

## Sergei S. Sheiko

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### Education

December 2000 Habilitation in polymer chemistry, University of Ulm, Germany  
August 1990 Ph.D. in polymer physics, Institute of Chemical Physics of the Russian Academy of Sciences, Moscow.  
1980-1986 M.S. in molecular and chemical physics, Moscow Physico-Technical Institute.

### Professional Experience

2009-present Professor, Department of Chemistry, University of North Carolina at Chapel Hill.  
2005-2009 Associate Professor, Department of Chemistry, University of North Carolina at Chapel Hill.  
2001-present Joint appointment in the Curriculum of Materials Science.  
2001-2005 Assistant Professor, Department of Chemistry, University of North Carolina at Chapel Hill.  
1998-2000 Research assistant (C1), Department of Organic Chemistry and Macromolecular Chemistry, University of Ulm  
1993-1998 Post-Doctoral Fellow, University of Ulm  
1991-1993 Post-Doctoral Fellow, University of Twente, the Netherlands.  
1989-1991 Engineer-researcher, Institute of Chemical Physics of the Russian Academy of Sciences, Moscow.

### Honors

2010 American Physical Society Fellow

### Publications

Total 163: 119 Refereed papers, 10 review articles, 3 patents, 31 conference preprints  
Times cited: 6073 (total), 5485 (w/o self-citations); H-index: 40

Highlights: Nature, Science, Washington Post, Chemical & Engineering News, Materials Today, Chemistry World, Analytical Chemistry.

[http://www.washingtonpost.com/wp-dyn/content/article/2006/03/12/AR2006031200947\\_2.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/03/12/AR2006031200947_2.html)

<http://www.sciencemag.org/cgi/reprint/318/5850/537c.pdf>

<http://www.nature.com/nature/journal/v440/n7081/pdf/440160a.pdf>

<http://www.rsc.org/chemistryworld/News/2006/March/09030601.asp>

<http://pubs.acs.org/doi/pdf/10.1021/ac031369k>

#### a. Refereed papers

1. Nese, A.; Li, Y.; Averick, S.; Kwak, Y.; Konkolewicz, D.; Sheiko, S.S.; Matyjaszewski, K. "Synthesis of Amphiphilic Poly(N-vinylpyrrolidone)-b-poly(vinyl acetate) Molecular Bottlebrushes." *ACS Macromol. Lett.*, 1, 227–231 (2012).
2. Nese, A.; Lebedeva, N.V.; Sherwood, G.; Averick, S.; Li, Y.; Gao, H.F.; Peteanu, L.; Sheiko, S.S.; Matyjaszewski, K. "pH-Responsive Fluorescent Molecular Bottlebrushes

- Prepared by Atom Transfer Radical Polymerization." *Macromolecules*, **44**, 5905-5910 (2011).
3. Yu-Su, S.Y.; Sun, F.C.; Sheiko, S.S.; Konkolewicz, D.; Lee, H.I.; Matyjaszewski, K. "Molecular Imaging and Analysis of Branching Topology in Polyacrylates by Atomic Force Microscopy." *Macromolecules*, **44**, 5928-5936 (2011).
  4. Li, Y.; Nese, A.; Lebedeva, N.V.; Davis, T.; Matyjaszewski, K.; Sheiko, S.S. "Molecular Tensile Machines: Intrinsic Acceleration of Disulfide Reduction by Dithiothreitol." *J. Am. Chem. Soc.*, **133**, 17479–17484 (2011).
  5. Wang, J.-Y.; Wang, Y.; Sheiko, S.S.; Betts, D.E.; DeSimone, J.M. "Tuning Multiphase Amphiphilic Rods to Direct Self-Assembly." *J. Am. Chem. Soc.*, Articles ASAP (2011).
  6. Nese Alper; Sheiko Sergei S.S.; Matyjaszewski Krzysztof "Effect of residual copper on stability of molecular brushes prepared by atom transfer radical polymerization." *Europ. Polym J.* **47**, 1198-1202 (2011).
  7. Sheiko, S.S.; Panyukov, S.; Rubinstein, M. "Bond Tension in Tethered Macromolecules" *Macromolecules* **44**, 4520-4529 (2011).
  8. Park, I., Nese, A.; Pietrasik, J.; Matyjaszewski, K.; Sheiko, S.S. "Focusing bond tension in bottle-brush macromolecules during spreading." *J. Mater. Chem.* **21**, 8448-8453 (2011).
  9. Tang HY, Li YC, Lahasky SH, Sheiko SS, Zhang DH "Core-Shell Molecular Bottlebrushes with Helical Polypeptide Backbone: Synthesis, Characterization, and Solution Conformations." *Macromolecules* **44**, 1491-1499 (2011).
  10. Carrillo Jan-Michael Y.; Sheiko Sergei S.; Dobrynin Andrey V. "Molecular dynamics simulations of bottlebrush macromolecules in two dimensional polymeric melts under flow conditions." *Soft Matter* **7**, 2805-2811 (2011).
  11. Barrett MJ, Sun FC, Nese A, Matyjaszewski, K.; Carrillo JMY, Dobrynin AV, Sheiko SS "Size Separation of Macromolecules during Spreading." *Langmuir* **26**, 15339-15344 (2010).
  12. Park, I.; Shirvaniants, D.; Nese, A.; Matyjaszewski, K.; Rubinstein, M.; Sheiko, S.S. "Spontaneous and specific activation of chemical bonds in macromolecular fluids." *J. Am. Chem. Soc.* **132**, 12487–12491 (2010).
  13. Nese, A.; Kwak, Y.; Nicolay, R.; Barrett, M.; Sheiko, S.S.; Matyjaszewski, K. "Synthesis of Poly(vinyl acetate) Molecular Brushes by a Combination of Atom Transfer Radical Polymerization (ATRP) and Reversible Addition-Fragmentation Chain Transfer (RAFT) Polymerization" *Macromolecules* **43**, 4016-4019 (2010).
  14. Lee, H.-i.; Pietrasik, J.; Sheiko, S.S.; Matyjaszewski, K. "Stimuli-Responsive Molecular Brushes" *Prog. Polym. Sci.* **35**, 24-44, (2010).
  15. Yu-Su, S.; Sheiko, S.S.; Lee, H.-il; Jakubowski, W.; Nese, A.; Matyjaszewski, K.; Anokhin, D.; Ivanov, D.I. "Crystallization of Molecular Brushes with Diblock Copolymer Side Chains." *Macromolecules* **42**, 9008-9017 (2009).
  16. Panyukov, S.V., Sheiko, S.S.; Rubinstein, M. "Amplification of tension in branched macromolecules." *Phys. Rev. Lett.* **102**, 148301/1-4 (2009).
  17. Park, I.; Nese, A.; Matyjaszewski, K.; Sheiko, S.S. "Molecular Tensile Testing Machines: Selective Scission of A Single Disulfide Bond by Adsorption-Induced Tension." *Macromolecules* **42**, 1805-1807 (2009).
  18. Panyukov, S.V., Zhulina, E.B.; Sheiko, S.S.; Randall, G.; Brock, J.; Rubinstein, M. "Tension Amplification in Molecular Brushes in Solutions and at Substrates" *J. Phys. Chem.* **113**, 3750–3768 (2009).

