*JP Wiese* ***SABIC***
	Lunch		
1.30 pm	Polymeric Solutions for Infrared Optical Sensing Matrices *Resin choice and part design with polymeric optics should incorporate knowledge of performance tradeoffs and good part production practices to supply reproducible components at scale. Thermoplastic polyetherimides (ULTEM™ and EXTEM™ resins) have been used to produce complex components with integrated optical lenses for infrared sensing and datacenter communication applications for decades. Design considerations from these applications can help accelerate and reimagine the construction of ADAS components and define the development of new materials tailored toward matching optical geometries for these next generation safety systems.*		*Dr. Peter Johnson* ***SABIC***
2.00 pm	The new Ultradur® RX Portfolio for High-Performance Radar Sensors *With Ultradur® RX, BASF has developed a PBT specifically for sensor applications. Like any sensitive electronic components, sensors must be able to function properly in high temperatures in all climate zones worldwide. Furthermore, while they block or transmit radar waves from other vehicles, they must be resistant to media like water spray, oils, and road salt. This presentation discusses the BASF specific products family and their features and strengths for key applications in sensor and radar.*		*Adam Marcinkowski* ***BASF***
2.30 pm	Optimizing Plastic Painted Substrates for Medium- and Short-Range Radar *Traditionally, one positions RADAR units behind plastic exterior trim – with performance affected by both the composition of that plastic trim and applied coatings. Reducing the potential for distortions is critical. The design of the plastic trim then requires that one minimize reflections in the 76-81 GHz frequency range and, in turn, optimize the thickness of the plastic part. To do this, one must consider the effects of paint systems. This session provides an illustration of the optimization process through an idealized bumper fascia and computer-aided engineering analysis. This view can help demonstrate the importance of achieving optimal thickness to decrease the reflection of RADAR signals, in addition to minimizing the potential for "ghosts" (i.e., detecting vehicles that are not present) and increasing resolution at the large angles needed for short and medium range RADAR.*		*Carlos Pereira* ***SABIC***
	Break		
3.30 pm	Covers for Radar, LiDAR, and Driver Monitoring System – Material Selection and Design Considerations *Radars use 77GHz microwave signals while lidars & driver monitoring systems use near-IR light sources. All of them utilize a similar send-signal/receive-reflection methodology. That means the signals travel through a protective cover twice for each sensing event. This talk reviews the basics of each sensing technology, relevant parameters when selecting materials and some simplified design calculations to maximize range, resolution, and accuracy.*		*Dr. Mark Torgerson* ***Covestro***

Material Innovations

- New material innovations to achieve mass savings, including material innovations beyond weight savings, also moving from ICE to electrics
- Inter-material substitutions to achieve mass savings
- Design approaches/Multi-Material Approaches to achieve mass savings

Session Chairs

Michael Shoemaker
Borealis

Paula Kruger
Ascend Performance Materials.

Sunit Shah
LyondellBasell

Program Schedule (Wednesday, May 4, 2022)

