

## **RALPH HAYES COLBY**

Corning Chair Professor of Materials Science and Engineering  
The Pennsylvania State University  
University Park, PA 16802 RHC@PLMSC.PSU.EDU  
(814) 863-3457 (office) (814) 865-2917 (FAX)

### **Education**

1985 Ph.D. in Chemical Engineering, Northwestern University  
1983 M.S. in Chemical Engineering, Northwestern University  
1979 B.S. in Materials Science and Engineering, Cornell University

### **Employment**

2011, 2012 Leverhulme Visiting Professor, Imperial College, London  
2005 Fulbright Scholar, Victoria University of Wellington, New Zealand  
2003, 2004, 2009, 2011, 2012, 2019 Michelin Chair Professor, E.S.P.C.I., Paris  
2000 Visiting Professor, Department of Physics, University of Rome  
2000-present Professor of Materials Science and Engineering, Penn State University  
1995-2000 Associate Professor of Materials Science and Engineering, Penn State University  
1990-1995 Adjunct Assistant Professor, Department of Physics and Astronomy,  
University of Rochester  
1985-1995 Research Scientist, Eastman Kodak Company  
1983-1985 Visiting Scholar, Exxon Research and Engineering Company  
1979-1981 Plastics Technology Program, General Electric Company

### **Awards**

2022 American Chemical Society PMSE Fellow  
2022 Faculty Scholar Medal, Penn State University  
2012 Bingham Medal, Society of Rheology  
2004 Wilson Research Award, College of Earth and Mineral Sciences, Penn State  
2002 Chair, Division of Polymer Physics, American Physical Society  
1998 American Physical Society Fellow  
1987 C.E.K. Mees Award, Eastman Kodak Company

**Textbook** M. Rubinstein and R. H. Colby, **Polymer Physics**, Oxford University Press (2003).

**Editor** **XV<sup>th</sup> International Congress on Rheology**, AIP Conference Proceedings #1027 (2008).

2011-2022 **Editor, Journal of Rheology**

More than 260 publications in peer-reviewed journals; Web of Science **H-index = 70**

## PUBLICATIONS

1. R.H.Colby, G.E.Milliman and W.W.Graessley, Melting Temperature of Mixed-Microstructure Polybutadiene, *Macromolecules*, **19**, 1261 (1986).
2. R.H.Colby, L.J.Fetters and W.W.Graessley, Melt Viscosity -.Molecular Weight Relationship for Linear Polymers, *Macromolecules*, **20**, 2226 (1987).
3. R.H.Colby, Linear Viscoelasticity of Polymer Blends: Poly(Ethylene Oxide) and Poly(Methyl Methacrylate), in *Proceedings of the Tenth International Congress on Rheology* (P. H. T. Uhlherr, editor) Vol. 1, p. 278 (1988).
4. M.Rubinstein and R.H.Colby, Self-Consistent Theory of Polydisperse Entangled Polymers: Linear Viscoelasticity of Binary Blends, *J. Chem. Phys.*, **89**, 5291 (1988).
5. M.Rubinstein, R.H.Colby and J.R.Gillmor, Dynamic Scaling for Polymer Gelation, in *Space-Time Organization in Macromolecular Fluids* (F. Tanaka, T. Ohta and M. Doi, editors) Springer-Verlag (Berlin, 1989), p. 66.
6. R.H.Colby, Breakdown of Time-Temperature Superposition in Miscible Polymer Blends, *Polymer*, **30**, 1275 (1989).
7. R.H.Colby and M.Rubinstein, Two Parameter Scaling for Polymers in Theta Solvents, *Macromolecules*, **23**, 2753 (1990).
8. C.K.Ober, S.McNamee, A.Delvin and R.H.Colby, Chemical Heterogeneity in LC Polyesters, in Liquid-Crystalline Polymers (C.K.Ober and R.A.Weiss, editors) ACS Symposium Series, **435**, 220 (1990),
9. J.L.Viovy, M. Rubinstein and R.H.Colby, Constraint Release in Polymer Melts: Tube Reorganization Versus Tube Dilation, *Macromolecules*, **24**, 3587 (1991).
10. R.H.Colby, L.J.Fetters, W.G.Funk and W.W.Graessley, Effects of Concentration and Thermodynamic Interaction on the Viscoelastic Properties of Polymer Solutions, *Macromolecules*, **24**, 3873 (1991).
11. L.Leibler, M.Rubinstein and R.H.Colby, Dynamics of Reversible Networks, *Macromolecules*, **24**, 4701 (1991).
12. E.Hall, C.K.Ober, E.J.Kramer, R.H.Colby, J.R.Gillmor and G.Galli, Melt Diffusion in Model Liquid Crystalline Polymers, in *Complex Fluids* (E.B.Sirota, D.Weitz, T.Witten and J.Israelachvili, editors) Materials Research Society (Pittsburgh, 1992), p. 113.
13. R.H.Colby, M.Rubinstein and J.L.Viovy, Chain Entanglement in Polymer Melts and Solutions, *Macromolecules*, **25**, 996 (1992).
14. J.A.Zawada, C.M.Ylitalo, G.G.Fuller, R.H.Colby and T.E.Long, Component Relaxation Dynamics in a Miscible Polymer Blend: Poly(ethylene oxide)/Poly(methylmethacrylate), *Macromolecules*, **25**, 2896 (1992).
15. R.H.Colby, Viscoelasticity of Structured Fluids, in *Theoretical and Applied Rheology* (P.Moldenaers and R.Keunings, editors) Vol. 2, Elsevier (New York, 1992), p. 519.
16. S.K.Patel, S.Malone, C.Cohen, J.R.Gillmor and R.H.Colby, Elastic Modulus and Equilibrium Swelling of Poly(dimethyl siloxane) Networks, *Macromolecules*, **25**, 5241 (1992).

17. R.H.Colby, M.Rubinstein, J.R.Gillmor and T.H.Mourey, Scaling Properties of Branched Polyesters 2. Static Scaling Above the Gel Point, *Macromolecules*, **25**, 7180 (1992).
18. K.A.Koppi, M.Tirrell, F.S.Bates, K.Almdal and R.H.Colby, Lamellae Orientation in Dynamically Sheared Diblock Copolymer Melts, *J. Phys. II France*, **2**, 1941 (1992).
19. R.H.Colby, J.R.Gillmor, G.Galli, M.Laus, C.K.Ober and E.Hall, Linear Viscoelasticity of Side Chain Liquid Crystal Polymers, *Liquid Crystals*, **13**, 233 (1993). Errata, **15**, 563 (1993).
20. T.A.Witten, M.Rubinstein and R.H.Colby, Reinforcement of Rubber by Fractal Aggregates, *J. Phys. II France*, **3**, 367 (1993).
21. E.Hall, C.K.Ober, E.J.Kramer, R.H.Colby and J.R.Gillmor, Diffusion and Melt Viscosity of a Main-Chain Liquid Crystalline Polyether, *Macromolecules*, **26**, 3764 (1993).
22. L.Leibler, M.Rubinstein and R.H.Colby, Dynamics of Telechelic Ionomers, Can Polymers Diffuse Large Distances Without Relaxing Stress?, *J. Phys. II France*, **3**, 1581 (1993).
23. R.H.Colby, J.R.Gillmor and M.Rubinstein, Dynamics of Near-Critical Polymer Gels, *Phys. Rev. E*, **48**, 3712 (1993).
24. C.J.T.Landry, D.J.Massa, D.M.Teegarden, M.R.Landry, P.M.Henrichs, R.H.Colby and T.E.Long, Miscibility in Binary Blends of Poly(vinylphenol) and Aromatic Polyesters, *Macromolecules*, **26**, 6299 (1993).
25. M.Rubinstein and R.H.Colby, Elastic Modulus and Equilibrium Swelling of Near-Critical Gels, *Macromolecules*, **27**, 3184 (1994).
26. S.P.Obukhov, M.Rubinstein and R.H.Colby, Network Modulus and Superelasticity, *Macromolecules*, **27**, 3191 (1994).
27. R.H.Colby, M.Rubinstein and M.Daoud, Hydrodynamics of Polymer Solutions via Two-Parameter Scaling, *J. Phys. II France*, **4**, 1299 (1994).
28. J.R.Gillmor, R.H.Colby, E.Hall and C.K.Ober, Viscoelastic Properties of a Model Main-Chain Liquid Crystalline Polyether, *J. Rheol.*, **38**, 1623 (1994).
29. M.Rubinstein, R.H.Colby and A.V.Dobrynin, Dynamics of Semidilute Polyelectrolyte Solutions, *Phys. Rev. Lett.*, **73**, 2776 (1994).
30. M.R.Landry, D.J.Massa, C.J.T.Landry, D.M.Teegarden, R.H.Colby, T.E.Long and P.M.Henrichs, A Survey of Poly(vinylphenol) Blend Miscibility, *J. Appl. Polym. Sci.*, **54**, 991 (1994).
31. G.G.Fuller, J.A.Zawada and R.H.Colby, Investigating Miscible Polymer Blend Dynamics with Optical and Mechanical Rheometry, *J. Non-Cryst. Sol.*, **172**, 668 (1994).
32. J.A.Zawada, G.G.Fuller, R.H.Colby, L.J.Fetters and J.Roovers, Measuring Component Contributions to the Dynamic Modulus in Miscible Polymer Blends, *Macromolecules*, **27**, 6851 (1994).
33. J.A.Zawada, G.G.Fuller, R.H.Colby, L.J.Fetters and J.Roovers, Component Dynamics in Miscible Blends of 1,4-Polyisoprene and 1,2-Polybutadiene, *Macromolecules*, **27**, 6861 (1994).