19. Lee, H.-I.; Boyce, J.B.; Nese, A.; Matyjaszewski, K.; Sheiko, S.S. "pH-Induced Conformational Changes of Loosely-Grafted Molecular Brushes Containing Poly (acrylic acid) Side Chains." *Polymer* (2008) 49, 5490-5496.
20. Yu-Su, S. Y.; Thomas, D.R.; Alford, J. E.; LaRue, I.; Pitsikalis, M.; Hadjichristidis, N.; DeSimone, J.M.; Dobrynin, A.V.; Sheiko, S.S. "Molding Block Copolymer Micelles: A Framework for Molding of Discrete Objects on Surfaces" *Langmuir* (2008) 24, 12671-12679.
21. Lee, H.-il; Matyjaszewski, K.; Yu-Su, S.; Sheiko, S.S. "Hetero-Grafted Block Brushes with PCL and PBA Side Chains" *Macromolecules* 41, 6073-6080 (2008).
22. LaRue, I.; Adam, M.; Rubinstein, M.; Pitsikalis, M.; Hadjichristidis, N.; Hammouda, B.; Lin, M.Y.; Ivanov, D.A.; Gearba, R.I.; Anokhin, D.V. and Sheiko, S.S. "Effect of the Soluble Block Size on Spherical Diblock Polymer Micelles" *Macromolecules* 41, 6555-6563 (2008).
23. Sheiko, S.S.; Sumerlin, B.S.; Matyjaszewski, K. "Cylindrical molecular brushes: Synthesis, characterization, and properties." *Progress in Polymer Science* 33, 759-785 (2008).
24. Lebedeva, N.V., Sun, F.C.; Lee, H.-il, Matyjaszewski, K., and Sheiko, S.S. "Fatal Adsorption of Brush-Like Macromolecules: High Sensitivity of C-C Bond Cleavage Rates to Substrate Surface Energy" *J. Am. Chem. Soc.* 130, 4228-4229 (2008).
25. Min K., Yu S., Lee H.I., Mueller L, Sheiko S.S., Matyjaszewski K. "High yield synthesis of molecular brushes via ATRP in miniemulsion" *Macromolecules* 40, 6557-6563 (2007).
26. Sun, F.C.; Dobrynin, A.V.; Shirvanyants, D.; Lee H.-I., Matyjaszewski, K.; Rubinstein, G.; Rubinstein, M.; and Sheiko, S.S. "A Flory Theorem for Structurally Asymmetric Mixtures" *Phys. Rev. Lett.* 99, 137801 (2007).
27. Gallyamov, M.O.; Tartsch, Mela, P.; Potemkin, I.I.; Sheiko, S.S.; Börner, H.G.; Matyjaszewski, K.; Khokhlov, A.R.; Möller, M. "Vapour-induced Spreading Dynamics of Adsorbed Linear and Brush-like Macromolecules as Observed by Environmental-SFM: Polymer Chain Statistics and Scaling Exponents" *Journal of Polymer Science B: Polymer Physics* 45, 2368-2379 (2007)
28. Xu, H.; Shirvanyants, D.; Rubinstein, M.; Shabratov, D.; Beers, K.; Matyjaszewski, K.; Sheiko, S.S. "Molecular Pressure Sensors" *Advanced Materials* 19, 2930-2934 (2007).
29. Cherian, A.E.; Sun, F.C.; Sheiko, S.S.; Coates, G.W. "Formation of Nanoparticles by Intramolecular Cross-Linking: Following the Reaction Progress of Single Polymer Chains by Atomic Force Microscopy." *J. Am. Chem. Soc.* 129, 11350-11351 (2007).
30. Maynor, B.W.; LaRue, I.; Rolland, J.P.; Spontak, R.J. Sheiko, S.S.; Samulski, R.J.; Samulski, E.T.; DeSimone, J.M. "Molecular Nanomimetics: Replication of Viruses, Micelles and other Naturally-Occurring Objects" *Small* 3, 845-849 (2007).
31. Tang, H.-Z.; Garland, E.R.; Novak, B.M.; He, J.; Polavarapu, P.L.; Sun, F.C.; Sheiko, S.S. "Helical Polyguanidines Prepared by Helix-Sense-Selective Polymerizations of Achiral Carbodiimides Using Enantiopure Binaphthol-Based Titanium Catalysts." *Macromolecules* 40, 3575-3580 (2007).
32. Gallyamov, M.O.; Tartsch, Mela, P.; Börner, H.G.; Matyjaszewski, K.; Sheiko, S.S.; Khokhlov, A.R.; Möller, M. "A scanning force microscopy study on the mobility of single brush-like macromolecules on a silicon substrate induced by coadsorption of small molecules." *Phys. Chem. Chem. Phys.* 9, 346-352 (2007).

