

10. MRSEC Supported Publications and Patents
(May 1, 2004 - April 30, 2005)

Publications resulting from PRIMARY MRSEC Support

IRG 1 - Microstructured Polymers

Bang, J.; **Lodge, T.P.** *A Long-Lived Metastable BCC Phase During Ordering of Micelles.* Phys. Rev. Lett. **2004**, 93, 245701.

Bang, J.; Viswanathan, K.; **Lodge, T.P.**; Park, M.-J.; Char, K. *Temperature Dependent Micellar Structures in Poly(styrene-*b*-isoprene) Diblock Copolymer Solutions Near the Critical Micelle Temperature.* J. Chem. Phys. **2004**, 121, 11489

Brannan, A.K.; **Bates, F.S.** *ABCA Tetrablock Copolymer Vesicles.* Macromolecules, **2004**, 37, 8816.

Galloway, J.A.; **Macosko, C.W.** *Comparison of Methods for the Detection of Cocontinuity in Polyethylene Oxide/Polystyrene Blends.* Polym. Engr. Sci., **2004**, 44, 714.

Ha, J.-M.; Wolf, J.H.; **Hillmyer, M.A.**; **Ward, M.D.** *Polymorph Selectivity under Nanoscopic Confinement.* J. Am. Chem. Soc. **2004**, 126, 3382.

Hillmyer, M.A.; Schmuhl, N.W.; **Lodge, T.P.** *Fluorinated Amphiphilic Block Copolymers: Combining Anionic Polymerization and Selective Polymer Modification.* Macromol. Symp. **2004**, 215, 51.

Jeon, H.K.; **Macosko, C.W.**; Moon, B.; Hoyer, T.R. *Coupling Reactions of End- vs. Mid-functional Polymers.* Macromolecules, **2004**, 37, 2563.

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Park, M.-J.; Bang, J.; Harada, T.; Char, K.; **Lodge, T.P.** *Epitaxial Transitions Among FCC, HCP, BCC, and Cylinder Phases in a Block Copolymer Solution.* Macromolecules, **2004**, 37, 9064.

Wu, L.; Cochran, E.W.; **Lodge, T.P.**; **Bates, F.S.** *Consequences of Block Number on the Order-Disorder Transition and Viscoelastic Properties of Linear (AB)_n Multiblock Copolymers.* Macromolecules, **2004**, 37, 3360.

Wu, L.; **Lodge, T.P.**; **Bates, F.S.** *Bridge to Loop Transition in Shear Aligned Lamellae Forming Heptablock Copolymer.* Macromolecules, **2004**, 37, 8184.

Galloway, J.A.; Jeon, H.K.; Bell, J.R.; **Macosko, C.W.** *Block Copolymer Compatibilization of Cocontinuous Polymer Blends.* Polymer, **2005**, 46, 183.

Ha, J.-M.; **Hillmyer, M.A.**; **Ward, M.D.** *Thermotropic Properties of Organic Nanocrystals Embedded in Ultrasmall Crystallization Chambers.* J. Phys. Chem. B. **2005**, 109, 1392.

Lodge, T.P.; Bang, J.; Li, Z.; **Hillmyer, M.A.**; Talmon, Y. *Strategies for Controlling Intra- and Intermicellar Packing in Block Copolymer Solutions: Illustrating the Flexibility of the Self-Assembly Toolbox*. Faraday Discuss. **2005**, 128, 1.

Gorghchian, P.P.; Frail, P.R.; Susumo, K.; Blessington, D.; Brannan, A.K.; **Bates, F.S.**; Chance, B.; Hammer, D.A.; Therien, M.J. *Near-Infrared-Emissive Polymersomes: Self-assembled Soft Matter for In Vivo Optical Imaging*. PNAS, **2005**, 102, 2922.

Park, M.-J.; Char, K.; Bang, J.; **Lodge, T.P.** *Interplay Between Cubic and Hexagonal Phases in Block Copolymer Solutions*. Langmuir, **2005**, 21, 1403.

