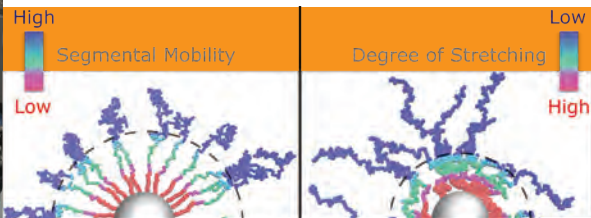




THE UNIVERSITY OF
TENNESSEE
KNOXVILLE



DEPARTMENT OF CHEMISTRY



Covalent Bonding

Physical Adsorption



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

RESEARCH & ENGAGEMENT



2016 UT/VT Polymer Workshop

April 18th - 19th, 2016

Four Points Sheraton, Knoxville, TN

Co-hosted by the Department of Chemistry at the University of Tennessee Knoxville and Virginia Tech

Contacts: Professor Mark Dadmun (UTK), Dr. Rachel Rui (UTK), Dr. Tiffany Carpenetti (VT)

<https://www.chem.utk.edu/polymerworkshop>

Agenda

Available online at <https://www.chem.utk.edu/polymerworkshop>

April 18

12:00 - 1:00 pm Lunch: Welcome and Introductions (Four Points Agee Room, level M)

1:00- 3:00 pm Interfaces in Nanocomposites, Blends, Adhesives, and Films (Four Points Parkview Ballroom, level M)

- 1:00- 1:15 Bortner, M. (VT) "Nanocomposite Processing, Morphology and Structure-Property Relationships"
- 1:15-1:30 Zhao, B. (UTK) "Hairy Nanoparticles"
- 1:30-1:45 Martin, S. (VT) "Processing and Transport in Nanostructured and Nanocomposite Materials"
- 1:45-2:00 Doxastakis, E. (ANL/UTK) "Simulations at the interface: association, adsorption, reaction and diffusion"
- 2:00-2:15 Sokolov, A. (UTK) "Controlling interfacial layer properties in polymer nanocomposites"
- 2:15-2:30 Kilbey, M. (UTK) "Linking Design, Structure, and Properties of Polymer-Modified Interfaces"
- 2:30-2:45 Stein, G. (UH/UTK) "Functional Polymer Films"
- 2:45-3:00 Khomami, B. (UTK) "Multiscale Modeling of Polymeric Fluids"

3:00-3:15 pm Break (Four Points Agee Room & Sanders Room, level M)

3:15-4:30 pm Additive Manufacturing (Four Points Parkview Ballroom, level M)

- 3:15-3:30 Dadmun, M. (UTK) "Strengthening Interfaces in 3D Printed Polymers"
- 3:30-3:45 Long, T. (VT) "Advanced Manufacturing Demands Advanced Materials: Expanding the Polymer Toolbox for 3D Printing"
- 3:45-4:00 Compton, B. (UTK) "Additive manufacturing of thermoset polymer materials"
- 4:00-4:15 Williams, C. (VT) "Additive Manufacturing of Multi-Functional Products through Tailored Materials and Topologies"
- 4:15-4:30 Duty, C. (UTK) "Large scale Additive Manufacturing of Composite Structures"

4:30-6:00 pm Poster Session with refreshments (Four Points Parkview Ballroom, Agee Room & Sanders Room, level M)

6:30 - 8:30 pm Dinner at Club LeConte (downtown Knoxville First Tennessee Building, take elevator to 26th floor then walk up the stairs on the left)

April 19

8:00 - 8:30 am Arrival and Breakfast (Four Points Agee Room)

8:30 - 9:50 am Transport in Polymer Membranes Session I (Four Points Parkview Ballroom, level M)

- 8:30 - 8:50 Dai, S. (UTK) "Separation of Carbon Dioxide based on Porous Membranes"
- 8:50-9:10 Long, B (UTK) "Vinyl-Addition Polymerization of Siloxane Functionalized Norbornenes for CO₂ Separation Membranes"
- 9:10-9:30 Liu, G. (VT) "Synthesis and Characterization of Polyacrylonitrile-Containing Block Copolymers as well as the integration with Anisotropic Nanoparticles"
- 9:30-9:50 Sangoro, J. (UTK) "Ion transport in polymerized ionic liquids"

9:50-10:10 am Break (Four Points Agee Room & Sanders Room, level M)

10:10-11:30 am Transport in Polymer Membranes Session II (Four Points Parkview Ballroom, level M)