34. A.V.Dobrynin, R.H.Colby and M.Rubinstein, Scaling Theory of Polyelectrolyte Solutions, *Macromolecules*, **28**, 1859 (1995).
35. C.P.Lusignan, T.H.Mourey, J.C.Wilson and R.H.Colby, Viscoelasticity of Randomly Branched Polymers in the Critical Percolation Class, *Phys. Rev. E*, **52**, 6271 (1995).
36. M.Rubinstein, R.H.Colby, A.V.Dobrynin and J.-F.Joanny, Elastic Modulus and Equilibrium Swelling of Polyelectrolyte Gels, *Macromolecules*, **29**, 398 (1996).
37. G.D.Smith, D.Y.Yoon, R.L.Jaffe, R.H.Colby, R.Krishnamoorti and L.J.Fetters, Conformations and Structures of Poly(oxyethylene) Melts from Molecular Dynamics Simulations and Small Angle Neutron Scattering Experiments, *Macromolecules*, **29**, 3462 (1996).
38. L.J.Fetters, D.J.Lohse and R.H.Colby, Chain Dimensions and Entanglement Spacings, in *Physical Properties of Polymers Handbook* (J.E. Mark, editor) AIP Press (Woodbury, NY, 1996), p. 335. **6-page review**
39. R.H.Colby, Block Copolymer Dynamics, *Curr. Opin. Coll. Int. Sci.*, **1**, 454 (1996). **12-page review**
40. D.C.Boris and R.H.Colby, Shear Viscosity of Polyelectrolyte Solutions, in *Proceedings of the XIIth International Congress on Rheology* (A.Ait-Kadi, J.M.Dealy, D.F.James and M.C.Williams, editors) Canadian Rheology Group (Quebec City, 1996), p. 195.
41. R.H.Colby, Modulus and Swelling of Polymer Gels, in *Proceedings of the XIIth International Congress on Rheology* (A.Ait-Kadi, J.M.Dealy, D.F.James and M.C.Williams, editors) Canadian Rheology Group (Quebec City, 1996), p. 255.
42. C. P. Lusignan and R.H.Colby, Influence of the Chain Length Between Branch Points on Gelation, in *Proceedings of the XIIth International Congress on Rheology* (A.Ait-Kadi, J.M.Dealy, D.F.James and M.C.Williams, editors) Canadian Rheology Group (Quebec City, 1996), p.256.
43. S.K.Kumar, R.H.Colby, S.H.Anastasiades and G.Fytas, Concentration Fluctuation Induced Dynamic Heterogeneities in Polymer Blends, *J. Chem. Phys.*, **105**, 3777 (1996).
44. R.H.Colby, Dynamics in Blends of Long Polymers with Unentangled Short Chains, *J. Phys. II France*, **7**, 93 (1997).
45. R.H.Colby, Scaling Analysis of the Temperature Dependence of Intrinsic Viscosity, *J. Polym. Sci., Polym. Phys. Ed.*, **35**, 1989 (1997).
46. R. H. Colby, C. K. Ober, J. R. Gillmor, R. W. Connelly, T. Duong, G. Galli and M. Laus, Smectic Rheology, *Rheol. Acta*, **36**, 498 (1997).
47. R. H. Colby, D. C. Boris, W. E. Krause and J. S. Tan, Polyelectrolyte Conductivity, *J. Polym. Sci., Polym. Phys. Ed.*, **35**, 2951 (1997).
48. D. C. Boris and R. H. Colby, Rheology of Sulfonated Polystyrene Solutions, *Macromolecules*, **31**, 5746 (1998).
49. R. H. Colby, X. Zheng, M. Rafailovich, J. Sokolov, D. G. Peiffer, S. A. Schwarz, Y. Strzhemechny and D. Nguyen, Dynamics of Lightly Sulfonated Polystyrene Ionomers, *Phys. Rev. Lett.*, **81**, 3876 (1998).

50. J. A. Pathak, R. H. Colby, S. Y. Kamath, S. K. Kumar and R. Stadler, Rheology of Miscible Blends: SAN and PMMA, *Macromolecules*, **31**, 8988 (1998).
51. A. J. Konop and R. H. Colby, The Role of Condensed Counterions in the Thermodynamics of Surfactant Micelle Formation with and without Oppositely-Charged Polyelectrolytes, *Langmuir*, **15**, 58 (1999).
52. S. R. Clingman, G. Mao, C. K. Ober, R. H. Colby, M. Brehmer, R. Zentel, M. Bignozzi, M. Laus, A. Angeloni and J. R. Gillmor, Effect of Polymer Architecture on Self-Diffusion of LC Polymers, *J. Polym. Sci., Polym. Phys. Ed.*, **37**, 405 (1999).
53. J. A. Pathak, R. H. Colby, G. Floudas and R. Jerome, Dynamics in Miscible Blends of Polystyrene and Poly(vinyl methyl ether), *Macromolecules*, **32**, 2553 (1999).
54. A. J. Konop and R. H. Colby, Polyelectrolyte Charge Effects on Solution Viscosity of Poly(acrylic acid), *Macromolecules*, **32**, 2803 (1999).
55. S. Ge, L. Guo, M. H. Rafailovich, J. Sokolov, D. G. Peiffer, S. A. Schwarz, R. H. Colby and W. D. Dozier, Surface-Induced Ordering in Graft Copolymer Thin Films, *Langmuir*, **15**, 2911 (1999).
56. J. R. Gillmor, R. W. Connelly, R. H. Colby and J. S. Tan, Effect of Sodium Poly(styrene sulfonate) on Thermoreversible Gelation of Gelatin, *J. Polym. Sci., Polym. Phys. Ed.*, **37**, 2287 (1999).
57. J. Janzen and R. H. Colby, Diagnosing Long Chain Branching in Polyethylenes, *J. Mol. Struct.*, **485**, 569 (1999).
58. S. Kamath, R. H. Colby, S. K. Kumar, K. Karatasos, G. Floudas, G. Fytas and J. E. L. Roovers, Segmental Dynamics of Miscible Polymer Blends: Comparison of the Predictions of a Concentration Fluctuation Model to Experiment, *J. Chem. Phys.*, **111**, 6121 (1999).
59. C. P. Lusignan, T. H. Mourey, J. C. Wilson and R. H. Colby, Viscoelasticity of Randomly Branched Polymers in the Vulcanization Class, *Phys. Rev. E*, **60**, 5657 (1999).
60. W. E. Krause, J. S. Tan and R. H. Colby, Semidilute Solution Rheology of Polyelectrolytes with No Added Salt, *J. Polym. Sci., Polym. Phys. Ed.*, **37**, 3429 (1999).
61. R. H. Colby, Dynamic Scaling Approach to Glass Formation, *Phys. Rev. E*, **61**, 1783 (2000).
62. L. Bromberg, M. Temchenko and R. H. Colby, Interactions among Hydrophobically Modified Polyelectrolytes and Surfactants of the Same Charge, *Langmuir*, **16**, 2609 (2000).
63. L. Kielhorn, R. H. Colby and C. C. Han, Relaxation behavior of Polymer Blends after the Cessation of Shear, *Macromolecules*, **33**, 2486 (2000).
64. R. H. Colby, C. P. Lusignan and J. Janzen, Rheology of Randomly Branched Polymers, *ANTEC2000*, Vol. I, 1106 (2000).
65. J. A. Pathak, R. H. Colby, S. K. Kumar and R. Krishnamoorti, Dynamics of Melt Miscible Polymer Blends, in Proceedings of the XIIIth International Congress on Rheology, Vol. 1, p. 257 (2000).
66. R. H. Colby, Polyelectrolyte Interactions with Surfactants and Proteins, in Proceedings of the XIIIth International Congress on Rheology, Vol. 1, p. 414 (2000).

67. L. Guo, R. H. Colby and E. L. Paulsen, Rheology of Pluronic Solutions mixed with a Non-Ionic Diol Surfactant, in Proceedings of the XIIIth International Congress on Rheology, Vol. 3, p. 304 (2000).
68. N. Plucktaveesak, L. E. Bromberg and R. H. Colby, Effect of Surfactants on the Gelation Threshold Temperature in Aqueous Solutions of a Hydrophobically Modified Polyelectrolyte, in Proceedings of the XIIIth International Congress on Rheology, Vol. 3, p. 307 (2000).
69. H. S. Jeon, A. I. Nakatani, C. C. Han and R. H. Colby, Melt Rheology of Lower Critical Solution Temperature Polybutadiene/Polyisoprene Blends, *Macromolecules*, **33**, 9732 (2000).
70. W. E. Krause, E. G. Bellomo and R. H. Colby, Rheology of Sodium Hyaluronate Under Physiological Conditions, *Biomacromolecules*, **2**, 65 (2001).
71. R. H. Colby, L. M. Nentwich, S. R. Clingman and C. K. Ober, Defect-mediated Creep of Structured Materials, *Europhys. Lett.*, **54**, 269 (2001).
72. R. H. Colby, N. Plucktaveesak and L. Bromberg, Critical Incorporation Concentration of Surfactants added to Micellar Solutions of Hydrophobically Modified Polyelectrolytes of the same Charge, *Langmuir*, **17**, 2937 (2001).
73. L. Guo, R. H. Colby, M. Y. Lin and G. P. Dado, Micellar Structure Changes in Aqueous Mixtures of Nonionic Surfactants, *J. Rheol.*, **45**, 1223 (2001).
74. R. H. Colby, Melt Rheology of Block Copolymers, in *Encyclopedia of Materials: Science and Technology*, Elsevier, 727 (2001).
75. S. Kamath, R. H. Colby, S. K. Kumar and J. Baschnagel, Thermodynamic Signature of the Onset of Caged Dynamics in Glass Forming Liquids, *J. Chem. Phys.*, **116**, 865 (2002).
76. K. M. N. Oates, W. E. Krause and R. H. Colby, Using Rheology to Probe the Mechanism of Joint Lubrication: Polyelectrolyte/Protein Interactions in Synovial Fluid, *Mat. Res. Soc. Symp. Proc.* **711**, 53 (2002).
77. J. R. Lizotte, B. M. Erwin, R. H. Colby and T. E. Long, Investigations of Thermal Polymerization in the Stable Free-Radical Polymerization of 2-Vinylnaphthalene, *J. Polym. Sci., Polym. Chem.* **40**, 583 (2002).
78. B. M. Erwin and R. H. Colby, Temperature Dependences of Viscosity and the Length Scale of Cooperative Motion for Glass-Forming Liquids, *J. Non-Cryst. Solids* **307-310**, 225 (2002).
79. F. Bordi, C. Cametti, J. S. Tan, D. C. Boris, W. E. Krause, N. Plucktaveesak and R. H. Colby, Determination of Polyelectrolyte Charge and Interaction with Water Using Dielectric Spectroscopy, *Macromolecules* **35**, 7031 (2002).
80. F. Bordi, R. H. Colby, C. Cametti, L. De Lorenzo and T. Gili, Electrical Conductivity of Polyelectrolyte Solutions in the Semidilute and Concentrated Regime: The Role of Counterion Condensation, *J. Phys. Chem. B* **106**, 6887 (2002).
81. F. Bordi, C. Cametti, T. Gili and R. H. Colby, Dielectric Relaxations in Aqueous Polyelectrolyte Solutions: A Scaling Approach and the Role of the Solvent Quality Parameter, *Langmuir* **18**, 6404 (2002).

