2018 Auto TPO: 20 Years Young

SPE’s TPO Automotive Engineered Polyolefins Conference
Draws Celebratory Crowd to Detroit

By Peggy Malnati

Special treats were in store for the record-breaking 992 attendees at the 2018 SPE TPO Automotive Engineered Polyolefins Conference in Troy, Mich., to celebrate the event’s 20th anniversary. Attendees from around the globe gathered Oct. 7 to 10 to discuss the latest automotive innovations in thermoplastic polyolefins (TPOs), thermoplastic elastomers (TPEs), thermoplastic vulcanizates (TPVs), and short- and long-glass polypropylene (PP) compounds.

A record-breaking 992 attendees from around the world gathered in the Detroit suburbs from Oct. 7 to 10 to discuss the latest in automotive TPOs, TPEs, and TPVs at the 20th SPE Auto TPO conference. Courtesy of SPE Detroit Section/Jill Bahm
For two decades, the show has been organized by members of SPE’s Detroit Section, which itself is celebrating its 75th anniversary this year. Conference proceeds are used for a number of charitable causes. Scholarships are funded through the SPE Detroit Foundation, as are PlastiVan visits to Michigan middle schools. Resin and press time are donated to Toys for Tots and injection-molded toy cars are presented to needy children in Southeast Michigan at Christmas. The proceeds also provide support for local Michigan–based student SPE chapters. Interested college students were invited to attend the conference free to network and learn more about the automotive plastics industry.

Interestingly, the format for the technical program as well as the layout of exhibit space were changed heading into this year’s program. Organizers reduced the number of exhibitors from 80 in 2017 to 64, but provided more space and greater focus on sponsors and exhibitors that supported this year’s program. It certainly did not slow down networking or booth traffic in the exhibition areas.

For the 20th-anniversary program, organizers reduced the total number of exhibits but provided more space and greater focus on sponsors and exhibitors that supported this year’s program. It certainly did not slow down networking or booth traffic in the exhibition areas. Photos by Peggy Malnati

Additionally, two free tutorials were offered to conference attendees Sunday afternoon while exhibitors set up their displays. John Mara, technical and marketing manager with Amfine Chemical Corp. of Hasbrouck Heights, N.J., and Yota Tsuneizumi, a member of the technical service team with ADEKA Corp. of Tokyo co–presented a talk on Review of Basic Polymer Stabilization Principles and Advanced Stabilizer & Antistatic Solutions for Polypropylene-based TPO Automotive Applications. This was followed by a tutorial on Automotive TPV—A Solution Approach by Morteza Jandeghi, process development engineer with Alterra Holdings of Clifton, N.J. Networking receptions were held Sunday, Monday, and Tuesday evenings.

Technical Programming: from Macro- to Micro-

Morning super sessions challenged keynote speakers and industry experts to reflect on two decades of progress in automotive TPOs and to speculate how they might evolve in the near future.

Monday’s technical programming started off with two back-to-back keynotes from Lon Offenbacher, president and chief executive officer of Inteva Products LLC of Troy,
Mich., speaking on the topic of A Look Back and a Look Forward. He was followed by Heiko Pries, manager quality assurance for materials technology for Audi AG of Ingolstadt, Germany, who challenged the audience with a talk on What Will the Future Hold for Us? After a morning break, Mike Balow, senior advisor with Asahi Kasei Plastics North America Inc. of Fowlerville, Mich., gave a talk on An Overview of Key Material Developments in Engineered Polyolefins for Automotive Applications. He was followed by a talk from Rose Rynitz, vice president of advanced development and materials engineering for IAC Group of Southfield, Mich., on the topic of Have Plastic Surfaces been Enhanced?

On Tuesday, the morning lineup included keynotes from Suzanne Cole, CEO of Miller Cole LLC (with offices in both Washington and Detroit), who gave a timely update on The Impact of the North American Free Trade Agreement (NAFTA) on the Plastics Industry. She was followed by Joel Morales, executive director of polyolefins Americas with IHS Markit of Houston, whose keynote was on Global Trade for TPO. After a break, Robert Eller, president of Robert Eller Assoc. LLC of Akron, Ohio, spoke on the topic of Twenty Years of TPO and TPE Evolution in Auto Interiors and a Vision of the Future. He was followed by Mark Pilette, global product line manager for exterior trim with Magna Exteriors of Troy, Mich., who spoke on the topic of Driving
Innovation and Material Collaboration on Exterior Products. And on Wednesday, James Guilfoyle, executive vice president of advanced polymer solutions and global supply chain for LyondellBasell of Houston, gave a keynote on How the Industry has Changed over the last 20 Years and What the Future Holds for Polyolefins. Guilfoyle also updated the audience on LyondellBasell’s recent acquisition of A. Schulman, Inc. of Fairlawn, Ohio, which is being combined with the company’s global PP compounding business to create a leading Advanced Polymer Solutions business unit. After a break, two final industry experts shared their reflections on the state of the industry starting with Matthew Marks, senior manager of market development and technical service for automotive Americas with SABIC of Wixom, Mich., who spoke about Polypropylene and its Use in Structural Automotive Applications. He was followed by Jason Holbrook, sales manager with KraussMaffei Corp. of Toledo, Ohio, who spoke about 20 Years of Developments in Process and Equipment Trends.

