

**12. MRSEC-SUPPORTED PUBLICATIONS AND PATENTS**  
*(March 1, 2010 – February 28, 2011)*

† denotes publications with international co-authors

\*denotes undergraduate authors

## IRG-1 ENGINEERED MULTIBLOCK POLYMERS

### IRG-1 Publications resulting from PRIMARY MRSEC Support

- Lee, S.; Bluemle, M.J.; **Bates, F.S.** *Discovery of a Frank-Kasper sigma-phase in Sphere Forming Block Copolymer Melts.* Science, **2010**, 340, 349.
- Lee, S.; A.M. Adhimoalam, A.M.; **Bates, F.S.** *Path Dependent Morphologies in Oil/Water/Diblock Copolymer Mixtures.* Langmuir, **2010**, 26, 1707.
- Percec, V.; Wilson, D.A.; Leowanawat, P.; Wilson, C.; Hughes, A.D.; Kaucher, M.S.; Hammer, D.A.; Levine, D.H.; Kim, A.J.; **Bates, F.S.**; Davis, K.P.; **Lodge, T.P.**; Klein, M.L. DeVane, R.; Aqad, E.; Sienkowska, M.J.; Argintaru, A.O.; Rosen, B.M.; Rissanen, K.; Nummelin, S.; Ropponen, J. *Self-Assembly of Janus-Dendrimers into Monodisperse Dendrosomes and other Complex Architectures.* Science, **2010**, 328, 1009.
- Pangu, G.D.; Davis, K.P.; **Bates, F.S.**; Hammer, D.A. *Ultrasonically Induced Release from Nanosized Polymer Vesicles.* Macromolecular Bioscience, **2010**, 10, 546.
- Rexeisen, E.L.; Fan, W.; Pangburn, T.O.; Taribagil, R.R.; **Bates, F.S.**; **Lodge, T.P.**; Tsapatsis, M.; **Kokkoli, E.** *Self-Assembly of Fibronectin Mimetic Peptide-Amphiphile Nanofibers.* Langmuir. **2010**, 26, 1953.
- Cussler, E.L.**; Wagner, A.; and Marchal-Heussler, L. *Designing Chemical Products Requires More Knowledge of Perception.* AIChE Journal, **2010**, 56, 282.
- †Querelle, S.E.; Chen, L.; **Hillmyer, M.A.**; **Cussler, E.L.**; Nijmeijer, K.; Wessling, M. *Block Copolymer Derived Membranes for Enhanced Carbon Dioxide–Methane Separations.* Ind. Eng. Chem. Res. **2010**, 49, 12051.
- Phillip, W. A.; **Hillmyer, M. A.**; **Cussler, E. L.** *Predicting the Orientation of Cylinders in Block Copolymer Thin Films.* Macromolecules, **2010**, 43, 7763.
- Taribagil, R.R.; **Hillmyer, M.A.**; **Lodge, T.P.** *Hydrogels from ABA and ABC Triblock Polymers.* Macromolecules, **2010** 43, 5396.
- Phillip, W. A.; O'Neill, B.\*; Rodwogin, M.; **Hillmyer, M. A.**; **Cussler, E. L.** *Self-Assembled Block Copolymer Thin Films as Water Filtration Membranes.* ACS Appl. Mater. Interfaces **2010**, 2, 847.
- Shroff, K.; Rexeisen, E.L.; Arunagirinathan, M.A.; **Kokkoli, E.** *Fibronectin-Mimetic Peptide-Amphiphile Nanofiber Gels Support Increased Cell Adhesion and Promote ECM Production.* Soft Matter, **2010**, 6 (20), 5064.
- Petersen, M.A.; Yin, L.; **Kokkoli, E.**; **Hillmyer, M.A.** *Synthesis and Characterization of Reactive PEO-PMCL Polymersomes.* Polym. Chem., **2010**, 1 (8), 1281.
- Zhou, N.; **Lodge, T.P.**; **Bates, F.S.** *Phase Behavior of Polyisoprene-Poly(butylene oxide) and Poly(ethylene-alt-propylene)-Poly(butylene oxide) Block Copolymers.* Soft Matter, **2010**, 6, 1281.
- Bluemle, M.J.; Zhang, J.; **Lodge, T.P.**; **Bates, F.S.** *Inverted Phases Induced by Chain Architecture in ABAC Tetrablock Terpolymers.* Macromolecules, **2010**, 43, 4449.
- Saito, N.; Liu, C.; **Lodge, T. P.**; and **Hillmyer, M. A.** *Multicompartment Micelle Morphology Evolution in Degradable Miktoarm Star Terpolymers.* ACS Nano, **2010**, 4, 1907.

