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Education

- 1969 - 1972 Department of Textile Engineering, Kyoto Institute of Technology, Kyoto 606, Japan, B. S.
- 1972 - 1974 Department of Polymer Chemistry, Faculty of Engineering, Kyoto University, Kyoto 606, Japan, M. S.
- 1974 - 1980 Department of Polymer Chemistry, Faculty of Engineering, Kyoto University, Kyoto 606, Japan, Ph. D.

Employment

- 1980 - 1981 Post-Doctoral Fellow, Department of Chemistry, McGill University, Montreal, Quebec H3A 2K6, Canada.
- 1981 - 1983 Research Associate, Polymer Research Institute, University of Massachusetts, Amherst, MA 01003.
- 1983 - 1987 Assistant Professor, Department of Polymer Engineering, The University of Akron, Akron, OH 44325.
- 1987 - 1991 Associate Professor, Department of Polymer Engineering, The University of Akron, Akron, OH 44325.
Tenure awarded in 1987.
- 1991 - 2006 Professor, Department of Polymer Engineering, The University of Akron, Akron, OH 44325.
- 2006 - Present Distinguished Professor, Department of Polymer Engineering, The University of Akron, Akron, OH 44325.

Professional

American Chemical Society, American Physical Society, Materials Research Society, International Polymer Processing Society, Akron Polymer Lecture Group.

Honors

Mombusho Scholar, Ministry of Education, Science and Culture, Japan, 1967-1974 and 1978-1980.
Outstanding Research Award, University of Akron, 1998; Bestowed a Distinguished Professorship, 2006.

Research Interest

Phase equilibria and kinetics of phase separation in polymer blends; phase transitions in crystalline and liquid crystalline polymers; molecular composites; processing, structure and properties of ionomer membranes; pattern formation and electro-optical properties of dispersed liquid crystal systems and photonic crystals.

Books

1. *"Liquid Crystalline Polymer Systems: Tech. Advances,"* A.I. Isayev, T. Kyu, and S.Z.D. Cheng Eds., Am. Chem. Soc., Symp. Ser. # 632, Washington D.C., 1996.
2. *"Polyolefin Blends,"* D. Nwabunma and T. Kyu Eds., J. Wiley & Sons, New York, (2007).
3. *"Polyolefin Composites,"* D. Nwabunma and T. Kyu Eds., J. Wiley & Sons, New York, (2007).

Patents and Copy Rights

1. *"Single phase blends of Polycarbonate and Polymethyl methacrylate"* T. Kyu and J.M. Saldanha, U.S. Patent 4,773,654, May 10, (1988).
2. *"Melt-Processable, Toughened, Transparent Blends of PC/PMMA,"* T. Kyu, U.S. Patent 5,049,619, September 17, (1991).
3. *"Small-Angle Scattering and Image Analysis,"* SASIMA program, Copy Right, University of Akron, H.W. Chiu and T. Kyu, 1998.
4. *"Simulation of Phase Separation Dynamics,"* Copy Right, University of Akron, H.W. Chiu and T. Kyu, May 5, 1999.
5. *"Non-Birefringent Optical Adhesives and Films,"* T. Kyu, U.S. Patent 5,905,554, May 18, (1999).
6. *"Electrically Tunable Microlens Array Formed by Pattern Polymerization of Photopolymerizable Mixtures Containing Liquid Crystals"* T. Kyu and D. Nwabunma, U.S. Patent No. 6,815,016 (2004).
7. *"Micro-porous Compound Lens,"* T. Kyu and S. Meng, Patent application disclosure to University of Akron, 2003.
8. *"Modification of Nafion[®] Membranes by Incorporation of Polyacid Functionalized Hyperbranched Polyesters (HBPEAc-COOH)"* N. Nazir and T. Kyu, Patent application disclosure to University of Akron, UA 777, 2008.
9. *"Polymer Composition and Dialysis Membrane Formed From the Polymer Composition"* Provisional Patent Application: U.S. Serial No. 61/119,822, 2008.

