10. MRSEC Supported Publications and Patents
(May 1, 2003 - April 30, 2004)

Publications resulting from PRIMARY MRSEC Support

IRG 1 - Microstructured Polymers

Bermudez, H.; Brannon, A.K.; Hammer, D.A.; **Bates**, **F.S.**; Discher, D.E. *Molecular Weight Dependence of Polymersome Membrane Structure, Elasticity, and Stability*. Macromolecules, **2002**, *35*, 8203.

Santore, M.M.; Discher, D.E.; Won, Y.-Y.; **Bates, F.S.**; Hammer, D.A. *The Effect of Surfactant on Unilamellar Polymeric Vesicles: Altered Membrane Properties and Stability in the Limit of Weak Surfactant Partitioning*. Langmuir, **2002**, *18*, 7299.

Bang, J; **Lodge, T.P.** *Mechanisms and Epitaxial Relationships between Close-Packed and BCC Lattices in Block Copolymer Solutions*. J. Phys. Chem. B, **2003**, *107*, 12071.

Cole, P.J.; Cook, R.; **Macosko, C.W.** *Adhesion between Immiscible Polymers Correlated with Interfacial Entanglements*. Macromolecules, **2003**, *36*, 2808.

Davidock, D.A.; **Hillmyer, M.A.**; **Lodge, T.P.** *Persistence of the Gyroid Morphology at Strong Segregation in Diblock Copolymers.* Macromolecules, **2003**, *36*, 4682.

Harada, T.; **Bates, F.S.**; **Lodge, T.P.** *Transverse Orientation of Lamellae and Cylinders by Solution Extrusion of a Pentablock Copolymer*. Macromolecules, **2003**, *36*, 5440.

Jain, S.; **Bates, F.S**. *On the Origins of Morphological Complexity in Aqueous Dispersions of Block Copolymer Surfactants*. Science, **2003**, *300*, 460.

Jeon, H.K.; Moon, B.; Hoye, T.R.; **Macosko, C.W.** *Reactions at Polymer Polymer Interfaces for Blend Compatibilization*. Soc. Plast. Eng. Tech. Pap. (ANTEC), **2003**, 3784.

Tyler, C.A.; **Morse, D.C.** *Linear Elasticity of Cubic Phases in Block Copolymer Melts by Self Consistent Field Theory.* Macromolecules, **2003**, *36*, 3764.

Tyler, C.A.; **Morse, D.C.** *Stress in Self-consistent Field Theory*. Macromolecules, **2003**, *36*, 8184.

Won, Y.-Y.; Davis, H.T.; **Bates, F.S.** *Molecular Exchange in PEO-PB Micelles in Water*. Macromolecules, **2003**, *36*, 953.

Zhou, Z.; Li, Z.; Ren, Y.; **Hillmyer, M.A.**; **Lodge, T.P.** *Micellar Shape Change and Internal Segregation Induced by Chemical Modification of a Tryptych Block Copolymer Surfactant*. J. Am. Chem. Soc. **2003**, *125*, 10182.

Davidock, D.A.; **Hillmyer, M.A.**; **Lodge, T.P.** *Mapping Large Regions of Diblock Copolymer Phase Space by Selective Chemical Modification.* Macromolecules, **2004**, *37*, 397.

Ha, J.-M.; Wolf, J.H.; **Hillmyer, M.A.**; **Ward, M.D.** *Regulating Polymorph Selectivity Through Confined Crystallization in Nanopores*. J. Am. Chem. Soc. ASAP (Web)

Zhang, K.; Wang, Y.; **Hillmyer, M.A.**; **Francis L.F**. *Processing and Properties of Porous Poly(L-lactide)/Bioactive Glass Composites*. Biomaterials, **2004**, *25*, 2489.

IRG 2 – Crystalline Organic Semiconductors

Chesterfield, R.J.; Newman, C.R.; Pappenfus, T.M.; Ewbank, P.C.; Haukaas, M.H.; **Mann, K.R.**; **Miller, L.L.**; **Frisbie, C.D.** *High Electron Mobility and Ambipolar Transport in Organic*

Thin-film Transistors Based on a π-stacking Quinoidal Terthiophene. Advanced Materials (Weinheim, Germany), **2003**, *15*, 1278.

Pappenfus, T.M.; Burand, M.W.; Janzen, D.E.; **Mann, K.R.** *Synthesis and Characterization of Tricyanovinyl-Capped Oligothiophenesas Low Band-Gap Organic Materials*. Organic Letters, **2003**, 5, 1535.

Zhu, X.-Y. *Electronic Interaction at Molecule-metal Interfaces: Implication for Molecule-based Electronics*. SPIE Proceedings, **2003,** 5223, 100.