### IRG-1 Publications resulting from PARTIAL MRSEC Support

Rodwogin, M.D.; Spanjers, C.S.\*; **Leighton, C.**; **Hillmyer, M.A.** *Poly(lactide-Polydimethylsiloxane) Block Polymers as Multifunctional Materials for Nanolithographic Applications*. ACS Nano **2010**, *4*, 725. (Cross-referenced under IRG-3)

Choi, S.-H.; **Lodge, T.P.**; **Bates, F.S.** *Molecular Exchange in Diblock Copolymer Micelles: Hypersensitivity to Core Chain Length*. Phys. Rev. Lett., **2010**, *104*, 047802.

Jones, B.H.; **Lodge, T.P.** *Nanoporous Materials Templated by Polymeric Bicontinuous Microemulsions*. Chemistry of Materials, **2010**, *22*, 1279.

Mansour, A.; Johnson, L.\*; **Lodge, T.P.**; **Bates, F.S.** *Thermodynamic Characteristics of Poly(cyclohexylethylene-*b*-ethylene-co-ethylethylene) Block Copolymers*. J. Polym. Sci., Polym. Phys., **2010**, *48*, 566. (\*University of Minnesota Directed Research)

Zhang, J.; Ji, S.; Song, J.; **Lodge, T.P.**; **Macosko, C.W.** *Flow Accelerates Interfacial Coupling Reactions*. Macromolecules, **2010**, *43*, 7617.

### IRG-1 Publications resulting from the USE OF SHARED FACILITIES

Liu, J.; Thompson, Z.J.; Sue, H.-J.; **Bates, F.S.**; **Hillmyer, M.A.**; Dettloff, M.; Jacob, G.; Verghese, N.; Pham, H. *Modification of Epoxies with Block Copolymer Micelles of Wormlike Morphology*. Macromolecules, **2010**, *43*, 7238.

Fleury, G.; **Bates, F.S.** *Hierarchically Structured Bicontinuous Polymeric Microemulsions*. Soft Matter, **2010**, *6*, 2751.

Alfonzo, C. G.; Fleury, G.; Chaffin, K.A.; **Bates, F.S.** *Crystallization Induced Structure and Properties in CEC-P-CEC Elastomeric Multiblock Terpolymers*. Macromolecules, **2010**, *43*, 5295.

Reynolds, T.R.; Kalpathy, S.; Kumar, S.; **Francis, L.F.** *Dip Coating of Charged Colloidal Suspensions onto Substrates with Patterned Wettability: Coating Regime Maps*. J. Colloid Interface Sci., **2010**, *352*, 202.

Song, J.-O.; Henry, R.M.; Jacobs, R.M.\*; **Francis, L.F.** *Magnetic Microrheometer for In-Situ Characterization of Coating Viscosity*. Rev. of Scientific Instruments, **2010**, *8*, 093903. (University of Minnesota, UROP Program)

Cardinal, C.; Jung, Y.D.; Ahn, K.; **Francis, L.F.** *Drying Regime Maps for Particulate Coatings*. AIChE J, **2010**, *56* 2769.

Royer, M.; Davidson, J.H.; **Francis, L.F.**; Mantell, S.M. *Shear Induced Removal of Calcium Carbonate Scale from Polypropylene and Copper Tubes*. J. Solar Energy Eng., **2010**, *132*, 011013.