33. Kim, K.T.; Han, J.; Ryu, C.Y.; Sun, F.C.; Sheiko, S.S.; Winnik, M.A.; Manners, I. "Synthesis, Characterization, and AFM Studies of Dendronized Polyferrocenylsilanes." *Macromolecules* **39**, 7922-7930 (2006)
34. Lee, H.I.; Jakubowski, W.; Matyjaszewski, K.; Yu, S.; Sheiko, S.S. "Cylindrical core-shell brushes prepared by a combination of ROP and ATRP" *Macromolecules* **39**, 4983-4989 (2006).
35. Kreutzer, G.; Ternat, C.; Nguyen, T. Q.; Plummer, C.J.G.; Månson, J.-A.E.; Castelletto, V.; Hamley, I.W.; Sun, F.; Sheiko, S.S.; Klok, H.A. "Water-Soluble, Unimolecular Containers Based On Amphiphilic Multiarm Star Block Copolymers" *Macromolecules* **39**, 4507-4516 (2006).
36. Sheiko, S.S.; Sun, F.; Randal, A.; Shirvaniants, D.; Matyjaszewski, K.; Rubinstein, M. "Adsorption-Induced Scission of Carbon-Carbon Bonds" *Nature* **440**, 191-194 (2006).
37. LaRue, I.; Adam, M.; Pitsikalis, M.; Hadjichristidis, N.; Rubinstein, M.; Sheiko, S.S. "Reversible Morphological Transitions of Polystyrene-b-Polyisoprene Micelles" *Macromolecules* **39**, 309-314 (2006).
38. Xu, H.; Sheiko, S.S.; Shirvaniants, D.; Rubinstein, M.; Beers, K.L.; Matyjaszewski, K.; "Flow induced epitaxial ordering of brush-like macromolecules on graphite" *Langmuir* **22**, 1254-1259 (2006).
39. Xu, H.; Shirvaniants, D.; Beers, K.L.; Matyjaszewski, K.; Dobrynin, A.V.; Rubinstein, M.; Sheiko, S.S. "Molecular visualization of conformation-triggered flow instability" *Phys. Rev. Lett.* **94**, 237801/1-4 (2005).
40. Zhulina, E.B.; Adam, M.; LaRue, I.; Sheiko, S.S.; Rubinstein, M. "Diblock Copolymer Micelles in Dilute Solution" *Macromolecules* **38**, 5330-5351 (2005).
41. Lübbert, A.; Nguyen, T.Q.; Sun, F.; Sheiko, S.S.; Klok, H.-A. "l-Lysine Dendronized Polystyrene" *Macromolecules* **38**, 2064-2071 (2005).
42. Logan, J.; Masse, P.; Dorvel, B.; Skolnik, A.; Sheiko, S.S.; Francis, R.; Taton, D.; Gnanou, Y.; Duran, R.S. "AFM study of micelle chaining in surface films of polystyrene-b-polyethylene oxide stars at the air/water interface" *Langmuir* **21**, 3424-3431 (2005)
43. Klok, H-A; Vandermeulen, G.W.M.; Nuhn, H.; Rösler, A.; Hamley, I.W.; Castelletto, V.; Xu, H.; Sheiko, S.S. "Peptide mediated formation of hierarchically organized solution and solid state polymer nanostructures" *Faraday Discuss.* **128**, 29-41 (2005).
44. Xu, H.; Shirvaniants, D.; Beers, K.; Matyjaszewski, K.; Rubinstein, M.; Sheiko, S.S. "Molecular Motion in a Spreading Precursor Film" *Phys. Rev. Lett.* **93**, 206103/1-4, (2004).
45. Sun, F.; Sheiko, S.S.; Möller, M.; Beers, K.; Matyjaszewski, K.; "Conformational switching of molecular brushes in response to the energy of interaction with the substrate" *Phys. Chem. A* **108**, 9682-9686 (2004).
46. Gallyamov, M.O.; Tartsch, B.; Khokhlov, A.R.; Sheiko, S.S.; Börner, H.G.; Matyjaszewski, K.; Möller, M. "Real-Time Scanning Force Microscopy of Macromolecular Conformational Transitions" *Macromol. Rapid Comm.* **25**, 1703-1707 (2004).
47. Gallyamov, M.O.; Tartsch, B.; Khokhlov, A.R.; Sheiko, S.S.; Börner, H.G.; Matyjaszewski, K.; Möller, M. "Reversible Collapse of Brushlike Macromolecules in Ethanol and Water Vapours as Revealed by Real-Time Scanning Force Microscopy" *Chemistry - A European Journal* **10**, 4599-4605 (2004).
48. Gallyamov, M.O.; Tartsch, B.; Khokhlov, A.R.; Sheiko, S.S.; Börner, H.G.; Matyjaszewski, K.; Möller, M. "Conformational dynamics of single molecules visualized