	Hall- I	
10.30 am	A new Halogen Free FR-PP For EV battery Cases *Borealis newly developed compounds can be used for example in lithium-ion battery applications such as cell holders and thereby provide a more sustainable and cost-effective alternative to existing plastic solutions.*	 *Florian Schuetz* ***Borealis***
11.00 am	Post Industrial Recycled Polypropylene for First Exterior Surface Aesthetic Applications *This presentation will demonstrate the material properties and part performance of an injection molded thermoplastic using postindustrial recycled content with a unique filler for high quality first surface applications and saving weight.*	 *Matt Delaney* ***The Materials Group***
11.30 am	EMI Shielding with Specialty Polymer Compounds and Composites for Metal Replacement in EVs Light Weight Sheet Molded Compound Battery Enclosures *IIn this paper, a range of material solutions including several newly developed materials has been investigated for electromagnetic interference (EMI) shielding to create metal replacement opportunities in many components of EVs*	 *Dr. Qasim Shaikh* ***Solvay***
	Lunch	
1.30 pm	PPAs to meet the increasing demand of vehicle electrification *This presentation will share information on* • *FR, low moisture uptake, high performance PPA blends (PA 66/PPA)* • *FR PPAs which meet blister free Reflow and SMT requirements and provide dimensional stability, color stability and great flow.* • *Regrind and property retention in FR grades*	 *Michael Pilarski* ***BASF***
2.00 pm	Next generation Adhesives for Composite & Plastics *Learn how new adhesive bonding chemistries within the trusted BETAFORCETM and BETAMATETM product lines pair with novel techniques to allow automotive OEMs and component manufacturers to redesign and light-weight vehicles, including battery packs themselves.*	 *Art Cawley, Tom Clark* ***DuPont***
2.30 pm	Low Density PP Compounds for Part Weight Reduction *To help address part weight reduction for automotive industry, this presentation covers several key approaches including chemically or physically foamed injection molding, thin walled parts design, lower density materials offering with innovative technologies, and any combination of these methods.*	 *Charlie Yang,* ***LyondellBasell***
	Break	
3.30 pm	Flame Retardant (FR) Glass Fiber Reinforced Polypropylene light weighting and innovation for EV applications *This session will present a portfolio of non-halogenated short- and long-glass-fiber reinforced flame retardant (FR) polypropylene grades, with a view of their performance during various high-temperature testing environments simulating thermal runaway and bonfire situations.*	  *Tariq Sayed & Dr. Fred Chang,* ***SABIC***
4.00 pm	EMI Shielding with Sustainable PA66 Carbon-Fiber Reinforced Materials *Using a novel recycled carbon-fiber based PA66 material, the EMI shielding was measured to be as high as 64 dB. In addition, the absorption of the incident EM waves is above 90%. This is especially important in housing and antenna applications, where reflected EM waves can affect adjacent electronic units.*	 *Prabuddha Bansal,* ***Celanese***
4.30 pm	New Energy Vehicles & Fire Safety: Variety of Flame Retardant Choices *We will discuss the variety of flame retardant choices that exist in the market, and the outlook on regulatory issues surrounding them. We will review solutions for pertinent applications and share performance data for different Flame Retardants categories. Lastly, we will show some recent developments specific to NEVs, like the development of flame retardant formulations with high voltage resistance, or formulation of FR nylon copolymers with increased thermal stability.*	 *Jakub Lison* ***ICL Industrial Products***

Evolution of Interiors

- Aesthetics (Color, Gloss, Haptics, Birefringence)
- Design and Construction (Seat, Carpet, Headliner, Plastic Components, EMI Shielding, Personalization)
- Functionality (Smart, Dark Front)
- Health and Safety (VOC, Odor, Impact Resistance, Anti-Microbial, Cccupant Safety)
- Maintenance and Durability (Cleaning, Resistance Properties)

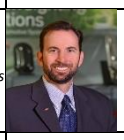
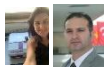
Session Chairs

Dr. Rose Ryntz
Ryntz & Associates, LLC.

Jeff B. Crist
Ford Motor Co.

Jim Keller
Mankiewicz Coatings LLC

Program Schedule (Wednesday, May 4, 2022)