Fritz, S.; Martin, S.M.; **Frisbie, C.D.**; **Ward, M.D.**; Toney, M.F. *Structural Characterization of a Pentacene Monolayer on Amorphous SiO2 with Grazing Incidence X-ray Diffraction*. J. Am. Chem. Soc. ASAP (Web).

Former IRG 2 - Artificial Tissues

Devireddy, R.V.; Neidert, M.R.; **Bischof, J.C.**; **Tranquillo**, R.T. *Cryopreservation of Collagen-based Tissue-equivalents - Part I: Effect of Freezing in the Absence of Cryoprotective Agents*. Tissue Eng. **2003**, *9*,1089.

Koop, B.E.; **Lewis, J.L.** *A Model of Fracture Testing of Soft Viscoelastic Tissues*. J. Biomechanics, **2003**, *36*, 605.

Zhang, K.; Yan, H.; Bell, D.C.; **Stein, A.**; **Francis, L.F.** *Effects of Materials Parameters on Mineralization and Degradation of Sol-Gel Bioactive Glasses with 3D-Ordered Macroporous Structures*. J. Biomed. Mater. Res. **2003**, *66A*, 860 (featured on cover).

Neidert, M.R.; Devireddy R.V.; **Tranquillo R.T.**; **Bischof J.C.** *Cryopreservation of Collagen-based Tissue-equivalents - Part II: Improved Freezing in the Presence of Cryoprotective Agents*. Tissue Eng. **2004**, *10*, 23.

IRG 3 - Magnetic Heterostructures

Dahlberg, E.D.; Gredig, T.; Krivorotov, I.N.; **Leighton, C**.; Nogues, J., Schuller, I.K.; **Goldman, A.M.** *The Use of the Anisotropic Magnetoresistance to Study Exchange Coupling*. Intermag Europe 2002 Digest of Technical Papers. 2002 IEEE International Magnetics Conference (Cat.No.02CH37323). IEEE. **2002**, pp.DA5. Piscataway, NJ, USA.

Dobin, A.Y.; Nikolaev, K.R.; Krivorotov, I.N.; **Wentzcovitch, R.M.**; **Dahlberg, E.D.**; **Goldman, A.M.** *Electronic and Crystal Structure of Fully Strained $LaNiO_3$ Films*. Phys. Rev. B., **2003**, *68*, 113408.

Dobin, A. Yu.; **Victora, R.H.** *Intrinsic Nonlinear Ferromagnetic Relaxation in Thin Metallic Films*. Phys. Rev. Letters, **2003**, *90*, 167203.

Dong, X.Y.; Dong, J.W.; Xie, J.Q.; Shih, T.C.; McKernan, S; **Leighton, C.**; **Palmstrøm, C.J.** *Growth Temperature-controlled Magnetism in Molecular Beam Epitaxy Grown Ni_2MnAl Heusler Alloy*. J. Cryst. Growth, **2003**, *254* 384.

Krivorotov, I.N.; **Leighton, C**.; Nogues, J.; Schuller, I.K.; **Dahlberg, E.D.** *Origin of Complex Exchange Anisotropy in Fe/MnF_2 Bilayers*. Phys. Rev. B. **2003**, *68*, 54430.

Venus, D.; Hunte, F.; Krivorotov, I.N.; Gredig, T.; **Dahlberg, E.D.** *Magnetic Relaxation in Exchange-coupled Co/CoO Bilayers Measured with ac-anisotropic Magnetoresistance*. J. Appl. Phys. **2003**, *93*, 8609.

Wolf, J.A.; Anderson, K.K.; **Dahlberg, E.D**.; **Crowell, P.A.**; Chen, L.C.; **Palmstrøm, C.J.** *Tunable Magnetization Reversal in Epitaxial bcc $Fe_{1-x}Co_x$ Films on Vicinal Surfaces.* J. Appl. Phys. **2003,** *93*, 8256. (Wolf – 2001, 2002, and 2003 Summer Program faculty participant).

Seed

Al-Daous, M.A.; **Stein, A.** *Preparation and Catalytic Evaluation of Macroporous Crystalline Sulfated Zirconium Dioxide Templated with Colloidal Crystals*. Chem. Mater. **2003**, *15*, 2638.

Underwood, D.U.; **Blank, D.A.** *Ultrafast Solvation Dynamics: A View from the Solvent's Perspective Using a Novel Resonant-pump Non-resonant Probe Technique*. J. Phys. Chem. A, **2003**,107, 956.

Publications resulting from PARTIAL MRSEC Support

IRG 1 - Microstructured Polymers

Lu, Q-W.; **Macosko, C.W.**; Horrion, J. *Compatibilized Blends of Thermoplastic Polyurethane*. Macromol. Symp. **2002**, *198*, 221.