- in real time by scanning force microscopy: macromolecular mobility on a substrate surface in different vapours" *J. Microscopy* 215, 245-256 (2004).
49. Boyce, J.R.; Shirvanyants, D.; Sheiko, S.S.; Ivanov, D.A.; Qin, S.H.; Börner, H.G.; Matyjaszewski, K. "Multiarm cylindrical brushes: effect of the number of arms on the molecular weight polydispersity and surface ordering" *Langmuir* 20, 6005-6011 (2004).
  50. Neugebauer, D.; Sumerlin, B.; Matyjaszewski, K.; Goodhart, B.; Sheiko, S.S.; "How Dense are Cylindrical Brushes Grafted from a Multifunctional Macroinitiator?" *Polymer* 45, 8173-8179 (2004).
  51. Li, J.; Gauthier, M.; Teertstra, S.J.; Hu, X.; Sheiko, S.S. "Synthesis of Arborescent Polystyrene-graft-polyisoprene Copolymers using Acetylated Substrates" *Macromolecules* 37, 795-802 (2004).
  52. Potemkin, I.I.; Khokhlov, A.R.; Sheiko, S.S.; Prokhorova, S.A.; Beers, K.; Matyjaszewski, K. "Spontaneous Curvature of Comb-Like Polymers at a Flat Interface" *Macromolecules* 37, 3918-3923 (2004).
  53. Lord, S.J.; Sheiko, S.S.; LaRue, I.; Qin, S.; Lee, H-I.; Matyjaszewski, K. "Tadpole Conformation of Gradient Polymer Brushes" *Macromolecules* 37, 4235-4240, (2004).
  54. Vandermeulen, G.W.M.; Hinderberger, D.; Xu, H.; Sheiko, S.S.; Jeschke, G.; Klok, H-A "Structure and Dynamics of Self-Assembled PEGylated Coiled Coil Nano-Objects" *Phys. Chem. Phys.* 5, 488-494 (2004).
  55. Sheiko, S.S.; Borisov, O.V.; Prokhorova, S.A.; Schmidt U, Möller, M.; Schmidt, M. "Microsegregation of Cylindrical Molecular Brushes: Microscopic Observation and Scaling Analysis" *Europ. Phys. J. E* 13, 125-131 (2004).
  56. LaRue, I.; Adam, M.; Sheiko, S.S.; Rubinstein, M. "Wormlike Micelles of Block Copolymers: Measuring the Linear Density by AFM and Light Scattering" *Macromolecules* 37, 5002-5005 (2004).
  57. Qin, S.; Matyjaszewski, K.; Xu, H.; Sheiko, S.S. "Synthesis and Visualization of Densely Grafted Molecular Brushes with Crystallizable Poly(octadecyl methacrylate) Block Segments" 36, 605-612 *Macromolecules* (2003).
  58. Sheiko, S.S.; daSilva, M.; Shirvanyants, D.G.; LaRue, I.; Prokhorova, S.A.; Beers, K.; Matyjaszewski, K. "Measuring Molecular Weight by Atomic Force Microscopy" *J. Am. Chem. Soc.* 125, 6725-6728 (2003).
  59. Matyjaszewski, K.; Qin, S.H.; Boyce, J.R.; Shirvanyants, D.; Sheiko, S.S. "Effect of initiation conditions on the uniformity of three-arm star molecular brushes" *Macromolecules* 36, 1843-1849 (2003).
  60. Neugebauer, D.; Zhang, Y.; Pakula, T.; Sheiko, S.S.; Matyjaszewski, K. "Densely Grafted and Double-Grafted PEO Brushes via ATRP. A Route to Soft Elastomers" *Macromolecules* 36, 6746-6755 (2003).
  61. Börner, H.G.; Duran, D.; Matyjaszewski, K.; DaSilva, M.; Sheiko, S.S. "Synthesis of Molecular Brushes with Gradient in Grafting Density by Atom Transfer Polymerization" *Macromolecules* 35, 3387 -3394 (2002).
  62. Börner, H.G.; Beers, K.; Matyjaszewski, K.; Sheiko, S.S.; Möller, M. "Synthesis of Molecular Brushes with Block Copolymer Side Chains Using Atom Transfer Radical Polymerization" *Macromolecules* 34, 4375-4383 (2001).
  63. Sheiko, S.S.; Prokhorova, S.A.; Beers, K.; Matyjaszewski, K.; Potemkin, I.I.; Khokhlov, A.R.; Möller, M. "Single Molecule Rod-Globule Phase Transition for Brush Molecules at a Flat Interface" *Macromolecules* 34, 8354-8360 (2001).

64. Sheiko, S.S.; Slangen, P.-J.; Krupers, M.; Mourran, A.; Möller, M. „Wetting Behavior of Thin Films of Polymethacrylates With Oligo(hexafluoropropene oxide) Side Chains“ in “Fluorinated Surfaces, Coatings, and Films” D.G. Castner, D.W. Grainger, Eds. *ACS Symposium Series* **787**, 71-82 (2001).
65. Khalatur, P.G., Khokhlov, A.R.; Prokhorova, S.A., Sheiko, S.S.; Möller, M.; Reineker, P. Shirvanyanz, D.G.; Starovoitova, N. “Unusual Conformation of Cylindrical Brushes Strongly Adsorbed on a Flat Solid Substrate” *Europ. Phys. J. E* **1**, 99-103 (2000).
66. Zhang, X.-Y.; Klein, J.; Sheiko, S.S.; Muzafarov, A. “Normal and Shear Behavior Between Two Mica Surfaces with Adsorbed Carbosiloxane Dendrimer” *Langmuir* **16**, 3893-3901 (2000).
67. Beginn, U.; Sheiko, S.S.; Möller, M. “Self-Organisation of 3,4,5-Tris(octyloxy)benzamide in Solution and Embedding of the Aggregates into Methacrylate Resins” *Macromol. Chem. Phys.* **201**, 1008-1015 (2000).
68. Prokhorova, S.A.; Sheiko, S.S.; Mourran, A.; Möller, M.; Beginn, U.; Zipp, G.; Ahn, C.-H.; Percec, V. „Epitaxial Crystallization of Monodendron Jacketed Linear Polymers on HOPG: studied by SFM and STM“ *Langmuir* **16**, 6862 -6867 (2000).
69. Sheiko, S.S.; Prokhorova S.A.; Schmidt U.; Dziezok, P.; Schmidt, M. ; Möller, M. „Sparse Coatings by Disperse Adsorption of Molecular Brushes“ *ACS Symposium Series* **741** Tsukruk V.V.; Wahl, K.J. Eds. 346-355 (1999).
70. Gerle, M.; Fischer, K.; Schmidt, M.; Roos, S.; Müller, A.H.E.; Sheiko, S.S.; Prokhorova, S.A.; Möller, M. „Main Chain Conformation and Anomalous Elution Behavior of Cylindrical Brushes by GPC/MALLS, Light Scattering and SFM“ *Macromolecules* **32**, 2629-2637 (1999).
71. Prokhorova, S.A.; Sheiko, S.S.; Ahn, C.-H.; Percec, V.; Möller, M. „Molecular Conformations of Monodendron Jacketed Polymers by Scanning Force Microscopy“ *Macromolecules* **32**, 2653-2660 (1999).
72. Schwegler, L.A.; Sheiko, S.S.; Möller, M.; Fossum, E.; Matyjaszewski, K. “Preparation of Telechelic Polysilylenes: A General Methodology for the Synthesis of Polysilylene Based Triblock Copolymers” *Macromolecules* **32**, 5901-5904 (1999).
73. Emmerich, O.; Hugenberg, Schmidt, M.; N.; Sheiko, S.S.; Baumann, F.; Deubzer, B.; Weis, J.; Ebenhoch, J. “Molecular Boxes Based on Hollow Organosilicon Micronetworks” *Advanced Materials* **11**, 1299-1303 (1999)
74. Mazo, M.A.; Zhilin, P.A.; Gusarova, E.B. ; Sheiko, S.S.; Balabaev, N.K. „Computer Simulation of Itramolecular Mobility of Dendrimers“ *J. Molec. Liquids* **82**, 105-116 (1999).
75. Mazo, M.A.; Zhilin, P.A.; Gusarova, E.B. ; Sheiko, S.S.; Balabaev, N.K. „Molecular Dynamics Simulation of Dendrimer Itramolecular Mobility“ (Russian) *Izvestiya Akadem. Nauk, Ser. Fiz.* **62**, 1098-1102 (1998).
76. Percec, V.; Ahn, C.-H., Ungar, G.; Yearley, D.J.P.; Möller, M.; Sheiko, S.S. "Spherical and Cylindrical Supermolecules from Polymer Backbones Jacketed with Quasi-Equivalent Dendritic Coats" *Nature* **391**, 161-164 (1998).
77. Krupers, M.J.; Sheiko, S.S.; Möller, M. „Micellar morphology of a Semifluorinated Diblock Copolymer“ *Polym. Bull.* **40**, 211-217 (1998).
78. Prokhorova, S.A.; Sheiko, S.S.; Möller, M., Ahn, C.-H.; Percec, V. „Molecular Imaging of Monodendron Jacketed Linear Polymers by Scanning Force Microscopy“ *Makromol. Rapid Comm.* **19**, 359-366 (1998).