	Hall- I	
10.30 am	**Growth and Value Opportunities for Plastic in Auto Interiors for Electric Vehicles (EVs)/Autonomous Vehicles (AVs)** *The expanded functionality and value-added opportunities in interior applications such as acoustics, body seals, heating requirements, interaction with battery systems, signal projection, send/ receive functions, space management/storage and noise management will be examined.*	 *Bob Eller* ***Robert Eller Associates LLC***
11.00 am	**Are Interior Materials Ready to Meet the Needs for Autonomous Vehicle Surfaces?** *Advanced materials will be needed to meet the unique application requirements for Autonomous vehicles. Ride sharing will require surfaces that are both durable and easy to clean. Personal vehicle owners will demand interiors that are both extremely luxurious and capable of performing multifunctional roles. This presentation will highlight the market needs and how thermoplastic olefins are the material of choice for next generation interior surfaces. TPO material developments for both durable flooring systems and luxurious multifunctional surfaces will be showcased.*	 *Mark Allen* ***Dow***
11.30 am	**Advanced Materials for Battery and Thermal Management System** *This presentation will address the growing need and opportunities for advanced materials in EVs, with emphasis on the use and development of aerogels for thermal management in battery applications. Current challenges in the manufacturing, properties and scalability of aerogels will also be discussed.*	 *Dr. Haibo Zhao* ***Ford***
	Lunch	
1.30 pm	**Expanding Deadfront Effect Possibilities Through Coating Technologies** *The trend towards electric and autonomous vehicles has brought with it an increased desire for purposeful and responsive surfaces that are clean, clear, uncomplicated, and interesting. Using Mankiewicz's ShyTech paint systems, plastic surfaces can be enhanced with functional symbols or designs that can be illuminated on demand. In this presentation we will introduce a portfolio of proven paint technologies for first and second that can be further enhanced through novel haptic, graining, laser-etching, and lighting effects.*	 *Laura Coatsworth, Leslie Preston* ***Mankiewicz Coatings LLC***
2.00 pm	**Seamless Covers for Automotive Displays** *Protective coatings, decorative & functional graphics, light management and assembly techniques are recurring themes in seamless display modules. This talk will review the stack-up of two different assembly strategies, material, and color selection as well as performance testing of several allied technologies used in the stack-ups of a seamless injection-molded display cover.*	 *Dr. Mark Torgerson* ***Covestro LLC***
2.30 pm	**Enhanced, Customizable Appearance with Mold-in-Color** *Metallic MICs have great properties and compete with paint in terms of appearance. Unique appearance MIC plastics, metallics included, with enhanced marking capability can allow customers to customize the appearance of their interiors or OEMs to vary appearance through secondary marking only to achieve a wide range of effects such as wood grain, stone, logos, or customized patterns/names.*	 *Dr. Kent Miller,* ***Celanese***
	Break	
3.30 pm	**Acoustic Materials and Treatments for Electric Vehicles** *A variety of EV noise control strategies have been adopted by vehicle manufacturers. This presentation will systematically discuss electric vehicle noise sources, frequency contents, vehicle architecture, acoustic material design and selection to reduce electric vehicle noise. Selection of class A surfaces to fulfill other functional requirements will also be discussed.*	 *Jian Pan,* ***Auria Solutions***
4.00 pm	**Antimicrobial Plastics for Automotive Interiors in the COVID-19 Era** *CpK has developed a proprietary additive (Fort-Vi) that can deactivate the SARS-CoV-2 as quickly as 1 hour as a hard surface disinfectant. This additive can be used with various plastics including TPU, PVC, TPO, PP and ABS. In this presentation we will discuss the additive technology, testing method, and efficacy among viruses including Alpha- SARS-CoV-2..*	 *Dr. Murali Reddy and Dr. Greg Farrar,* ***CpK Interior Products***
4.30 pm	**Thermoplastic Elastomers Containing Antimicrobial Additives for Micro-Mobility and Transportation Safety** *Styrene-ethylene/butylene-styrene (SEBS) based thermoplastic elastomers (TPE) incorporated with six different formulations were investigated for mechanical and antiviral performance. The formulations consist of a combination of zinc pyrithione (ZnPT), sodium borate (NaB), disodium octaborate tetrahydrate (DOT), and chlorhexidine (CHX). Evaluation of anti-viral efficacy, tensile strength, elongation at break, modulus, density, and hardness of antimicrobial additives-incorporated samples are presented and compared with standard TPE compounds.*	 *Zeynep Iyugundogdu & Dr. Alper Kiziltas,* ***Ford***

Sustainability, Recycling & Carbon Neutrality

- Circular economy and closed-loop recycling
- Sustainable textiles
- CO2 as a renewable feedstock
- Natural fiber reinforced composites
- Vitrimers chemistry
- Upgrading agriculture feedstocks

Session Chairs

Drew Geda
Hyundai

Chuck Jarrett
The Materials Group

Dr. Alper Kiziltas
Ford

Program Schedule (Wednesday-Thursday, May 4 - 5, 2022)