Zhang, H.; Wu, Z.; **Francis, L.F.** *Salt Whisker Formation on Porous Coatings*. Langmuir, **2010**, *26*, 2847.

Jindal, K.; Bhattacharya, D.; **Francis, L.F.**; McCormick, A.V.; Germinario, L.T.; Williams, C. *Structure and Property Development during Solidification of VOC Compliant Automotive Refinish Clearcoats*. Prog. Org. Coatings, **2010**, *67*, 296.

Wu, Z.; Davidson, J.H.; **Francis, L.F.** *Effect of Water Chemistry on Calcium Carbonate Deposition on Metal and Polymer Surfaces*. J. Colloid and Interface Sci., **2010**, *343*, 176.

Pitet, L.M.; Chamberlain, B.M.; Hauser, A.W.\*; **Hillmyer, M.A.** *Synthesis of Linear, H-Shaped, and Arachnearm Block Copolymers by Tandem Ring-Opening Polymerizations*. Macromolecules, **2010**, *43*, 8018.

Theryo, G.; Jing, F.; Pitet, L.M.; **Hillmyer, M.A.** *Tough Polylactide Graft Copolymers.* *Macromolecules*, **2010**, *43*, 7394.

Pietrangelo, A.; Knight, S.C.\*; Gupta, A.K.; Yao, L.J.; **Hillmyer, M.A.**; **Tolman, W.B.** *Mechanistic Study of the Stereoselective Polymerization of D,L-Lactide using Indium(III) Halides.* *J. Am. Chem. Soc.*, **2010**, *132*, 11649.

Fiore, G.L.; Jing, F.; Young Jr., V.G.; Cramer, C.J.; **Hillmyer, M.A.** *High  $T_g$  Aliphatic Polyesters by the Polymerization of Spirolactide Derivatives.* *Polym. Chem.*, **2010**, *6*, 870.

Kobayashi, S.; **Macosko, C.W.**; **Hillmyer, M.A.** *Model Linear Low Density Polyethylenes from the ROMP of 5-hexyl-1-cyclooctene.* *Aust. J. Chem.*, **2010**, *63*, 1201.

Pitet, L.M.; Amendt, M.A.; **Hillmyer, M.A.** *Nanoporous Linear Polyethylene from a Block Polymer Precursor.* *J. Am. Chem. Soc.*, **2010**, *132*, 8230.

Amendt, M.A.; Chen, L.; **Hillmyer, M.A.** *The Formation of Nanostructured Poly(dicyclopentadiene) Thermosets using Reactive Block Polymers.* *Macromolecules*, **2010**, *43*, 3924.

Boudouris, B.W.; **Frisbie, C.D.**; **Hillmyer, M.A.** *Polylactide-Polythiophene-Polylactide Triblock Copolymers.* *Macromolecules*, **2010**, *43*, 3566.

Gramlich, W.M.; Robertson, M. L.; **Hillmyer, M.A.** *Reactive Compatibilization of Poly(L-lactide) and Conjugated Soybean Oil.* *Macromolecules*, **2010**, *43*, 2313.

Robertson, M.L.; Chang, K.; Gramlich, W.M.; **Hillmyer, M.A.** *Toughening of Polylactide with Polymerized Soybean Oil.* *Macromolecules*, **2010**, *43*, 1807.

Bai, Z. and **Lodge, T.P.** *Pluronic Micelle Shuttle Between Water and an Ionic Liquid.* *Langmuir*, **2010**, *26*, 8887.

Jiang, X.; Zhao, B.; Zhong, G.; Jin, N.; Horton, J.M.; Zhu, L.; Hafner, R.S.; and **Lodge, T.P.** *Microphase Separation of High Grafting Density Asymmetric Mixed Homopolymer Brushes on Silica Particles.* *Macromolecules*, **2010**, *43*, 8209.