Dalhaimer, P.; **Bates, F.S**.; Aranda-Espinosa, H.; Discher, D. *Synthetic Cell Elements from Block Copolymers - Hydrodynamic Aspects*. C.R. Physique, **2003,** *4*, 251.

Dalhaimer, P.; **Bates, F.S.**; Discher, D.E. *Single Molecule Visualization of Stable Stiffness-Tunable, Flow Conforming Worm Micelles*. Macromolecules, **2003**, *36*, 6873.

Grosberg, A.; Frisch, H. *Winding Angle Distribution for Planar Random Walk, Polymer Ring Entangled with an Obstacle, and All That: Spitzer-Edwards-Prager-Frisch Model Revisited.* J. Phys. A: Math. & Gen. **2003**, *36*, 8955.

Photos, P.J.; Bacakova, L.; Discher, B.; **Bates, F.S.**; Discher, D.E. *Polymer Vesicles in Vivo: Correlation with PEG Molecular Weight*. J. Controlled Release, **2003**, *90*, 323.

Wolf, J.H.; **Hillmyer, M.A.** *Ordered Nanoporous Polycyclohexylethylene.* Langmuir, **2003**, *19*, 6553.

Lua, R.; Borovinskiy, A.L.; **Grosberg, A**. *Fractal and Statistical Properties of Large Compact Polymers: A Computational Study*. Polymer, **2004**, 45, 717.

IRG 2 – Crystalline Organic Semiconductors

Adams, D.; Brus, L.; Chidsey, C.E.D.; Creager, S.; Creutz, C.; Kagan, C.R.; Kamat, P.; Lieberman, M.; Lindsay, S.; Marcus, R.A.; Metzger, R.M.; Michel-Beyerle, M.E.; Miller, J.R.; Newton, M.D.; Rolinson, D.R.; Sankey, O.; Schanze, K.S.; Yardley, J.; **Zhu., X.-Y**. *Charge Transfer on the Nanoscale: Current Status*. J. Phys. Chem. B, **2003**, *107*, 6668.

Casado, J.; Pappenfus, T.M.; **Mann, K.R.**; Milian, B.; Orti, E.; Viruela, P.M.; Ruiz Delgado, M.C.; Hernandez, V.; Lopez Navarrete, J.T. *UV-Vis, IR, Raman and Theoretical Characterization of a Novel Quinoid Oligothiophene Molecular Material*. J. Molecular Structure, **2003**, 651-653, 665.

Casado, J.; Pappenfus, T.M.; **Miller, L.L.**; **Mann, K.R.**; Orti, E.; Viruela, P.M.; Pou-Amerigo, R.; Hernandez, V.; Lopez Navarrete, J.T. *Nitro-Functionalized Oligothiophenes as a Novel Type of Electroactive Molecular Material: Spectroscopic, Electrochemical and Computational Study*. J. Am. Chem. Soc. **2003**, *125*, 2524.

Merlo, J.A.; **Frisbie, C.D**. *Field Effect Conductance of Conducting Polymer Nanofibers.* J. Polym. Phys.: B Polym. Phys. **2003**, *41*, 2674.

Puntambekar, K.P.; Pesavento, P.V.; **Frisbie, C.D**. *Surface Potential Profiling and Contact Resistance Measurements on Operating Pentacene Thin Film Transistors by Kelvin Probe Force Microscopy*. Appl. Phys. Lett. **2003**, *83*, 5539.

IRG 3 - Magnetic Heterostructures

Adelmann, C.; Carr, D.M.; **Crowell, P.A.**; Dong, J.W.; Dong, X.Y.; Hilton, J.L.; Isakovic, A.F.; Lu, J.; McKernan, S.; Schultz, B.D.; Shih, T.C.; Strand, J.; Xie, J.Q.; Xin, Y.; **Palmstrøm, C.J.** *Physics of Semiconductor Devices (IWPSD-2003),* edited by Bhat, K.N. and DasGupta, A. **2004**, *1*, 33.

Nikolaev, K.R.; Krivorotov, I.N.; **Dahlberg, E.D**.; Vas'ko, V.A.; Urazhdin, S.; Loloee, R.; Pratt, W.P. *Structural and Magnetic Properties of Triode-sputtered Epitaxial Gamma '-Fe/sub 4/N Films Deposited on SrTiO/sub 3/ (001) Substrates*. Appl. Phys. Lett. **2003**, *82*, 4534.

Palmstrøm, C.J. *Epitaxial Heusler Alloys: New Materials for Semiconductor Spintronics*. MRS Bulletin, **2003**, *28*, 725.

Strand, J.; Isakovic, A.F.; Lou, X.; **Crowell, P.A.**; Schultz, B.D.; **Palmstrøm, C.J**. *Nuclear Magnetic Resonance in a Ferromagnet-Semiconductor Heterostructure*. Appl. Phys. Lett. **2003**, *83,* 3335.