	Hall- III		
10.30 am	Hemp Filled Post-Industrial Recycled PP Development for Sustainability *Using post-industrial recycled resins can help reduce CO2 emissions and greenhouse gasses without compromising essential material properties. This is also possible while reducing mass through the use of sustainable fillers with low specific gravity. This presentation will highlight ways to meet performance and environmental goals using post-industrial recycled polypropylene with a renewable natural hemp filler.*		*Amy Stephen* ***TMG***
11.00 am	Back to Our Roots: Using the Circular Economy to Reach Carbon Neutral Vehicles *New regulations and demand from customers regarding carbon neutral vehicles have motivated automotive manufacturers to look for ways to innovate, produce and implement sustainable materials. These sustainable materials have to pass rigorous safety standards, meet or exceed durability requirements, and be economically viable while maintaining a net negative or neutral carbon footprint. In this study, a general overview of our efforts towards circular economy has been presented*		*Dr. Sandeep Tamrakar* ***FORD***
11.30 am	Exploiting the Usage of Sustainable Material with Enhanced Performance for Electrical Vehicles *This work will utilize Spray Transfer Molding (STM) as a high throughput process to manufacture bio renewable composite sandwich panels as interior parts. This study will focus on altering the existing process from glass fiber honeycomb polyurethane to gradually increase the bio renewable contents to achieve up 70-80% bio renewable contents. In this study, a polyurethane will be reformulated to include higher percentage of bio renewable contents, then will introduce natural fiber sheet of jute and flax reinforced with basalt or bamboo to cover the corrugated paper honeycomb core both sides to form a sandwich blank*		*Dr. Elias Shakour* ***BASF***
	Lunch		
1.30 pm	Polyurethane Foams: Current Advances and Future Perspectives for Automotive Applications *As automotive OEMs place greater emphasis on sustainable materials and systems, polyurethane foams present an exciting opportunity for improvement. As electrification continues, new applications for polyurethane are expected to emerge. Foam materials will need to meet new requirements such as flammability and electrical insulation for use around battery packs, motors, and electronics.*		*Owen Li* ***FORD***
2.00 pm	Evolution in Automotive Lighting to Meet Future Designs Compatible with Environmental Considerations *A generic battery pack is considered to assess the feasibility of thermoplastic solutions for the battery pack components such as enclosures, module housings, etc. Different design concepts using thermoplastic materials and the corresponding structural performance are compared with incumbent aluminum solutions and summarized in this paper.*		*Brian Guinn* ***VALEO***
2.30 pm	ISCC+ Certified Renewable ULTEM™ Resin Solutions *A new portfolio of bio-based ULTEM™ resins was recently launched to offer sustainability benefits while delivering the exact high performance and processability as existing ULTEM materials. The approach used to produce the product will be discussed, along with performance expectations for current ULTEM materials and potential applications where high temperature, dimensional stability and/or other demanding mechanical performance is required.*		*Paul Nugent* ***SABIC***
	Break		
3.30 pm	Roundtable Discusion on Bringing the Automotive, Plastics and Composites Industry Together to Drive Sustainable Vehicle Production ***Panelists: Matthew Delaney*** *– TMG,* ***Dr. Debbie Milewski*** *– Ford Motor Company,* ***Dr. Arash Khani****- Alterra Holdings,* ***Prof. Amar K. Mohanty*** *– University of Guelph,* ***Dr. Soydan Ozcan*** *– Oak Ridge National Laboratory,* ***Dr. Gulay K. Serhatkulu*** *–BASF,* ***Prof. Uday Vaidya*** *– The University of Tennessee Knoxville,* ***Matthew Vandyke*** *– General Motors*		*Alper Kiziltas* ***FORD*** *Moderator*
	Thursday, May 5, 2022 at 4:30PM, Hall -IV		
	CO2 Footprint Of Plastic Materials And Comparing Properties Of New Sustainable Compounds *The presentation will compare a new range of green plastic compounds such as biobased nylons as well as long fiber reinforced PP based on mass-balanced bio-circular vegetable oil waste. Biobased PA 6.9, PA 5.6 and PA 5.10 show some unique technical properties, and the presentation will compare the new nylon grades to the established grades.*		*Thilo Stier* ***Akro Plastics***

Noise, Vibration and Sealing Session

- Fluid Sealing Solutions
- Acoustic barriers materials
- Damper materials
- Absorber Materials
- Buzz, Squeak, Rattle solutions

Session Chairs

Mark Jablonka
Dow

Tom Pickett
General Motors

Program Schedule (Wednesday, May 4, 2022)

