Curriculum Vitae

SuPing Lyu

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Education

2000	Ph.D.	Chemical Engineering. Advisors: Frank Bates and Chris Macosko. University of Minnesota-Twin Cities.
1994	M. Sc.	Polymer Chemistry and Physics. Advisor: ZN Qi. The Institute of Chemistry, the Chinese Academy of Sciences.
1991	B.E.	Chemical Engineering, minor in Computer Science and Technology. Tsinghua University.

Experience

2008	Technical Fellow, Medtronic Inc. Minneapolis, MN.
2000-present	Principal Scientist and Senior Scientist, Medtronic Corporate Science and Technology, Medtronic Inc., Minneapolis, MN.
2006-present	Visiting Professor, Minnesota Center for Industrial Mathematics, School of Mathematics, University of Minnesota-Twin Cities, MN.
1995-2000	Research Assistant, Department of Chemical Engineering and Materials Science, University of Minnesota-Twin Cities, MN.

Teaching Experience

2006-present	Guest lecturer, Biomaterials, Department of Biomedical Engineering, University of Minnesota-Twin Cities, MN.
2006	Summer Graduate Student Workshop, the Institute of Mathematics and its Applications, University of Minnesota-Twin Cities, MN.
1996-1999	Teaching Assistant, Reactor Analysis, Unit Operation Laboratories, Statistical Mechanics, University of Minnesota-Twin Cities, MN.

Research Interests

1. Material-drug interactions: thermodynamics, dynamics, morphology, and chemistry.
2. Biomedical device-drug combination products: design and processing.
3. Biomedical device-biological interactions.
4. Biodegradable materials and biomedical devices.
5. Nanomaterials for biomedical applications.
6. Tissue/polymer hybrids: processing, structures, and properties.

Publications

1. Lyu Sp et al. Toughening and reinforcing biodegradable materials for biomedical devices through processing. In preparation (Patent application filed).

2. Lyu SP, Coles J, Hobot C, Brabec SJ, Gardeski KC. Flexible and highly conductive bioelectrodes with nano-surface. In preparation (Patent application filed).
3. Lyu SP et al. Degradation of solid polymers is diffusion controlled. To be submitted.
4. Lyu SP. Dynamic logic method for determining behaviors of biological networks. To be submitted (arXiv 0806-1733).
5. Untereker D, Lyu SP, Schley J. Gonzalo M. Maximum conductivity of nano and micro polymer composites. ACS Applied Materials & Interfaces 2009, 1:97.
6. Calderer MC, Chabaud B, Lyu SP, Weinberger H, Zhang H. Modeling of hydrogels. Submitted to PRE, 2008.
7. Lyu SP, Schley J, Loy B, Luo L, Hobot C, Sparer R, Untereker D, Krezeszak J. In vitro biostability evaluation of polyurethane composites in acidic, basic, oxidative, and neutral solutions. J Biomed. Mater. Res. B. 2008, 85:509-518.
8. Lyu SP, Grailer T, Schley J, Belu A, Bartlett T, Hobot C, Sparer R, Untereker D. Nano-adsorbents control surface composition of polyurethane. Polymer 2007, 48:6049.
9. Lyu SP, Schley, J, Lind D, Loy B, Hobot C, Sparer R, Untereker D. Kinetics and time-temperature equivalence of polymer degradation. Biomacromolecules 2007, 8:2301.
10. Lyu SP, Sparer R, Untereker D. Analytical solutions to mathematical models of the surface and bulk erosion of solid polymers. Journal of Polymer Science, Part B: Polymer Physics 2005, 43:383.
11. Lyu SP, Sparer R, Hobot C, Dang K. Adjusting drug diffusivity using miscible polymer blends. Journal of Controlled Release 2005, 102:679.
12. Lyu SP. Block copolymers suppressing droplet coalescence through stopping film rupture. Macromolecules 2003, 36:10052.
13. Lyu S, Jones TD, Bates FS, Macosko CW. Role of block copolymers on suppression of droplet coalescence. Macromolecules 2002, 35:7845.
14. Lyu SP, Bates FS, Macosko CW. Modeling of coalescence in polymer blends. AICHE Journal 2002, 48:7.
15. Adedeji A, Lyu SP, Macosko CW. Block copolymers in homopolymer blends: interface vs micelles. Macromolecules 2001, 34:8663.
16. Maynard HD, Lyu SP, Fredrickson GH, Wudl F, Chmelka BF. Syntheses of nanophase-segregated poly(vinyl acetate)-poly(dimethylsiloxane) and poly(vinyl acetate)-poly(styrene) graft copolymers. Polymer 2001, 42:7567.
17. Lyu SP, Bates FS, Macosko CW. Coalescence in polymer blends during shearing. AIChE Journal 2000, 46:229.
18. Lyu SP, Bates FS, Macosko CW. Competitive roles of block copolymer during polymer blending: suppression of coalescence and reduction of interfacial tension. Polymer Preprints 1999, 40:1016.
19. Lyu SP, Cernohous JJ, Bates FS, Macosko CW. Interfacial reaction induced roughening in polymer blends. Macromolecules.1999, 32:106.
20. Lyu SP, Zhu XG, Liu ZH, Qi ZN. Damage competition criterion of brittle-ductile transition of polymer blends. III. Effect of morphological parameters and interfacial adhesion on brittle-ductile transition of polymer blends. Gaofenzi Cailiao Kexue Yu Gongcheng (Polymer Materials Science and Engineering) 1996, 12(6):9.
21. Lyu SP, Zhu XG, Qi ZN. Damage competition mechanism of the brittle-ductile transition of

