

Curriculum Vitae

Yifu Ding

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Research Interests

Structure and dynamics of polymers in bulk and under confinement; Functional polymer nanocomposites; Nanoimprint lithography; Patterning of functional materials; Instabilities in polymer films and nanostructures; Mechanical and viscoelastic properties of polymer nanostructures; Inelastic scattering methods.

Education

Ph.D. – University of Akron, Akron, Ohio	09/2001 – 05/2005
Department of Polymer Science – Advisor: Prof. Alexei P. Sokolov	
M.S. – Fudan University, Shanghai, China	09/1998 – 07/2001
Department of Macromolecular Chemistry and Physics – Advisor: Prof. Shanjun Li	
B.S. – Fudan University, Shanghai, China	09/1994 – 07/1998
Department of Polymer Science and Engineering	

Employment

08/2008 – present	Assistant Professor, Mechanical Engineering, University of Colorado, Boulder CO
06/2005 - 07/2008	Post-doctoral Researcher, National Institute of Standards & Technology (NIST).
08/2001 - 05/2005	Graduate Assistant, University of Akron, Akron, OH
09/1998 - 07/2001	Graduate Assistant, Fudan University, Shanghai, China

Awards and Honors

Teets Family Fellowship for graduate student, 2010-2012.
Junior Faculty Development Award, 2009, University of Colorado.
Travel award for Graduate Research Symposium and Gordon Research Conference of 2007 Polymer West.
Chair's travel award in 2004 for Gordon Research Conference on Polymer Physics.
Kodak-Eastman Scholarship for outstanding graduate student research of 2000.
3rd prize for graduate student of 1999.
Renming Scholarship from 1994 to 1998.

Synergistic Activities:

- Membership: American Chemical Society, American Physical Society, Materials Research Society, North American Membrane Society.
- Served as journal reviewer for Macromolecules, Journal of Polymer Science, Journal of Applied Polymer Science, Nanotechnology, Journal of Physical Chemistry, Macromolecular theory and simulations, ACS Applied Materials & Interfaces, ACS Nano, Nanoletters, Accounts of Chemical Research, Soft Matter, PNAS, Langmuir, and Chemistry of Materials.
- Served as panelist for NSF grant proposals.

- Instructor for “Engineering sampler” events of University Colorado for pre-engineering high school students.
- Serve on graduate committee of department of Mechanical Engineering at CU Boulder.

PUBLICATIONS (on journals)

1. “Pattern Memorizing Polymer Surface”, Wang, Z.; Hansen, C. Ge.; Q.; Ahn, D.; Maruf, S.; Qi, H.; and Ding, Y.; **Submitted**.
2. “3D Finite Deformation Viscoelasticity Based Thermomechanical Constitutive Model for Amorphous Shape Memory Polymers”, Westbrook, K.; Castro, F.; Ding, Y.; J. Qi. **Submitted**.
3. “Glass Transition Behaviors of Interfacially Polymerized Polyamide Barrier Layers on Thin Film Composite Membranes via Nano-Thermal Analysis.” Maruf, S.; Ahn, D.; Greenberg, A.; Ding, Y. *Polymer in press*.
4. “Vertical Pattern Decay and Lateral In-Phase Capillary Breakup of Nanoimprinted Bilayer Polymer Films”, Ahn, D. and Ding, Y. *Soft Matters* **2011**, 7, 3794 – 3800.
5. “Time Dependent Recovery Characteristics of Epoxy-Based Shape Memory Polymers”, Castro, F.; Westbrook, K.; Hermiller, J.; Ahn, D.; Ding, Y.; Qi, H. *Journal of Engineering Materials and Technology*, **2011**, 133, 021025.
6. “Cubic Silsesquioxanes as a Green, High-Performance Mold Material for Nanoimprint Lithography”, Ro, H.; Popova, V.; Chen, L.; Foster, A. M.; Ding, Y.; Alvine, K.; Krug, D.; Laine, R.; Soles, C. *Advanced Materials* **2011**, 23, 414-420.
7. “Thermodynamics underpinning of cell alignment on topographic surfaces”, Ding, Y.; Sun, J.; Ro, H.; Wang, Z.; Lin, N.; Zhou, J.; Cicerone, M.; Lin-Gibson, S.; Soles, C. *Advanced Materials* **2011**, 23, 421-425.
8. “Toward understanding of cell responses to grating patterns”, Sun, J.; Ding, Y.; Zhou, J.; Ro, H.; Soles, C.; Cicerone, M.; Lin-Gibson, S. *Biomacromolecules* **2010**, 11, 3067–3072.
9. “Stability and instability in nanoimprinted polymer patterns during thermal reflow”, Ding, Y.; Ro, H.; Alvine, K.; Zhou, J.; Douglas, J.; Soles, C. *Macromolecules* **2010**, 43, 8191-8201.
10. “Hierarchical polymer patterns driven by capillary instabilities at mobile and corrugated polymer-polymer interface”, Ahn, D.; Wang, Z.; Yang, R.; Ding, Y. *Soft Matter* **2010**, 6, 4900-4907.
11. “Fabrication of Topographically Uniform but Chemically Heterogeneous Patterns from Immiscible Polymer Blends”, Wang, Z.; Ahn, D.; Ding, Y. *Langmuir* **2010**, 26, 14909-14914.
12. “Probing deformation profiles at varying depths in nanoimprint lithography”, Wang, Z.; Ding, Y. *Nanotechnology* **2010**, 20, 105301.
13. “Effect of fluorosurfactant on capillary instabilities in nanoimprinted polymer patterns”, Alvine, K.; Ding, Y.; Douglas, J.; Ro, H.; Okerberg, B.; Karim, A.; Lavery, K.; Lin-Gibson, S.; Soles, C. *J. Polym. Sci. Part B: Polym. Phys.* **2009**, 47, 2591-2600.
14. “Capillary instability in nanoimprinted polymer films”, Alvine, K.; Ding, Y.; Ro, H.; Douglas, J.; Lavery, K.; Karim, A.; Soles, C. *Soft Matter* **2009**, 5, 2913-2918. **(Cover Story)**
15. “Dielectric spectroscopy investigation of relaxation in C₆₀-polyisoprene nanocomposites”, Ding, Y.; Pawlus, S.; Sokolov, A.; Douglas, J.; Soles, C.; Karim, A. *Macromolecules* **2009**, 42, 3201-3206.
16. “Material science: nanoscale polymer processing”, Soles, C.; Ding, Y. *Science* **2008**, 322, 689.