82. S. Salaniwal, R. Kant, R. H. Colby and S. K. Kumar, Computer Simulations of Local Concentration Variations in Miscible Polymer Blends, *Macromolecules* **35**, 9211 (2002).
83. S. Y. Kamath, R. H. Colby and S. K. Kumar, Evidence for Dynamic Heterogeneities in Computer Simulations of Miscible Polymer Blends, *Phys. Rev. E* **67**, 010801(R) (2003).
84. N. Plucktaveesak, A. J. Konop and R. H. Colby, Viscosity of Polyelectrolyte Solutions with Oppositely Charged Surfactant, *J. Phys. Chem. B* **107**, 8166 (2003).
85. Y. Zhang, S. Ge, M. H. Rafailovich, J. C. Sokolov and R. H. Colby, Surface Characterization of Cross-linked Elastomers by Shear Modulation Force Spectroscopy, *Polymer* **44**, 3327 (2003).
86. S. Kamath, R. H. Colby and S. K. Kumar, Dynamic Heterogeneity in Miscible Polymer Blends with Stiffness Disparity: Computer Simulations Using the Bond Fluctuation Model, *Macromolecules* **36**, 8567 (2003).
87. L. Guo, R. H. Colby, C. P. Lusignan and T. H. Whitesides, Kinetics of Triple Helix Formation in Semidilute Gelatin Solutions, *Macromolecules* **36**, 9999 (2003).
88. L. Guo, R. H. Colby, C. P. Lusignan and A. M. Howe, Physical Gelation of Gelatin Studied with Rheo-Optics, *Macromolecules* **36**, 10009 (2003).
89. R. Kant, S. K. Kumar and R. H. Colby, What Length Scales Control the Dynamics of Miscible Polymer Blends?, *Macromolecules* **36**, 10087 (2003).
90. M. G. McKee, G. L. Wilkes, R. H. Colby and T. E. Long, Correlations of Solution Rheology with Electrospun Fiber Formation of Linear and Branched Polyesters, *Macromolecules* **37**, 1760 (2004).
91. A. V. Dobrynin, R. H. Colby and M. Rubinstein, Polyampholytes, *J. Polym. Sci., Polym. Phys.* **42**, 3513 (2004). **26-page review**
92. E. Sauvage, D. A. Amos, B. Antalek, K. M. Schroeder, J. S. Tan, N. Plucktaveesak and R. H. Colby, Amphiphilic Maleic Acid-Containing Alternating Copolymers 1. Dissociation Behavior and Compositions, *J. Polym. Sci., Polym. Phys.* **42**, 3571 (2004).
93. E. Sauvage, N. Plucktaveesak, R. H. Colby, D. A. Amos, B. Antalek, K. M. Schroeder and J. S. Tan, Amphiphilic Maleic Acid-Containing Alternating Copolymers 2. Dilute Solution Characterization by Light Scattering, Intrinsic Viscosity and PGSE NMR Spectroscopy, *J. Polym. Sci., Polym. Phys.* **42**, 3584 (2004).
94. J. A. Pathak, S. K. Kumar and R. H. Colby, Miscible Polymer Blend Dynamics: Double Reptation Predictions of Linear Viscoelasticity in Model Blends of Polyisoprene and Poly(vinyl ethylene), *Macromolecules* **37**, 6994 (2004).
95. M.-P. Nieh, S. K. Kumar, R. H. Fernando, R. H. Colby and J. Katsaras, Effect of the Hydrophilic Size on the Structural Phases of Aqueous Nonionic Gemini Surfactant Solutions, *Langmuir* **20**, 9061 (2004).
96. E. Di Cola, N. Plucktaveesak, T. A. Waigh, R. H. Colby, J. S. Tan, W. Pyckhout-Hintzen, R. K. Heenan, Structure and Dynamics in Aqueous Solutions of Amphiphilic Sodium Maleate-Containing Alternating Copolymers, *Macromolecules* **37**, 8457 (2004).
97. F. Bordini, C. Cametti and R. H. Colby, Dielectric Spectroscopy and Conductivity of Polyelectrolyte Solutions, *J. Phys.: Condens. Matter* **16**, R1423 (2004). **41-page review**

98. R. Bandyopahyay, D. Liang, R. H. Colby, J. L. Harden and R. L. Leheny, Enhanced Elasticity and Soft Glassy Rheology of a Smectic in a Random Porous Environment, *Phys. Rev. Lett.* **94**, 107801 (2005).
99. R. H. Colby and J. E. G. Lipson, Modeling the Segmental Relaxation Time Distribution of Miscible Polymer Blends: Polyisoprene/Poly(vinyl ethylene), *Macromolecules* **38**, 4919 (2005).
100. F. Bordi, C. Cametti, T. Gili, S. Sennato, S. Zuzzi, S. Dou and R. H. Colby, Conductometric Properties of Linear Polyelectrolytes in Poor-Solvent Condition: The Necklace Model, *J. Chem. Phys.* **122**, 234906 (2005).
101. E. Krygier, G. Lin, J. Mendes, G. Mukandela, D. Azar, A. A. Jones, J. A. Pathak, R. H. Colby, S. K. Kumar, G. Floudas and R. Krishnamoorti, Segmental Dynamics of Head-to-Head Polypropylene and Polyisobutylene in their Blend and Pure Components, *Macromolecules* **38**, 7721 (2005).
102. S. Zhang, S. Dou, R. H. Colby and J. Runt, Glass Transition and Ionic Conduction in Plasticized and Doped Ionomers, *J. Non-Cryst. Solids* **351**, 2825 (2005).
103. F. Bordi, C. Cametti, T. Gili, S. Sennato, S. Zuzzi, S. Dou and R. H. Colby, Solvent Quality Influence on the Dielectric Properties of Polyelectrolyte Solutions: A Scaling Approach, *Phys. Rev. E* **72**, 031806 (2005).
104. B. Farago, C. Chen, J. K. Maranas, S. Kamath, R. H. Colby, A. J. Pasquale and T. E. Long, Collective Motion in Poly(ethylene oxide)/poly(methyl methacrylate) Blends, *Phys. Rev. E* **72**, 031809 (2005).
105. R. Patil, R. H. Colby, D. J. Read, G. Chen and Z. Guan, Rheology of Polyethylenes with Novel Branching Topology Synthesized by a Chain Walking Catalyst, *Macromolecules* **38**, 10571 (2005).
106. K. M. N. Oates, W. E. Krause, R. L. Jones and R. H. Colby, Rheology of Synovial Fluid and Protein Aggregation, *J. Royal Soc. Interface* **3**, 167 (2006).
107. R. J. Klein, S. Zhang, S. Dou, B. H. Jones, R. H. Colby and J. Runt, Modeling Electrode Polarization in Dielectric Spectroscopy: Ion Mobility and Mobile Ion Concentration of Single-Ion Polymer Electrolytes, *J. Chem. Phys.* **124**, 144903 (2006).
108. S. Dou and R. H. Colby, Charge Density Effects in Polyelectrolyte Solution Rheology, *J. Polym. Sci., Polym. Phys.* **44**, 2001 (2006).
109. F. Bordi, C. Cametti, S. Sennato, S. Zuzzi, S. Dou and R. H. Colby, Dielectric Scaling in Polyelectrolyte Solutions with Different Solvent Quality in the Dilute Concentration Regime, *Phys. Chem. Chem. Phys.* **8**, 3653 (2006).
110. S. Dou, S. Zhang, R. J. Klein, J. Runt and R. H. Colby, Synthesis and Characterization of Poly(ethylene glycol)-based Single-Ion Conductors, *Chem. Mater.* **18**, 4288 (2006).
111. B. M. Erwin, K. A. Masser and R. H. Colby, A Comparison of Rheology, Dielectric Response and Calorimetry within Indane-based Glass-Formers, *J. Non-Cryst. Sol.* **352**, 4776 (2006).
112. L. Guo, R. H. Colby and P. Thiyagarajan, Temperature and Hydrophobic Alcohol-Induced Structural Changes of Pluronic Micelles, *Physica B*, **385-386**, 685 (2006).

113. L. J. Fetters, D. J. Lohse and R. H. Colby, Chain Dimensions and Entanglement Spacings, in *Physical Properties of Polymers Handbook* (J.E. Mark, editor) Second Edition, Springer (2006). **8-page review**
114. E. Di Cola, T. A. Waigh and R. H. Colby, Dynamic Light Scattering and Rheology Studies of Aqueous Solutions of Amphiphilic Sodium Maleate Containing Copolymers, *J. Polym. Sci., Polym. Phys.* **45**, 774 (2007).
115. J. A. Langston, R. H. Colby, T. C. M. Chung, F. Shimizu, T. Suzuki, M. Aoki, Synthesis and Characterization of Long Chain Branched Isotactic Polypropylene via Metallocene Catalyst and T-Reagent, *Macromolecules* **40**, 2712 (2007).
116. J. A. Langston, R. H. Colby, F. Shimizu, T. Suzuki, M. Aoki and T. C. Chung, One-pot Synthesis of Long Chain Branch PP (LCBPP) using Ziegler-Natta Catalyst and Branching Reagents, *Macromol. Symp.* **260**, 34 (2007).
117. R. H. Colby, D. C. Boris, W. E. Krause and S. Dou, Shear Thinning of Unentangled Flexible Polymer Liquids, *Rheol. Acta*, **46**, 569 (2007).
118. R. H. Colby, Polyelectrolyte Gels: Ionic Partners Split Up, *Nature Materials* **6**, 401 (2007).
119. J. Jiang, C. Burger, C. Li, J. Li, M. Y. Lin, R. H. Colby, M. H. Rafailovich and J. C. Sokolov, Shear-Induced Layered Structure of Polymeric Micelles by SANS, *Macromolecules* **40**, 4016 (2007).
120. S. K. Kumar, S. Shenogin and R. H. Colby, Dynamics of Miscible Polymer Blends: Role of Concentration Fluctuations on Characteristic Segmental Relaxation Times, *Macromolecules* **40**, 5759 (2007).
121. S. Shenogin, R. Kant, R. H. Colby and S. K. Kumar, Dynamics of Miscible Polymer Blends: Predicting the Dielectric Response, *Macromolecules* **40**, 5767 (2007).
122. B. S. Douglass, R. H. Colby, L. A. Madsen and P. T. Callaghan, Rheo-NMR of Wormlike Micelles formed from Nonionic Pluronic Surfactants, *Macromolecules* **41**, 804 (2008).
123. J. Jiang, R. Malal, C. Li, M. Y. Lin, R. H. Colby, D. Gersappe, M. H. Rafailovich, J. C. Sokolov, and D. Cohn, Rheology of Thermoreversible Hydrogels from Multiblock Associating Copolymers, *Macromolecules* **41**, 3646 (2008).
124. J. Jiang, C. Li, J. Lombardi, R. H. Colby, B. Rigas, M. H. Rafailovich and J. C. Sokolov, The Effect of Physiologically Relevant Additives on the Rheological Properties of Concentrated Pluronic Copolymer Gels, *Polymer* **49**, 3561 (2008).
125. D. Fragiadakis, S. Dou, R. H. Colby and J. Runt, Molecular Mobility, Ion Mobility, and Mobile Ion Concentration in Poly(ethylene oxide)-based Polyurethane Ionomers, *Macromolecules* **41**, 5723 (2008).
126. S. Dou and R. H. Colby, Polyelectrolyte Solution Rheology, in *Proceedings of The XVth International Congress on Rheology* (A. Co, L. G. Leal, R. H. Colby and A. J. Giacomin, editors) AIP Conference Proceedings 1027 (2008), p. 312.
127. S. Dou and R. H. Colby, Solution Rheology of a Strongly Charged Polyelectrolyte in Good Solvent, *Macromolecules* **41**, 6505 (2008).