Each afternoon, three parallel technical tracks moved topics from the big-picture view to detailed updates on the latest in materials, process, equipment, and application developments. Monday’s lineup pitted Materials Development against sessions on Surface Enhancements & Coatings and Process Developments & Simulations. Tuesday afternoon’s sessions featured Interior Applications going up against Lightweighting Technologies and Sustainability & Emissions. And Wednesday’s late-morning technical programming continued the conversation with shorter sessions on Materials Development, Surface Enhancements & Coatings, and Interior Applications. With such a rich offering of topics, the challenge was to catch as much innovation as possible in the time available.

New and Noteworthy
There were lots of interesting talks and displays to see during the conference. However, the most buzz-worthy technology at the show seemed to be a new 1-mm-thick, injection-molded soft skin (iMSS) for large parts like instrument panels (IPs), door-panel inners, and center consoles. Developed and displayed by Kraton Corp. of Houston, with an accompanying technical presentation on Tuesday afternoon, the iMSS TPE skin is produced via a faster, more consistent process than conventional slush molding, provides low and globally acceptable VOC/odor/fogging, has excellent haptics and grain definition, can handle tight radii and undercuts, is low gloss, and has no visible weldlines. Joe Schulz, Kraton automotive market manager, noted that IMSS skin technology—in 75 Shore A Kraton styrene ethylene butylene styrene (SEBS) TPE—already has passed OEM requirements for airbag deployment, abrasion, scuff, cold-temperature flexibility, and heat aging without coatings or paint. Interesting next-generation work already

Throughout the conference, attendees could visit a display of historic instrument panels, door panels, and exterior trim representing two decades of evolution with olefinic and elastomeric technologies on interior and exterior automotive components. Many of the parts on display have won either category or Grand Award honors from sister organization SPE Automotive Division’s Automotive Innovation Awards Competition or had been honored in earlier Auto TPO conference part competitions. Photos by Peggy Malnati
underway is focused on pre-molding airbag tear seams, which would eliminate the need for post-mold laser or knife scoring. Currently, Schulcz reports a slight mark shows on the A side of skins, but researchers hope to eliminate that.

Marcus Greger, Kraton global technical leader for IMSS Technology says that the 500 MFR SEBS skin injection molds in 60 seconds (at 2,500 tonnes clamping pressures) versus three to four minutes for a slush-molded polyvinylchloride (PVC) skin. The IMSS compound is based on Kraton’s new, high-flow SEBS polymer technology, with which Greger says they’ve molded viable skins as thin as 0.8–0.9 mm. He also says they’ve reduced cycle time to below one minute. For technology conversions, an existing slush-molded skin design can be used with only minor changes made to the A surface. To avoid tearing thin flexible skins during ejection, air poppets are used in place of ejector pins and a robot end-of-arm tool removes skins from the press where it typically would then be back-foamed in a slush-molding tool and bonded to a rigid substrate. IMSS can reuse scrap and production trim as long as no polyurethane foam is attached to the skin.

According to Chris Mayville, Kraton market development manager, at present the IMSS technology has been molded in 1K processes for back-foaming applications and 2K processes over rigid substrates. It also could be molded in multiple colors. The latter is especially interesting since—if formulated without pigment—the skin is technically transparent. In the future, that might allow two-color molding with selective transparency for ambient backlighting or for use in smart-surface/touchscreen applications.

Thanks to its lower specific gravity (0.9 versus 1.2 for PVC) and ability to be molded in thinner cross-sections, IMSS typically can offer a 25 to 40 percent weight savings versus conventional slush-molded skins. The company also claims system costs can be lower relative to competitive technologies—as much as $6 to $7 per car. Savings accrue from faster cycle times compared to slush molding that lead to processing cost reductions, as well as avoidance of surface coatings and laser scoring for airbag tear seams. Additional savings could result from tool savings at production volumes above 200,000 units. While initial outlay for a new injection-molding tool can run as high

Because it was Detroit, there were cars for Auto TPO attendees to explore. Among those were the 2019 Audi Q8 crossover utility vehicle from Audi AG (left) and the 2019 Jeep Cherokee Trailhawk sport utility vehicle (top) from FCA US LLC. Nearby signage identified major components molded in olefins and TPEs.

Photos by Peggy Malnati
as $500,000 versus $125,000 for a comparable slush-molding tool, every 16 weeks a new Galvano master (from Galvanof orm Gesellschaft für Galvanoplastik GmbH of Lahr, Germany) is needed for the slush-molding process, so the bigger and longer-running the program, the higher the potential savings. To demonstrate the capabilities of this new use for an established material, the team invested in their own injection tool with the geometries of an iP skin for a Ford Fusion midsize sedan to mold full-size skins in Kraton SEBS. “Anyone can make a plaque look good,” adds Schulcz. “However, with this tool, we can give someone a good feel for what the material will look like and how it will process.”