	Hall- IV	
10.30 am	**Compatibility Testing of Materials with Lithium Electrolytes** *This presentation will present the test methodology developed by Freudenberg Sealing Technologies to evaluate material compatibility with lithium-ion electrolytes. An overview of the considerations that were necessary for the design of the test will be presented. Specifics of the tests; equipment, electrolyte composition, and material data generated to date, will be presented and discussed.*	 *Joe Walker* ***Freudenberg NOK***
11.00 am	**Electric Vehicle Challenges for Noise and Vibration** *In this presentation, the basic principles of noise and vibration refinement will be reviewed. A Source / Path / Receiver model will be used to present structure-borne and airborne concepts as well as illustrate the primary Noise and Vibration stimuli experienced by the customer. Comparisons between Noise &Vibration technical challenges for electric & internal combustion engine vehicles will be made. Content & material challenges specific to electric vehicles will be reviewed.*	 *Tim Roggenkamp* ***General Motors***
11.30 am	**Weatherseals for Optimum Acoustics Experience for Battery Electric Vehicles** *Vehicle sealing is an underestimated task that requires early stage involvement from body in white (BIW, CIW) and body sealing engineering groups. Synergy between the design, material selection and manufacturability are key to ensure quality weatherstrips. From their 70 years experience in body sealing systems, Toyoda Gosei North America experts will present the benefits of quality weather seals to deliver the optimum passenger acoustics experience.*	 *Benoit Tetreault* ***Toyoda Gosei***
	Lunch	
1.30 pm	**Foam & Insulating Materials to address NVH, Sealing and Thermal Protection for Battery Electric Vehicles** *This presentation will cover cellular rubber and polyolefin foams used to address sealing and acoustical needs in BEV applications. In addition, ArmaComp Smart, a hydrophobic melt-blown nonwoven made of pure melamine used to provide outstanding acoustics and thermal insulation at mid-range temperatures, and ArmaGel, an aerogel capable of withstanding temperatures up to 1,300°C making it ideal for thermal runaway protection will also be discussed.*	 *Augusto Cucala Isabel Wright* ***Armacell***
2.00 pm	**Liquid Applied Sound Damping for Battery Electric Vehicles** *This presentation explores the effects of three factors on damping performance of LASD materials up to 3200 Hz: i) formulation, ii) polymer/filler interactions, and iii) coating areal density. Comparison of performance at low and high frequencies will illustrate similarities and differences in optimal LASD design for BEV and ICE vehicles, and the findings will provide guidance for creation of next-generation LASD coatings.*	 *Dr. Ian Robertson* ***Dow***
2.30 pm	**Novel Polyamide Solution for Damping Enhancement in Anti Vibration Structural Applications** *This presentation discusses: 1) why anti-vibration components are becoming of such great importance, 2) how they have the capability to improve component, system and vehicle level NVH performance, 3) how thermoplastics can be used to replace metal and finally 4) how they can provide significant damping improvement. We will also share a novel polyamide material which has been developed to be utilized in structural components focusing on a balance of mechanical and damping performance.*	 *Dr. Vahid Mortazavian* ***Ascend***
	Break	
3.30 pm	**Making EV's Quieter with BETAFOAM™** *Long used as an alternative to baffles in traditional ICE vehicles, BETAFOAM™ is specially positioned to address the unique NVH challenges of EV's. With proven performance within existing EV vehicles, Dow can use BETAFOAM™ to offer tailor-made NVH cavity-fill solutions to combat the frequency, sounds, and vibration generated from within and outside the vehicle.*	 *Arnold Braun* ***Dow***
4.00 pm	**Basotect foam – lightweight acoustic insulation for the growing EV and AV markets** *This presentation will cover Basotect®, an open-celled melamine resin foam from BASF, used as lightweight acoustic insulation. Within vehicles, Basotect excels in absorbing noise across a wide frequency range, and thanks to its low flammability – Basotect has a UL 94 V-0 fire resistance rating, without the addition of fire-retardant additives – the foam helps the vehicles meet stringent fire requirements.*	 *Dr. Bob Ober* ***BASF***
4.30 pm	**Compatibility of Elastomer Sealing Materials in Dielectric e-Fluids** *Immersive cooling requires the use of non-conductive, dielectric fluids, like polyalphaolefins (PAOs) and dielectric esters. Water-resistant type elastomers typically used for coolant sealing, like EPDM, generally have poor compatibility in dielectric fluids. This presentation will introduce a comprehensive analysis of a broad range of elastomers used for fluid sealing and their compatibilities in a wide selection of dielectric coolants for EV battery thermal systems.*	 *Mark Nevitt* ***Zeon Chemicals***

Program Schedule (Thursday, May 5, 2022)

	Hall- I	
4:00 pm	**New acoustic dissipation material** *This presentation will cover new 3M technology that uses acoustic particles to provide high acoustic dissipation performance in a single-layer while remaining relatively lightweight. In the presentation, acoustic performance will be shown as acoustic absorption and transmission loss. Furthermore, application testing will be presented.*	 *Dr. Taewook Yoo,* **3M**