128. D. Bedrov, W. Liu and R. H. Colby, Influence of polymer chain connectivity on local composition distribution in miscible polymer blends, *Philosophical Magazine* **88**, 3979 (2008).
129. D. Fragiadakis, S. Dou, R. H. Colby and J. Runt, Molecular Mobility and Li<sup>+</sup> Conduction in Polyester Copolymer Ionomers based on Poly(ethylene oxide), *J. Chem. Phys.* **130**, 064907 (2009).
130. P. Akcora, H. Liu, S. K. Kumar, J. Moll, Y. Li, B. C. Benicewicz, L. S. Schadler, D. Acehan, A. Z. Panagiotopoulos, V. Pryamitsyn, V. Ganesan, J. Ilavsky, P. Thiyagarajan, R. H. Colby and J. F. Douglas, Anisotropic Self-Assembly of Spherical Polymer-Grafted Nanoparticles, *Nature Materials* **8**, 354 (2009).
131. W. Liu, D. Bedrov, S. K. Kumar, B. Veytsman and R. H. Colby, Role of Distributions of Intramolecular Concentrations on the Dynamics of Miscible Polymer Blends Probed by Molecular Dynamics Simulation, *Phys. Rev. Lett.* **103**, 037801 (2009).
132. P. Akcora, S. K. Kumar, J. Moll, S. Lewis, L. S. Schadler, Y. Li, B. C. Benicewicz, A. Sandy, S. Narayanan, J. Ilavsky, P. Thiyagarajan, R. H. Colby and J. F. Douglas, "Gel-like" Mechanical Reinforcement in Polymer Nanocomposite Melts, *Macromolecules* **43**, 1003 (2010).
133. R. H. Colby, Structure and linear viscoelasticity of flexible polymer solutions: comparison of polyelectrolyte and neutral polymer solutions, *Rheol. Acta* **49**, 425 (2010). **18-page review**
134. S. Liu, W. Liu, Y. Liu, J.-H. Lin, X. Zhou, M. J. Janik, R. H. Colby and Q. M. Zhang, Influence of Imidazolium-based Ionic Liquids on Performance of Ionic Polymer Conductor Network Composite Actuators, *Polym. Int.* **59**, 321 (2010).
135. L. M. Ramirez, S. T. Milner, C. E. Snyder, R. H. Colby and D. Velegol, Controlled Flats on Spherical Polymer Colloids, *Langmuir* **26**, 7644 (2010).
136. W. Wang, W. Liu, G. J. Tudryn, R. H. Colby and K. I. Winey, Multi-Length Scale Morphology of Poly(Ethylene Oxide)-Based Sulfonate Ionomers with Alkali Cations at Room Temperature, *Macromolecules* **43**, 4223 (2010).
137. M. Lee, U H. Choi, R. H. Colby and H. W. Gibson, Ion Conduction in Imidazolium Acrylate Ionic Liquids and their Polymers, *Chem. Mater.* **22**, 5814 (2010).
138. M. Lee, U H. Choi, D. Salas de la Cruz, A. Mittal, K. I. Winey, R. H. Colby and H. W. Gibson, Imidazolium Polyesters: Structure-Property Relationships in Thermal Behavior, Ionic Conductivity and Morphology, *Adv. Funct. Mater.* **21**, 708 (2011).
139. X. Chen, Y. Zhang, H. Wang, S.-W. Wang, S. Liang and R. H. Colby, Solution Rheology of Cellulose in 1-butyl-3-methyl Imidazolium Chloride, *J. Rheol.* **55**, 485 (2011).
140. G. J. Tudryn, W. Liu, S.-W. Wang and R. H. Colby, Counterion Dynamics in Polyester-Sulfonate Ionomers with Ionic Liquid Counterions, *Macromolecules* **44**, 3572 (2011).
141. S.-W. Wang, W. Liu and R. H. Colby, Counterion Dynamics in Polyurethane-Carboxylate Ionomers with Ionic Liquid Counterions, *Chem. Mater.* **23**, 1862 (2011).
142. B. Kaur, L. D'Souza, L. A. Slater, T. H. Mourey, S. Liang, R. H. Colby and W. T. Ford, Model Random Polyampholytes from Nonpolar Methacrylic Esters, *Macromolecules* **44**, 3810 (2011).

143. M. Lee, U H. Choi, S. Wi, C. Sledobnick, R. H. Colby and H. W. Gibson, 1,2-Bis[N-(N0-alkylimidazolium)]ethane Salts: A New Class of Organic Ionic Plastic Crystals, *J. Mater. Chem.* **21**, 12280 (2011).
144. W. Wang, G. J. Tudryn, R. H. Colby and K. I. Winey, Thermally Driven Ionic Aggregation in Poly(ethylene oxide)-Based Sulfonate Ionomers, *J. Amer. Chem. Soc.* **133**, 10826 (2011).
145. J. Moll, P. Akcora, A. Rungta, S. Gong, R. H. Colby, B. C. Benicewicz, and S. K. Kumar, Mechanical Reinforcement in Polymer Melts Filled with Polymer Grafted Nanoparticles, *Macromolecules* **44**, 7473 (2011).
146. Y.-J. Wang, R. H. Colby and D. Kim, Proton Conducting 9P<sub>2</sub>O<sub>5</sub>-6TiO<sub>2</sub>-85SiO<sub>2</sub> Glass-Filled Nafion Composite Membranes, *J. Membrane Sci.* **366**, 421 (2011).
147. D. J. Roach, S. Dou, R. H. Colby and K. T. Mueller, Nuclear Magnetic Resonance Investigation of Dynamics in Poly(Ethylene Oxide) Based Lithium Polyether-ester-sulfonate Ionomers, *J. Chem. Phys.* **136**, 014510 (2012).
148. L. M. Ramirez, A. S. Smith, D. B. Unal, R. H. Colby and D. Velegol, Self-Assembly of Doublets from Flattened Polymer Colloids, *Langmuir* **28**, 4086 (2012).
149. G. J. Tudryn, M. V. O'Reilly, S. Dou, D. R. King, K. I. Winey, J. Runt and R. H. Colby, Molecular mobility and cation conduction in polyether-ester-sulfonate copolymer ionomers, *Macromolecules* **45**, 3962 (2012).
150. U H. Choi, M. Lee, S. Wang, W. Liu, K. I. Winey, H. W. Gibson and R. H. Colby, Ionic Conduction and Dielectric Response of Poly(imidazolium acrylate) Ionomers, *Macromolecules* **45**, 3974 (2012).
151. W. Liu, M. J. Janik and R. H. Colby, First Principles Design of Ionomers for Facile Ion Transport, in *Polymers for Energy Storage and Delivery: Polyelectrolytes for Batteries and Fuel Cells* (K. Page, C. Soles, J. Runt, editors) ACS Symposium Series **1096**, Ch. 2, p. 19-44, ACS (Washington, 2012).
152. S. Liang, U H. Choi, W. Liu, J. Runt, and R. H. Colby, Synthesis and Lithium Ion Conduction of Polysiloxane Single-Ion Conductors Containing Novel Weak-Binding Borates, *Chem. Mater.* **24**, 2316 (2012).
153. U H. Choi, A. Mittal, T. L. Price, Jr., H. W. Gibson, J. Runt and R. H. Colby, Polymerized Ionic Liquids with Enhanced Static Dielectric Constants, *Macromolecules* **46**, 1175 (2013).
154. A. A. Lee, R. H. Colby and A. A. Kornyshev, Statics and Dynamics of Electroactuation with Single-charge-carrier Ionomers, *J. Phys.: Condens. Matt.* **25**, 082203 (2013).
155. A. A. Lee, R. H. Colby and A. A. Kornyshev, Electroactuation with Single Charge Carrier Ionomers: the roles of Electrostatic Pressure and Steric Strain, *Soft Matter* **9**, 3767 (2013).
156. D. J. Roach, S. Dou, R. H. Colby, and K. T. Mueller, Solid state nuclear magnetic resonance investigation of polymer backbone dynamics in poly(ethylene oxide) based lithium and sodium polyetherester-sulfonate ionomers, *J. Chem. Phys.* **138**, 194907 (2013).
157. M. Zhang, R. H. Colby, S. T. Milner and T. C. M. Chung, Synthesis and Characterization of Maleic Anhydride Grafted Polypropylene with a Well-Defined Molecular Structure *Macromolecules* **46**, 4313 (2013).

158. R. Gao , M. Zhang, S.-W. Wang, R. B. Moore, R. H. Colby and T. E. Long, Polyurethanes Containing an Imidazolium Diol-Based Ionic-Liquid Chain Extender for Incorporation of Ionic-Liquid Electrolytes, *Macromol. Chem. Phys.* **214**, 1027 (2013).
159. Q. Chen, G. J. Tudryn and R. H. Colby, Ionomer Dynamics and the Sticky Rouse Model, *J. Rheol.* **57**, 1441 (2013).
160. S. V. Kesava, R. Dhanker, D. R. Kozub, K. Vakhshouri, U H. Choi, R. H. Colby, C. Wang, A. Hexemer, N. C. Giebink and E. D. Gomez, Mesoscopic Structural Length Scales in P3HT/PCBM Mixtures Remain Invariant for Various Processing Conditions, *Chem. Mater.* **25**, 2812 (2013).
161. L. M. Ramirez, C. A. Michaelis, J. E. Rosado, E. K. Pabón, R. H. Colby and D. Velegol, Polloidal Chains from Self-Assembly of Flattened Particles, *Langmuir* **29**, 10340 (2013).
162. Q. Chen, S. Liang, H.-S. Shiau and R. H. Colby, Linear Viscoelastic and Dielectric Properties of Phosphonium Siloxane Ionomers, *ACS Macro. Lett.* **2**, 970 (2013).
163. J.-H. H. Wang and R. H. Colby, Exploring the role of ion solvation in ethylene oxide based single-ion conducting polyanions and polycations, *Soft Matter* **9**, 10275 (2013).
164. H.-S. Shiau, W. Liu, R. H. Colby, and M. J. Janik, Cluster-continuum quantum mechanical models to guide the choice of anions for Li<sup>+</sup>-conducting ionomers, *J. Chem. Phys.* **139**, 204905 (2013).
165. J. Moll, S. K. Kumar, F. Snijkers, D. Vlassopoulos, A. Rungta, B. C. Benicewicz, E. Gomez, J. Ilavsky and R. H. Colby, Dispersing Grafted Nanoparticle Assemblies into Polymer Melts through Flow Fields, *ACS Macro. Lett.* **2**, 1051 (2013).
166. M. M. Castellanos, J. A. Pathak and R. H. Colby, Both protein adsorption and aggregation contribute to shear yielding and viscosity increase in protein solutions, *Soft Matter* **10**, 122 (2014).
167. U H. Choi, Y. Ye, D. Salas de la Cruz, W. Liu, K. I. Winey, Y. A. Elabd, J. Runt and R. H. Colby, Dielectric and Viscoelastic Responses of Imidazolium-Based Ionomers with Different Counterions and Side Chain Lengths, *Macromolecules* **47**, 777 (2014).
168. U H. Choi, S. Liang, M. V. O'Reilly, K. I. Winey, J. Runt and R. H. Colby, Influence of Solvating Plasticizer on Ion Conduction of Polysiloxane Single-Ion Conductors, *Macromolecules* **47**, 3145 (2014).
169. Q. Chen, H. Masser, H.-S. Shiau, S. Liang, J. Runt, P. C. Painter and R. H. Colby, Linear Viscoelasticity and Fourier Transform Infrared Spectroscopy of Polyether–Ester–Sulfonate Copolymer Ionomers, *Macromolecules* **47**, 3635 (2014).
170. M. M. Castellanos, J. A. Pathak, W. Leach, S. M. Bishop and R. H. Colby, Explaining the non-Newtonian Character of Aggregating Monoclonal Antibody Solutions Using Small-Angle Neutron Scattering, *Biophys. J.* **107**, 469 (2014).
171. S. Liang, M. V. O'Reilly, U H. Choi, H.-S. Shiau, J. Bartels, Q. Chen, J. Runt, K. I. Winey and R. H. Colby, High Ion Content Siloxane Phosphonium Ionomers with Very Low Tg, *Macromolecules* **47**, 4428 (2014).
172. C. Jangu , J.-H. H. Wang , D. Wang , S. Sharick , J. R. Heflin , K. I. Winey , R. H. Colby , T. E. Long, Well-Defined Imidazolium ABA Triblock Copolymers as Ionic-Liquid-Containing Electroactive Membranes, *Macromolecular Chemistry and Physics* **215**, 1319 (2014).