Papers and Book Chapters

1. T. Kyu, M. Tabushi, S. Nomura and H. Kawai, "Dynamic Birefringence Behavior of Semicrystalline Polymers. I. Principles and Experimental Procedures of the π -sector Technique," *Polym. J.*, 7, 108 (1975).
2. " T. Kyu, N. Yasuda, S. Suehiro, S. Nomura and H. Kawai, Dynamic Birefringence Behavior of Semicrystalline Polymers. II. The Crystalline Relaxation Mechanisms of Low- and Medium-Density Polyethylene," *Polym. J.*, 8, 56 (1976).
3. S. Suehiro, T. Yamada, H. Inagaki, T. Kyu, S. Nomura and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline polymers. IV. On the Nature of α Mechanical Dispersion of Low-Density Polyethylene in Relation to the Mechanism of Spherulite Deformation," *J. Polym. Sci., Polym. Phys. Ed.*, 17, 763 (1979).
4. S. Suehiro, T. Kyu, K. Fujita and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline Polymers. V. Quantitative Analysis of Grain-Boundary Relaxation Phenomenon," *Polym. J.*, 11, (1979).
5. S. Suehiro, T. Yamada, T. Kyu, K. Fujita, T. Hashimoto and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline Polymers. VIII. Dynamic X-ray Diffraction of a High-Density Polyethylene Having Row-Nucleated Crystalline Texture of C-axis Orientation," *Polym. Eng. Sci.*, 19, 929 (1979).
6. T. Kyu, N. Yasuda, S. Suehiro, T. Hashimoto and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline Polymers. IX. Dynamic Birefringence Behavior of a High-Density Polyethylene Having Row-Nucleated Crystalline Texture of C-axis Orientation," *Polymer*, 21, 1205 (1980).
7. T. Kyu, S. Suehiro, S. Nomura and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline Polymers. X. The Orientation Retardation Spectrum of Polyethylene," *J. Polym. Sci. Polym. Phys. Ed.* 18, 951 (1980).
8. T. Kyu, S. Suehiro and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline Polymers. XI. Mechanical and Optical Retardation Spectra of High-Density Polyethylene Having Row-Nucleated Crystalline Texture of C-axis Orientation," *Polym. J.*, 12, 251 (1980).
9. T. Kyu, M. Yamada, S. Suehiro and H. Kawai, "Rheo-Optical Studies on the Deformation Mechanism of Semicrystalline Polymers. XII. On the Nature of Alpha and Beta Mechanical Dispersion High-Density Polyethylene in Relation to Mechanism of Spherulite Deformation," *Polym. J.*, 12, 809 (1980).
10. H. Kawai, T. Hashimoto, S. Suehiro, and T. Kyu, "Rheo-Optical Studies on the Nature of Alpha and Beta Mechanical Dispersions of Polyethylene in Relation to the Deformation Mechanisms of Spherulitic Crystalline Texture," *Rheology Applications*"; Vol. 3, Ed. by G. Astarita, Plenum Press N.Y., pp. 409-414, 1980.
11. R.J. Cembrola, T. Kyu, S. Suehiro, H. Kawai and R.S. Stein, "Dynamic Birefringence Studies of High-Density Polyethylene," *J. Polym. Sci., Polym. Phys. Ed.* 20, 1279 (1982).
12. T. Kyu and A. Eisenberg, "Mechanical Relaxations in Nafion Perfluorinate Ionomeric Membranes," *Perfluorinated Ionomer Membranes*, ACS Symp. Series #180, A. Eisenberg and H.L. Yeager Eds., Washington, D.C., Ch.6, p. 79, 1982.
13. R.J. Cembrola, T. Kyu, R.S. Stein, S. Suehiro and H. Kawai, "Dynamic X-ray Diffraction Studies of High-Density Polyethylene," *J. Polym. Sci., Polym. Phys. Ed.*, 21, 329 (1983).
14. T. Kyu, M. Hashiyama and A. Eisenberg, "Dynamic Mechanical Studies of Partially Ionized and Neutralized Nafion Polymers," *Can. J. Chem.*, 61, 680 (1983).
15. T. Kyu and A. Eisenberg, "Electro-rheological Effect on Ionomer Membranes. I. The Nafion Polymers," *J. Polym. Sci., Polym. Lett. Ed.*, 21, 589 (1983).