Lee, H.-N. and **Lodge, T.P.** *Lower Critical Solution Temperature (LCST) Phase Behavior of Poly(ethylene oxide) in Ionic Liquids.* *J. Phys. Chem. Lett.*, **2010**, *1*, 1962.

Lee, H.-N.; Bai, Z.; Newell\*, N.; and **Lodge, T.P.** *Micelle/Inverse Micelle Self-Assembly of a PEO-PNIPAm Block Copolymer in Ionic Liquids with Double Thermoresponsivity.* *Macromolecules*, **2010**, *43*, 9522. (\*University of Minnesota MRSEC REU)

Bai, Z.; **Lodge, T.P.** *Polymersomes with Ionic Liquid Interiors Dispersed in Water.* *J. Am. Chem. Soc.*, **2010**, *132*, 16265.

Simone, P.M.; **Lodge, T.P.** *Phase Behavior and Ionic Conductivity of Concentrated Solutions of Polystyrene-Poly(ethylene oxide) Diblock Copolymers in an Ionic Liquid.* *ACS Applied Materials and Interfaces*, **2009**, *12*, 2812.

Gaikwad, A.N.; Choperena, A.; Painter, P.C.; **Lodge, T.P.** *Restoring Thermo-Rheological Simplicity to Miscible Polymer Blends: How Many Hydrogen Bonds are Required?* *Macromolecules*, **2010**, *43*, 4814.

Tan, D.H.; Zhou, C.; Ellison, C.J.; Kumar, S.; **Macosko, C.W.**; **Bates, F.S.** *Meltblown Fibers: Influence of Viscosity and Elasticity on Diameter Distribution.* *J. Non-Newtonian Fluid Mech.*, **2010**, *165*, 892.

## IRG-2 ORGANIC OPTOELECTRONIC INTERFACES

### IRG-2 Publications resulting from PRIMARY MRSEC Support

†Carrera-Sanchez, R.S.; Paramonov, P.; Day, G.; Coropceanu, V.; **Brédas, J.L.** *The Interaction of Charge Carriers with Lattice Vibrations in Oligoacene Crystals from Naphthalene to Pentacene*. Journal of the American Chemical Society, **2010**, *132*, 14437.

Ruiz Delgado, M.C.; Kim, E.G.; da Silva Filho, D.A.; **Brédas, J.L.** *Tuning the Charge-Transport Parameters of Perylene Diimide Single Crystals via End and/or Core Functionalization: A Density Functional Theory Investigation*. Journal of the American Chemical Society, **2010**, *132*, 3375.

Viani, L.; Olivier, Y.; Athanasopoulos, S.; da Silva Filho, D.A.; Hulliger, J.; **Brédas, J.L.**; Gierschner, J.; Cornil, J. *Theoretical Characterization of Charge Transport in One-Dimensional Collinear Arrays of Organic Conjugated Molecules*. Chem. Phys. Chem., **2010**, *11*, 1062.

Yagodkin, E.; **Douglas, C.J.** *Low Temperature Kumada-Corriu Cross Coupling of Polychlorinated Acene Derivatives and a Synthesis of Sterically Demanding Acenes*. Tetrahedron Letters, **2010**, *51*, 3037.

Kaake, L.G.; Paulsen, B.D.; **Frisbie, C.D.**; **Zhu, X.Y.** *Mixing at the Charged Interface of a Polymer Semiconductor and a Polyelectrolyte Dielectric*. Journal of Physical Chemistry Letters, **2010**, *1*, 862

Xia, Y.; Zhang, W.; Ha, M.; Cho, J.H.; Renn, M.J.; Kim, C.H.; **Frisbie, C.D.** *Printed Sub-2V Gel-Electrolyte-Gated Polymer Transistors and Circuits*. Advanced Functional Materials, **2010**, *20*, 587.

Erickson, N.C.; **Holmes, R.J.** *Highly Efficient, Single-Layer Organic Light-Emitting Devices Based on a Graded-Composition Emissive Layer*. Appl. Phys. Lett., **2010**, *97*, 083308.