- 10:10-10:30 Saito, T. (ORNL) "Tailored Polymer Membranes for High Flux Carbon Dioxide Separation"
- 10:30-10:50 Paddison, S. (UTK) "Structure/Function Modeling of Ion Containing Polymers"
- 10:50-11:10 Moore, R. (VT) "Structure-Processing-Morphology-Transport Property Relationships in Ionomeric Membranes"
- 11:10-11:30 Zawodzinski, T. (UTK) "Polymer Electrolytes: Fundamental Aspects for Applications"

11:30 - 12:30 pm Lunch, Summary & Closing Remarks (Long & Dadmun) (Four Points Agee Room & Sanders Room, level M)

12:30 - 1:30 pm Transportation to ORNL

1:30 - 2:30 pm Tour of MDF

ADJOURN

UTK: University of Tennessee Knoxville;

VT: Virginia Tech;

ANL: Argonne National Laboratory;

ORNL: Oak Ridge National Laboratory;

MDF: Manufacturing Demonstration Facility;

UH: University of Houston

Transport in Polymers

1. Random and Non-Random Sulfonation of Poly(ether ether ketone) for Fuel Cell Membranes. **Lindsey J. Anderson**, Xijing Yuan; Robert B. Moore
 2. Synthesis and Characterization of Aliphatic Polyketone Materials. **Kyle J. Arrington**, Clifton B. Murray, Emily C. Smith, John B. Waugh, Hervé Marand, John B. Matson
 3. Imidazole-Containing Block Copolymers: Understanding the Effect of Morphology on Electromechanical Response. **Mingtao Chen**, Bradley S. Lokitz, Tomonori Saito, Timothy E. Long
 4. Siloxane Functionalized Vinyl-added Polynorbornenes and their Development as Advanced Gas Separation Membranes. **Kevin Gmernicki**, **Christopher Maroon**
 5. Blocky Ionomers via Gel-State Functionalization of Syndiotactic Polystyrene. **Greg Fahs**
 6. Ionic Conductivity and Structural Dynamics in Block Copolymers of Ammonium-based Poly (ionic liquids). **Matthew Harris**, Maximilian Heres, Veronika Strehmel, Joshua Sangoro
 7. Ion Dynamics in Ultrathin Films of Polymerized Ionic Liquids. **Maximilian Heres**, Tyler Cosby, Roberto Benson, Stefan Berdzinski, Veronika Strehmel, Joshua Sangoro
 8. Development of Polydimethylsiloxane-based Membranes for Carbon Dioxide Separation. **Tao Hong**, Sophia Lai, Sabornie Chatterjee, Shannon Mahurin, De-en Jiang, Brian Long, Jimmy Mays, Alexei Sokolov, Tomonori Saito
 9. Direct Comparison of Atomistic Molecular Dynamics Simulations and X-ray Scattering of Polymerized Ionic Liquids. **Hongjun Liu**, Stephen J. Paddison
 10. Synthesis and Characterization of Novel Phosphonium Ionenenes. **Ryan J. Mondschein**, Asem I. Abdulahad, Quan Chen, Ralph H. Colby, Timothy E. Long
-
11. Dissipative Particle Dynamics Simulations of the Morphology of Proton and Anion Exchange Membranes. **Fatemeh Sepehr**, Stephen J. Paddison
 12. Influence of Ion Size on Ion Conductivity and Dynamics in Polymerized Ionic Liquids. **Eric Stacy**, Vera Bocharova, Catalin Gainaru, Tomonori Saito, Alexei Sokolov
 13. Understanding Transport and Conductivity in Macromolecular Systems. Bryce Kidd, Curt Zanelotti, Drew Korovich, **Lam Thieu**, Rui Zhang, Xiuli Li, Ying Wang, Loius Madsen
 14. Highly Conductive and Thermally Stable Ion Gel Electrolytes for High Energy Density Li Batteries. **Ying Wang**, Ying Chen, Jianwei Gao, Hyun Gook Yoon, Liyu Jin, Maria Forsyth, Theo J. Dingemans, Louis A. Madsen

