



THERMOPLASTIC ELASTOMERS

Technical Interest Group



January 2023

LETTER FROM THE CHAIR — PRAKASH SANJEEVAIAH

Dear Fellow Members of the TPE Industry,

Welcome back to our spring edition of Newsletter. Throughout the latter half of 2022, the TPE industry followed the rest of manufacturing sector in being careful watcher of economy, federal interest rate, global conflicts leading to conservative decisions in spending, expansion, hiring. Supply chain achieved new stability with availability and pricing continued to fall.

It was a busy summer with in-person TOPCON, a flagship US-based technical conference fully dedicated to TPE's. Our TPE TIG TOPCON subcommittee worked tirelessly with the SPE Akron Section in Akron, Ohio to host the event at Fairlawn, OH on September 15-16, 2022. Excitement and enthusiasm were in the air throughout the 2 ½ days including the primer which was well attended and received. Main event included papers from wide array of topics and remained true to the essence of TPE. The event kicked off with the Keynote speaker Dr. Krishna Venkataswamy. Topics covered sustainability, new products, processing, applications. Among the attendees were industry veterans, students, job seekers, suppliers and consumers who networked extensively during and after event.

I extend my heartfelt thanks to Homaira Naseem, Bill Blasius, Hoan Tran, Nick DeLuca and all active Akron section- Dave Schultz, Bob Weiler and team for their support for a successful event. The theme for TOPCON 2022 "TPE's: unmasked" was aptly conceived and represented during the event. I would like to thank all the presenters and attendees for supporting and being part of the in-person TOPCON event. I also thank all the sponsorship companies for their support of this event. TPE TIG also had monthly meeting during TOPCON. It was our first in-person board meeting in 3 years. TPE TIG board by-laws have been reviewed by sub-committee led by Brad Guilani and is now getting final approval by the board. The approved version will be rolled out before the end of the year.

We are now focusing our efforts on our next exciting event ANTEC 2023 to be held in Denver, CO in March 27-30, 2023. Our subcommittee headed by Mubashir Ansari is closely working with SPE team to organize another successful event. We are inviting speakers for this event, so please look out for more information in this letter and at SPE website.

SPE TPE TIG is a non-profit organization with a clear mission to promote knowledge and sharing of technical information about TPE's within our interest group and greater technical community, especially among students and young engineers. Please feel free to share this newsletter with your colleagues and encourage them to join our TIG.

I welcome your comments and look forward to connecting with you in person. See you all at ANTEC 2023.

Best regards,

Prakash Sanjeevaiah, PhD
VP, Technology, Star Thermoplastic



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NEWSLETTER EDITOR CORNER

Happy New Year and welcome to the Spring edition of the TPE TIG newsletter. 2022 was marked by the return of our hallmark event, the TPE TOPCON, held in-person and appropriately themed “TPEs Unmasked”. It was great to attend the talks and primer sessions and meet the attendees. Thanks to our organizers Homaira Naseem, Hoan Tran and Nick Deluca for taking the lead in organizing this event with the Akron SPE Chapter. You can read more about the successful TOPCON in this newsletter.

I would also like to congratulate our three scholarship recipients: Amy Kurr, Tolulope (Tolu) Lawal and Rachel LeBlanc. This is second year in a row that all three winners are females. The newsletter covers their impressive accomplishments.

Two long serving members of the TPE TIG Board, Bob Abell and Armando Sardanopoli, elected to step down in September 2022. Their 30 plus years of dedicated service to the TIG is gratefully acknowledged and their experience and industry know-how will be hard to replace on the TIG Board. The TPE TIG presented Appreciation Plaques to Bob and Armando. An article by Reza Sadeghi reflecting on their careers is included in this newsletter.

Finally, I would like to thank Bill Blasius for interviewing Beck Renkert from Renkert Oil and getting her valuable perspective on the Process Oil industry.

Santosh Bawiskar



TPE TIG REVISES BYLAWS

A subcommittee consisting of board members Nicholas DeLuca, Brad Guilani, Jeff Munro, and Prakash Sanjeevaiah reviewed and revised the TPE TIG bylaws. The revisions were focused on changes stemming from the renaming of SIG to TIG as well as better alignment of the working structure of the TIG board. The website coordinator and newsletter editor were segregated into two separate board member positions as reflected in the practice of the past several years. Also, term limits were imposed on officer positions to ensure rotation of all board members into these positions. The new bylaws were unanimously approved by all members at the December 2nd board meeting.

Brad Guilani

SUGGESTIONS FOR THE NEWSLETTER?