17. "Scatterometry for in-situ measurement of annealing-induced decay in nanoimprinted polymer gratings", Patrick, H.; Germer, T.; Ding, Y.; Ro, H.; Richter, L.; Soles, C. *Appl. Phys. Lett.* **2008**, *93*, 233105.
18. "Nanoimprint lithography and the role of viscoelasticity in the generation of residual stress in model polystyrene patterns", Ding, Y.; Ro, H.; Alvine, K.; Okerberg, B.; Douglas, J.; Soles, C. *Adv. Funct. Mater.* **2008**, *18*, 1854.
19. "Relaxation behavior of polymer nanostructures fabricated by nanoimprint lithography", Ding, Y.; Ro, H.; Douglas, J.; Okerberg, B.; Karim, A.; Soles, C. *ACS Nano* **2007**, *1*, 84. (Cover Story)
20. "Polymer viscoelasticity and residual stress effects on nanoimprint lithography", Ding, Y.; Ro, H.; Douglas, J. Jones, R.; Hines, D.; Karim, A.; Soles, C. *Adv. Mater.* **2007**, *19*, 1377.
21. "Evidence for internal stresses induced by nanoimprint lithography", Ro, H.; Ding, Y.; Lee, H.; Hines, D.; Jones, R.; Lin E.; Karim, A.; Wu, W.; Soles, C. *J Vac. Sci. Tech. B* **2006**, *24*, 2973. (Selected to publish on *Virtual Journal of Nanoscale Science and Technology*, Vol.14, Issue 24, Dec. 2006.)
22. "Why many polymers are so fragile?", Sokolov, A.; Novikov, V.; Ding, Y. *J. Phys. Condens. Matter.* **2007**, *19*, 205116.
23. "Breakdown of time-temperature superposition principle and the universality of chain relaxation", Ding, Y.; Sokolov, A. *Macromolecules* **2006**, *39*, 3322.
24. "Correlation of fragility of supercooled liquids with elastic properties of glasses", Novikov, V.; Ding, Y.; Sokolov, A. *Phys. Rev. E* **2005**, *71*, 061501.
25. "Observation of chain dynamics in depolarized light scattering spectra", Ding, Y.; Novikov, V.; Sokolov, A; Casalini, R.; Roland, C. *Macromolecules* **2004**, *37*, 9273.
26. "Influence of molecular weight on fast dynamics and fragility of polymers", Ding, Y.; Novikov, V.; Sokolov, A.; Alba-Simionesco, C. Frick, B. *Macromolecules*, **2004**, *37*, 9764.
27. "When does molecule become a polymer", Ding, Y.; Kisliuk, A.; Sokolov, A. *Macromolecules* **2004**, *37*, 161. (Most accessed article of *Macromolecules* in 2004.)
28. "A comment on dynamic bead size and kuhn segment length in polymers: example of polystyrene", Ding, Y.; Sokolov, A. *J. Polym. Sci. Part B: Polym. Phys.* **2004**, *42*, 3505.
29. "Unusual relaxation process in polybutadiene: resolving the controversy", Ding, Y.; Novikov, V.; Sokolov, A. *J. Polym. Sci. Part B: Polym. Phys.* **2004**, *42*, 994.
30. "Brillouin scattering studies of polymeric nanostructures", Hartschuh, R.; Ding, Y.; Roh, J.; Kisliuk, A.; Sokolov, A.; Soles, C.; Wu, W; Mahorowala, A. *J. Polym. Sci. Part B: Polym. Phys.* **2004**, *42*, 1106.
31. "Influence of molecular architecture on fast and segmental dynamics and the glass transition in polybutadiene", Kisliuk, A.; Ding, Y.; Hwang, J.; Lee, J.; Annis, B.; Foster, M.; Sokolov, A. *J. Polym. Sci. Part B: Polym. Phys.* **2002**, *40*, 2431.
32. "Water transportation in epoxy resin", Li, L.; Zhang, S.; Chen, Y.; Liu, M.; Ding, Y.; Luo, X.; Pu, Z.; Zhou, W.; Li, S. *Chem. Mater.* **2005**, *17*, 839.
33. "Effect of free volume and water affinity on corrosion protection of epoxy resin coatings", Zhang, S.; Kong, Y.; Ding, Y.; Li, S.; Zhou, W. *Acta Physico-Chemica Sinica* **2004**, *20*, 360.
34. "Contributions of side groups to the water diffusion in cured epoxy resin (2) study on physical aging", Liu, M.; Ding, Y.; Wang, M.; Li, S.; Liu, W.; Wang, B. *J. Polym. Sci. Part B: Polym. Phys.* **2003**, *41*, 1135.