Strand, J.; Schultz, B.D.; Isakovic, A.F.; **Palmstrøm, C.J**.; **Crowell, P.A.** *Dynamic Nuclear Polarization by Electrical Spin Injection in Ferromagnet-Semiconductor Heterostructures*. Phys. Rev. Lett. **2003,** *91,* 036602.

Welp, U.; te Velthuis, S.G.E.; Felcher, G.P.; Gredig, T.; **Dahlberg, E.D** *Domain Formation in Exchange Biased Co/CoO Bilayers*. J. Appl. Phys. **2003**, *93*, 7726.

Wolf, J.A.; Anderson, K.K.; **Dahlberg, E.D.; Crowell, P.A.**; Chen, L.C.; **Palmstrøm, C.J.** *Tunable Magnetization Reversal in Epitaxial bcc $Fe_{1-x}Co_x$ Films on Vicinal Surfaces.* J. Appl. Phys. **2003**, *93*, 8256 (Wolf – 2001, 2002, and 2003 Summer Program faculty participant).

Seed

Bapat, A.; **Kortshagen, U.**; **Campbell, S.A.**; Perrey, C.R.; Carter, C.B. *Synthesis of Crystalline Silicon Nanoparticles in Low-pressure Inductive Plasmas*. MRS Symposium Proceedings, **2003**, *737*, 301.

Bapat, A.; Perrey, C.R.; **Campbell, S.A.**; Carter, C.B.; **Kortshagen, U.** *Synthesis of Highly Oriented, Single-Crystal Silicon Nanoparticles in a Low-pressure Inductively Coupled Plasma*. J. Appl. Phys. **2003**, *94*, 1969.

Belich, T.J.; Thompson, S.; Perrey, C.R.; **Kortshagen, U.**; Carter, C.B.; **Kakalios, J.** *Hydrogenated Amorphous Silicon Thin Films with Nanocrystalline Silicon Inclusions*. MRS Symposium Proceedings, **2003**, *762*, 509.

Belich, T.J.; Shen, Z.; **Campbell S.A.**; **Kakalios, J.** *Non-Gaussian 1/f Noise as a Probe of Long-Range Structural and Electronic Disorder in Amorphous Silicon*. ed. Weissman, M.B.; Israeloff, N.E.; Kogan, A.S. Noise as a Tool for Studying Materials. SPIE, **2003**, *5112*, 67.

Shen, Z.; Kim, T.; **Kortshagen, U.**; McMurry, P.H.; **Campbell, S.A.** *Formation of Highly Uniform Silicon Nanoparticles in High Density Silane Plasmas*. J. Applied Physics, **2003**, *94*, 2277.

Shen, Z.; Kim, T.; **Kortshagen, U.**; McMurry, P.H.; **Campbell, S.A.** *Particle Production in High Density Silane Plasma*. MRS Symposium Proceedings, **2003**, *737,* 721.

Sokolov, S.; Bell, D.; **Stein, A**. *Preparation and Characterization of Macroporous α-Alumina*. J. Am. Ceram. Soc. **2003**, *86*, 1481.

Sokolov, S.; **Stein, A.** *Preparation and Characterization of Macroporous γ-$LiAlO_2$*. Mater. Letters, **2003**, *57*, 3593.

Yan, H.; Sokolov, S.; Lytle, J.C.; **Stein, A.**; Zhang, F.; Smyrl, W.H. *Colloidal-Crystal-Templated Synthesis of Ordered Macroporous Electrode Materials for Lithium Secondary Batteries*. J. Electrochem. Soc. **2003**, *150*, A1102.

Publications resulting from the USE OF SHARED FACILITIES

IRG 1 - Microstructured Polymers

Alcazar-Roman, L.M.; O'Keefe, B.J.; **Hillmyer, M.A.**; Tolman, W.B. *Electronic Influence of Ligand Substituents on the Rate of Polymerization of ε-Caprolactone by Single-Site Aluminum Alkoxide Catalysts.* J. Chem. Soc., Dalton Trans. **2003**, 3082.

Anderson, K.S.; Lim, S.H.; **Hillmyer, M.A.** *Toughening of Polylactide by Melt Blending with Linear Low-Density Polyethylene*. J. Appl. Polym. Sci. **2003**, *89*, 3757.

Boaen, N.K.; **Hillmyer, M.A.** *Selective and Mild Oxyfunctionalization of Model Polyolefins.* Macromolecules, **2003**, *36*, 7027.

Cavicchi, K.A.; **Lodge, T.P.** *Self and Tracer Diffusion in Sphere-forming Block Copolymers*. Macromolecules, **2003**, *36*, 7158.