Kang, M.S.; Sahu, A.; **Norris, D.J.**; **Frisbie, C.D.** *Size-Dependent Electrical Transport in CdSe Nanocrystal Thin Films*. Nano Letters, **2010**, *10*, 3727. (Cross-referenced under IRG-4)

Chang, H.-C.; **Ruden, P.P.**; Liang, Y.; **Frisbie, C.D.** *Transient Effects Controlling the Charge Carrier Population of Organic Field Effect Transistor Channels*. Journal of Applied Physics, **2010**, *107*, 104502.

### IRG-2 Publications resulting from PARTIAL MRSEC Support

Choi, S.H.; Risko, C.; Ruiz Delgado, M.C.; Kim, B.S.; **Brédas, J.L.**; **Frisbie, C.D.** *Transition from Tunneling to Hopping Transport in Long, Conjugated Oligo-Imine Wires Connected to Metals*. J. Am. Chem. Soc., **2010**, *132*, 4358.

Ha, M.J.; Xia, Y.; Green, A.A.; Zhang, W.; Renn, M.J.; Kim, C.H.; Hersam, M.C.; **Frisbie, C.D.** *Printed, Sub-3V Digital Circuits on Plastic from Aqueous Carbon Nanotube Inks*. ACS Nano, **2010**, *4*, 4388.

Kalihari, V.; Haugstad, G.; **Frisbie, C.D.** *Distinguishing Elastic Shear Deformation from Friction on the Surfaces of Molecular Crystals*. Phys. Rev. Lett., **2010**, *104*, 086102/1.

Lodden, G.H.; **Holmes, R.J.** *Electrical Excitation of Microcavity Polaritons by Radiative Pumping from a Weakly Coupled Organic Semiconductor*. Phys. Rev. B, **2010**, *82*, 125317.

Pandey, R.; **Holmes, R.J.** *Graded Donor-Acceptor Heterojunctions for Efficient Organic Photovoltaic Cells*. Adv. Mater., **2010**, *22*, 5301.

Pandey, R.; **Holmes, R.J.** *Organic Photovoltaic Cells Based on Continuously Graded Donor-Acceptor Heterojunctions*. IEEE Jour., **2010**, *16*, 1537.

Cheng, K.-Y.; Anthony, R.; **Kortshagen, U.R.**; **Holmes, R.J.** *Hybrid Silicon Nanocrystal-Organic Light-Emitting Devices for Infrared Electroluminescence*. *Nano Lett.*, **2010**, *10*, 1154. (Cross-referenced under IRG-4)

Xia, Y.; Xie, W.; **Ruden, P.P.**; **Frisbie, C.D.** *Carrier Localization on Surfaces of Organic Semiconductors Gated with Electrolytes*. *Phys. Rev. Lett.*, **2010**, *105*, 036802/1.

**IRG-2 Publications resulting from the USE OF SHARED FACILITIES**

†Martinelli, N.G.; Ide, J.; Sanchez-Carrera, R.S.; Coropceanu, V.; **Brédas, J.L.**; Ducasse, L.; Castet, F.; Cornil, J.; Beljonne, D. *Influence of Structural Dynamics on Polarization Energies in Anthracene Single Crystals*. *J. Phys. Chem. C*, **2010**, *114*, 20678.

Zhu, L.; Kim, E.G.; Yi, Y.; Ahmed, E.; Jenekhe, S.; Coropceanu, V.; **Brédas, J.L.** *Charge Transport Properties of the Tetraphenylbis (indolo [1, 2-a]quinoline) and 5, 7-Diphenylindolo [1,2-a] quinoline Crystals*. *J. Phys. Chem. C*, **2010**, *114*, 20401.

Choi, S.H.; **Frisbie, C.D.** *Enhanced Hopping Conductivity in Low Bandgap Donor-Acceptor Molecular Wires Up to 20 nm in Length*. *J. Am. Chem. Soc.*, **2010**, *132*, 16191.

