

# **51st North American Thermal Analysis Society Conference and 9th Baekeland Symposium 2025**

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11-15 August 2025

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**Monday, August 11, 2025**

**Welcome Reception, Poster Session and Exhibition**

**18:00 – 20:30**

***Dining Room A/D***

- Oscillatory Rheological Analysis of Poly(Vinylidene Fluoride) Solutions made from  $\gamma$ -Valerolactone...34 PS-1  
*Anuja Jayasekara, Peggy Cebe, Lily Buyea, Karin Wyatt (Tufts University)*
- Application of Modulated DSC Methods on Cooling for Analysis of Petroleum-Based Products...35 PS-2  
*Jennifer Schott (TA Instruments - Waters, LLC)*
- Next-Gen Skincare: Rheological Insights into Silver-Enhanced Aloe Gel vs. Commercial Hand Creams...35 PS-3  
*Tien Nguyen, Brooke Wilcox, (Central Michigan University) Isaac Roscoe Finch (University of Michigan)*
- Integration of DSC and ARC Data for Determination of TMRad in DTBP/Toluene Systems with Various Concentrations...35 PS-4  
*Bertrand Roduit, Patrick Folly, Alexandre Sarbach, Richard Baltensperger (AKTS SA)*

**Tuesday, August 12, 2025**

**Welcome and Plenary Lecture**

***Michigan Room East***

9:00 – 10:00      Viscoelasticity and Light-Matter Interactions at GHz Frequencies...2  
*John Kieffer* (University of Michigan)      PL-1

**10:00-10:20      *AM Break***

**Batteries**

**Lei Chen** (University of Michigan - Dearborn)

**Solomon Adera** (University of Michigan)

**Meng Jiang** (General Motors)

***Michigan Room East***

10:20-11:00      **Keynote Speaker:** Lignin-Based Thermally Stable Separators for Lithium-Ion Batteries...4  
*Chengcheng Fang* (Michigan State University)      BAT-1

11:00-11:20      Oxidation Sensitivity and Thermal Decomposition of Halide-Doped Argyrodite Solid Electrolytes via TGA/DSC and Gas Analysis Method...4  
*Hernando Gonzalez Malabet* (General Motors)      BAT-2

11:20-11:40      From Winter to Summer: How Seasonal Climate Variation Shapes Battery Lifespan and Mileage...5  
*Hanyu Bai, Qiu hao Hu, Yao Ren, Weiran Jiang, Ziyong Song* (University of Michigan)      BAT-3

11:40-12:00      Acoustically Driven Thermal Management of Battery Packs in Electric Vehicles...5  
*Young Jin Lee, Mikko Hendricks, Solomon Adera* (University of Michigan)      BAT-4

12:00-13:20	<b>Lunch Break</b>	
13:20-13:40	Wide Band Gap Semiconductor Thermal Management using Direct Immersion Cooling...6 <i><u>Biruk Teka Gidreta</u>, Runshuang Guo, Solomon Adera (University of Michigan)</i>	BAT-5
13:40-14:00	Temperature Estimation of Pouch Cell with Indirect Liquid Cooling Based on Physics-Informed Machine Learning...7 <i><u>Zheng Liu</u> (University of Michigan-Dearborn)</i>	BAT-6
14:00-14:20	Dual-scale model enabled explainable-AI toward decoding internal short circuit risk of lithium metal batteries...7 <i><u>Jinrong Su</u>, Lei Chen (University of Michigan-Dearborn)</i>	BAT-7
14:20-14:40	Investigating the Effect of Thermophysical Inhomogeneity and Uneven External Cooling on Battery Degradation...7 <i><u>Wenxue Liu</u>, Zhiwen Wan, Jason B. Siegel, Anna G. Stefanopoulou (University of Michigan)</i>	BAT-8
14:40-15:00	A Compact Hybrid Battery Thermal Management System for Enhanced Cooling...8 <i><u>Jinrong Su</u>, Lei Chen (University of Michigan-Dearborn)</i>	BAT-9
15:00-15:20	<b>PM Break</b>	
15:20-15:40	Phase Change Material Seeded Coolant for Electronics Thermal Management...9 <i><u>Yimin Zhou</u>, Tomasz Kulakowski, Solomon Adera (University of Michigan)</i>	BAT-10