173. S. Gong, Q. Chen, J. F. Moll, S. K. Kumar and R. H. Colby, Segmental Dynamics of Polymer Melts with Spherical Nanoparticles, *ACS Macro. Lett.* **3**, 773 (2014).
174. Q. Chen and R. H. Colby, Linear Viscoelasticity of Sulfonated Styrene Oligomers near the Sol-Gel Transition, *Korea-Australia Rheology Journal* **26**, 257 (2014).
175. M. Lee, U H. Choi, R. H. Colby and H. W. Gibson, Ion Conduction in a Semicrystalline Polyviologen and Its Polyether Mixtures, *Macromolecular Chemistry and Physics* **216**, 344 (2015).
176. J. Bartels, A. Hess, H.-S. Shiau, H. R. Allcock, R. H. Colby and J. Runt, Synthesis, Morphology, and Ion Conduction of Polyphosphazene Ammonium Iodide Ionomers, *Macromolecules* **48**, 111 (2015).
177. M. V. O'Reilly, H. Masser, D. R. King, P. C. Painter, R. H. Colby, K. I. Winey and J. Runt, Ionic Aggregate Dissolution and Conduction in a Plasticized Single-ion Polymer Conductor, *Polymer* **59**, 133 (2015).
178. C. G. Lopez, S. E. Rogers, R. H. Colby, P. Graham and J. T. Cabral, Structure of Sodium Carboxymethyl Cellulose Aqueous Solutions: A SANS and Rheology Study, *J. Polym. Sci., Polym. Phys.* **53**, 492 (2015).
179. Q. Chen, C. Huang, R. A. Weiss and R. H. Colby, Viscoelasticity of Reversible Gelation for Ionomers, *Macromolecules* **48**, 1221 (2015).
180. Q. Chen, S. Gong, J. Moll, D. Zhao, S. K. Kumar and R. H. Colby, Mechanical Reinforcement of Polymer Nanocomposites from Percolation of a Nanoparticle Network, *ACS Macro. Lett.* **4**, 398 (2015).
181. C. Jangu, J.-H. H. Wang, D. Wang, G. Fahs, J. R. Heflin, R. B. Moore, R. H. Colby and T. E. Long, Imidazole-containing Triblock Copolymers with a Synergy of Ether and Imidazolium Sites, *J. Mater. Chem. C* **3**, 3891 (2015).
182. F. G. Hamad, R. H. Colby and S. T. Milner, Onset of Flow-Induced Crystallization Kinetics of Highly Isotactic Polypropylene, *Macromolecules* **48**, 3725 (2015).
183. U H. Choi, A. Mittal, T. L. Price, M. Lee, H. W. Gibson, J. Runt and R. H. Colby, Molecular Volume Effects on the Dynamics of Polymerized Ionic Liquids and their Monomers, *Electrochim. Acta* **175**, 55 (2015). **7-page review**
184. J.-H. H. Wang, C. H.-C. Yang, H. Masser, H.-S. Shiau, M. V. O'Reilly, K. I. Winey, J. Runt, P. C. Painter and R. H. Colby, Ion States and Transport in Styrenesulfonate Methacrylic PEO<sub>9</sub> Random Copolymer Ionomers, *Macromolecules* **48**, 7273 (2015).
185. F. G. Hamad, R. H. Colby and S. T. Milner, Lifetime of Flow-Induced Precursors in Isotactic Polypropylene, *Macromolecules* **48**, 7286 (2015).
186. S. Liang, Q. Chen, U H. Choi, J. Bartels, N. Bao, J. Runt and R. H. Colby, Plasticizing Li single-ion conductors with low volatility siloxane copolymers and oligomers containing ethylene oxide and cyclic carbonates, *J. Mater. Chem. A* **3**, 21269 (2015).
187. Q. Chen, N. Bao, J.-H. H. Wang, T. Tunic, S. Liang and R. H. Colby, Linear Viscoelasticity and Dielectric Spectroscopy of Ionomer/Plasticizer Mixtures: A Transition from Ionomer to Polyelectrolyte, *Macromolecules* **48**, 8240 (2015).

188. U H. Choi, S. Liang, Q. Chen, J. Runt and R. H. Colby, Segmental Dynamics and Dielectric Constant of Polysiloxane Polar Copolymers as Plasticizers for Polymer Electrolytes, *ACS Appl. Mater. Int.* **8**, 3215 (2016).
189. J. Bartels, J.-H. H. Wang, Q. Chen, J. Runt and R. H. Colby, Segmental Dynamics of Ethylene Oxide-Containing Polymers with Diverse Backbone Chemistries, *Macromolecules* **49**, 1903 (2016).
190. G. P. Baeza, C. Dessi, S. Costanzo, D. Zhao, S. Gong, A. Alegria, R. H. Colby, M. Rubinstein, D. Vlassopoulos and S. K. Kumar, Network Dynamics in Nanofilled Polymers, *Nature Comm.* 11368 (2016).
191. C. Huang, C. Wang, Q. Chen, R. H. Colby and R. A. Weiss, Reversible Gelation Model Predictions of the Linear Viscoelasticity of Oligomeric Sulfonated Polystyrene Ionomer Blends, *Macromolecules* **49**, 3936 (2016).
192. U H. Choi, A. Mittal, T. L. Price Jr., R. H. Colby and H. W. Gibson, Imidazolium-Based Ionic Liquids as Initiators in Ring Opening Polymerization: Ionic Conduction and Dielectric Response of End-Functional Polycaprolactones and Their Block Copolymers, *Macromolecular Chemistry and Physics* **217**, 1270 (2016).
193. B. Nazari, A. M. Rhoades, R. P. Schaake and R. H. Colby, Flow-Induced Crystallization of PEEK: Isothermal Crystallization Kinetics and Lifetime of Flow-Induced Precursors during Isothermal Annealing, *ACS Macro. Lett.* **5**, 849 (2016).
194. F. G. Hamad, R. H. Colby and S. T. Milner, Transition in Crystal Morphology for Flow-Induced Crystallization of Isotactic Polypropylene, *Macromolecules* **49**, 5561 (2016).
195. A. Shabbir, Q. Huang, Q. Chen, R. H. Colby, N. J. Alvarez and O. Hassager, Brittle fracture in associative polymers: the case of ionomer melts, *Soft Matter* **12**, 7606 (2016).
196. Q. Chen, Z. Zhang and R. H. Colby, Viscoelasticity of entangled random polystyrene ionomers, *J. Rheol.* **60**, 1031 (2016).
197. N. H. LaFemina, Q. Chen, R. H. Colby and K. T. Mueller, The diffusion and conduction of lithium in poly(ethylene oxide)-based sulfonate ionomers, *J. Chem. Phys.* **145**, 114903 (2016).
198. N. H. LaFemina, Q. Chen, K. T. Mueller and R. H. Colby, Diffusive flux as a new metric for ion-conducting soft materials, *ACS Energy Lett.* **1**, 1179 (2016).
199. C. G. Lopez, R. H. Colby, P. Graham and J. T. Cabral, Viscosity and Scaling of Semiflexible Polyelectrolyte NaCMC in Aqueous Salt Solutions, *Macromolecules* **50**, 332 (2017).
200. Z. Zhang, C. Liu, X. Cao, J.-H. H. Wang, Q. Chen and R. H. Colby, Morphological Evolution of Ionomer/Plasticizer Mixtures during a Transition from Ionomer to Polyelectrolyte, *Macromolecules* **50**, 963 (2017).
201. R. Xie, Y. Lee, M. P. Aplan, N. J. Caggiano, C. Müller, R. H. Colby and E. D. Gomez, Glass Transition Temperature of Conjugated Polymers by Oscillatory Shear Rheometry, *Macromolecules* **50**, 5146 (2017).
202. U H. Choi and R. H. Colby, The Role of Solvating 12-Crown-4 Plasticizer on Dielectric Constant and Ion Conduction of Poly(ethylene oxide) Single-Ion Conductors, *Macromolecules* **50**, 5582 (2017).

203. B. Nazari, N. W. Utomo, and R. H. Colby, The Effect of Water on Rheology of Native Cellulose/Ionic Liquids Solutions, *Biomacromolecules* **18**, 2849 (2017).
204. A. Shabbir, Q. Huang, G. P. Baeza, D. Vlassopoulos, Q. Chen, R. H. Colby, N. J. Alvarez and O. Hassager, Nonlinear Shear and Uniaxial Extensional Rheology of Polyether-ester-sulfonate Copolymer Ionomer Melts, *J. Rheol.* **61**, 1279 (2017).
205. R. Xie, R. H. Colby and E. D. Gomez, Connecting the Mechanical and Conductive Properties of Conjugated Polymers, *Advanced Electronic Materials*, 1700356 (2017).
206. X. Chen, S. Liang, S.-W. Wang, and R. H. Colby, Linear Viscoelastic Response and Steady Shear Viscosity of Native Cellulose in 1-ethyl-3- methylimidazolium methylphosphonate, *J. Rheol.* **62**, 81 (2018).
207. A. Pena-Francesch, H. Jung, M. Segad, R. H. Colby, B. D. Allen and M. C. Demirel, Mechanical Properties of Tandem-Repeat Proteins Are Governed by Network Defects, *ACS Biomater. Sci. Eng.* **4**, 884 (2018).
208. Z. Zhang, Q. Chen and R. H. Colby, Dynamics of Associative Polymers, *Soft Matter* **14**, 2961 (2018). **17-page review**
209. S.-W. Wang and R. H. Colby, Linear Viscoelasticity and Cation Conduction in Polyurethane Sulfonate Ionomers with Ions in the Soft Segment – Single Phase Systems, *Macromolecules* **51**, 2757 (2018).
210. S.-W. Wang and R. H. Colby, Linear Viscoelasticity and Cation Conduction in Polyurethane Sulfonate Ionomers with Ions in the Soft Segment – Multiphase Systems, *Macromolecules* **51**, 2767 (2018).
211. A. M. Rhoades, A. M. Gohn, J. Seo, R. Androsch and R. H. Colby, Sensitivity of Polymer Crystallization to Shear at Low and High Supercooling of the Melt, *Macromolecules* **51**, 2785 (2018).
212. C. G. Lopez, R. H. Colby and J. T. Cabral, Electrostatic and Hydrophobic Interactions in NaCMC Aqueous Solutions: Effect of Degree of Substitution, *Macromolecules* **51**, 3165 (2018).
213. J. Seo, H. Takahashi, B. Nazari, A. M. Rhoades, R. P. Schaake and R. H. Colby, Isothermal Flow-Induced Crystallization of Polyamide 66 Melts, *Macromolecules* **51**, 4269 (2018).
214. B. Nazari, H. Tran, B. Beauregard, M. Flynn-Hepford, D. Harrell, S. T. Milner and R. H. Colby, Two Distinct Morphologies for Semicrystalline Isotactic Polypropylene Crystallized after Shear Flow, *Macromolecules* **51**, 4750 (2018).
215. F. G. Hamad, Q. Chen and R. H. Colby, Linear Viscoelasticity and Swelling of Polyelectrolyte Complex Coacervates, *Macromolecules* **51**, 5547 (2018).
216. C. Nam, H. Li, G. Zhang, L. R. Lutz, B. Nazari, R. H. Colby and T. C. M. Chung, Practical Oil Spill Recovery by a Combination of Polyolefin Absorbent and Mechanical Skimmer, *ACS Sustainable Chem. Eng.* **6**, 12036 (2018).
217. P. Zhan, W. Zhang, I. E. Jacobs, D. M. Nisson, R. Xie, A. R. Weissen, R. H. Colby, A. J. Moulé, S. T. Milner, J. K. Maranas and E. D. Gomez, Side Chain Length Affects Backbone Dynamics in Poly(3-Alkylthiophene)s, *J. Polym. Sci., Polym. Phys.* **56**, 1193 (2018).