polymer blends. II. Effect of matrix parameters on the brittle-ductile transition. Gaofenzi Cailiao Kexue Yu Gongcheng (Polymer Materials Science and Engineering) 1996, 12(5):61.

22. Lyu SP, Xu HY, Qi ZN, Wang SY. Studies of gamma-irradiated poly(ethylene naphthalate) with positron annihilation lifetime spectrum and thermal stimulated current. Gaofenzi Cailiao Kexue Yu Gongcheng (Polymer Materials Science and Engineering) 1996, 12:87.
23. Lyu SP, Zhu XG, Qi ZN. Brittle-ductile transition of polymer blends. Journal of Polymer Research 1995, 2:217.
24. Lyu SP, Zhu XG, Qi ZN. Damage competition mechanisms of brittle-ductile transition of polymer blends: Prediction of fracture behavior with molecular chain parameters. Chinese Science Bulletin 1995, 40(6):523.
25. Lyu SP, Zhu XG, Qi ZN. Damage competition mechanisms of brittle-ductile transition of polymer blends I. dimensionless damage competition group criterion. Science in China (B) 1994, (24):1028.
26. Lyu SP, Zhu XG, Qi ZN. Correlation between the fractal dimension of fracture surfaces and fracture toughness for ductile polymer materials. Journal of Polymer Science, Part B: Polymer Physics 1994, 32:2151.
27. Lyu SP, Qi ZN, Shi J, Wang SY. Studies on gamma-irradiated polymer with positron annihilation lifetime spectrum. Chinese Science Bulletin 1994, 39:183.
28. Lyu SP, Yan D, Wang KH. Database of pyrograms of polymers. Chinese J. of Chromatography 1994, (12):56.

Books

1. Biophysical principles of biomedical devices. Expected to complete drafting in 2011.

Invited Talks, Conference Presentations, and Guest Lectures

1. Lyu SP. Controlling drug release rates by polymer matrix design. Workshop of Materials Properties of Pharmaceuticals, Industrial Partnership for Research in Interfacial and Materials (IPRIME) Annual Meeting, University of Minnesota-Twin Cities, May 27th, 2008.
2. Lyu SP. Invited talk: Biocompatibility of implantable biomedical devices. American Physical Society Meeting, New Orleans, LA, March 10th, 2008.
3. Lyu SP. Determining behaviors of biological networks with dynamic logic method. American Physical Society Meeting, New Orleans, LA, March 10th, 2008.
4. Lyu SP, Untereker D. Invited talk. Biocompatibility of biomaterials and medical Devices. MNNano Briefing, Minneapolis, MN, January 23rd, 2008.
5. Lyu SP, Untereker D. Invited talk: Nano-technology, sometimes it helps and sometimes it does not. Nanotechnology Session 303, Medical Design and Manufacturing, Minneapolis, MN, October 18th, 2007.
6. Lyu SP, Haddock S, Loy B, Kinane M, Hobot C, Simonton A, Gross J. Bone allograft degradable polymer composites. The 32nd Society for Biomaterials Annual Meeting, Chicago, IL, April 18-21st, 2007.
7. Lyu SP, Untereker D, Schley J. How conductive polymer/nano-conductive filler composites can be? The 108th America Physical Society (APS) March Meeting, Denver, CO, March 5-9th, 2007.
8. Fernandes B, Bergan M, Gardeski K, Lyu SP, Morris M. Strategies to prevent the phenomenon of settling associated with cardiac cell delivery. Annual TERMIS EU Meeting, the European Tissue Engineering Society (ETES), Rotterdam, October 8th, 2006.