15:40-16:00 Phase change-based thermal management for battery packs...9  
Takiyah Ali, Solomon Adera (Michigan State University) BAT-11

**Thermophysical Properties**  
**Alicyn Rhoades (Penn State – Behrend)**  
**Room 188**

10:20-11:00 **Keynote Speaker:** The Hidden Flow: Unnoticed Rheology, Thermal Effects,  
and Their Impact on Daily Life, Industry, and Health...10 TP-1  
Leela Rakesh (Central Michigan University)

11:00-11:20 Building on History: 200+ Years of Thermal Analysis in Rubber  
Characterization...10 TP-2  
Gregory McKenna (North Carolina State University)

11:20-11:40 Modeling the Glass-Liquid Transition in Thin Films: A Theoretical  
Approach using the Modified Allen-Cahn Model...11 TP-3  
Koksai Karakus, Leela Rakesh, Valeriy V. Ginzburg, Keith Promislow (Central Michigan University)

11:40-12:00 Synchrotron X-Ray Mapping on Flow-Induced Crystallized Polymers...11  
Session: Thermophysical Properties TP-4  
Xiaoshi Zhang, Benson Jacob, Jason Alexander, Ryan Flanigan, Kirt Page, Arthur Woll, Ralph Colby, Alicyn Rhoades (Penn State - Behrend)

**12:00-13:20 Lunch Break**

13:20-13:40 Thermal Transport Characterization of Materials in Non-Ambient  
Conditions and Non-Conventional Configurations...12 TP-5  
Emma Mattinson, Hitoshi Taniguchi (C-Therm Technologies Ltd.)

## Advanced Instrumentation & Tandem Techniques

**Gray Slough** (TA Instruments)  
**Danielle Kimmel** (Mettler-Toledo)  
**Room 188**

13:40-14:00	Undercooling Minimization in Ultrasound Coupled DTA Measurements of Molten Salts...12 <i>Jacob Yingling, Andrew Johanssen, Michael Woods, William Phillips (Idaho National Laboratory)</i>	AITT-1
14:00-14:20	Predicting Friction Material Composition Solely from TGA Data...13 <i>Tina Adams (The Lubrizol Corporation)</i>	AITT-2
14:20-14:40	Dynamic mechanical analyzer updated and engineered for comprehensive viscoelastic characterization of materials...13 <i>Peter Vichos (NETZSCH Instruments North America, LLC)</i>	AITT-3
14:40-15:00	Cooling Calibration of DSCs: Comparison of the Liquid Crystalline and Magnetic Transition Temperatures...14 <i>Joseph Menczel (Thermal Measurements LLC)</i>	AITT-4
15:00-15:20	<b>PM Break</b>	
15:20-16:00	<b>Keynote Speaker:</b> Solid Water Interactions and their Impact on Storage, Processing, and Shelf Life of Materials...14 <i>Matthias Wagner, Markus Schubnell, Nicolas Fedelich, Andreas Bach, Angela Hammer (METTLER TOLEDO)</i>	AITT-5
16:00-16:20	Introducing the TGA Smart-Seal Pans™...14 <i>Carlton (Gray) Slough (TA Instruments)</i>	AITT-6