Other interesting technologies announced at the show included a new low-odor, talc-filled PP grade from PolyOne Corp. of Avon Lake, Ohio, called Maxxam LO that was specially designed to help automakers meet vehicle interior air-quality (VIAQ) standards for underhood heating/ventilation/air-conditioning (HVAC) applications. The company reports that the grade reduces VOC emissions and consistently achieves odor test results of 3.0 per the VDA 270 (Verband der Automobilindustrie of Berlin) Determination of the Odour Characteristics test. As countries in various geographies enact tougher air-quality standards for vehicle interiors, the auto industry is responding with new chemical-emissions testing and reporting. In this environment, products like Maxxam LO can help OEMs reduce VOC/odor/fogging without sacrificing mechanical performance or surface aesthetics. “We’re helping our customers address current trends with a low odor product that can withstand the rigors of underhood specifications,” explains Jim Mattey, PolyOne’s global marketing director of performance products and solutions. “This new product underscores our commitment to formulating solutions for tomorrow’s automotive needs.” New grades can be customized to achieve a broad range of physical and

Kraton Corp. attracted a lot of attention for its new 1-mm-thick, injection-molded soft skin (IMSS) technology for large parts like instrument panels, door-panel inners, and center consoles based on Kraton’s new, high-flow SEBS polymer. It provides low and globally acceptable VOC/odor/fogging, has excellent haptics and grain definition, is low gloss, has no visible weldlines, and can handle tight radii and undercuts (left). To demonstrate the capabilities of IMSS, Kraton has invested in its own injection tool to mold full-size skins (right). Courtesy of Kraton Corp.

PolyOne Corp. has introduced a new low-odor, talc-filled polypropylene (PP) product called Maxxam LO that was specially designed to help automakers meet vehicle interior air-quality (VIAQ) standards for underhood heating/ventilation/air-conditioning (HVAC) applications. The compounds can be customized to achieve a broad range of physical and mechanical performance. Courtesy of PolyOne Corp./ThinkStockPhotos.com
Another Auto TPO exhibitor introducing new technology at the show was RTP Co. of Winona, Minn., which announced a new line of Light and Tough (LT) compounds said to be 5 to 10 percent lighter than conventional glass-reinforced grades with the same resin and reinforcement type and level, yet maintain similar or equivalent mechanical and shrink properties.

“Our LT Compounds can be drop-in replacements without the cost burden associated with other options to reduce weight,” explains Eric Lee, RTP’s general manager of structural products. He adds that automakers can reduce mass without sacrificing performance or surface appearance and without making tooling modifications.

One product that’s not new but has people in the North American automotive industry quite interested is an inorganic filler called MOS–HIGE magnesium oxysulfate whiskers from Ube Material Industries, Ltd. of Tokyo, according to Rosa Zhang, sales associate for functional materials with Mitsui Plastics, Inc. of White Plains, N.Y. As a replacement for talc, the lower-density (2.3 SG) MOS–HIGE can reduce part wallstock 13 percent and part mass 8 percent while improving flexural modulus and providing a smoother surface than either talc or fiberglass, translating to better surface aesthetics—and it does this at a third lower filler levels. The company also claims it’s safer and more environmentally friendly than talc since it’s easily soluble and does not remain in the body if inhaled. It has achieved both Toxic Substance Control Act (TSCA) and Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) registration in the U.S. and the European Union, respectively. The one downside is that MOS–HIGE changes a compound’s shrink properties and no one in automotive wants to pay to modify tooling in order to make a formulation change. Still, demand for MOS–HIGE is growing globally, and this spring Ube announced the construction of a new plant in Thailand that is due to come on stream next year. In the meantime,
there should be plenty of capacity if automakers and their suppliers are interested. Current production is 3,000 tonnes annually and the new Thai plant will add an extra 1,500 tonnes in 2019.

The 2019 SPE Auto TPO conference is scheduled for Oct. 6 to 9 at the Marriott in Troy, Mich. For more information on next year’s conference, visit www.4spe.org/Events.

MOS-HIGE magnesium oxysulfate whiskers are gaining interest as a talc replacement in materials like PP and TPOs. Courtesy of Ube Material Industries, Ltd.

ABOUT THE AUTHOR

Peggy Malnati has more than 30 years' experience writing about the global plastics and composites industries. She has organized technical conferences for SPI, SPE and SAE International, edited the 1994 book, "Structural Analysis of Thermoplastic Components" from McGraw-Hill, spent 15 years as board member and communications chair for the SPE Automotive Division, and has been a contributing writer covering automotive and composites beats for various trade publications, including Plastics Engineering. She also provides communications services for plastics- and composites-industry clients globally via her own Detroit-area firm. Contact her at Peggy@MalnatiandAssociates.com.