9. Lyu SP. Biocompatibility and biostability of polymeric materials for long term implantation. Advanced Biomaterial, Department of Biomedical Engineering, University of Minnesota-Twin Cities, October 3rd, 2006. October 30th, 2007. September 30th, 2008.
10. Lyu SP. Cell particle interaction. Summer Graduate Student Workshop, the Institute of Mathematics and its Applications, University of Minnesota-Twin Cities, MN, August 9-18th, 2006.
11. Lyu SP. Brittle-to-ductile transition of polymer blends. Polymer Workshop, the Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME), University of Minnesota-Twin Cities, May 31st, 2006.
12. Lyu, SP, Schley, J, Hobot, C, Sparer, R. Interfacial bonding and mechanical properties of polyurethane composites under wet conditions. The 31st Society for Biomaterials Annual Meeting, Pittsburgh, PA, April 26-29th, 2006.
13. Lyu, SP, et al. Biostability of polymeric materials for long term implantation. The Technology and Training Forum at the 2006 Society for Biomaterials Annual Meeting, Pittsburgh, PA, April 26-29th, 2006.
14. Lyu, SP, Untereker D, Scott, E, Pratti A, Martinez G. Invited talk. Scaling and properties of micro-structured composites. The Institute of Mathematics and its Applications Tutorial/Workshop: Composites: Where Mathematics Meets Industry, University of Minnesota - Twin Cities, February 7-9th, 2005.
15. Lyu SP, Sparer R, Hobot C, Dang K. Adjust drug permeability by using miscible polymer blends. The 31st Annual Meeting & Exposition of the Controlled Release Society, Honolulu, HI, June 13th, 2004.
16. Lyu SP, Bates FS, Macosko CW. Modeling of coalescence in polymer blends during shearing. The 101st American Physical Society (APS) March Meeting, Minneapolis, MN, March 20-24th, 2000.
17. Lyu SP, Bates FS, Macosko CW. Competitive roles of block copolymer during polymer blending: Suppression of coalescence and reduction of interfacial tension. The 218th American Chemical Society ACS National Meeting, New Orleans, AL, Aug. 22-26th, 1999.
18. Lyu SP, Bates FS, Macosko CW. Monitoring blend coalescence via particle size distribution and rheolgoy. The 71st Society of Rheology Annual Meeting, Madison, WI, October 17-21st, 1999.
19. Lyu SP, Bates FS, Macosko CW. Coalescence in polystyrene/high density polyethylene blends during shear. The 100 American Physical Society (APS) March Meeting, Atlanta, GA, March 19-26th, 1999.
20. Lyu SP, Zhu XG, Qi ZN. Transition of polymer blends. Proceedings of the International Chinese Symposium on the Polymer Blends, HsinChu, Taiwan, Republic of China, July 13-15th, 1995.
21. Lyu SP, Yan D, Wang KH. Effect of sample size on the retention of peaks in pyrograms of polymers. Proceedings of 34th International Union of Pure and Applied Chemistry (IUPAC) Congress, Beijing, August 15-20th, 1993.
22. Lyu SP, Yan D, Wang KH. Pyrogram similarity index and identification of polymers. Proceedings of 34th International Union of Pure and Applied Chemistry (IUPAC) Congress, Beijing, August 15-20th, 1993.
23. Over 30 internal presentations in Medtronic Inc.