IRG 2 – Crystalline Organic Semiconductors

Casado, J.; Pappenfus, T.M.; **Mann, K.R.**; Hernandez, V.; Navarrete, J.T.L. *Exploration of the Electronic Structure of Dendrimer-like Acetylene-bridged Oligothiophenes by Correlating Raman Spectroscopy, Electrochemistry, and Theory*. J. Chem. Phys. **2004**, 120, 11874.

Casado, J.; Pappenfus, T.M.; **Mann, K.R.**; Orti, E.; Viruela, P.M.; Milian, B.; Hernandez, V.; Navarrete, J.T.L. *Spectroscopic and Theoretical Study of the Molecular and Electronic Structures of a Terthiophene-based Quinodimethane*. Chem. Phys. Chem. **2004**, 5, 529.

Chesterfield, R.J.; McKeen, J.C.; Newman, C.R.; Ewbank, P.C.; da Silva Filho, D.A.; **Brédas, J.-L.**; Miller, L.L.; **Mann, K.R.**; **Frisbie, C.D.** *Organic Thin Film Transistors Based on N-Alkyl Perylene Diimides: Charge Transport Kinetics as a Function of Gate Voltage and Temperature*. J. Phys. Chem. B, **2004**, 108, 19281.

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Fritz, S.E.; Martin, S.M.; **Frisbie, C.D.**; **Ward, M.D.**; Toney, M.F. *Structural Characterization of a Pentacene Monolayer on an Amorphous SiO₂ Substrate with Grazing Incidence X-ray Diffraction*. J. Am. Chem. Soc. **2004**, 126, 4084.

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Mohapatra, S.; Holmes, B.T.; Newman, C.R.; Prendergast, C.F.*; **Frisbie, C.D.**; **Ward, M.D.** *Organic Thin Film Transistors based on Toly-Substituted Oligothiophenes*. Adv. Funct. Mater. **2004**, 14, 605. (*Trinity College, Dublin)

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IRG 3 - Magnetic Heterostructures

Bayer, C.; Park J.P.; Wang, H.; Yan, M.; Campbell, C.E.; **Crowell, P.A.** *Spin Waves in an Inhomogeneously Magnetized Stripe.* Phys. Rev. B, **2004**, 69, 134401.

Dobin, A.Yu.; **Victora, R.H.** *Intrinsic Nonlinear Ferromagnetic Relaxation.* J. Appl. Phys. **2004**, 95, 7139.

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Chabanov, A.A.; Jun, Y; **Norris, D.J.** *Avoiding Cracks in Self-Assembled Photonic Band Gap Crystals.* Appl. Phys. Lett. **2004**, 84, 3573.

Chandran, P.L.; **Barocas, V.H.** *Microstructural Mechanics of Collagen Gels in Confined Compression: Poroelasticity, Viscoelasticity, and Collapse.* ASME J. Biomech. Eng. **2004**, 126, 152.

Publications resulting from PARTIAL MRSEC Support

IRG 1 - Microstructured Polymers

Lin, J.J.; Silas, J.A.; Bermudez, H.; Milam, V.T.; **Bates, F.S.**; Hammer, D.A. *The Effect of Chain Length and Density on the Adhesiveness of Polymersomes*. *Langmuir*, **2004**, *20*, 5493.

Olayo-Valles, R.; Lund M.S.; **Leighton, C.**; **Hillmyer, M.A.** *Large Area Nanolithographic Templates by Selective Etching of Chemically Stained Block Copolymer Thin Films*. *J. Mater. Chem.* **2004**, *14*, 2729. (Cross-referenced under IRG 3)

Savin, D.A.; Larson, A.M.*; **Lodge, T.P.** *Effect of Composition on the Width of the Calorimetric Glass Transition in Polymer/Solvent and Solvent/Solvent Mixtures*. *J. Polym. Sci., Polym. Phys. Ed.* **2004**, *42*, 1155. (*2002 MRSEC REU participant, South Dakota School of Mines and Technology)

Spitael, P.; **Macosko, C.W.**; **McClurg, R.B.** *Block Copolymer Micelles for Nucleation of Microcellular Thermoplastic Foams*. *Macromolecules*, **2004**, *37*, 6874. (Cross-referenced under Seed)

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Velankar, S.; Zhou, H.; Jeon, H.K.; **Macosko, C.W.** *CFD Evaluation of Drop Retraction Methods for the Measurement of Interfacial Tension of Surfactant-Laden Drops*. *J. Coll. Int. Sci.* **2004**, *272*, 172.