218. R. Xie, M. P. Aplan, N. J. Caggiano, A. R. Weisen, T. Su, C. Müller, M. Segad, R. H. Colby and E. D. Gomez, Local Chain Alignment via Nematic Ordering Reduces Chain Entanglement in Conjugated Polymers, *Macromolecules* **51**, 10271 (2018).
219. J. Seo, A. M. Gohn, O. Dubin, H. Takahashi, H. Hasegawa, R. Sato, A. M. Rhoades, R. P. Schaake and R. H. Colby, Isothermal Crystallization of Poly(ether ether ketone) with Different Molecular Weights over a Wide Temperature Range, *Polym. Cryst.* **2**, E10055 (2019).
220. R. J. Mondschein, J. M. Dennis, H. Liu, R. K. Ramakrishnan, J. M. Serrine, T. Weiseman, R. H. Colby, S. Nazarenko, S. R. Turner, and T. E. Long, Influence of Bibenzoate Regioisomers on Cyclohexanedimethanol-based (Co)polyester Structure-Property Relationships, *Macromolecules* **52**, 835 (2019).
221. T. L. Price Jr., U H. Choi, D. V. Schoonover, M. Arunachalam, R. Xie, S. Lyle, R. H. Colby and H. W. Gibson, Ion Conducting ROMP Monomers Based on (Oxa)norbornenes with Pendant Imidazolium Salts Connected via Oligo(oxyethylene) Units and with Oligo(ethyleneoxy) Terminal Moieties, *Macromolecules* **52**, 1371 (2019).
222. T. L. Price Jr., U H. Choi, D. V. Schoonover, D. Wang, J. R. Heflin, R. Xie, R. H. Colby and H. W. Gibson, Studies of Ion Conductance in Polymers Derived from Norbornene Imidazolium Salts Containing Ethyleneoxy Moieties, *Macromolecules* **52**, 1389 (2019).
223. H. Lentzakis, S. Costanzo, D. Vlassopoulos, R. H. Colby, D. J. Read, H. Lee, T. Chang and E. van Ruymbeke, Constraint Release Mechanisms for H-Polymers Moving in Linear Matrices of Varying Molar Masses, *Macromolecules* **52**, 3010 (2019).
224. W. Zhang, J. H. Bombile, A. R. Weisen, R. Xie, R. H. Colby, M. J. Janik, S. T. Milner, and E. D. Gomez, Thermal Fluctuations lead to Cumulative Disorder and Enhance Charge Transport in Conjugated Polymers, *Macromol. Rapid Commun.* 1900134 (2019).
225. A. Mordvinkin, M. Suckow, F. Böhme, R. H. Colby, C. Creton and K. Saalwächter, Hierarchical Sticker and Sticky Chain Dynamics in Self-Healing Butyl Rubber Ionomers, *Macromolecules* **52**, 4169 (2019).
226. M. Lee, H. W. Gibson, T. Kim, R. H. Colby and U H. Choi, Ion–Dipole-Interaction-Driven Complexation of Polyethers with Polyviologen-Based Single-Ion Conductors, *Macromolecules* **52**, 4240 (2019).
227. C. Lang, J. A. LaNasa, N. Utomo, Y. Xu, M. J. Nelson, W. Song, M. A. Hickner, R. H. Colby, M. Kumar and R. J. Hickey, Solvent-Non-Solvent Rapid-Injection for Preparing Nanostructured Materials from Micelles to Hydrogels, *Nature Comm.* **10**, 3855 (2019).
228. N. W. Utomo, I. Saifuddin, B. Nazari, P. Jain and R. H. Colby, Chain dynamics and glass transition of dry native cellulose solutions in ionic liquids, *Soft Matter* **16**, 200 (2020).
229. D. Hou, J. E. Bostwick, J. R. Shallenberger, E. S. Zofchak, R. H. Colby, Q. Liu and R. J. Hickey, Simultaneous Reduction and Polymerization of Graphene Oxide / Styrene Mixtures to Create Polymer Nanocomposites with Tunable Dielectric Constants, *ACS Appl. Nano. Mater.* **3**, 962 (2020).
230. J. E. Bostwick, C. J. Zanelotti, C. Iacob, A. G. Korovich, L. A. Madsen and R. H. Colby, Ion Transport and Mechanical Properties of Non-Crystallizable Molecular Ionic Composite Electrolytes, *Macromolecules* **53**, 1405 (2020).

231. R. Xie, A. R. Weisen, Y. Lee, M. A. Aplan, A. M. Fenton, A. E. Masucci, F. Kempe, M. Sommer, C. W. Pester, R. H. Colby and E. D. Gomez, Glass Transition Temperature from the Chemical Structure of Conjugated Polymers, *Nat. Comm.* **11**, 893 (2020).
232. C. Liu, J. Zhang, Z. Zhang, S. Huang, Q. Chen and R. H. Colby, Shear-Induced Oriented Crystallization for Isotactic Poly(1-butene) and its Copolymer with Ethylene, *Macromolecules* **53**, 3071 (2020).
233. J. Seo, A. M. Gohn, R. P. Schaake, D. Parisi, A. M. Rhoades, and R. H. Colby, Shear Flow-Induced Crystallization of Poly(ether ether ketone), *Macromolecules* **53**, 3472 (2020).
234. A. M. Gohn, J. Seo, R. H. Colby, R. P. Schaake, R. Androsch and A.M. Rhoades, Crystal Nucleation in Poly(ether ether ketone)/Carbon Nanotube Nanocomposites at High and Low Supercooling of the Melt, *Polymer* **199**, 122548 (2020).
235. D. Parisi, J. Seo, B. Nazari, R. P. Schaake, A. M. Rhoades and R. H. Colby, Shear-Induced Isotropic–Nematic Transition in Poly(ether ether ketone) Melts, *ACS Macro. Lett.* **9**, 950 (2020).
236. U H. Choi, T. L. Price, Jr., D. V. Schoonover, H. W. Gibson and R. H. Colby, The Effect of Oligo(oxyethylene) Moieties on Ion Conduction and Dielectric Properties of Norbornene-Based Imidazolium Tf<sub>2</sub>N Ionic Liquid Monomers, *Macromolecules* **53**, 4990 (2020).
237. N. W. Utomo, B. Nazari, D. Parisi and R. H. Colby, Determination of Intrinsic Viscosity of Native Cellulose in Ionic Liquids, *J. Rheol.* **64**, 1063 (2020).
238. A. Mordvinkin, D. Döhler, W. H. Binder, R. H. Colby and K. Saalwächter, Terminal Flow of Cluster-Forming Supramolecular Polymer Networks: Single-Chain Relaxation or Micelle Reorganization?, *Phys. Rev. Lett.* **125**, 127801 (2020).
239. J. Seo, D. Parisi, A. M. Gohn, A. Han, L. Song, Y. Liu, R. P. Schaake, A. M. Rhoades and R. H. Colby, Flow-Induced Crystallization of Poly(ether ether ketone): Universal Aspects of Specific Work Revealed by Corroborative Rheology and X-ray Scattering Studies, *Macromolecules* **53**, 10040 (2020).
240. U H. Choi, T. L. Price, D. V. Schoonover, R. Xie, H. W. Gibson and R. H. Colby, Role of Chain Polarity on Ion and Polymer Dynamics: Molecular Volume-Based Analysis of Dielectric Constant for Polymerized Norbornene-based Ionic Liquid, *Macromolecules* **53**, 10561 (2020).
241. H. Gudapati, D. Parisi, R. H. Colby and I. T. Ozbolat, Rheological investigation of collagen, fibrinogen, and thrombin solutions for drop-on-demand 3D bioprinting, *Soft Matter* **16**, 10506 (2020).
242. D. Parisi, J. Seo, R. P. Schaake, A. M. Rhoades and R. H. Colby, Shear-Induced Nematic Phase in Entangled Rod-Like PEEK Melts, *Prog. Polym. Sci.* **112**, 101323 (2021).
243. D. Yu, X. Pan, J. E. Bostwick, C. J. Zanelotti, L. Mu, R. H. Colby, F. Lin, and L. A. Madsen, Room Temperature to 150 °C Lithium Metal Batteries Enabled by a Rigid Molecular Ionic Composite Electrolyte, *Advanced Energy Materials* 2003559 (2021).
244. A. Han and R. H. Colby, Rheology of Entangled Polyelectrolyte Solutions, *Macromolecules* **54**, 1375 (2021).
245. A. Mordvinkin, D. Döhler, W. H. Binder, R. H. Colby and K. Saalwächter, Rheology, sticky chain and sticker dynamics of supramolecular elastomers based upon cluster-forming telechelic linear and star polymers, *Macromolecules* **54**, 5065 (2021).