Luo, L.; Choi, S.H.; **Frisbie, C.D.** *Probing Hopping Conduction in Conjugated Molecular Wires Connecto to Metal Electrodes*. *Chem. Mat.*, **2010**, ACS ASAP. DOI: 10.1021/cm102402t

Luo, L.; **Frisbie, C.D.** *Length-Dependent Conductance of Conjugated Molecular Wires Synthesized by Stepwise “Click” Chemistry*. *J. Am. Chem. Soc.*, **2010**, *132*, 8854.

## IRG-3 MAGNETIC HETEROSTRUCTURES

### IRG-3 Publications resulting from PRIMARY MRSEC Support

Chen, T.Y.; **Crowell, P.A.** *Non-Linear Dynamics of a Magnetic Vortex*. IEEE Trans. Mag., **2010**, *46*, 1457.

Compton, R.L.; Chen, T.Y.; **Crowell, P.A.** *Magnetic Vortex Dynamics in the Presence of Pinning*. Phys. Rev. B, **2010**, *81*, 144412.

Schulz, T.; Burch\*, G.; Kunz, A.; **Dahlberg, E.D.** *Magnetic Response vs. Lift Height of Thin Ferromagnetic Films*. IEEE Trans Mag, **2010**, *46*, 1752. (\*2009 MRSEC REU participant, UC Berkeley)

Rodwogin, M.D.; Spanjers, C.S.; Wang, R.; **Leighton, C.**; **Hillmyer, M.A.** *Poly lactide-Polydimethylsiloxane Block Copolymers as Multifunctional Materials for Nanolithographic Applications*, ACS Nano, **2010**, *4*, 725. (Cross-referenced under IRG-1)

Chen, T.Y.; Chien, C.L.; Manno, M.; Wang, L.; **Leighton, C.** *Ballistic Heat Transport in Nanocontacts*. Phys. Rev. B. Rapid Comm. **2010**, *81*, 020301.

McGary, P.D.; Reddy, K.S.M.; Haugstad, G.D.; **Stadler, B.J.H.** *Combinatorial Aqueous Electrochemical Deposition of Magnetostrictive Fe<sub>1-x</sub>Ga<sub>x</sub> Alloy Films*. J. Electrochem. Soc., **2010**, *157*, D656.

Park, J.J.; Reddy, M.; Mudivarthi, C.; Downey, P.R.; **Stadler, B.J.H.**; Flatau, A.B. *Characterization of the Magnetic Properties of Multilayer Magnetostrictive Iron-Gallium Nanowires*. J. Appl. Phys., **2010**, *107*, 09A954.

Hernandez, S.; **Victoria, R.H.** *Calculation of Spin Transfer Torque in Partially Polarized Spin Valves Including Multiple Reflections*. Appl. Phys. Lett., **2010**, *97*, 062506.

Lyle, A.; Yao X.F.; Ebrahimi, F.; Harms, J.D.; **Wang, J.-P.** *Communication Between Magnetic Tunnel Junctions Using Spin-Polarized Current for Logic Applications*. IEEE Transactions on Magnetics, **2010**, *46*, 2216.

Lyle, A.; Harms, J.D.; Patil, S.; Yao X.F.; Lilja, D.J.; **Wang, J.-P.** *Direct Communication Between Magnetic Tunnel Junctions for Nonvolatile Logic Fan-out Architecture*. Appl. Phys. Lett., **2010**, *97*, 152504.

†Hsu, H.; Blaha, P.; **Wentzcovitch, R.M.**; **Leighton, C.** *Cobalt Spin States and Hyperfine Interactions in LaCoO<sub>3</sub> Investigated by LDA+U Calculations*. Phys. Rev. B. Rapid. Comm., **2010**, *82*, 100406.

†Hsu, H.; Umemoto, K.; **Wentzcovitch, R.M.**; and Blaha, P. *Spin States and Hyperfine Interactions of Iron in (Mg,Fe)SiO<sub>3</sub> Perovskite Under Pressure*. Earth Planet. Sc. Lett., **2010**, *294*, 19.