Advanced Manufacturing Session

- *Additive printing material and applicaton selection*
- *Hybrid thermoplastic solution implementation*
- *Accelerated development cycle challenges in EV's*
- *Simulation technologies to aid lightweighting*

Session Chairs

Steve VanLoozen
Lotte Chemical

David Kosse
Ascend Performance Materials

Program Schedule (Thursday, May 5, 2022)

	Hall- IV		
10.30 am	**Additive Manufactured Plastic Parts is Driving Innovative EV part design** *New developments in plastics additive manufacturing offers Automotive OEM's and Tier 1s the ability to economically print plastic parts to be used on cars. New developments allow class A surfaces to be printed as mass customized trim parts. The use of generative design, computational fluid dynamics, and design freedom provides opportunities to increase EV range and offer better passenger comfort. New printing technology is also replacing thermoset polyurethane seating with recyclable additive manufactured lattice structures.*		*Fernando Grego* ***HP***
11.00 am	**Using Scorecard Methodology to Select the Best EV Additive Manufacturing Project & Design Strategy** *This presentation will explore the topic of "How to select the right project to focus your team's finite Additive Manufacturing resources". It will look at a novel approach to understanding AM value drivers cascaded across several automotive subsystems to navigate where and how AM can be deployed in a vehicle. Several non-automotive commercial applications will be referenced to describe what successful AM projects have in common.*		*David Tucker* ***Stanley X***
11.30 am	**AKRO Additive Manufacturing Developing Materials for Additive Manufacturing** Large-format parts, high volumes, maximum productivity - 3D printing with pellets opens up new applications for additive manufacturing. Additive manufacturing technology is advancing rapidly. 3D printing is becoming a well-established manufacturing process in a growing number of industry sectors. Directly processing thermoplastic pellets using screw extrusion for a layer-by-layer deposition in additive manufacturing makes high production speeds and large parts possible.		*Thilo Stier* ***Akro***
	Lunch		
1.30 pm	**UniFORM Process for Automotive Lightweighting** *Automotive light-weighting is driven by electrification and sustainability, however mass adoption of light-weighting solutions depends on the cost-performance balance. Carbon fiber composites offer many advantages for automotive light-weighting but typically come with longer manufacturing cycle times compared to traditional technologies. CpK has combined process (UniFORM) engineering and resin chemistry to achieve short cycle times and near zero voids.*		*Murali Reddy* ***CPK***
2.00 pm	**Solving Unique EV & AV Manufacturing Challenges Through Hybrid AM** *Electric vehicle sales are experiencing a global surge with sales increasing by 160% in the first half of 2021 from a year earlier. This unprecedented growth is a key factor in the acceleration of development cycles for electric and autonomous vehicles. Currently, AM technology and materials are meeting the demand for parts for these vehicles, but rapid development has started to present new challenges for manufacturers.*		*Justin Swartz* ***GKN***
2.30 pm	**Sheet Molding Compound (SMC) for EV Battery Enclosures** As the transportation market shifts from internal combustion engines (ICE) to battery powered electric vehicles (EV), a few things remain constant; vehicles need to be lighter, more efficient, and equal or better performance than ICE. These constants effect every model moving to EV. The major difference is EV's need a bank of batteries to travel the same distance as ICE. Structural components and covers are required to protect the batteries lying within the structure of the vehicle. With current automotive designs tailored to steel and aluminum it is hard to achieve efficiencies to compete with ICE, this is the reason for Sheet Molding Compounds (SMC).		*Justin McClure* ***Lyondell***
	Break		
3.30 pm	**Optimizing Assembly Through Fastening to Improve Ergonomics and Reduce Complexity and Cost** Establishing context from historical Exterior and Interior system assembly trends, on first review, assembly optimization via fastening appears as simple as replacing metal with plastic, but fundamentally this transition moved from higher-effort but more straightforward fasteners with long track records to more highly engineered fasteners to make life easier on the assembly line (via PIA, elimination of power-driven tools or tools altogether, higher ergonomics, etc). History is repeating itself in that many vehicle electrification components and systems today are being assembled via the same "long track record, higher-effort" fasteners but fundamentally MUST evolve to enable high-volume manufacturing, while managing the new and evolved functional requirements integral to successful electrified vehicle performance. Within this context, this presentation seeks to highlight high-level trends, challenges, and strategies related to optimizing assembly for electrified vehicle components and systems.		*Ajit Katharopoulos* ***ITW***
4.00 pm	**Exploring Automotive Light-weighting Technologies with Simulations** *This study investigates light-weighting an automotive component using foaming with a chemical blowing agent (CBA). The effect of different factors on part density, degree of foaming and overall quality is studied and impact of simulation technology in Design-For-Manufacturing (DFM) for advanced manufacturing processes is discussed.*	 	*Srikur Vallury* ***Moldex3D*** *Anand Bora* ***Moldex3D***