Chastek, T.Q.; **Lodge, T.P.** *Measurement of Gyroid Single Grain Growth Rates in Block Copolymer Solutions*. Macromolecules, **2003**, *36*, 7672.

Cochran, E.W.; **Morse, D.C.**; **Bates, F.S.** *Design of ABC Triblock Copolymers near the ODT with the Random Phase Approximation*. Macromolecules, **2003**, *36*, 782.

Dean, J.M.; Grubbs, R.B.; Saad, W.; Cook, R.F.; **Bates, F.S.** *Mechanical Properties of Block Copolymer Micelle Modified Epoxy*. J. Polym. Sci. Part B: Polym. Phys. **2003**, *41*, 2444.

Dean, J.M.; Verghese, N.E.; Pham, H.Q.; **Bates, F.S.** *Tough Flame Resistant Epoxy Resins*. Macromolecules, **2003**, *36*, 9267.

Dolgovskij, M.K.; Fasulo, P.D.; Lortie, F.; **Macosko, C.W.**; Ottaviani, R.A.; Rodgers, W.R. *Effect of Mixer Type on Exfoliation of Polypropylene Nanocomposites*. Soc. Plast. Eng. Tech. Pap. (ANTEC), **2003**, 2255.

Epps, T.H.; Bailey, T.S.; Waletzko, R.; **Bates, F.S.** *Phase Behavior and Block Sequence Effects in Lithium Perchlorate-Doped Poly(isoprene-b-styrene-b-ethylene oxide) and Poly(styrene-b-isoprene-b-ethylene oxide) Triblock Copolymers*. Macromolecules, **2003**, *36*, 2873.

Frick, E.M.; Zalusky, A.S.; **Hillmyer, M.A.**; *Characterization of Polylactide-b-Polyisoprene-b-Polylactide Thermoplastic Elastomers*. Biomacromolecules, **2003**, *4,* 216.

Guo, Q; Dean, J.M.; Grubbs, R.B.; **Bates, F.S.** *Block Copolymer Modified Novolac Epoxy Resin*. J. Polym. Sci. Part B: Polym. Phys. **2003**, *41*, 1994.

Haley, J.C.; **Lodge, T.P.**; He, Y.; Ediger, M.D.; von Meerwall, E.D.; Mijovic, J. *Composition and Temperature Dependence of Terminal and Segmental Dynamics in Polyisoprene/Poly(vinyl ethylene) Blends*. Macromolecules, **2003**, *36*, 6142.

Hermel, T.J.; Hahn, S.F.; Chaffin, K.A.; Gerberich, W.W.; **Bates, F.S.** *Role of Molecular Architecture in Mechanical Failure of Glassy/Semicrystalline Block Copolymers: CEC versus CECEC Lamellae*. Macromolecules, **2003**, 36, 2190.

Jeon, H.K.; **Macosko, C.W.** *Visualization of Block Copolymer Distribution on a Sheared Drop*. Polymer, **2003**, *44*, 5381.

Jones, T.D.; Schulze, J; **Macosko, C.W.**; Moon, B.; **Lodge, T.P.** *Effect of Thermodynamic Interactions on Reactions at Polymer/Polymer Interfaces*. Macromolecules, **2003**, *36*, 7212.

Lu, Q-W; Hernandez-Hernandez, M.E.; **Macosko, C.W.** *Explaining the Abnormally High Flow Activation Energy of Thermoplastic Polyurethanes*. Polymer, **2003**, *44*, 3309.

Sun, J.; Gerberich, W.W.; **Francis, L.F.** *Electrical and Optical Properties of Ceramic-Polymer Nanocomposite Coatings*. J. of Polymer Science B: Polymer Physics, **2003**, *41*, 1744.

Trammell, B.C.; Ma, L.; Luo, H.; **Hillmyer, M.A.**; Carr, P.W. *An Ultra Acid Stable Reversed Stationary Phase.* J. Am. Chem. Soc. **2003**, *125*, 10504.

Velankar, S.; Zhou, H.; Jeon, H.K.; **Macosko, C.W.** *Drop Retraction Methods for the Measurement of Interfacial Tension of Surfactant-laden Drops*. Soc. Plast. Eng. Tech. Pap. (ANTEC), **2003**, 1597.

Williams, C.K.; Breyfogle, L.E.; Choi, S.K.; Nam, W.W.; Young, V.G.; **Hillmyer, M.A.**; Tolman, W.B. *A Highly Active Zinc Catalyst for the Controlled Polymerization of Lactide*. J. Am. Chem. Soc. **2003**, *125*, 11350.

Xu, J.J.; Nguyen, B.T.; **Bates, F.S.**; Hahn, S.F.; Hudack, M.L. *Hydrogenated Poly(Styrene-co-α-Methyl-styrene) Polymers: A New Class of High T_g Polyolefins*. J. Polym. Sci. Part B: Polym. Phys. **2003**, *41*, 725.