246. D. Parisi, A. Han, J. Seo and R. H. Colby, Rheological Response of Entangled Isotactic Polypropylene Melts in Strong Shear Flows: Edge Fracture, Flow Curves and Normal Stresses, *J. Rheol.* **65**, 605 (2021).
247. J. Seo, X. Zhang, R. P. Schaake, A. M. Rhoades and R. H. Colby, Dual Nakamura Model for Primary and Secondary Crystallization Applied to Nonisothermal Crystallization of Poly(ether ether ketone), *Polymer Engineering and Science* **61**, 2416 (2021).
248. R. Fair, R. Xie, Y. Lee, R. H. Colby and E. D. Gomez, Molecular Weight Characterization of Conjugated Polymers through Gel Permeation Chromatography and Static Light Scattering, *ACS Applied Polymer Materials* **3**, 4572 (2021).
249. W. Mei, A. J. Rothenberger, J. E. Bostwick, J. M. Rinehart, R. J. Hickey and R. H. Colby, Zwitterions Raise the Dielectric Constant of Soft Materials, *Phys. Rev. Lett.* **127**, 228001 (2021).
250. W. Mei, A. Han, R. J. Hickey and R. H. Colby, Effect of Chemical Substituents Attached to the Zwitterion Cation on Dielectric Constant, *J. Chem. Phys.* **155**, 244505 (2021).
251. J. E. Bostwick, C. J. Zanelotti, D. Yu, N. F. Pietra, T. A. Williams, L. A. Madsen and R. H. Colby, Ionic Interactions Control the Modulus and Mechanical Properties of Molecular Ionic Composite Electrolytes, *J. Mater. Chem. C* **10**, 947 (2022).
252. A. M. Fenton, R. Xie, M. P. Aplan, Y. Lee, M. G. Gill, R. Fair, F. Kempe, M. Sommer, C. R. Snyder, E. D. Gomez and R. H. Colby, Predicting the plateau modulus from molecular parameters of conjugated polymers, *ACS Central Science* **8**, 268 (2022).
253. A. Han, V. V. S. Uppala, D. Parisi, C. George, B. J. Dixon, C. D. Ayala, X. Li, L. A. Madsen and R. H. Colby, Determining the Molecular Weight of Polyelectrolytes Using the Rouse Scaling Theory for Salt-free Semidilute Unentangled Solutions, *Macromolecules* **55**, 7148 (2022).
254. W. Mei, D. Yu, C. George, L. A. Madsen, R. J. Hickey and Ralph H. Colby, Anion Chemical Composition of Poly(ethylene oxide)-based Sulfonylimide and Sulfonate Lithium Ionomers Controls Ion Aggregation and Conduction, *J. Mater. Chem. C* **10**, 14569 (2022).
255. D. Parisi, C. D. Ditillo, A. Han, S. Lindberg, M. W. Hamersky and R. H. Colby, Rheological investigation on the associative properties of poly(vinyl alcohol) solutions, *J. Rheol.* **66**, 1141 (2022).
256. H. Li, J. Sengeh, O. Agboola, J. Seo, R. Colby and T. C. Chung, Preparation and Characterization of Polyethylene Copolymer with PAH Side Groups as Carbon Fiber Precursors, *ACS Applied Materials and Interfaces* **5**, 791 (2023).
257. X. Zhang, J. D. Alexander, J. Seo, A. M. Gohn, M. J. Behary, R. P. Schaake, R. H. Colby and A. M. Rhoades, Crystallization Kinetics of Glass Fiber Filled Poly(ether ether ketone) with Nanogram Sample Size: Feasibility Study for Fast Scanning Calorimetry, *Thermochimica Acta* **721**, 179442 (2023).
258. D. Yu, D. Troya, A. G. Korovich, J. E. Bostwick, R. H. Colby and L. A. Madsen, Uncorrelated Lithium-ion Hopping in a Dynamic Solvent-anion Network, *ACS Energy Letters* **8**, 1944 (2023).
259. J. Tang, R. H. Colby and Q. Chen, Revisiting the Elasticity of Tetra-Polyethylene Glycol Hydrogels, *Macromolecules* **56**, 2939 (2023).

260. U H. Choi, P. L. Handayani, Y. H. Song, T. Kim, A. Han and R. H. Colby, Ionic Conduction and Dielectric Response of Nanoparticle-Coupled Hydrogel Network Polymer Electrolytes, *Macromolecules* **56**, 3393 (2023).

261. A.V. Dobrynin, R. Sayko and R. H. Colby, Viscosity of Polymer Solutions and Molecular Weight Characterization, *ACS Macro Lett.* **12**, 773 (2023).

262. J. E. Bostwick, D. Yu, C. J. Zanelotti, T. J. Dingemans, L. A. Madsen and R. H. Colby, High Modulus Single-Ion-Conducting Electrolytes Based on a Rigid-Rod Polyanion, *ACS Applied Energy Materials* **6**, 6910 (2023).

263. W. Mei, D. Yu, L. A. Madsen, R. J. Hickey and R. H. Colby, Ion States Impact Charge Transport and Dielectric Constant for Poly(ethylene oxide)-based Sulfonilimide Lithium Ionomers, *Macromolecules* **56**, 5141 (2023).

## PATENTS

1. D.M. Teegarden, C.J.T. Landry, M.R. Landry, T.E. Long, D.J. Massa and R.H. Colby, Miscible Blends of Polyamides and Vinylphenol Containing Polymers, US Patent 5,250,624 (1993).

2. R.H. Colby, C.J.T. Landry, M.R. Landry, T.E. Long, D.J. Massa and D.M. Teegarden, Compatible Polyester Blends, US Patent 5,276,089 (1994).

3. C.J.T. Landry, D.J. Massa, T.E. Long, M.R. Landry, D.M. Teegarden and R.H. Colby, Compatible Polyamide Blends, US Patent 5,302,662 (1994).

4. W. Mei, R. J. Hickey and R. H. Colby, High Dielectric Constant Zwitterionic Liquids, Provisional Patent Application (2022).

## INVITED PRESENTATIONS

**Rheology of Polymer Solutions**, Cornell University (1986), University of Southern California (1987), University of Virginia (1990), Polymers-West Gordon Research Conference, Ventura, CA (1991).

**Rheology of Gelation in Orthosilicate Reacting Systems**. American Chemical Society Rubber Division Meeting, Cleveland, Ohio (1987), Cornell University (1988).

**Rheology of Single-Phase Polymer Blends**, University of Wisconsin (1988), University of Connecticut (1989) and Stanford University (1991).

**Dynamic Scaling in Polymer Gelation**, Condensed Matter Symposium, University of Rochester (1989).

**Rheology of Polymer Gelation**, Elastomers Gordon Research Conference, New London, NH (1989), University of Wisconsin (1990), Exxon Corporate Research, Clinton, NJ (1991), Northwestern University (1994), University of California, Santa Barbara (1995), University of Tennessee (1995).

**Statics and Dynamics of Near-Critical Gels**, Laboratoire Leon Brillouin, Saclay, France (1992), E.S.P.C.I., Paris, France (1992), Universitat Mainz, Germany (1992) Institut Charles Sadron, Strasbourg, France (1992).

**Dynamics in Polymer Blends and Copolymers**, Polymer Physics Gordon Research Conference, Newport, RI (1992).

**Viscoelasticity of Liquid Crystal Polymers**, Cornell University (1993).

**Viscoelasticity of Structured Fluids**, Cornell University (1993), State University of New York, Stony Brook (1993), University of Pittsburgh (1996), University of Akron (1998), University of North Carolina (1999), New England Workshop on Complex Fluids, Boston (2001), Institute for Theoretical Physics, University of California, Santa Barbara (2002).

**Rheology of Randomly Branched Polymers**, American Physical Society Meeting (1996), University of Akron (1996), NIST (1997), Eastman Chemical Company (1997), Phillips Petroleum Company (1998), Exxon Chemical Company (1999), Rohm & Haas Company (2001).

**Polyelectrolyte Solution Rheology**, American Physical Society Meeting (1996), University of North Carolina (1996), Eastman Kodak Company (1996), University of Massachusetts (1996), 3M Center (1996), Rohm & Haas Company (1996), University of Delaware (1997), Brooklyn Polytechnic University (1997), State University of New York, Stony Brook (1997), Colloidal, Macromolecular and Polyelectrolyte Solutions Gordon Research Conference, Ventura, CA (1998), Eastman Kodak Company (1998), College de France, Paris, France (1998), Laboratoire Leon Brillouin, Saclay, France (1998), Stanford University (1998).

**Polyelectrolyte-Surfactant Interactions**, Eastman Kodak Company (1997).

**Miscible Blend Dynamics**, Case Western Reserve University (1998), Institut Laue Langevin, Grenoble, France (1998), Eastman Kodak Company (1998), Elf-Atochem, Paris, France (1999), Brooklyn Polytechnic University (2000), University of Akron (2000), Polymer Physics Gordon Research Conference, New London, CT (2000), University of Leeds (2000), University of North Carolina (2001), ExxonMobil (2001), Eastman Chemical Company (2002), Xerox Corporation (2003).

**The Dynamic Scaling Approach to Glass Formation**, Eastman Kodak Company (1999), Institut Laue Langevin, Grenoble, France (1999), FORTH, Heraklion, Crete (1999), NIST (1999), SUNY Stony Brook (2000), University of Rome, Italy (2000).

**Modulus and Swelling of Polyelectrolyte Gels**, Ion-Containing Polymers Gordon Research Conference, Newport, RI (1999), Virginia Polytechnic Institute (1999), University of Naples, Italy (2000).

**Interactions Among Polymers and Surfactants in Solution**, Air Products and Chemicals (1999), Rhodia (2000), DuPont (2001).

**Interactions of Polyelectrolytes with Surfactants and Proteins**, Polyelectrolytes2000, Switzerland (2000), University of Rome, Italy (2000), Eastman Kodak Company (2000), 3M Center (2002), Universitat Bayreuth, Germany (2002), E.S.P.C.I., Paris, France (2003), University of Leeds (2003), Kodak, Ltd., Harrow, UK (2004).

**Cooperative Motion in Glass-Forming Liquids, Probed Using Miscible Polymer Blends**, University of Athens, Athens, Greece (2001).

**Dielectric Measure of Polyelectrolyte Charge and Interaction with Water**, Telluride Workshop on Polymer Theory vs. Polymer Experiment (2001), University of Connecticut (2001), American Physical Society Meeting (2002), Universitat Mainz, Germany (2002), Universitat Freiburg, Germany (2002).

**Rheology of Glass Formation**, University of Wisconsin (2002), University of Pittsburgh (2002), University of Oregon (2002), Juelich Soft Matter Days Conference, Kerkrade, The Netherlands (2002), ExxonMobil Chemicals (2003), E.S.P.C.I., Paris, France (2003), Universite de Paris Sud, Orsay (2003).

**Entanglement in Polyelectrolyte Solutions**, Institute for Theoretical Physics, U.C.S.B. (2002), Entanglements and Architectures Workshop, Capri, Italy (2011).

**Molecular Rheology of Branched Polymers**, Virginia Polytechnic Institute (2002).

**Kinetics of Helix Reversion and Physical Gelation of Gelatin**, College de France, Paris (2003).

**Reversible Aggregation of Albumin**, Johns Hopkins University (2003), Dartmouth College (2004), Issac Newton Institute, Cambridge University (2004), Massey University, Palmerston North, New Zealand (2005), Virginia Polytechnic Institute (2007).

**Determining the Average Chain Length between Branch Points**, American Chemical Society Meeting (2003), American Chemical Society Meeting (2008).

**Cooperative Length Scale of Glass-Forming Liquids**, US Naval Academy (2004), E.S.P.C.I., Paris, France (2004), F.O.R.T.H., Heraklion, Crete (2004), University of Leeds (2004), Victoria University of Wellington, New Zealand (2005), Canterbury University, Christchurch, New Zealand (2005).

**Polyelectrolyte Solution Rheology 2, Colloidal, Macromolecular and Polyelectrolyte Solutions Gordon Research Conference**, Ventura, CA (2004), Cambridge University (2004), Polyelectrolytes 2004 Meeting, Amherst, MA (2004), E.S.P.C.I., Paris, France (2004), F.O.R.T.H., Heraklion, Crete, Greece (2004), Victoria University of Wellington, New Zealand (2005), Ecole Polytechnique, Montreal, Canada (2005), Princeton University (2006), Third Annual European Rheology Conference, Hersonissos, Crete, Greece (2006), Rhodia, Bristol, PA (2006), New York University (2006), Virginia Polytechnic Institute (2007), University of Delaware (2008), Tsinghua University (2008), Institute of Chemistry, Chinese Academy of Sciences, Beijing (2008), Tianjin University (2008), Zhejiang University (2008), Donghua University (2008), Soft Matter Physics Workshop, University of Tokyo (2010).