79. Spatz, J.P.; Sheiko, S.S.; Möller, M. "Shape and Quality Control of Modified Scanning Force Microscopy Tips" *Ultramicroscopy* **75**, 1-4 (1998).
80. Hempenius, M.A.; Langeveld-Voss, B.M.W.; van Haare, J.A.E.H.; Janssen, R.A.J.; Sheiko, S.S.; Spatz, J.P.; Möller, M.; Meijer, E.W. "A Polystyrene-Oligothiophene-Polystyrene Triblock Copolymer" *J. Am. Chem. Soc.* **120**, 2798-2804 (1998).
81. Percec, V.; Ahn, C.-H.; Cho, W.-D.; Jamieson, A.M.; Kim, J.; Leman, T.; Schmidt, M.; Gerle, M.; Möller, M.; Prokhorova, S.A.; Sheiko, S.S.; Cheng, S.Z.D.; Zhang, A.; Ungar, G.; Yearley, D.J.P. *J. Am. Chem. Soc.* **120**, 8619-8631 (1998).
82. Polyakov, D.K.; Ignat'eva, G.M.; Rebrov, E.A.; Vasilenko, N.G.; Muzafarov, A.M.; Sheiko, S.S.; Möller, M. "Star-shaped Multi-arm Poly(styrene-*block*-isoprene)" *Polymer Science. Ser. A*, **40**, 876-883 (1998) *Translated from Vysokomolekul. Soed.* **A40**, 1421-1429 (1998).
83. Huck, W.T.S.; van Veggel, F.C.J.M.; Sheiko, S.S.; Möller, M.; Reinhoudt, D.N. "Molecularly Thin Films of Metallo-dendrimers" *J. Phys. Org. Chem.* **11**, 540-545 (1998).
84. Beers, K.; Gaynor, S.G.; Matyjaszewski, K.; Sheiko, S.S.; Möller, M. "The synthesis of Densely Grafted Copolymers by Atom Transfer Radical Polymerization" *Macromolecules* **31**, 9413-9415 (1998).
85. Sheiko, S.S.; Buzin A.I.; Muzafarov, A.M.; Rebrov, E.A.; Getmanova, E.V. „Spreading of carbosilane dendrimers on the air/water interface“ *Langmuir* **14**, 7468-7474 (1998).
86. Sheiko S., Kunz M., Deckmann H., Möller M., "Nanofibrillar Structure of Gel-Drawn UHMW PE", *Acta Polymerica* **47**, 492-497 (1997)
87. Fossum, E.; Matyaszhevskij, K.; Sheiko, S.; Möller, M. "Morphology Studies of Polystyrene-*block*-Poly(methylphenylsilylene)" *Macromolecules* **30**, 1765-1767 (1997).
88. Sheiko, S.S.; Gauthier, M.; Möller, M. "Film Formation of Arborescent Graft Polystyrenes" *Macromolecules* **30**, 2343-2349 (1997).
89. Sheiko, S.S.; Gerle, M.; Fischer, M.; Schmidt, M.; Möller, M. „Worm-like Polystyrene Brushes in Thin Films“ *Langmuir* **13**, 5368-5772 (1997).
90. Sheiko, S.S.; Muzafarov, A.M.; Winkler, R.G.; Getmanova, E.V.; Eckert, G.; Reineker, P. "Contact Angle Microscopy on a Carbosilane Dendrimer with Hydroxyl End Groups: A Method for Mesoscopic Characterization of the Surface Structure" *Langmuir* **13**, 4172-4181 (1997).
91. Spatz, J.P.; Sheiko, S.; Möller, M.; Winkler, R.; Reineker, P.; Marti, O. "Tapping Scanning Force Microscopy in Air - Theory and Experiment" *Langmuir* **13**, 4699-4703 (1997).
92. Mazo, M.A.; Sheiko, S.S.; Perov, N.S.; Gusarova, E.B.; Balabaev, N.K. „Molecular Dynamic Simulation of Molecular Structure of Carbosilane Dendrimers“ *Izvestiya of Russian Academy of Sciences, Phys. Ser.* **61**, 1728 (1997).
93. Baumann, F.; Deubzer, B.; Geck, M.; Dauth, J.; Sheiko, S.S.; Schmidt, M. "Soluble Organosilicon-Micronetworks with Spatially Confined Reaction Sites" *Advanced Materials* **9**, 955-958 (1997)
94. Dziezok, P.; Sheiko, S.S.; Fischer, K.; Schmidt, M.; Möller, M. "Cylindrical Molecular Brushes" *Angew. Chemie* **109**, 2894-2897 (1997). *Int. Engl. Ed.* **109**, 2812-2815 (1997).
95. Sheiko, S.S.; Frey, H.; Blomers, B.; Möller, M. "Substrate-Induced Orientation of Poly(di-n-alkylsilylenes)" *Langmuir* **12**, 584-587 (1996).