Patents and Published Applications

1. Lyu SP, Schley J, Zhang J. Medical devices and methods including blends of biodegradable polymers. Pat Appl. US filed 2008.
2. Lyu SP, Fernandes B, Bergan M. Shear thinning polymer cell delivery compositions. Pat. Appl. US20070048288, 2007.
3. Lyu SP, et al. Compression molding method for making biomaterial composites. Pat. Appl. US11/523841, 2006.
4. Marshall M, Whitman T, Lyu SP, Nagy E, Olson D. Medical electrical electrodes with conductive polymer. Pat. Appl. US20060241734, 2006.
5. Lyu SP, Gross J, Haddock S, Hobot C, Kinnane M, Loy B, Schley J. Solvent based processing technologies for making tissue/polymer composites. Pat. Appl. US20060216321, 2006.
6. Lyu SP, Bischoff TG, Gates J, McIntyre P, Robinson S, Mehdizadeh B, Iknayan J, Belden E. Medical electrical connector. US Pat. 7108549, 2006.
7. Brabec SJ, Gardeski KC, Lyu SP, Coles J, Hobot C. Medical devices incorporating carbon nantube material and methods of fabricating same. Pat. Appl. WO2006078700, 2006.
8. Dinh T, Sparer R, Lyu SP, Dang K, Hobot C. Active agent delivery systems including a single layer of a miscible polymer blend, medical devices, and methods. Pat. Appl. US20050064038, 2005.
9. Dinh T, Sparer R, Lyu SP, Dang K, Hobot C. Active agent delivery systems including a miscible polymer blend, medical devices, and methods. Pat. Appl. US20050064005, 2005.
10. Udipi K, Cheng P, Chen MF, Lyu SP. Biocompatible controlled release coatings for medical devices and related methods. Pat. Appl. US2005084515A1, 2005.
11. Udipi K, Cheng P, Shalaby S, Campbell T, Lyu SP. Biocompatible controlled release polymer coatings for medical devices and related methods. Pat. Appl. WO2005016396A1, 2005.
12. Sparer R. Hobot C, Lyu SP, Dang K. Active agent delivery system including a hydrophilic polymer, medical device, and method. Pat. Appl. US20040127978, 2004.
13. Sparer R, Hobot C, Lyu SP. Medical device exhibiting improved adhesion between polymeric coating and substrate. Pat. Appl. US20040039437, 2004.
14. Sparer R, Hobot C, Lyu SP, Udipi K. Active agent delivery systems, medical devices, and methods. Pat. Appl. US20040086569, 2004.
15. Sparer R, Hobot C, Lyu SP, Dang K, Cheng P. Active agent delivery system including a hydrophobic cellulose derivative, medical device, and method. Pat. Appl. US20040115273, 2004.
16. Sparer R, Hobot C, Lyu SP, Dang K. Active agent delivery system including a polyurethane, medical device, and method. Pat. Appl. US20040033251, 2004.
17. Lyu SP, Sparer R, Hobot C, Dang K. Active agent delivery system including a poly(ethylene-co-(meth)acrylate), medical device, and method. Pat. Appl. US20040047911, 2004.
18. Benz M, Alkatout J, Lyu SP. AnB block copolymers containing poly(vinyl pyrrolidone) units, medical devices, and methods. US Pat. 6756449, 2004
19. More than 15 applications in the areas of biomaterials processing and biomedical applications to be disclosed.

Professional Activities

Committee member

1. Chair, Advanced Material SIG, MNNano, 2008 – present.

2. Vice Chair, Protein and Cells at Interfaces, Society for Biomaterials, 2007.
3. Member, Devices and Materials Committee, Society for Biomaterials, 2005-2007.
4. Member, Technical Advisory Committee of the Nanostructural Materials and Processes Program, the Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME), University of Minnesota –Twin Cities, 2004-present.
5. Member, Industrial Advisory Board of the Institute of Mathematics and its Applications, University of Minnesota-Twin Cities, 2005-present.

Conference (co)organizer

1. Bio Medical Applications of NANO Materials, MN Nano, St Paul, MN, September 25th, 2008.
2. Focus Session, Biocompatibility (A38). American Physical Society Meeting, New Orleans, LA, March 10th, 2008
3. Panel Discussion, Where have we been and where are we going - traditional approaches versus nanotechnologies. Society for Biomaterials Annual Meeting, Chicago, April 18-21st, 2007. Co-organized with Professor Nick Ziats, Case Western Reserve University.

Affiliations

1. The America Physical Society
2. The America Chemical Society
3. The Society for Biomaterials
4. AIChE

Awards

1. NSF Student Travel Award for presentation at the 218th American Chemical Society (ACS) annual meeting, New Orleans, AL, Aug. 22-26th, 1999.
2. Research grant, Ford China Research and Development Program (with ZN Qi), 1994.
3. Graduation with Honors, Tsinghua University, Beijing, 1991.