16. H. Kawai, T. Hashimoto, S. Suehiro and T. Kyu, "Rheo-Optical Studies on the α and β Mechanical Dispersions of High-Density Polyethylene in Relation to Deformation Mechanisms of Crystalline Texture," *The Strength and Stiffness of Polymers*, A.E. Zachariades and R.S. Porter Eds., Marcel Dekker, New York, Ch. 5, p. 181 (1983).
17. H. Kawai, S. Suehiro, T. Kyu and A. Shimomura, "Rheo-Optical Studies on the Nature of α and β Mechanical Dispersions Polyethylenes in Relation to Deformation Mechanisms of Spherulite Textures," *Polym. Eng. Rev.* 3, 109 (1983).
18. P. Young, T. Kyu, S. Suehiro, J.S. Lin and R.S. Stein, "Dynamic Small-Angle X-ray Scattering from Crystalline Polymers," *J. Polym. Sci., Polym. Phys. Ed.*, 21, 881 (1983).
19. T. Kyu and A. Eisenberg, "Underwater Stress Relaxation Studies of Nafion Membranes," *J. Polym. Sci. Polym. Symp.* #71, 203 (1984).
20. "Optical Characterization of Solid-State Co-extruded PET," T. Sun, T. Kyu, J. Sheng, D. Lefebvre, R.S. Stein and R.S. Porter, *J. Appl. Polym. Sci.*, 30, 251 (1985).
21. T. Kyu "Structure and Properties of Perfluorinated Ion Exchange Membranes," in "Material Science of Synthetic Membranes" ACS Symp. #269, D.R. Lloyd Ed., Washington, D.C., Ch. 18, p. 365 (1985).
22. T. Kyu, P. Mukherjee and H. S. Park, "Self-Polarizing Liquid Crystalline Films," *Macromolecules*, 18, 2231 (1985).
23. S. Endo, K. Min, J.L. White and T. Kyu, "Polyethylene-Polycarbonate Blends: Interface Modification, Phase Morphology and Measurement of Orientation Development During Melt Spinning and Tubular Extrusion by Infrared Dichroism," *Polym. Eng. Sci.*, 26, 45 (1986).
24. T. Kyu and P. Vadhar, "Co-crystallization and Miscibility Studies of Ultra-High Molecular Weight Polyethylene Blends with Conventional Polyethylenes," *J. Appl. Polym. Sci.*, 32, 5575 (1986).
25. T. Kyu, S.R. Hu and R.S. Stein, "Characterization and Properties of Polyethylene Blends: I. Linear Low-Density with Conventional Low-Density Polyethylene," *J. Polym. Sci. Polym. Phys. Ed.*, 25, 71 (1987).
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27. M. Ree, T. Kyu and R.S. Stein, "Quantitative Small Angle Light Scattering Studies of the Melting and the Crystallization of LLDPE/LDPE Blends," *J. Polym. Sci., Polym. Phys. Ed.*, 25, 105 (1987).
28. P. Vadhar and T. Kyu, "Effects of Mixing on Morphology, Rheology and Mechanical Properties of Blends of Ultra-High Molecular Weight Polyethylene with Linear Low-Density Polyethylene," *Polym. Eng. Sci.*, 27, 202 (1987).
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30. H.H. Chuah, T. Kyu and T.E. Helminiak, "Phase Separation in Poly-p-Phenylene Benzobisthiazole/Nylon 66 Molecular Composites," *Polymer*, 28, 2130 (1987).
31. J.M. Saldanha and T. Kyu, "Influence of Solvent Casting on the Evolution of Phase Morphology in Polymer Blends," *Macromolecules*, 20, 2840 (1987).
32. T. Kyu and J.M. Saldanha, "Miscible Blends of Polycarbonate and Polymethyl Methacrylate," *J. Polym. Sci. Polym. Lett. Ed.*, 26, 33 (1988).
33. S. Suehiro, R.W. Hendricks, J.S. Lin, T. Kyu P. Young and R.S. Stein, "Dynamic Small-Angle Scattering System for the Studies of Materials Deformation and Relaxation," *J. Polym. Sci. Polym. Phys. Ed.*, 26, 745 (1988).
34. T. Kyu and J.M. Saldanha, "Phase Separation by Spinodal Decomposition in PC/PMMA Blends," *Macromolecules*, 21, 1021 (1988).
35. T. Kyu and P. Zhuang, "Phase Segregation in Thermotropic Liquid Crystalline Copolyester and Polycarbonate Blends," *Polym. Commun.*, 29, 99 (1988)