**The Role of the Chain Length between Branch Points on the Rheology of Randomly Branched and Hyperbranched Polymers**, International Workshop on Branched Polymers for Performance, Williamsburg, VA (2004), Society of Rheology Meeting, Vancouver, Canada (2005).

**A Lattice Model for Segmental Dynamics of Miscible Polymer Blends**, Materials Research Society Meeting, Boston, MA (2004), 5<sup>th</sup> International Discussion Meeting on Relaxation in Complex Systems, Lille, France (2005), American Physical Society Meeting (2006).

**Electrical and Mechanical Properties of Poly(ethylene oxide)-based Ionomers as Single Ion Conductors**, Second International Conference on Advanced Materials and Nanotechnology, Queenstown, New Zealand (2005), University of Auckland, New Zealand (2005), NIST, Gaithersburg, MD (2005), American Physical Society Meeting (2006), University of Athens, Athens, Greece (2006), F.O.R.T.H., Heraklion, Crete, Greece (2006), Virginia Polytechnic Institute (2006), Lawrence Berkeley National Lab (2007).

**Ion Pairing and Clustering in Solutions of Ion-Containing Polymers**, International Meeting on Associations in Solution for Function, Performance and Synthesis, Barga, Italy (2007), Naval Research Laboratory, Washington, D.C. (2007).

**Coercing Polymer Insulators to Transport Ions: New Soft Materials for Actuators, Batteries and Fuel Cells**, Taylor Lecture, Penn State University (2007).

**Contributions of Nobel Laureate P. G. de Gennes to Polyelectrolyte Solutions**, American Physical Society Meeting (2008).

**Designing Ion-Containing Polymers for Facile Ion Transport**, Georgia Tech (2008), Cal Tech (2008), Columbia University (2008), Fudan University (2008), Peking University (2008), Nankai University (2008) Polymer Physics Meeting, Xiamen, China (2008), Lanzhou University (2008), Nanjing University (2008), University of Science and Technology, Hefei (2008), Shanghai Jiao Tong University (2008), Polymer Physics Gordon Research Conference, Newport, RI (2008), E.S.P.C.I., Paris (2009), University of Akron (2009), Polymers Gordon Research Conference, S. Hadley, MA (2009), 6<sup>th</sup> International Discussion Meeting on Relaxation in Complex Systems, Rome, Italy (2009), Physical Aspects of Polymer Science Workshop, University of Bristol (2009), Cornell University (2009), Clark University (2009), University of North Carolina (2009), Waseda University, Tokyo (2010), 8th Greek Polymer Society Symposium, Hersonissos, Crete, Greece (2010), CEA Saclay, France (2011), Imperial College, London (2011), Jülich Soft Matter Days, Bonn, Germany (2011), University of Leeds (2011), University of Durham (2011).

**Rheology of Unentangled Polyelectrolyte and Neutral Polymer Solutions**, de Gennes Discussion Conference, Chamonix, France (2009).

**Random Branching and Gelation Rheology**, DYNACOP Tutorial, Heraklion, Crete, Greece (2010).

**Solution Rheology of Cellulose in Ionic Liquids**, American Chemical Society Meeting, Anaheim (2011).

**Cluster-Continuum Model for Li Single-Ion Conductor Design**, American Chemical Society Meeting, Anaheim (2011).

**Polymer Solution Rheology**, DYNACOP Summer School, Capri, Italy (2011), Leverhulme Lectures, Imperial College, London (2012).

**Miscible Blend Dynamics**, DYNACOP Summer School, Capri, Italy (2011), Leverhulme Lectures, Imperial College, London (2012).

**Dielectric Spectroscopy of Polymers: Blends, Nanocomposites and Ionomers**, ESPCI, Paris, France (2011).

**Electrode Polarization and Dielectric Constant of Single-Ion Conducting Ionomers**, 6<sup>th</sup> International Conference on Broadband Dielectric Spectroscopy and its Applications, Perpignan, France (2011).

**Ionomer Design Principles for Ion-Conducting Energy Materials**, University of Sheffield (2012), University of Manchester (2012), University of Cambridge (2012), University of Oxford (2012), University of Edinburgh (2012), IUPAC World Congress on Polymers, Blacksburg VA (2012), Dow Chemical Company, Spring House, PA (2012), University of Maryland (2012).

**Shear Yielding of Aggregated Globular Protein Dispersions**, Proteins and Vaccines Congress, London (2012), International Congress on Rheology, Lisbon (2012).

**Linear Viscoelasticity of Associating Ionomers**, ESPCI, Paris, France (2012), University of Crete, Heraklion, Crete, Greece (2012), Society of Rheology Bingham Lecture, Pasadena, CA (2013), Society of Rheology Japan (2013), Cornell University (2013), Seoul National University, Seoul, Korea (2014), ExxonMobil, Baytown, TX (2014), Hellenic Society of Rheology Meeting, Samos, Greece (2015),

University of Akron (2015), SUNY Stony Brook (2016), British Society of Rheology Meeting, Reading, United Kingdom (2016).

**Ionomer Design, Synthesis and Characterization for Ion-Conducting Energy Materials**, American Physical Society Meeting, Baltimore (2013), Kyoto University, Japan (2013), Waseda University, Japan (2013), Korea Institute of Materials Science, Changwon, Korea (2014), Postech, Pohang University, Korea (2014), AIChE Meeting, Atlanta, GA (2014), Cornell University (2015), University of North Carolina (2015), Rutgers (2016), SUNY Stony Brook (2016), Argonne National Lab (2016).

**Dynamics of Polymerized Ionic Liquids**, Osaka University (2013), 7<sup>th</sup> International Discussion Meeting on Relaxation in Complex Systems, Barcelona, Spain (2013), Keynote Lecture 14<sup>th</sup> International Symposium on Polymer Electrolytes, Geelong, Australia (2014), Plenary Lecture Polydays Meeting, Berlin, Germany (2014), American Physical Society Meeting, San Antonio, Texas (2015), Drexel University (2015), University of North Carolina (2015), American Chemical Society Meeting, Boston (2015), Michigan Tech (2017), Sophia University, Tokyo, Japan (2018).

**Trying to get Ionomers to be Polyelectrolytes**, Colloidal, Macromolecular and Polyelectrolyte Solutions Gordon Research Conference, Ventura, CA (2014), Deakin University, Melbourne, Australia (2014).

**The Sol-gel Transition of Lightly Sulfonated Styrene Oligomers**, International Symposium on Applied Rheology, Keynote Lecture, Seoul (2014), DSM, Maastricht, The Netherlands (2014).

**Reversible Gels (sticky Rouse and reptation models)**, SUPOLEN Summer School, Capri, Italy (2015).

**Polyelectrolyte to Ionomer Transition**, SUPOLEN Summer School, Capri, Italy (2015), European Molecular Liquids Group Meeting, Vienna, Austria (2017).

**Interrelations of Segmental, Chain and Ion Dynamics in Soft Ionomers**, Polymer Physics Gordon Research Conference (2016).

**Diffusive Flux as a new Metric for Ion-Conducting Soft Energy Materials**, Materials Research Society Meeting, Boston (2016).

**Flow-Induced Crystallization**, Levich Institute, CUNY, New York (2017), INNFM, Lake Vyrnwy, Wales (2017), Florida State, Tallahassee, Florida (2018), Pacific Rim Conference on Rheology, Jeju, Korea (2018), Toray Research Center, Kyoto, Japan (2018), DSM, Maastricht, The Netherlands (2019), ETH-Zurich, Switzerland (2019), International Soft Matter Conference, Edinburgh, UK (2019), University of Crete (2019), ESPCI, Paris, France (2019), University of Rochester (2019), Martin Luther Universität Halle-Wittenberg, Germany (2019), Universität Dresden, Germany (2019), Universität Mainz, Germany (2019), University of Illinois (2019).

**Ionomers for Ion-Conducting Energy Materials**, American Physical Society Meeting, New Orleans (2017), Pukyong University, Busan, Korea (2018).

**Linear Viscoelasticity of Ionic Polymers: Ionomers and Polyelectrolytes**, American Physical Society Meeting, New Orleans (2017), Kyoto University, Japan (2018).

**Solution Rheology of Dry Native Cellulose in Ionic Liquids: Weakly Associating Polymers?** SUPOLEN Meeting on Associating Polymers, Hersonissos, Crete, Greece (2017), ETH-Zurich, Switzerland (2019), Proctor & Gamble, West Chester, Ohio (2019), PPG Industries, Pittsburgh, PA (2019), ESPCI, Paris, France (2019).

**Polarizability Volume of Ion Pair Dipoles in Ionomers and Polymerized Ionic Liquids**, CECAM Workshop on Electrostatic Interactions in Concentrated Electrolytes, Lausanne, Switzerland (2018), International Symposium on Polymer Electrolytes, Yokohama, Japan (2018).

**Modulus and Swelling of Neutral Polymer and Polyelectrolyte Gels**, DoDyNet Summer School, Capri, Italy (2019).

**Ionomers, Polymerized Ionic Liquids and Associating Polymers**, DoDyNet Summer School, Capri, Italy (2019).

**Liquid Crystal Mesophases in Conjugated Polymers for Flexible Electronics**, Martin Luther Universität Halle-Wittenberg, Germany (2019), Universität Freiburg, Germany (2019).

**Flow-Induced Crystallization of Semicrystalline Polymers**, Braskem (2020 virtual), Dow (2021 virtual), Arizona State University (2021), Stanford University (2022).

**Structure and Dynamics of Polyelectrolyte Solutions and Coacervates**, invited virtual talk at the American Physical Society March Meeting (2021).

**Shear-Induced Nematic Phase in Entangled Rod-like PEEK Melts**, virtual seminar for the Polymer Physics and Polymer Spectroscopy Webinar organized by the University of Halle, Germany (2021), virtual seminar for SUNY Stony Brook (2021), virtual seminar for the Fundamental Polymer Rheology Enabling Next Generation Technologies Workshop at Arizona State University (2022), University of Crete (2022).

**Rheological Investigation on the Associative Properties of Poly(vinyl alcohol) Solutions**, DoDyNet Meeting, Hersonissos, Crete, Greece (2022).

**Glass Transition and Entanglement in Semiflexible Conjugated Polymers**, NATAS Meeting, Cleveland (2022).

**Dielectric Spectroscopy of Neat Poly(ethylene oxide)-based Sulfonylimide and Sulfonate Ionomers with Lithium Counterions**, American Chemical Society Meeting, Chicago (2022).

**Flow-induced Nematic Alignment and Nucleation Acceleration in Polymer Melts**, American Physical Society Meeting, Las Vegas (2023), University of Massachusetts, Amherst (2023), American Institute of Chemical Engineers Meeting, Orlando (2023).

**Glass Transition and Entanglement in Conjugated Polymer Melts**, Pacific Rim Rheology Conference, Vancouver (2023).

**Determination of Molecular Weights using a Polydisperse Rouse model for Semidilute Unentangled Polyelectrolyte and Neutral Polymer Solutions**, International Congress on Rheology, Athens (2023).