Yonezawa, J.; **Macosko, C.W.**; Martin, S.M.; **Ward, M.D.** *Polymer-organic Crystal Blends from Smectic Liquid Crystal*. Polym. Mater. Sci. Eng. **2003**, *89*, 96.

Galloway, J.A.; Koester, K.J.; Paasch, B.J.; **Macosko, C.W.** *Effect of Sample Size on Solvent Extraction for Detecting Cocontinuity in Polymer Blends*. Polymer, **2004**, *45*, 423.

Jeon, H.K.; Feist, B.J.; Koh, S.B.; Change, K.; **Macosko, C.W.** *Reactively Formed Block and Graft Copolymers as Compatibilzers for Polyamide 66/PS Blends*. Polymer, **2004**, *45*, 197.

Radhakrishnan, K.; Switek, K.A.; **Hillmyer, M.A.** *Synthesis of Seminfluorinated Block Copolymers by Atom Transfer Radical Polymerization.* J. Polym. Sci. Part A Polym. Chem. **2004**, *42*, 853.

Van Hemelrijck, E.; Van Puyvelde, P.; Velankar, S.; **Macosko, C.W.**; Moldenaers, P. *Interfacial Viscoelasticity and Coalescence Suppression in Compatibilized Polymer Blends*. J. Rheol. **2004**, *48*, 153.

Zhang, K.; Wang, Y.; **Hillmyer, M.A.**; **Francis, L.F.** *Processing and Properties of Porous Poly(L-lactide)/Bioactive Glass Composites*. Biomaterials, **2004**, *25*, 2489.

MRSEC Supported Patents

The following proposals were based on work related to MRSEC programs, but the personnel performing work that directly produced these patents were supported by other sources. These patents, however, benefited from the general intellectual environment of the IRGs and the access to Shared Facilities, with user fees charged according to University and Federal guidelines.

Boaen, N. K.; **Hillmyer, M.A.**; Hahn, S. F. *Oxyfunctionalization of Polyolefins* (submitted 2003) pending

Carr, P.W.; **Hillmyer, M.A.**; Liu, H.; Luo, H.; Ma, L.; Trammell, B.C. *Silica-Based Materials and Methods* (submitted 2003) pending

Discher, D.E.; Discher, B.M.; Lee, Y.J.C-M.; **Bates, F.S.**; Hammer, D.A. *Polymersome Related Encapsulating Membranes* (filed 12/14/99) pending

Lu, Q-W.; **Macosko, C.** *Promoting Adhesion to Thermoplastic Polyurenthane (TPU) by Amine Functional Polypropylenes* (submitted 2003) pending

Publications resulting from the USE OF SHARED FACILITIES authored by non-MRSEC faculty

In the interest of tracking the broader impact of the UMN MRSEC on the activities of non-MRSEC investigators, we have for the first time attempted to capture publications by those investigators that relied on MRSEC-purchased equipment and instrumentation. The UMN MRSEC places major equipment and instrumentation items in independent multi-user facilities with expert staff responsible for operating and maintaining the equipment. Many non-MRSEC faculty investigators and their students will use MRSEC-purchased equipment, but they will not necessarily acknowledge MRSEC support in publications and it is difficult to enforce this for non-MRSEC faculty. Furthermore, work they performed with MRSEC equipment typically would not be reported as MRSEC-related.

Table 2.2 lists the users of major MRSEC-purchased equipment in the multi-user facilities. These users were identified from the user logs for the equipment. In the past year major MRSEC-purchased equipment was used by 23 MRSEC faculty investigators (and their groups) and 78 other non-MRSEC faculty investigators (and their groups). We asked the users in Table 2.2 to provide us with publications that relied on major equipment and instrumentation that was purchased by MRSEC funds, either in whole or in part. These publications are listed below. Because this information has been requested from non-MRSEC faculty investigators, it is likely this list represents only a portion of the actual output.

Barry, C.R.; Lwin, N.Z.; Zheng, W.; **Jacobs**, **H.O.** *Printing Nanoparticle Building Blocks from the Gas-phase Using Nanoxerography*. Appl. Phys. Lett. **2003,** *83*, 5527.

Bhattacharya, M.; Mani, R. *Properties of Extrusion Cast Starch/Polyester Blends*. J. Applied Polymer Sci. **2003,** *90*, 1545.

Buck, B.; Mascioni, A.; Que, L., Jr.; **Veglia, G.** *Dealkylation of Organotin Compounds by Biological Dithiols: Toward the Chemistry of Organotin Toxicity*. JACS, **2003**, *125*, 13316.