96. Molenberg, A.; Sheiko, S.S.; Möller, M. "A Block Copolymer from Polystyrene and Columnar Liquid-Crystalline Polydiethylsiloxane" *Macromolecules* **29**, 3397-3400 (1996).
97. Sheiko, S.S.; Eckert, G.; Ignat'eva, G.; Muzafarov, A.M.; Spickermann, J.; Räder, H.J.; Möller, M. "Solid-like States of a Dendrimer Liquid Displayed by Scanning Force Microscopy" *Macromol. Chemie, Rapid Comm.* **17**, 283-297 (1996).
98. Spatz, J.P.; Sheiko, S.; Möller, M. "Ion Stabilized Block Copolymer Micelles - Film Formation and Inter Micellar Interaction" *Macromolecules* **29**, 3220-3226 (1996).
99. Spatz, J.P.; Sheiko, S.; Möller, M. "Substrate Induced Lateral Micro-Phase Separation by Self-ordering of a Diblock Copolymer" *Advanced Materials* , **8**, 513-517 (1996)
100. Sheiko, S.; Lermann, E.; Möller, M. "Self-Dewetting of Perfluoroalkylmethacrylate Films on Glass" *Langmuir* **12**, 4015-4024 (1996)
101. Winkler, R.G.; Spatz, J.P.; Sheiko, S.; Möller, M.; Reineker, P.; Marti, O. „Imaging Material Properties by Resonant Tapping Force Microscopy: A Model Investigation“ *Phys. Rev. B.* **54**, 8908-8912 (1996)
102. Spatz, J.P., Roescher, A.; Sheiko, S.S.; Krausch, G.; Möller, M. "Noble Metal Loaded Block Ionomers: Micelle Organization, Adsorption of Free Chains and Formation of Free Films", *Adv. Mater.* **7**, 731-735 (1995).
103. Spatz, J.; Sheiko, S.S.; Möller, M.; Winkler, R.; Reineker, P.; Marti O. "Forces Affecting the Substrate in Resonant Tapping Force Microscopy" *Nanotechnology* **6**, 40-44, (1995).
104. van der Laan, G.P., de Haas M.P., Hummel A., Frey H., Sheiko S.S., Möller M., "Anisotropic Radiation Induced Conductivity in Oriented Poly(di-n-hexyl-silylene) in solid state and in the Mesophase" *Macromolecules* **27**, 1897 (1994).
105. Sheiko, S.S.; Möller, M.; Reuvekamp, E.M.C.M.; Zandbergen, H.W. "Evaluation of the probing profile of scanning-force-microscopy tips" *Ultramicroscopy* **53**, 371-380 (1994).
106. Frey, H.; Sheiko, S.S.; Möller, M.; Wittmann, J.C.; Lotz, B. "Highly Oriented Poly(di-n-alkylsilylene) films on Oriented PTFE Substrates" *Adv. Mater.* **5**, 917-919 (1993).
107. Möller, M.; Frey, H.; Sheiko S.S. "Blending, gel drawing and UV-crosslinking of ultra high molecular weight polyethylene and poly(di-n-pentylsilylene)" *Coll. Polym. Sci.* **271**, 345-353 (1993).
108. Dickland, H.G.; Sheiko, S.S.; v. der Does, L.; Möller, M.; Bantjes, A. "An Atomic Force Microscopy Study on the morphology of elastomer-coagent blends" *Polymer* **34**, 1773-1775, (1993).
109. Magonov, S.N.; Sheiko, S.S.; Deblieck, R.A.C.; Möller, M. "Atomic Force Microscopy of gel-drawn ultra high molecular weight polyethylene" *Macromolecules* **23**, 1380-1386, (1993).
110. Sheiko S.S., Möller M., Cantow H.-J., Magonov S.N., "Scanning Force Microscopy of Nanofibrillar Structure of Drawn Polyethylene Tapes 1. Different Modes and Tips", *Polymer Bulletin*, **31**, 693-698, (1993).
111. Sheiko, S.S.; Möller, M.; Reuvekamp, E.M.C.M.; Zandbergen, H.W. "Calibration and evaluation of scanning-force-microscopy probes" *Phys. Rev. B* **48**, 5675-5678, (1993).
112. Sheiko, S.S.; Kunz, M.; Möller, M. "An Atomic Force Microscopy Study of the Necking Process of Gel Drawn Ultra-High Molecular Weight Polyethylene" *Polymer Science* **35**, 1609-1617 (1994). *Official Engl. Translation of Vysokomolekul. Soed.* **35**, nr.11, 1903-1912 (1993).

113. Wawkuszewski, A., Cantow, H.-J.; Magonov, S.N.; Sheiko, S.S.; Möller, M. "Scanning Force Microscopy of Nanofibrillar Structure of Drawn Polyethylene Tapes 2. Measurements under Water" *Polymer Bulletin* 31, 699-705 (1993).
114. Sheiko, S.S.; Frey, H.; Möller, M. "FT-IR studies of the mechanical response of the crystalline fraction in ultrastrong polyethylene tapes" *Coll. Polym. Sci.* 270, 440, (1992).
115. Sheiko, S.S., Vainilovitch, I.S.; Magonov, S.N. "FTIR spectroscopy of polymer films under uniaxial stretching. 2. Amorphous and semicrystalline polyethyleneterephthalate" *Polym. Bull.* 25, 499, (1991).
116. Magonov, S.N.; Vainilovitch, S.N.; Sheiko, S.S. "FTIR spectroscopy of polymer films under uniaxial stretching. 1. Atactic polystyrene" *Polym. Bull.* 25, 491, (1991).
117. Sheiko, S.S.; Oleinik, E.F. "Strain recovery in single crystal mats of polyethylene", *Vysokomol. Soedin. (Russ.)* B32 145, (1990).
118. Sheiko, S.S.; Salamatina, O.B.; Rudnev, S.N.; Oleinik, E.F. „Mechanism of plastic deformation of glassy polymers. Amorphous poly(ethyleneterephthalate)“ *Vysokomol. Soedin. (Russ.)* B32, 1844, (1990).
119. Jashin, A.; Sheiko, S.S.; Zhuk, A.; Vainilovitch, I.S.; Magonov, S.N. "Tensile machine for stretching of polymer films" *Prib. Tehn. Eksp. (Russ.)* 4, 246, (1989).