Interfaces

15. Control of Wetting Behavior of Si Nanoparticles in PCHD-based Diblock Copolymers by Tuning the Graft Chain Stiffness. **Kamlesh Bornanin**, Weiyu Wang, Jimmy Mays, Mike Kilbey
16. Tailoring Polyesters for Structure-Property-Performance Relationships: From High Impact to Solvent Resistance. **Joseph M. Dennis**, Gregory B. Fahs, Joshua S. Enokida, Nicole Fazekas, Robert B. Moore, S. Richard Turner, Timothy E. Long
17. Tailoring Polymer Dynamics on the Nanoscale: Covalent Bonding versus Physical Adsorption in Polymer Nanocomposites. **Adam Holt**, Shiwang Cheng, Vera Bocharova, Tomonori Saito, Alexander Kisliuk, Halie Martin, Mark Dadmun, Alexei Sokolov
18. Synthesis and Characterization of Polyacrylonitrile-Based Block Copolymers and Anisotropic Plasmonic Nanoparticles. **Assad Khan**
19. Molecular Dynamics of Poly(styrene-*b*-1,4-isoprene) Diblock Copolymers with Varying Molecular Architectures. **Thomas Kinsey**, Maximilian Heres, Tyler Cosby, Zachariah Vicars, Roberto Benson, Jimmy Mays, Joshua Sangoro
20. In Situ Determination of Polymer Diffusion in Nanocomposites. **Halie Martin**, Guangcui Yuan, Sushil Satija, Mark Dadmun
21. In-Situ Methods for Tracking Structure Development in Nanostructured Polymers during Processing. Alicia Pape, **Stephen Martin**
22. Design and Characterization of Acrylate Based Multigraft Superelastomers. **Konstantinos Misichronis**, Yangyang Wang, Shiwang Cheng, Weiyu Wang, Andrew Goodwin, Nam-goo Kang, Jimmy Mays, Tomonori Saito
23. Chain Dynamics and Self-assembly of Linear Polymeric Melts: Dissipative Particle Dynamics and Self-Consistent-field Theoretic Simulations. **Mouge Mohagheghi**, Bamin Khomami
24. Single Chain Dynamics of Entangled Linear Polyethylene under Homogenous Shear and Planer Elongational Flows using Nonequilibrium Molecular Dynamics Simulations. **Hadi Nafar**, Brain Edwards, Bamin Khomami
25. Synthesis of Bottlebrush Polymers Using the Transfer-To Approach. **Scott Radzinski**, Jeffrey Foster, John Matson
26. Synthesis and Characterization of Interaction Tuned Copolymer Grafted Nanoparticles. **Rachel Ramirez**, Mike Kilbey
27. Understanding the Assembly of self-stratified Conjugated Polymer Thin Films. **Samantha Rinehart**, Mark Dadmun
28. Large-scale Brownian dynamics simulations of linear and comb polymer solutions. **Amir Saadat**, Bamin Khomami
29. Block Copolymer Self-Assembly in Dilute Solution. **Xianggui Ye**, Bamin Khomami
30. Spatial Distribution and Thermomechanical Properties of Methacrylate-Based Polymer Nanocomposites. **Dayton Street**, Mike Kilbey
31. Synthesis and Modification of Polymer Nanoparticles. **Tyler White**, Halie Martin, Konstantinos Misichronis, Alexei Sokolov, Mark Dadmun, Tomonori Saito

Additive Manufacturing

32. Bimodal Polymeric Blends to Improve Interfilament Adhesion in Fused Deposition Modeling. **Neiko Levenhagen**
33. Assessment of Additive Manufactured Molds for Hand-Laid Composite Parts. **Zeke Sudbury**, Robert Springfield, Chad Duty
34. 3D-Printed Biodegradable Polyester Tissue Scaffolds for Cell Adhesion. Justin Sirrine, **Allison Pekkanen**, Ashley Nelson, Nicholas Chartrain, Christopher Williams, Timothy Long
35. Initial Efforts at Modeling the Fused Filament Fabrication Process. **Craig D. Mansfield**, Mubashir Q. Ansari, Donald G. Baird, Taylor H. Presek, Matthew G. Price
36. Infrared Preheating - A Strategy to Enhance Interlayer Strength of Big Area Additive Manufacturing (BAAM) Components. **Vidya Kishore**, **Christine Ajinjeru**, Andrzej Nycz, Brian Post, John Lindahl, Vlastimil Kunc, Chad Duty
37. Additive Manufacturing of Thermoset-Based Composites. **Nadim Hmeidat**, Brett G. Compton
38. 3D-Printing of Functionally Graded Cellular Structures. **Michael J. Goin**, Brett G. Compton
39. Informed and Optimized 3D Printing: Determining Machine Parameters for Powder Bed Fusion through Evaluated Polymer Characterization. **Camden A. Chatham**, Christopher B. Williams, Timothy E. Long
40. From Molecules to Manufacturing: Developing & Processing Novel Polymers for Additive Manufacturing. **Nicholas A. Chartrain**, Abby R. Whittington, Christopher B. Williams
41. Generation of Thermotropic Liquid Crystalline Polymer Thermoplastic Composite Filaments and Their Processing in Fused Filament Fabrication. **Mubashir Q. Ansari**, Craig D. Mansfield, Donald G. Baird

Notes



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

BIG ORANGE. BIG IDEAS.