Chad R.B.; Steward, M.G.; Lwin, N.Z.; **Jacobs, H.O.** *Printing Nanoparticles from the Liquid and Gas-phase Using Nanoxerography*. Nanotechnology, **2003,** *14*, 1057.

Chang, M.C.; **Ko C.C.**; Douglas, W.H. *Conformational Change of Hydroxyapatite-Gelatin Nanocomposite by Glutaraldehyde*. Biomaterials, **2003**, *24*, 3087.

Chang, M.C.; **Ko, C.C.**; Douglas, W.H. *Preparation of Hydroxyapatite-Gelatin Nanocomposite*. Biomaterials, **2003**, *24*, 2853.

Cui J.; **James R.D.**; Shield T. *Phase Transformation and Magnetic Anisotropy of an Iron-Palladium Ferromagnetic Shape Memory Alloy*. Acta Materialia, **2003**, *52*, 23.

Francis, L.; **Davidson, J.H**.; Weathers, R.; Kinglsey, M. *The Potential for Scaling in Polymer Tubes*, SOLAR 2003, Proceedings of the 32nd ASES Annual Conference, Ed. Campbell-Howe, R. **2003,** 83.

Kang, Y.; **Taton, T.A.** *Micelle-Encapsulated Carbon Nanotubes: A General Route to Nanotube Composites*. J. Am. Chem. Soc. **2003**, *125*, 5650.

Lin B.; Mohanty S.; **McCormick A.V.**; **Davis H.T.** *Study of the Effects of Added Salts on Micellization of Cetyltrimethylammonium Bromide Surfactant*, Mesoscale Phenomena in Fluid Systems, Eds. Case F.; Alexandridis, P. ACS Symposium Series 861, American Chemical Society, Washington, D.C., **2003,** chapter 20, 313.

Nowak, M.J.; **Severtson, S.J.;** Wang, X.P.; Kroll, M.S. *Properties Controlling the Impact of Styrenic Block Copolymer Based Pressure Sensitive Adhesives on Paper Recycling*. Industrial & Engineering Chemistry Research, **2003**, *42*, 1681.

Orwin E.; Borene M.; **Hubel A**. *Biomechanical and Optical Characteristics of a Corneal Stromal Equivalent*. J. Biomech Eng. **2003**, *125*, 439.

Park, S.; Seethraman, M.; Ogdie, A.; Ferguson, D.; Shallop, A.; Jones, R.; **Tretyakova, N.Y**. *3'-Exonuclease Resistance of DNA Oligodeoxynucleotides Containing O^6-[4-oxo-4-(3-pyridyl)butyl] Guanine*. Nucleic Acids Research, **2003**, *31*, 1984.

Pyne, A.; Chatterjee, K.; **Suryanarayanan, R.** *Crystalline to Amorphous Transition of Disodium Hydrogen Phosphate during Primary Drying*. Pharm. Res. **2003,** *20*, 802.

Pyne, A.; Chatterjee, K.; **Suryanarayanan, R.** *Solute Crystallization in Mannitol-Glycine Systems Implications on Protein Stabilization in Freeze-Dried Formulations*. J. Pharm. Sci. **2003**, *92*, 2272.

Pyne A.; **Suryanarayanan, R.** *The Effect of Additives on the Crystallization of Cefazolin Sodium during Freeze-Drying*. Pharm. Res. **2003,** *20*, 283.

Russell, J.M.; **Johnson, T.C.;** Talbot, M.R. *A 725 Year Cycle in the Climate of Central Africa During theLate Holocene*. Geology, **2003,** *31*, 677.

Russell, J.M.; Talbot, M.R.; Haskell, B.J. *Mid-Holocene Climate Change in Lake Bosumtwi, Ghana*. Quaternary Research, **2003,** *60*, 133.

Stern, R.A.; Willoughby, S.D.; MacLaren, J.M.; Cui J.; Pan, Q.; **James R.D.** *Fe_3Pd Ferromagnetic Shape Memory Alloys*. J. Appl. Physics, **2003**, *93*, 8644.

Surana, R.; Pyne, A.; **Suryanarayanan, R.** *Solid-Vapor Interactions: Influence of Environmental Conditions on the Dehydration of Carbamazepine Dihydrate AAPS*. PharmSci. Tech. **2003,** *4*, 68.

Telang, C.; **Suryanarayanan, R.;** Yu, J. *Crystallization of D-mannitol in Binary Mixtures with NaCl: Phase Diagram and Polymorphism*. Pharm. Res. **2003,** *20*, 1939.

Telang, C.; Yu, L.; **Suryanarayanan, R.** *Effective Inhibition of Mannitol Crystallization in Frozen Solutions by Sodium Chloride*. Pharm. Res. **2003,** *20*, 660.