## **b. Patents**

120. Sheiko S.S., Möller M., Reuvekamp E.M.C.M., Rogalla H., "Mesoscopic Calibration of AFM Tips", NL-9202179, 1992.
121. Sheiko S.S. "Unimolecular Tweezers" (USA). U.S. Pat. Appl. Publ. (2008), US 2008221224 A1 20080911; Application: US 2007-682427 20070306. Priority: AN 2008:1101138
122. Sheiko, S.S.; Rubinstein, M.; Panyukov, S. "Molecular Tension Amplifiers" U.S. Patent Application Serial No. No. 61/087,340 (2008).

## **c. Unrefereed works**

### **Review articles**

123. Sheiko, S.S.; Magonov, S.N. "Scanning Probe Microscopy of Polymers" in Comprehensive Polymer Science, 2<sup>nd</sup> edition, V. 2 . , Eds. Krzysztof Matyjaszewski and Martin Möller, Elsevier (in press).
124. Yuan, J.; Müller, A.H.E.; Matyjaszewski, K.; Sheiko, S.S. "Molecular (cylindrical) brushes" in Comprehensive Polymer Science, 2<sup>nd</sup> edition, V. 6 . , Eds. Krzysztof Matyjaszewski and Martin Möller Elsevier (in press).
125. Sheiko S.S.; Möller M "Atomic Force Microscopy of Polymers: Imaging, Probing, and Lithography " in "Macromolecular Engineering : Precise Synthesis, Materials Properties, Applications" by Krzysztof Matyjaszewski, Yves Gnanou, and Ludwik Leibler (Eds.) v. 3, 1515-1574 (2007), ISBN: 978-3-527-31446-1.

126. Sheiko, S.S. "Proximal Probe Molecular Analysis" (Invited Review) in the McGraw-Hill 2006 Yearbook of Science and Technology ISSN 0076-2016 pp. 263-267 (**2006**).
127. Sheiko, S.S.; Sun, F.; Boyce, J. "Shape Responsive Molecules" Chapter in "Responsive Polymer Materials: Designs and Applications" Blackwell Professional Publishing ISBN-10 0-8138-2109-6 pp. 1-26 (**2006**).
128. Sheiko S.S.; Möller M "Visualization of Molecules – A First Step to Manipulation and Controlled Response" *Chem. Rev.* 101, 4099-4123 (**2001**).
129. Sheiko S.S.; Möller M "Hyperbranched Macromolecules: Soft Particles with Adjustable Shape and Capability to Persistent Motion" in Topics in Polymer Chemistry. Dendrimers III. 212, 137-175 (**2001**) Ed. F. Vögtle, Springer-Verlag, Heidelberg,.
130. Sheiko S.S. "Imaging of Polymers Using Scanning Force Microscopy: From Superstructures to Individual Molecules" *Adv. Polymer Sci* 151, 61-174 (**1999**).
131. Sheiko, S.S.; Möller, M. "Scanning Force Microscopy on the Orientation of Gel-crystallized Ultra High Molecular Weight Polyethylene" in "Oriented Polymer Materials" Eds. S. Fakirov, Hüthling & Wepf, Heidelberg, p. 210-237 (**1996**).
132. Sheiko, S.S.; Turetzki, A.A.; Hopken, J.; Möller, M. "Molecular Organization of Polystyrene and Polymethylmethacrylate with Fluorocarbon Side Chains" in Macromolecular Engineering, Ed. M.K. Mishra, Plenum Press, New York p.219-227, (**1995**).

### Conference proceedings

133. Sheiko, Sergei S. "Imaging of designer macromolecules: molecular characterization and material properties." *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* (**2008**), 49, 149-150.
134. Rubinstein, Michael; Panyukov, Sergey; Zhulina, Ekaterina; Randall, Gregory; Brock, James; Shirvanyants, David; Sheiko, Sergei S.; Matyjaszewski, Krzysztof; Sun, Frank. "Adsorption of branched polymers: bonds under high tension." *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* (**2008**), 49(1), 3-4.
135. Boyce, Jamie R.; Lee, Hyung-il; Matyjaszewski, Krzysztof; Sheiko, Sergei. pH induced conformational transition in polyelectrolyte brushlike macromolecules. *PMSE Preprints* 96, 864-865 (**2007**).
136. Sheiko, Sergei S.; Xu, Hui; Shirvanyants, David; Rubinstein, Michael; Beers, Kathryn L.; Matyjaszewski, Krzysztof. "Long-range ordering of brush-like macromolecules enhanced by flow." *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* 47(1), 513-514 (**2006**).
137. Boyce, Jamie R.; Sun, Frank C.; Sheiko, Sergei S.; Maynor, Benjamin W.; DeSimone, Joseph M.; Sumerlin, Brent; Matyjaszewski, Krzysztof. "Replicating fluid morphologies: from single molecules to macroscopic drops." *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* 47(1), 543-544 (**2006**).
138. Klok, Harm-Anton; Kreutzer, Georg; Ternat, Celine; Plummer, Christopher J. G.; Nguyen, Tuan Q.; Manson, Jan-Anders E.; Herrmann, Andreas; Ouali, Lahoussine; Sommer, Horst; Velazco, Maria Ines; Castelletto, Valeria; Hamlev, Ian W.; Sun, Frank; Sheiko, Sergei S.. "Water-soluble, unimolecular nanocontainers based on amphiphilic multiarm star block copolymers." *PMSE Preprints* 94, 250 (**2006**).
139. Sheiko, Sergei S.; Sun, Frank; Lee, Hyung-il; Matyjaszewski, Krzysztof. "Wetting-induced fracture of branched macromolecules." *PMSE Preprints* 94, 814 (**2006**).