†Hsu, H.; Umemoto, K.; **Wentzcovitch, R.M.** *Spin-state Crossover of Iron in Lower Mantle Minerals: Results of DFT+U Investigations*. Reviews in Mineralogy & Geochemistry, **2010**, *71*, 169.

### IRG-3 Publications resulting from PARTIAL MRSEC Support

Garlid, E.S.; Hu, Q.O., Chan, M.K.; **Palmstrøm, C.J.**; **Crowell, P.A.** *Electrical Measurement of the Direct Spin Hall Effect in Fe/In<sub>x</sub>Ga<sub>1-x</sub>As Heterostructures*. Phys. Rev. Lett., **2010**, *105*, 156602.

†Umemoto, K.; Hsu, H.; **Wentzcovitch, R.M.** *Effect of Site Degeneracies on the Spin Crossovers in (Mg,Fe)SiO<sub>3</sub>*. Phys. Earth. Planet. Int., **2010**, *180*, 209.

Nunez-Valdez, M.; Umemoto, K.; **Wentzcovitch, R.M.** *Fundamentals of Elasticity of  $(Mg_{(1-x)}Fe_x)_2SiO_4$ -olivine*. Geophys. Res. Lett., **2010**, 37, L14308.

†Umemoto, K.; Hsu, H.; **Wentzcovitch, R.M.** *Effect of Site Degeneracies on the Spin Crossovers in  $(Mg,Fe)SiO_3$* . Phys. Earth. Planet. Int., **2010**, 180, 209.

### **IRG-3 Publications resulting from the USE OF SHARED FACILITIES**

Spinelli, A.; Torija, M.A.; Liu, C.; Jan, C.; **Leighton, C.** *Electronic Transport in Doped  $SrTiO_3$ : Conduction Mechanisms and Potential Applications*. Phys. Rev. B., **2010**, 81, 155110.

Varela, M.; Gazquez, J.; Lupini, A.R.; Luck, J.T.; Torija, M.A.; Sharma, M.; **Leighton, C.**; Biegalski, M.G.; Christen, H.M.; Murfitt, M.; Dellby, N.; Krivanek, O.; Pennycook, S.J. *Application of Aberration Corrected Scanning Transmission Electron Microscopy and Electron Energy Loss Spectroscopy to Thin Oxide Films and Interfaces*. Int. J. Mat. Res. (Proc. of 7<sup>th</sup> International Workshop on Interfaces), **2010**, 101, 21.

Harms J.D.; Ebrahimi F.; Yao X.F.; **Wang J.-P.** *SPICE Macromodel of Spin-Torque-Transfer-Operated Magnetic Tunnel Junctions*. IEEE Transactions on Magnetics, **2010**, 57, 1425.



## IRG-4 NANOPARTICLE-BASED MATERIALS

### IRG-4 Publications resulting from PRIMARY MRSEC Support

Araki, N.; **Aydil, E.S.**; **Dorfman, K.** *Collision of a Long DNA Molecule with an Isolated Nanowire*. *Electrophoresis*, **2010**, *31*, 3675. (Cross-referenced under Seed)

Jeong, S.; **Aydil, E.S.** *Structural and Electrical Properties of Cu<sub>2</sub>O Thin Films Deposited on ZnO by Metal Organic Chemical Vapor Deposition*. *J. Vac. Sci. Technol. A*, **2010**, *28*, 1338.

†Liu, B.; Deng, D.; Lee J.Y.; **Aydil, E.S.** *Oriented Single-Crystalline TiO<sub>2</sub> Nanowires on Titanium Foil for Lithium Ion Batteries*. *J. Mater. Res.*, **2010**, *25*, 1588.

Liu C.-Y.; **Kortshagen, U.R.** *A Silicon Nanocrystal Schottky Junction Solar Cell Produced from Colloidal Silicon Nanocrystals*. *Nanoscale Res. Lett.*, **2010**, *5*, 1253.