Would you like to submit an article for the next newsletter?

Please contact:

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REVIEW: TPE TOPCON 2022 – “TPES UNMASKED”

The 15th Thermoplastic Elastomers Topical Conference was presented by the Akron Section and TPE Technical Interest Group at the Hilton Akron-Fairlawn from September 20th through 22nd. The theme for this year’s conference was “TPE’s Unmasked!” as we all hoped that everyone was ready to return to full participation at an in-person conference. Although not fully back to normal levels, attendance was quite solid with over 30 attendees for the primer and over 100 attendees for the 2 days of technical presentations. We would like to take this opportunity to acknowledge and thank all of our sponsors, exhibitors, and all those who attended:

Gold Sponsor - Kuraray

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Primer Sponsor – Star Thermoplastics.

Exhibitors included Kuraray, Star Thermoplastics, Renkert Oil, Akron Rubber Development Laboratory, TA Instruments, and SPE Plastivan. Without their generosity and commitment, we would not be able to continue our mission of facilitating the exchange of TPE industry knowledge and experience.



The conference started on Tuesday morning with the TPE Primer, which was facilitated by Bill Blasius. Various material experts provided introductions to the major TPE families including POE’s by Jeff Munro, TPV’s by Reza Sadeghi, SBC’s by Prakash Sanjeevaiah, TPU’s by Sat Nistala, and PEBA’s by Paul Cini. Santosh Bawiskar added valuable insight into formulating additives and Paul Anderson shared his processing expertise on the principles and practices of co-rotating twin-screw extrusion. A highlight for many of the attendees was the final case studies where teams took what they had just learned and applied it to address real world processing and material challenges.

On Tuesday evening, attendees gathered for the welcome mixer and had the opportunity to meet one another in a very casual relaxed atmosphere.

A very special thank you goes out to the many students and advisors from the University of Akron who displayed their posters at the mixer and throughout the conference.



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REVIEW: TPE TOPCON 2022 – “TPES UNMASKED” – CONTD.



Day one of the conference started with opening remarks from Homaira Naseem, (Technical Program Chair), from Alpha Gary, welcoming all to the conference. Homaira also moderated the morning session and introduced the first keynote speaker, Dr. Krishna Venkataswamy, who took us through some of the historical highlights of the TPE industry in his presentation entitled “Innovation Shines in Unmasking TPEs”. Two key themes emerged in the technical papers of this year’s conference with Sustainability being at the forefront of many of the development initiatives and Innovation evident in many of the highlighted and novel materials, processes, and applications. The morning session continued with the theme of sustainability with excellent presentations.

Day two of the conference started with opening remarks from Dave Schultz (Conference Chair) and morning session moderator Reza Sadeghi who introduced the second keynote speaker, Dr. Robert Savinell of Case Western Reserve University. Dr. Savinell spoke on the highly relevant topic of “Large scale Energy Storage” with a thorough analysis of the many energy storage technologies available today. Day two continued with presentations from both industry and academia.

We wish to thank all the speakers and their companies whose contributed content made the TOPCON a success and provided great value to all attendees.

All in all, it was a great conference and thank you to everyone who was able to attend in person. A special thanks to the SPE Akron section and all the committee members who made the conference work with all their prep work and behind-the-scenes coordination on the days leading up to and during the conference. Thanks also to the Technical Program Committee, who put together the great line up of presentations. We look forward to seeing you all again in 2024!

With sincere thanks,

TPE/ TIG – TOPCON Technical Program Committee

Homaira Naseem, Nick DeLuca, Hoan Tran

Conference Chairs

Dave Schultz and Homaira Naseem

Conference Committee

Dave Schultz, Robert Weiler, Stephen Reily, Kathy Perevosnik, Sherri Maker Hart, Iani Manas, John Braver, Tony Dean, Bob Wegelin, Jenny Digiantonio, Kevin Malpass