36. S.K. Roy, T. Kyu and R. St. John Manley, "Physical and Dynamic Mechanical Properties of Ultradrawn Polypropylene Films," *Macromolecules*, 21, 499 (1988).
37. T. Kyu and P. Mukherjee, "Kinetics of Phase Separation by Spinodal Decomposition in a Liquid Crystalline Polymer Solution," *Liq. Cryst.*, 3, 631 (1988).
38. S.H. Lim, T. Kikutani, J.L. White and T. Kyu, "Wide Angle X-ray Diffraction Investigation of Orientation of Chopped Fibers in Fabricated Thermoplastic Parts," *Adv. Polym. Tech.*, 8, 325 (1988).
39. P. Zhuang, J.L. White, and T. Kyu, "Characteristics of Hydroxybenzoic Acid-Ethylene Terephthalate Copolymer and Their Blends with Polystyrene, Polycarbonate and Polyethylene Terephthalate," *Polym. Eng. Sci.*, 2, 1095 (1988).
40. T. Kyu, P. Zhuang and P. Mukherjee, "Phase Dissolution in Aqueous hydroxypropyl cellulose Solution," *J. Appl. Cryst.*, 21, 828 (1988).
41. S.K. Roy, T. Kyu and R. St. John Manley, "Mechanical Relaxations of Oriented Gelation Crystallized Polyethylene Films," *Macromolecules*, 21, 1741 (1988).
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45. H.H. Chuah, T. Kyu and T.E. Helminiak, "Scaling Analysis of Phase Separation of Poly-p-Phenylene Benzobisthiazole /Nylon 66 Molecular Composites," *Polymer*, 30, 1591 (1989).
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47. T. Kyu, K. Fujita, M.H. Cho, T. Kikutani and J.S. Lin, "Melting and Crystallization of Gelation Crystallized UHMWPE," *Macromolecules*, 22, 2238, (1989).
48. H.S. Park and T. Kyu, "Rheology and Mechanical Properties of Poly-p-Phenylene Terephthalamide/Nylon Molecular and Particulate Composites," *Polym. Comp.*, 10, 429 (1989).
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51. H.S. Lee and T. Kyu, "Phase Separation Dynamics of Rubber/Epoxy Mixtures," *Macromolecules*, 23, 459 (1990).
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53. T.I. Chen and T. Kyu, "Phase Segregation in Poly-p-Phenylene Terephthalamide/Amorphous Nylon Mixtures," *Polym. Commun.*, 31, 111 (1990).
54. D.S. Lim and T. Kyu, "Phase Separation Dynamics of PC/PMMA Blends: I. Temperature Jumps into an Immiscibility Loop," *J. Chem. Phys.*, 92, 3944 (1990).
55. T. Kyu and D.S. Lim, "Phase Separation Dynamics of PC/PMMA Blends: II. Temperature Jumps above An Immiscibility Loop," *J. Chem. Phys.*, 92, 3951 (1990).
56. T. Kyu and J.C. Yang, "Miscibility Studies of Nafion Perfluorinated Ionomer and Polyvinylidene Fluoride Blends," *Macromolecules*, 23, 176 (1990).
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61. J.Q. Zheng and T. Kyu, " Kinetics of Phase Segregation in Thermotropic Liquid Crystalline Copolyester and Polyether Imide Blends," in "*Polym. Liquid Crystals*," *ACS Symp. Series # 435*, R.A. Weiss and C.K. Ober, Eds. Ch. **31**, p 458 (1990).
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63. T. Kyu, J.M. Saldanha and M.J. Kiesel "Toughness Enhancement in PC/PMMA Blends Via Polymer Phase Separation," in "*Two-Phase Polymer Systems*," L.A Utracki Ed., Ch **10**, p 259 (1991).
64. H.S. Lee, T. Kyu, A. Gadkari and J.P. Kennedy, "Kinetics of Phase Separation by Spinodal Decomposition in Mixtures of Telechelic Hydroxy Terminated Polyisobutylene and Polytetrahydrofuran," *Macromolecules*, **24**, 485(1991).
65. H. Takahashi, T. Kyu, Q. Tran-Cong, O. Yano and T. Soen, "Phase Separation Kinetics of Poly(Ethylene Glycol Monomethylether) and Poly(Propylene Glycol) Oligomer Mixtures," *J. Polym. Sci. Polym. Phys. Ed.*, **29**, 1419 (1991).
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