Liu C.-Y.; Holman, Z.; **Kortshagen, U.R.** *Optimization of Si NC/P3HT Hybrid Solar Cells*. *Adv. Func. Mater.*, **2010**, *20*, 2157.

Kang, M.S.; Sahu, A.; **Norris, D.J.**; **Frisbie, C.D.** *Size-Dependent Electrical Transport in CdSe Nanocrystal Thin Films*. *Nano Letters*, **2010**, *10*, 3727. (Cross-referenced under IRG-2)

Wills, A.W.; Kang, M.S.; Khare, A.; Gladfelter, W.L.; **Norris, D.J.** *Thermally Degradable Ligands for Nanocrystals*. *ACS Nano*, **2010**, *4*, 4523.

### IRG-4 Publications resulting from PARTIAL MRSEC Support

Leschkies, K.S.; Kang, M.S.; **Aydil E.S.**; **Norris, D.J.** *Influence of Atmospheric Gases on the Electrical Properties of PbSe Quantum-Dot Films*. *J. Phys. Chem. C*, **2010**, *114*, 9988.

Cheng K.-Y.; Anthony, R.; **Kortshagen, U.R.**; **Holmes, R.J.** *Hybrid Silicon Nanocrystal-Organic Light-Emitting Devices for Infrared Electroluminescence*. *Nano Letters*, **2010**, *10*, 1154. (Cross-referenced under IRG-2)

Tisdale, W.A.; Williams, K.J.; Timp, B.A.; **Norris, D.J.**; **Aydil, E.S.**; **Zhu, X.Y.** *Hot-Electron Transfer from Semiconductor Nanocrystals*. *Science*, **2010**, *328*, 1543.

### IRG-4 Publications resulting from the USE OF SHARED FACILITIES

Behr, M.J.; Gauling, E.A.\*; **Mkhoyan A.K.**; **Aydil, E.S.** *Hydrogen Etching and Cutting of Multiwall Carbon Nanotubes*. *J. Vac. Sci. Technol. B*, **2010**, *28*, 1187. (\*Undergraduate Student.) (Cross-referenced under Seed)

Behr, M.J.; Gauling, E.A.\*; **Mkhoyan A.K.**; **Aydil, E.S.** *Effect of Hydrogen on Catalyst Nanoparticles in Carbon Nanotube Growth*. *J. Appl. Phys.*, **2010**, *108*, 053303. (\*Undergraduate Student.) (Cross-referenced under Seed)

Behr, M.J.; **Mkhoyan A.K.**; **Aydil, E.S.** *Orientation and Morphological Evolution of Catalyst Nanoparticles During Carbon Nanotube Growth*. *ACS Nano*, **2010**, *4*, 5087. (Cross-referenced under Seed)

Behr, M.J.; **Mkhoyan A.K.**; **Aydil, E.S.** *Catalyst Rotation, Twisting, and Bending During Multiwall Carbon Nanotube Growth*. *Carbon*, **2010**, *48*, 3840. (Cross-referenced under Seed)

Burrows, N.D.; Yuwono, V.M.; **Penn, R.L.** *Quantifying the Kinetics of Crystal Growth by Oriented Aggregation*. *MRS Bulletin*, **2010**, *35*, 133.

Carvallo, C.; Sainctavit, P.; Arrio, M.-A.; Guyodo, Y.; **Penn, R.L.**; Forsberg, B.; Rogalev, A.; Wilhelm, F.; Smekhova, A. *Self-Reversal of Magnetization in Oceanic Submarine Basalts Studied with XMCD*. *Geophys. Res. Lett.*, **2010**, *37*, L11306/1.

Chun, C.L.; Baer, D.R.; Matson, D.W.; Amonette, J.E.; **Penn, R.L.** *Characterization and*

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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 MRSEC and the access to Shared Facilities, with user fees charged according to University and Federal guidelines.

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