Evolution of Exteriors Session

- Material Solutions for Front and Rear Smart Panels on EVs
- Radar Transparency of TPOs for Bumper Fascia
- New ICP Options for Exterior Auto Applications
- Acrylics For Signature Lighting, Sensors & Energy Efficiency
- Front Integration Panels for the Future

Session Chairs

Dave Helmer
General Motors

Dr. Akshay Trivedi
General Motors

Mark Lapain
Advanced Composites

Program Schedule (Thursday, May 5, 2022)

	Hall- III	
10.30 am	Automotive Trends, Material Solutions and Industrialization Concepts for Front and Rear Smart Panels on Electric Vehicles Automotive design and engineering is adapting and evolving, especially with the shift to electric vehicles (EVs). One of the emerging application spaces is smart panels, for both the front and rear of the vehicle. This session will review and consider various aspects of these components. This will include amongst others, Brand identity and differentiation, Design trends for EVs and autonomous driving, Integration of Lighting and sensors, and Manufacturing technologies for attractive cost-optimized parts.	 *Volker Plehn* ***SABIC***
11.00 am	Radar Transparency of Thermoplastic Olefins (TPOs) for Bumper Fascia The use of long-range radar (LRR) sensors is becoming more common to enable vehicle safety and comfort features, especially for autonomous driving. A thorough investigation was conducted to characterize interaction of thermoplastic olefins TPOs (the typical materials used for bumper fascia components) with the radar wave at high frequency range (76-77 GHz). This study covered the effects of the TPO composition, the paint system and the part thickness on radar reflection and transmission, as well as lot-to-lot performance consistence for a TPO product. The work is intended to address OEM concerns in designing a bumper fascia with radar transparency since there is little prior experience or knowledge in this area today.	 *Dr. Jane Lu* ***LyondellBasell***
11.30 am	New ICP Options for Automotive Applications There are several ways to accomplish weight reduction, including replacing heavier materials with lighter ones and downgauging of parts. Plastics can play a key role in achieving both as they typically weigh ~50% less than the common alternative materials and offer high performance part solutions. Exxon Mobil's **Achieve™** Advanced PP products are helping customers to challenge reality and unlock possibilities to explore new alternatives in automotive parts development and design. During this session, we will present successful case studies in which Achieve™ Advanced PP8285E1 has been used to decrease the weight of automotive parts without sacrificing mechanical properties or performance.	  *Brian Dujardin* *Timothy Dean* ***ExxonMobil***
	Lunch	
1.30 pm	Advancements in Acrylic Materials for Signature Lighting, Autonomous Sensors and Energy Efficiency Automotive signature lighting is a recent focus of OEMs looking to differentiate their products from others on the road. Now that LEDs have replaced traditional light sources, they require new material technologies to manipulate the light. The core of the presentation will highlight new materials including a variety of diffusive and long path length light guide grades that allow designers to maximize light output while providing energy efficiencies and minimizing component costs. Advancements in reflective materials more efficient than a silver mirror, as well as visually opaque grades with selective transmission for hiding autonomous vehicle sensors will also be discussed.	 *Nate Bachman* ***Trinseo***
2.00 pm	Front Integration Panels of the Future ADAS enabling sensors can be integrated into vehicle exteriors using advanced plastics, processes, and thoughtful design without sacrificing styling and brand identification. Using layering technologies that combine multiple materials and processes including high-pressure formed in-mold films and insert molding, it's possible to create a decorative, seamless front integration panel that enables advanced sensor performance. The evolution from the open grille architecture of ICE vehicles to the closed front panel of BEV's, has changed dramatically. Light patterns, animated sequences and colors are all possible, giving automakers true freedom of design. With increase in autonomy, integration of advanced lighting features will increase the safety.	 *Mark Hess* ***Magna***