**Composites & Nanocomposites**  
**Shiwang Cheng** (Michigan State University)  
**Room 196**

10:20-11:00	<b>Keynote Speaker:</b> Mechanical Reinforcement in Polymer Nanocomposites: Insights from Small-Angle Neutron Scattering...15 <u>Yangyang Wang</u> , Shiwang Cheng (Oak Ridge National Laboratory)	CN-1
11:00-11:20	Dynamics and Rheology of Polymer Nanocomposites with Repulsive Polymer-Nanoparticle Interactions...16 <u>Neda Hashemipour</u> , Shiwang Cheng (Michigan State University)	CN-2
11:20-11:40	The Effect of Nanotube Length and Functionalization on Rheological Properties of Carbon Nanotube/Polymer Composites...16 <u>Brian Grady</u> , Mason Rhue (University of Oklahoma)	CN-3
11:40-12:00	Dynamics of Poly(Methyl Acrylate)/Poly(Methyl Methacrylate)-Grafted Fe3O4...16 <u>Shalin Patil</u> , Christopher Mbonu, Tsengming Chou, Ruhao Li, Di Wu, Pinar Akcora, Shiwang Cheng (Michigan State University)	CN-4
<b>12:00-13:20</b>	<b>Lunch Break</b>	
13:20-13:40	Spatial Gradient of the Dynamics of Capped Thin Polymer Films through Broadband Dielectric Spectroscopy...17 <u>Juncheng Zheng</u> , Shiwang Cheng (Michigan State University)	CN-5
13:40-14:00	Recycling Carbon Fiber Epoxy Composites via Lewis Acid-Mediated Solvolysis... 17 <u>Cassandra Reese</u> , Wenbin Kuang, Kevin Simmons (PNNL/Bat)	CN-6
14:00-14:20	Carbon Precursor Resins and Semi-Fluorinated Polyaryl Ethers. Synthesis, Performance, and Commercialization...18 <u>Ernesto Borrego</u> , <sup>1,2</sup> <u>Gustavo Munoz</u> , <sup>1,2</sup> <u>Will Johnson</u> , <sup>1</sup> <u>Niroshani Abeynayake</u> , <sup>1,2</sup> <u>Maxim Solovyev</u> , <sup>1</sup> <u>Erfan Masaeli</u> , <sup>1</sup> <u>Charles Pittman, Jr.</u> , <sup>1</sup> and <u>Dennis W. Smith, Jr.</u> <sup>1,2</sup> ( <sup>1</sup> Mississippi State University, <sup>2</sup> Hand Technologies)	CN-7

14:20-14:40 Network Dynamics of Polymer Nanocomposites...19 CN-8  
Shiwang Cheng (Michigan State University)

### **Kinetics**

**Bob Howell** (Central Michigan University)

#### **Room 196**

14:40-15:00 Stability and Crystallization of Indomethacin/ Sucrose Benzoate  
Co-Amorphous Glasses...19 KIN-1  
Elaheh A. T. Moghadam, Sindee Simon (NC State University)

15:00-15:20 **PM Break**

15:20-16:00 **Keynote Speaker:** Dependence of curing kinetics on mass ratio for epoxy/  
amine systems and on intensity of UV light for photopolymers...20 KIN-2  
Elena Moukhina, Claire Strasser (NETZSCH Geraetebau GmbH)

16:00-16:20 Combined Effects of Temperature and Humidity on the Decomposition  
Kinetics of Nitrocellulose-Based Propellants: From Milligram to Kilogram  
Scale...20 KIN-3  
Bertrand Roduit, Patrick Folly, Alexandre Sarbach, Richard Baltensperger  
(AKTS SA)

16:20-16:40 Action of Organophosphorus Flame Retardants: Impact of Structure and  
Mode of Thermal Degradation...21 KIN-4  
Bob A. Howell (Central Michigan University)

16:40-17:00 Kinetic Modelling of Pressure Influences on Reactions in Solids...22 KIN-5  
Elena Moukhina (NETZSCH Geraetebau GmbH)

**Wednesday, August 13, 2025**

**Welcome and Plenary Lecture**

***Michigan Room East***

9:00-10:00 New Simulation and Modeling Tools to Understand Rheology, Processing, and Crystallization of Polyethylene Melts...1 PL-2  
Ronald Larson (*University of Michigan*)

10:00-10:20 ***AM Break***

**Sustainable Polymers**

**Amit K. Naskar** (Oak Ridge National Lab)

***Michigan Room East***

10:20-11:00 ***Keynote Speaker:*** Sustainable 3D-printing materials: Printability and performance...22 SP-1  
Michael Toomey (*Oak Ridge National Lab*)

11:00-11:20 Pressure-Differential Scanning Calorimetry of Virgin and Recycled Polyethylene...23 SP-2  
Heather Snell (*Intertape Polymer Group*)