Borene M.; Barocas V.; **Hubel A.** *Mechanical Characterization and Phenotype Assessment of Corneal Fibroblasts Cultured in a Three-Dimensional Collagen Matrix*. Ann. Biomed. Eng. **2004**, *32*, 274.

Chen, J.; **Davidson, J.H**. *Chemical Vapor Deposition of Silicon Dioxide by Direct-Current Corona Discharges in Dry Air Containing Octamethylcyclotetrasiloxane Vapor: Measurements of Deposition Rate*. Plasma Chemistry and Plasma Processing, **2004**, *24*, 169.

Debnath, S.; Predecki, P.; **Suryanarayanan, R.** *Use of Glancing Angle X-ray Powder Diffractometry to Depth-Profile Phase Transformations during Dissolution of Indomethacin and Theophylline Tablets*. Pharm. Res. **2004**, *21*, 149.

Debnath, S.; **Suryanarayanan, R.** *Influence of Processing-Induced Phase Transformations on the Dissolution of Theophylline Tablets AAPS*. Pharm. Sci. Tech. **2004**, *5*, 8.

Dong J.W.; Xie, J.Q.; Lu, J.; Adelmann, C.; Palmstrøm, C.J.; Cui, J.; Pan, Q.; Shield, T.W.; **James, R.D.;** McKernan S. *Shape Memory and Ferromagnetic Shape Memory Effects in Single-crystal Ni_2MnGa Thin Films*. J. Appl. Physics, **2004**, 95, 2593.

Nunes, C.; Han, J.; Monkhouse, D.; **Suryanarayanan, R.** *Preformulation Studies to Meet the Challenges in the Manufacture of Betaine Solid Dosage Form*. J. Pharm. Sci. **2004**, *93*, 38.

Shimotori, T.; Nuxoll, E.E.; Cussler, E.L.; **Arnold, W.A.** *A Polymer Membrane Containing Fe(0) as a Contaminant Barrier*. Environmental Science and Technology, ASAP Web Release, **04-Mar-2004.**

Toniolo, H.; Harff, P.; **Marr, J.;** Paola, C.; Parker, G. *Experiments on Reworking by Successive Unconfined Subaqueous and Subaerial Muddy Debris Flows.* J. Hydraulic Engineering, **2004**, *130*, 38.

Wu, C.; Mantell, S.C.; **Davidson, J.H.** *Polymers for Domestic Solar Hot Water: Long-term Performance of PB and Nylon 6,6 Tubing in Hot Water*. ASME Journal of Solar Energy Engineering, **2004**, *126*, 581.

11. BIOGRAPHIC INFORMATION FOR NEW INVESTIGATORS

POINCARÉ P. RUDEN, Professor, Electrical and Computer Engineering

Professional Preparation
- Max-Planck-Institute, Ph.D., 1982

Professional Appointments
- Professor, Department of Electrical and Computer Engineering, 1989-present
- Senior Principal Research Scientist, Honeywell Inc., 1985-1989
- Research Scientist, US Naval Research Laboratory, 1983-1989
- Post-doctoral Research Associate, Max-Planck-Institute, 1982-1983

Selected Publications
- T. Li, P.P. Ruden, I.H. Campbell, and D.L. Smith, "Investigation of Bottom-contact Organic field Effect Transistors by Two-dimensional Device Modeling," *J. Appl. Phys.* **93**, 4017 (2003)
- T. Li, J.W. Balk, P.P. Ruden, I.H. Campbell, and D.L. Smith, "Channel Formation in Organic Field Effect Transistors," *J. Appl. Phys.* 91, 4312 (2002)
- A. Sutandi, P.P. Ruden, and K.F. Brennan, "Electronic Structure of Dynamically Two-dimensional Hole Gas in AlGaN/GaN Heterostructures," *J. Phys.: Condensed Matter* **14**, 3435 (2002)
- Z. Rang, A. Haraldson, D.M. Kim, P.P. Ruden, and M.I. Nathan, "Hydrostatic Pressure Dependence of the Photoconductivity of Single Crystal Pentacene and Tetracene," *Appl. Phys. Lett.* **79**, 2731 (2001)
- P.P. Ruden, E. Bellotti, H.-E. Nilsson, and K.F. Brennan, "Modeling of Band-to-Band Tunneling Transitions During Drift in Monte Carlo Transport Simulations," *J. Appl. Phys.* **88**, 1488 (2000)
- *Book chapter:* "Materials Theory Based Modeling of GaN Devices," K.F. Brennan, J. Kolnik, I.H. Oguzman, E. Bellotti, M. Farahmand, P.P. Ruden, R. Wang, and J.D. Albrecht, Chapter 7 of "GaN and Related Materials II," Ed. S. J. Pearton, *"Optoelectronic Properties of Semiconductors and Superlattices,"* Series ed. M.O. Manasreh, Gordon and Breach Science Publishers (2000)