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A 2022 TPE TOPCON VIEW FROM THE WINGS BY BILL BLASIUS

One of my favorite parts of professional society conferences is having the opportunity to interact with students during poster sessions. TPE TOPCON is no exception and through the years, it has been awesome talking to students with diverse interests. It's great to see talent and intelligence combined with enthusiasm for a project. This year, I spent some time talking to Deliris Ortiz-Ortiz, a Ph.D. candidate in Professor Abraham Joy's research group at the University of Akron. Professor Joy has been a presenter at TPE TOPCON, so I appreciated that connection. Having worked in biomedical plastics and biodegradable polyesters, I had to find out more. Ms. Ortiz-Ortiz's poster introduced some of the challenges to printing by fusion deposition modeling (FDM) of low modulus polyesters. The ultimate end use would be the printing of scaffolding that could release an active drug ingredient as the polyester was absorbed into the body. Ms. Ortiz-Ortiz was working against competing requirements; the FDM process is most stable with high molecular weight polymers to minimize sagging and distortion while biodegradation is easiest with lower molecular weights. And by the way, this has to be done at low temperatures to avoid decomposing a potential biologically active ingredient. Did I mention that the polyester needs to be biocompatible and non-reactive with yet to be determined ingredients? The team took advantage of introduced hydrogen bonding to balance the need for low temperature processing and high viscosity with lower molecular weight polyesters. This was a very clever way around the problem without resorting to a full-on dendrimer. If you are interested, this link will take you deeper into their work <http://joyresearch.org/publications>. I walked away impressed and inspired.

POSTER SESSION @ 2022 TPE TOPCON

Naifu Shen, Advisor: **Weinan Xu**, *"Molecular Engineering and Additive Manufacturing of PIB-Based Functional Elastomers"*

Udayan Dabke, Advisor: **Erol Sancaktar**, *"Engineering Properties of Biobased electrically conductive composites"*

Abbas Valsadwala, Advisor: **Sadhan Jana**, *"Crystallinity of Carbon Black and its effect on the properties of rubber compounds"*

Sayan Basak, Advisor: **Kevin Cavicchi**, *"Towards Developing Semi-Crystalline Shape Memory Elastomers via Ene Reaction"*

Name: **Ziyan Li**, Advisor: **Kevin Cavicchi**, *"Compounding of Two-Way Shape Memory Polymers"*

Nazanin Sadeghi, Advisor: **Fardin Khabaz**, *"Structure and dynamics of the PE-iPP interface: role of supramolecular coupling agent"*

Chinnapatch Tantisuwanno, Advisor: **Abraham Joy**, *"Effect of Positional Variation of Pendant Cationic Amines on the Mechanical and Surface Properties of Polycaprolactone Based Segmented Polyurethanes"*

Joseph Nwosu, Advisor: **Mark Soucek**, *"Epoxides of Norbornylized Seed Oils and Carbonized Biomass Fillers for Sustainable Thermosets and Composites"*

Keaton Turney, Advisor: **James Eagan**, *"Thermoplastic Elastomers from Tunable Polyethylene using a Heterogeneous Nickel Alpha Diimine Catalyst"*

Harsh Pandya, Advisor: **Fardin Khabaz**, *"Understanding the dynamics of polymer grafted nanoparticles in a polymer matrix at sub-glass transition temperatures"*

Deliris Ortiz-Ortiz, Advisor: **Abraham Joy**, *"Synergistic effect of physical and chemical crosslinks enhances shape fidelity and mechanical properties of 3D printable low modulus polyesters"*

Dharamdeep Jain, Advisor: **Ali Dhinojwala**, *"Designing Novel Thermoplastic Adhesives for Lining of Paintings"*



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2022 SPE THERMOPLASTIC ELASTOMERS TIG SCHOLARSHIP RECIPIENTS

The Scholarship Committee consists of Edwin Tam (Chair), Iani Manas, Mukul Kaushik, Nicholas Deluca, and Armando Sardanopoli. The committee is glad to announce the 2022 SPE TPE Scholarship recipients, they are Amy Kurr, Tolulope Lawal and Rachel LeBlanc.



Amy Kurr, a second-year Ph.D. student in Macromolecular Science and Engineering from Case Western Reserve University, holds a B.S. in Materials Engineering from Iowa State University. She has prior experience as a technical product owner for electrical protective devices (e.g., circuit breakers, shunt trips) at Schneider Electric. Kurr was nationally recognized by the Engineering Honor Society with the Tau Beta Pi Laureate Award in 2018. She currently sits on Underwriters Laboratories' UL-746 Standards Technical Panel: the database for polymeric materials. Additionally, Ms. Kurr facilitates engineering professional development workshops for the National Science Foundation-funded Cyber Ambassador program and enjoys speaking Spanish.



Tolulope (Tolu) Lawal is a second year PhD student in Materials Science and Engineering at the University of Michigan. Tolu's current research focus is on the extraction of cellulose from different biomass waste via green solvents for the purpose of creating viable materials. In a similar fashion, the bulk of her research at the undergraduate level (at The Ohio State University) focused on the fabrication and characterization of biobased products like films and adhesives from naturally derived materials like invasive plants. She is very grateful for this scholarship and plans to use it to continue her research.