11:20-11:40 Go with the Flow: Viscoelastic Behavior of Biopolymer-Based Rheology Modifiers in Today's Complex Fluids...23 SP-3  
Jin Zhao, Matthias Knarr, Leela Rakesh (*Roquette*)

11:40-12:00 Unraveling the Influence of Hydrogen and Blended Gas on Polymer Performance in Infrastructure Systems...24 SP-4  
Wenbin Kuang, Kevin Simmons, Nalini Menon, Logan Kearney (*Pacific Northwest National Laboratory*)

12:00-15:00 ***Awards Luncheon & NATAS Fellow Talk***

15:00-15:20	<b><i>PM Break</i></b>	
15:20-15:40	Advancing Sustainability: Thermal Analysis of PLA Composites...24 <u>Karim Elhatab</u> (TA Instruments)	SP-5
15:40-16:00	Thermal Characterization of Devulcanized Ground Tire Rubber (dGTR): Advancing Sustainability and the Circular Economy...24 <u>Cathy Stewart</u> (Intertape Polymer Group)	SP-6
16:00-15:20	Sustainable polymer composites based on hemp hurd and recycled polyolefins...25 <u>Arun Ghosh</u> (Troy University)	SP-7
16:20-16:40	A sustainable structural adhesive and its improved corrosion resistance in adhesively bonded metal joints...25 <u>Amit Naskar</u> , Zeyang Yu (Oak Ridge National Laboratory)	SP-8

### **Energetics & Thermal Hazards**

**Ginger Guillen** (Lawrence Livermore National Laboratory)

**John Rosener** (Lawrence Livermore National Laboratory)

**Room 188**

10:20-11:00	<b><i>Keynote Speaker:</i></b> Leveraging controlled-atmosphere preparation methods with heat flow calorimetry to study environmental factors in explosive compatibility...26 <u>John Rosener</u> , Elizabeth Glascoe, Cody Cockreham, Steven Hawks (Lawrence Livermore National Laboratory)	ETH-1
11:00-11:20	Determination of Heat transfer in Virtual Packaging Systems (VPS) for Cookoff and Self Accelerating Decomposition Temperature (SADT) Evaluation...26 <u>Bertrand Roduit</u> , Patrick Folly, Alexandre Sarbach, Richard Baltensperger (AKTS SA)	ETH-2

11:20-11:40	Nuclear Recriticality Test Study of PCI Based on ASTM E521 & E261 & E228...27 <u>Yan Peng</u> (China Institute of Atomic Energy)	ETH-3
11:40-12:00	Explosive testing and assessment of in-house material standards...28 <u>Shanti Singh</u> , Hope Dettweiler, Isa Mohammed, Ricardo Pontes (Canadian Explosives Research Laboratory)	ETH-4
12:00-15:00	<b>Awards Luncheon &amp; NATAS Fellow Talk</b>	
15:00-15:20	<b>PM Break</b>	

**Fast Scan & Nanocalorimetry**  
**Xiaoshi Zhang** (Penn State – Behrend)  
**Alicyn Rhoades** (Penn State – Behrend)  
**Room 196**

10:20-11:00	<b>Keynote Speaker:</b> The Rigid Amorphous Fraction in Commercial Isotactic Polypropylene Fibers using Flash DSC...29 <u>Yung P. Koh</u> , Sindee Simon (North Carolina State University)	FSN-1
11:00-11:20	Advancing crystallization modeling in thermoplastic composites: Incorporating fiber effects...29 <u>Alicyn Rhoades</u> , Xiaoshi Zhang, Benson Jacob, Richard Schaake, Gijs Kort, Ralph Colby (Penn State - Behrend)	FSN-2
11:20-11:40	Tunable Dynamic Fragility and Salt-Enhanced Glass Transition Definition in Polyzwitterion Systems...30 John Thomas, Sophia Dinn, Ashleigh Herrera, Ayse Asatekin, Xiaoshi Zhang, Alicyn Rhoades, <u>Peggy Cebe</u> (Tufts University)	FSN-3