35. "Study on diffusion Behavior of water in epoxy resins cured by active ester", Liu, M.; Wu, P.; Ding, Y.; Li, S. *Phys. Chem. Chem. Phys.* **2003**, *5*, 1848.
36. "Two dimensional (2D) ATR-FTIR spectroscopic study on water diffusion in cured epoxy resin", Liu, M.; Wu, P.; Ding, Y.; Chen, G.; Li, S. *Macromolecules* **2002**, *35*, 5500.
37. "Effect of polymeric structure on the corrosion protection of epoxy coatings", Zhang, S.; Ding, Y.; Li, S.; Luo, X.; Zhou, W. *Corrosion Science* **2002**, *44*, 861.
38. "Effect of water absorption on behavior of dynamic relaxation of epoxy resins", Ding, Y.; Li, H.; Liu, M.; Wu, X.; Li, S. *Chemical J. Chinese Universities* **2002**, *23*, 965.
39. "Studies on polyetherimide-modified epoxy resin (5) phase separation behavior of a quasi-binary system", Wu, X.; Cui, J.; Ding, Y.; Li, S.; Dong, B.; Wang, J. *Macromol. Rapid Commun.* **2001**, *22*, 409.
40. "Contributions of the side groups to the characteristics of water absorption in cured epoxy resins", Ding, Y.; Liu, M.; Li, S.; Zhang, S.; Zhou, W.; Wang, B. *Macrom. Chem. Phys.* **2001**, *202*, 2681.
41. "Comparison of the effects of acetoxo and hydroxy groups on the water uptake into the cured epoxy resin", Li, S.; Zhang, S.; Luo, X.; Ding, Y.; Zhou, W. *Chemical J. Chinese Universities* **2000**, *21*, 813.
42. "On polyetherimide modified bismaleimide resins (1) effect of chemical backbone of polyetherimide", Jin, J.; Cui, J.; Tang, T.; Ding, Y.; Li, S.; Wang, J.; Zhao, Q.; Hua, X.; Cai, X. *Macrom. Chem. Phys.* **1999**, *200*, 1956.

PROCEEDINGS (Peer reviewed)

- 1 "In situ measurements of annealing-induced line shape decay in nanoimprinted polymers using scatterometry". Patrick, H.; Germer, T., Ding, Y., Ro, H., Richter, L., Soles, C. *Proceedings of SPIE*, **2009**, 7271. 727128.
- 2 "The role of stress in nanoimprint lithography", Ro, H.; Ding, Y.; Lee, H.; Hines, D.; Jones, R.; Lin, E.; Alamgir, K.; Wu, W.; Soles, C. *Proceedings of SPIE*, **2006**, 6151, 615116.
- 3 "Water absorption and corrosion protection of esterified novolac resin cured epoxy resins applicable for microelectronics packing", Li, S.; Tang, X.; Ding, Y.; Liu, M. *Proceedings of Fifth International Conference on Electronic Packaging Technology*, **2003**, 343-344.