Rachel LeBlanc is a 5th year student studying Macromolecular Science and Engineering at Case Western Reserve University. She also has minors in Biomedical Engineering and Spanish. Rachel was a member of the CWRU women's varsity soccer team and is the president of the CWRU's chapter of Society of Women Engineers. She also is a member of Theta Tau professional engineering fraternity and Tau Beta Pi honor society. After graduation, she hopes to start her career in the medical devices industry or pursue a Master's in Engineering Management.

All three TPE Scholarship recipients above are well-accomplished students, please join us to congratulate them for receiving this award.



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BOB ABELL & ARMANDO SARDANOPOLI ELECT TO STEP DOWN FROM TPE TIG BOARD

Two of our most experienced board members had elected to step down from the board and open it up to new members in September of 2022. SPE TPE TIG board members sincerely appreciate both Armando Sardanopoli's & Bob Abell's efforts in supporting TPE TIG as member of the board well over 25+ years. Thank you both for your many valuable contributions. Your loyal and dedicated support of the TPE TIG board played an integral part in the success of TPE TIG & TOPCONs. As token of our appreciation, we provided both Armando & Bob with special trophies (as seen below) for their contributions, and we wish both a wonderful retirement.



Bob Abell is one of the original founding members of the TPE TIG and had been a Board Member since 1988. He started his career at DuPont in 1962 and worked there for 35 years. He then held management positions at Advanced Polymer Alloys (working with ALCRYN™) and Ferro Corp before taking up consulting and founding Abell Consultants. His career spanned more than 50 years in the thermoplastic elastomers industry. He graduated with a Bachelors degree in Chemistry from the University of Marlyland in 1962.



Armando Sardanopli started his industrial career at Upjohn in 1970, and then joined BASF, working on thermoplastic polyurethanes (TPU). At BASF, he was a Technology Manager for the TPU business unit for over 20 years. After retiring form BASF, he has been an industry consultant, is active in the Taylor Rotary Club and teaches Plastics Courses at the Schoolcraft College in Livonia, MI. Armando served as a TPE TIG Board member since its early days and most recently was part of the scholarhsip and Plastivan committee.

Plaques Presented to Bob Abell & Armando Sardanopoli





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Q & A WITH BECKY RENKERT, RENKERT OIL BY BILL BLASIUS



TPE TIG: First off, we would like to thank you for your participation and support of TPE TOPCON. Have you found the industry interactions valuable both personally and for your business?

R Renkert: It is always a good opportunity to meet with our customers and discuss prospects with new attendees. We attract a lot of visitors and are delighted to explore applications and what benefits we can provide.

TPE TIG: In the continuing evolution away from thermoset rubbers towards thermoplastic elastomers, have you seen a demand shift within your process oil portfolio?

R Renkert: The need for process oil purity and UV stability has continued to grow. Since TPE's are easy to color and provide that soft touch, their demand has grown and water white process oils have supported lighter and vibrant colored elastomers.

TPE TIG: You distribute for some top names in the oil business and have your own formulated grades. Does having access to top quality ingredients help when tailoring products for TPE compounders or silicone extension market?

R Renkert: Our focus has been to provide the advantages of highly refined process oils like Chevron ParaLux. Having the top quality allows its use in all types of applications. By listening to our customers, we are able to customize our offering for performance, cost and logistics.

TPE TIG: Can your Renoil low volatility, high viscosity process oils make an improvement in automotive interior fogging and VOCs in general?

R Renkert: We have demonstrated at least 1/3 lower fogging than the currently approved oils. As the market shifts to tighter fogging standards, our oils can help keep TPE and rubber components within the new specifications. Our heavy process oils are not a source of VOCs.

TPE TIG: Do you have process oil options for formulators with extra critical color requirements?

R Renkert: Absolutely, we have developed this market with Chevron ParaLux process oils. Our experience provides us with a good understanding of what is needed in various applications. We encourage customers to bring their toughest color applications.

TPE TIG: Along those same lines, do you have high purity food grade oils that could also be used in medical device and pharma applications?

R Renkert: Renkert Oil is proud to have grown to the third largest Food Grade White Oil producer in North America. Our Renoil food grade oils meet or exceed NF/USP/FDA 21CFR178.3620(a) requirements. They are used in sensitive food processing, medical, cosmetic, agriculture and may more applications. We have earned a global food safety management certification SQF (Safe Quality Foods) for our production facilities.

TPE TIG: Thank you again for making the time to help support the activities of the TPE technical interest group. We look forward to seeing you at the next TPE TOPCON in 2024.



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