11:40-12:00	Rapid Thermal Decomposition of Viton-A...31 <i><u>Mirko Schoenitz</u>, Edward L Dreizin (New Jersey Institute of Technology)</i>	FSN-4
12:00-15:00	<b><i>Awards Luncheon &amp; NATAS Fellow Talk</i></b>	
15:00-15:20	<b><i>PM Break</i></b>	
15:20-16:00	<b><i>Student Award:</i></b> Impact of Lamellar Infill and Thickening on the Rigid Fraction of Semicrystalline PLLA...31 <i><u>Logan Williams</u>, Sindee Simon (North Carolina State University)</i>	FSN-5
16:00-16:20	Crystallization of Polyamide 66 Blends...31 <i><u>Xiaoshi Zhang</u>, John Buzinkai, René Androsch, Ralph Colby, Alicyn Rhoades (Penn State - Behrend)</i>	FSN-6

**Thursday, August 14, 2025**

**Welcome and Plenary Lecture**  
**NATAS Award for Outstanding Achievement**  
(Sponsored by Mettler-Toledo)  
***Michigan Room East***

9:00-10:00 Differential Scanning Calorimetry (DSC) of Polymers: Tips and Tricks (or Hacks for the Younger Crowd)...3 PL-3  
Brian Grady (*University of Oklahoma*)

10:00-10:20 ***AM Break***

**Electronic Packaging Materials**  
**Stian Romberg** (National Institute of Standards and Technology)  
**Eric Schoch** (Northrop Grumman Mission Systems)  
***Michigan Room East***

10:20-11:00 ***Keynote Speaker:*** Advanced Metrology Suite for Linking Residual Stress to Fundamental Properties of Thermoset Packaging Materials...32 EPM-1  
Stian Romberg, *Polette Centella, Ran Tao, Alexander Landauer, Huong Giang Nguyen, Gale Holmes, Gery Stafford, Christopher Soles* (*National Institute of Standards and Technology*), *Karl Schoch* (*Northrop Grumman*)

11:00-11:20 Thermal Interface Materials for Advanced Packaging: The Role of Thixotropic Rheology...32 EPM-2  
Ran Tao, *Stian Romberg, Amanda Forster, Christopher Soles, Kaitlyn Hartog* (*National Institute of Standards and Technology*), *Karl Schoch* (*Northrop Grumman*)

11:20-11:40	Experimental Investigation and Modeling of Direct Immersion Cooling for Electronics Thermal Management...33 <i><u>Hrushikesh Jadhav</u>, Runshuang Guo, Solomon Adera (University of Michigan)</i>	EPM-3
11:40-12:00	Measurement of Cure Stress During Cure of Thermosets and Subsequent Thermal Cycling...34 <i><u>Karl Schoch</u>, Kortney Kersten, Philip Panackal (Northrop Grumman)</i>	EPM-4
12:00-13:00	<b><i>Lunch Break</i></b>	

## Short Courses

**Thursday, August 14, 2025**

**Room 188**

13:00 pm – 17:10 pm

- 13:00-14:00 **TMA Theory & Practice...N/A**  
*Dr. Larry Judovits (Arkema, retired)*
- 14:00-15:00 **DSC Theory & Practice...N/A**  
*Dr. Han Xia (Eli Lilly)*
- 15:00-15:10 **Break (Refreshments will be provided)**
- 15:10-16:10 **TGA Theory & Practice...N/A**  
*Cathy Stewart (IPG, retired)*
- 16:10-17:10 **DMA Theory & Practice...N/A**  
*Dr. Karl F. (Eric) Schoch (Northrop Grumman)*

**Friday, August 15, 2025**

**Room 188**

8:30 am – 12:00 pm

- 8:30-9:20 **Introduction Rheology: Techniques & Applications...N/A**  
*Dr. Stian Romberg (NIST)*
- 9:20-10:10 **Extreme Soft Materials by Polymer-network Design...N/A**  
*Prof. Shaoting Lin (Michigan State University)*
- 10:10-10:20 **Break (Refreshments will be provided)**
- 10:20-11:10 **Soft and Hard X-rays for Organic, Non-crystalline materials...N/A**  
*Prof. Camille Bishop (Wayne State University)*
- 11:10-12:00 **Designing Polymeric Materials to Modulate Photon and Mass Transport...N/A**  
*Prof. Xinyue Liu (Michigan State University)*