140. Boyce, Jamie R.; Sheiko, Sergei S.; Neugebauer, Dorota; Matyjaszewski, Krzysztof. "Plate-cylinder transition observed for hydrophilic macromolecular brush." *PMSE Preprints* **94**, 253-254 (2006).
141. Maynor, Benjamin W.; LaRue, Isaac; Boyce, Jamie R.; Rolland, Jason P.; Samulski, Edward T.; Sheiko, Sergei S.; DeSimone, Joseph M. "Molding of biologically-derived soft nanostructures using pattern replication in non-wetting templates (PRINT)." *PMSE Preprints* **93**, 254-255 (2005).
142. Xu, H.; Shirvaniants, D.; Beers, K.; Matyjaszewski, K.; Rubinstein, M.; Sheiko, S.S. "Wetting – one molecule at a time" *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* **47**(1) (2005).
143. Visintin, P.M.; Denison, G.M.; Bessel, C.A.; Sheiko, S.S.; Schauer, C.K.; DeSimone, J.M. "Slurry design for a "dry" CO<sub>2</sub>-based copper chemical mechanical planarization process" *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* **45**(1) (2004).
144. Neugebauer, D.; Carson, B. E.; Sheiko, S.S.; Matyjaszewski, K. "Densely heterografted brush copolymers by combination of "grafting through" and "grafting from" ATRP." *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* **44**(1), 510-511 (2003).
145. Sheiko, S.S.; da Silva, M.; Shirvaniants, D.G.; Rodrigues, C. A.; Beers, K.; Matyjaszewski, K.; Potemkin, I. I.; Moeller, M. "Spontaneous Curvature of Polymer Brushes" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* **44**(1), 544-545 (2003).
146. Sheiko, S.S.; Shirvaniants, D.; de Silva, M.; Beers, K.; Matyjaszewski, K.; Prokhorova, S.; Moeller, M. "Characterization of Individual Polymer Molecules by AFM" *Polymeric Materials Science and Engineering* **88**, 231-232 (2003) .
147. LaRue, I., Sheiko, S.S.; Adam, M.; Rubinstein, M. "Characterization of cylindrical polystyrene-b-polyisoprene micelles using AFM and light scattering" *Polymeric Materials Science and Engineering* **88**, 236-237 (2003) .
148. Qin S.H., Borner H.S., Matyjaszewski K, Sheiko S.S. "Densely grafted molecular brushes with high molecular weight backbone by ATRP and raft techniques" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* **43**(2), 237-238 (2002).
149. Neugebauer D, Matyjaszewski K, Sheiko S, da Silva M "Brush polymers with methacrylate side chains synthesized via ATRP" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* **43**(2), 239-240 (2002).
150. Mourran, A.; Sheiko, S.S., Krupers, M.; Möller, M. "Breath Figures and Surface Emulsion: New Approach to Pattern of Polymer Surfaces" *PMSE Proceedings of the Am. Chem. Soc.* **80**, 175-176 (1999).
151. Prokhorova, S.A.; Sheiko, S.S.; Möller, M., Ahn, C.-H.; Percec, V. "Epitaxial Adsorption of Monodendron Jacketed Linear Polymers on HOPG studied by SFM and STM" *PMSE Proceedings of the Am. Chem. Soc.* **80**, 185-186 (1999).
152. Beers, K.; Matyjaszewski, K.; Sheiko, S.S.; Prokhorova, S.A.; Möller, M. "Poly(n-Butyl Acrylate) Brush Macromolecules by ATRP: Determination of Contour Length from Fractionation and AFM Studies" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* **40**(2) 446-447 (1999).
153. Mourran, A.; Sheiko, S.S., Möller, M. "Vitrified condensation pattern in thin polymer films. New approach for micropatterning" *PMSE Proceedings of the Am. Chem. Soc.* **81**, 426-427 (1999).

154. Sheiko, S.S.; Buzin A.; Muzafarov, A.M. "Interfacial ordering and wetting behavior of dendrimer liquids studied by scanning force microscopy" *Polymer Preprint (Am. Chem. Soc., Div. Coll. & Surf. Chem)* (1999).
155. Sheiko, S.S.; Buzin A.I.; Muzafarov, A.M.; Rebrov, E.A.; Getmanova, E.G. "Spreading of carbosilane dendrimers at the air/water interface" *Polymer Preprint* 39(1), 481-482 (1998).
156. Vasilenko, N.G.; Rebrov, E.A.; Muzafarov, A.M.; Sheiko, S.S.; Möller, M "Organosilicon Dendrimers and Star-Shaped Polymers and Block Copolymers Based On" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* 39(1), 479-480 (1998).
157. Prokhorova S.A.; Schmidt U.; Sheiko, S.S.; Möller, M.; Dziezok, P.; Schmidt, M. "Adsorption of Poly(2-vinylpyridine) Wormlike Polyelectrolyte Brushes on Mica Studied in situ by MAC Mode". Application Note, Molecular Imaging Inc. Arizona, USA, June (1998).
158. Sheiko, S.S.; Prokhorova, S.A.; Möller, M., Ahn, C.-H.; Percec, V. „Surface Patterning by „Fat“ Macromolecules with a Well Defined Cylindrical Shape“ *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* 39(2), 1157-1158 (1998).
159. Sheiko, S.S.; Krupers M.; Slangen P.-J.; Möller M „Wetting Behavior of Thin Films of Polymethacrylates With Oligo(hexafluoropropene oxide) Side Chains“ *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* 39(2), 956-957 (1998).
160. Percec, V.; Cho, W.-D.; Ahn, C.-H., Schlueter, D.; Johansson, G.; Mosier, P.E.; Ungar, G.; Möller, M.; Sheiko, S.S.; Hudson, S.D.; Jung, H.-T. "Controlled Interconversion Between Spherical and Columnar Shapes in Libraries of Supramolecular and Macromolecular Dendrimers Constructed from Quasi-Equivalent Monodendrons" *PMSE Proceedings of the Am. Chem. Soc.* 77, 97-98 (1997).
161. Sheiko, S.S.; Kunz, M.; Möller, M. "Atomic Force Microscopy on Gel Drawn UHMW-PE - II" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* 34, 778-779 (1993).
162. Hopken J., Sheiko S., Czech, Möller M., "Polymer surface modification by fluorocarbon-hydrocarbon substituents" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* 33(1), 937-938 (1992).
163. Sheiko S.S., Magonov S.N., Möller M. "AFM study of gel-drawn UHMW PE" *Polymer Preprint (Am. Chem. Soc., Div. Polym. Chem)* 33(1), 788-789 (1992).