IRG 2 – Crystalline Organic Semiconductors

Janzen, D.E.; Wang, X.; Carr, P.W.; **Mann, K.R.** *Synthesis and Characterization of Three Geometric Isomers of RutheniumII(2,2'-bipyridyl)(salicylaldehyde)₂*. *Inorganica Chimica Acta* **2004**, *357*, 3317.

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Kang, J.H.; da Silva Filho, D.; **Brédas, J.-L.**; **Zhu, X.-Y.** *Shallow Trap States in Pentacene Thin Films from Molecular Sliding*. *Appl. Phys. Lett.* **2005**.

Merlo, J.A.; Newman, C.R.; Gerlach, C.P.; Kelley, T.W.; Muyres, D.V.; Fritz, S.E.; Toney, M.F.; **Frisbie, C.D.** *P-Channel Organic Semiconductors Based on Hybrid Acene-Thiophene Molecules for Thin Film Transistor Applications*. *J. Am. Chem. Soc.* **2005**.

IRG 3 - Magnetic Heterostructures

Adelmann, C.; Schultz, B.D.; Strand, J.; Lou, X.; Dong, X.Y.; Xie, J.Q.; Park, S.; Fitzsimmons, M.R.; **Crowell, P.A.**; **Palmstrøm, C.J.** *Spin Injection Into Semiconductors: The Role of the*

Fe/Al_xGa_{1-x}As Interface. International Conference on Indium Phosphide and Related Materials, Kagoshima, Japan, **2004**, 505

Kim, N.H.; **Stadler, B.J.H.** *Magnetic Nanowires and Y-Junctions*. MRS Proceedings: Nanoparticles and Nanowire Building Blocks-Synthesis, Processing, Characterization and Theory, **2004**, 818 M2.5, 29.

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Publications resulting from the USE OF SHARED FACILITIES

IRG 1 - Microstructured Polymers

- Anderson, K.S.; **Hillmyer, M.A.** *Melt Chain Dimensions of Polylactide*. *Macromolecules*, **2004**, *37*, 1857.
- Anderson, K.A.; **Hillmyer, M.A.** *The Influence of Block Copolymer Crystallinity on the Toughness of Compatibilized Poly(lactide)/Poly(ethylene) Blends*. *Polymer*, **2004**, *45*, 8809.
- Cavicchi, K.A.; **Lodge, T.P.** *Anisotropic Self-Diffusion in Block Copolymer Cylinders*. *Macromolecules*, **2004**, *37*, 6004.
- Cavicchi, K.A.; Zalusky, A.S.; **Hillmyer, M.A.**; **Lodge, T.P.** *An Ordered Nanoporous Monolith From an Elastomeric Crosslinked Block Copolymer Precursor*. *Macromol. Rapid Commun.* **2004**, *25*, 704.
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- Jung, T.; Sheng, X.; Choi, C.K.; Kim, W.-S.; Wesson, J.A.; **Ward, M.D.** *Probing Crystallization of Calcium Oxalate Monohydrate and the Role of Macromolecule Additives with in situ Atomic Force Microscopy*. *Langmuir*, **2004**, *20*, 8587.
- Lee, J.; **Macosko, C.W.**; **Bates, F.S.** *Development of Discrete Nanopores I: Tension of Poly(ethylene)/Poly(propylene) Copolymer Blends*. *J. Appl. Polymer Sci.* **2004**, *91*, 3642.
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- Martin, S.M.; Yonezawa, Y.M.; Horner, J.; **Macosko, C.W.**; **Ward, M.D.** *Structure and Rheology of Hydrogen-bond Reinforced Smectic Liquid Crystals*. *Chem. Mater.* **2004**, *16*, 3045.
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MRSEC Supported Patents

The following patents 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 IRG and the access to Shared Facilities, with user fees charged according to University and Federal guidelines.

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