

# SYMPOSIUM A

Defect-Mediated Phenomena in Ordered Polymers

December 2 – 4, 2002

## Chairs

Christopher K. Harrison NIST  
Samuel P. Gido Univ of Massachusetts-Amherst  
Gregory C. Rutledge MIT

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\* Invited paper

SESSION A1:  
Chair: Samuel P. Gido  
Monday Morning, December 2, 2002  
Room 303 (Hynes)

### 8:30 AM \*A1.1

INFLUENCE OF GRAIN BOUNDARIES ON THE DEFORMATION BEHAVIOR OF BLOCK COPOLYMERS. Edwin L. Thomas, Panitarn Wanakamol, Yung-Hoon Ha, Dept of Materials Science and Engineering, MIT, Cambridge, MA; Christian Grippo, Eberhard Bamberg, Mary Boyce, Dept of Mechanical Engineering, MIT, Cambridge, MA.

### 9:00 AM A1.2

BLOCK COPOLYMERS IN SMALL CONFINEMENTS. Joy Y. Cheng, C.A. Ross, Edwin L. Thomas, Dept of Materials Science and Engineering, MIT, Cambridge, MA; Henry I. Smith, Dept of Electrical Engineering and Computer Science, MIT, Cambridge, MA; Mark A. Hempenius, G. Julius Vancso, Dept of Materials Science and Technology of Polymers, Univ. of Twente, NETHERLANDS.

### 9:15 AM \*A1.3

GRAIN STRUCTURE OF CROSS-LINKED BLOCK COPOLYMERS. Hyeok Hahn, Nitash P. Balsara, University of California, Dept of Chemical Engineering, Berkeley, CA.

### 9:45 AM BREAK

### 10:15 AM \*A1.4

NON-EQUILIBRIUM STRUCTURES IN LAMELLAR DIBLOCK COPOLYMERS UNDER SHEAR. Karen I. Winey, Univ of Pennsylvania, Dept of Materials Science, Philadelphia, PA.

### 10:45 AM \*A1.5

FOLDING LAYERED LIQUIDS. David Morse, Univ. Minnesota, Minneapolis, MN.

### 11:15 AM \*A1.6

CELL DYNAMICS SIMULATIONS OF SHEAR-INDUCED ALIGNMENT AND DEFECT ANNIHILATION IN STRIPE PATTERNS FORMED BY BLOCK COPOLYMERS. Ian Hamley, Shao-Ran Ren, Dept of Chemistry, University of Leeds, Leeds, UNITED KINGDOM; Paulo Teixeira, P.D.Olmsted, Dept of Physics and Astronomy, University of Leeds, UNITED KINGDOM.

### 11:45 AM A1.7

EFFECTS OF BLENDING SIBS AND SMA ON MORPHOLOGY AND MECHANICAL PROPERTIES. Lan Pham, Changmo Sung, Center for Advanced Materials, Dept of Chemical and Nuclear Engineering, University of Massachusetts Lowell, Lowell, MA; Julie Chen, Dept of Mechanical Engineering, University of Massachusetts Lowell, Lowell, MA; Joey Mead, Dept of Plastics Engineering, University of Massachusetts Lowell, Lowell, MA.

## SESSION A2:

Chairs: Nitash P. Balsara and Karen I. Winey  
Monday Afternoon, December 2, 2002  
Room 303 (Hynes)

### 1:30 PM \*A2.1

ORIENTATION OF COPOLYMER MORPHOLOGIES IN THIN FILMS VERTICAL AND LATERAL ORDERING. Thomas P. Russell and Mathew Meisner, University of Massachusetts-Amherst, Amherst, MA.

### 2:00 PM \*A2.2

DEFECTS IN OPTOELECTRONICALLY ACTIVE ORGANIC MOLECULAR AND POLYMER CRYSTALS. David C. Martin, Patricia Wilson, Jun Liao, Lebzylisbeth Gonzalez-Ronda, Christian Kuebel, and Lawrence F. Drummy, Dept. of Materials Science and Engineering and the Macromolecular Science and Engineering Center, The University of Michigan, Ann Arbor, MI.

### 2:30 PM A2.3

MICROMECHANISMS OF DEFORMATION-INDUCED MOLECULAR ALIGNMENT IN PENTACENE THIN FILMS. Lawrence F. Drummy, Paul K. Miska, David C. Martin, Department of Materials Science and Engineering and the Macromolecular Science and Engineering Center, University of Michigan, Ann Arbor, MI.

### 2:45 PM A2.4

ELECTRONS, HOLES, AND ELECTRON-HOLE PAIRS IN POLYETHYLENE. S. Serra<sup>c</sup>, E. Tosatti<sup>a,b,d</sup>, D. Ceresoli<sup>a,b</sup>, S. Scandolo<sup>a,b</sup>, C. Righi<sup>a,b</sup>, G. Santoro<sup>a,b</sup>; <sup>a</sup>International School for Advanced Studies (SISSA), Trieste, ITALY; <sup>b</sup>Istituto Nazionale per la Fisica della Materia (INFN); <sup>c</sup>Pirelli Cavi e Sistemi, Milano, ITALY; <sup>d</sup>International Center for Theoretical Physics (ICTP), Trieste, ITALY.

### 3:00 PM BREAK

### 3:30 PM \*A2.5

EVOLUTION OF PROPERTY AND MICROSTRUCTURE OF P(VDF-TRFE) COPOLYMERS MODIFIED BY IRRADIATION INTRODUCED DEFECTS. Z.-Y. Cheng, Ying Kang Wang, Q.M. Zhang, The Pennsylvania State University, Materials Research Institute, University Park, PA; Fred B. Bateman, Radiation Interactions and Dosimetry, NIST, Gaithersburg, MD.

### 4:00 PM \*A2.6

PHOTOEXCITATION DYNAMICS IN POLYFLUORENE OLIGOMERS AND THE ROLE OF KETO DEFECTS: A THEORETICAL STUDY. Sergei Tretiak, Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM.

### 4:30 PM \*A2.7

EFFECT OF PULSED MAGNETIC FIELDS ON CRYSTALLIZATION OF POLYMERS. Mark N. Levin, Voronezh State University, Voronezh, RUSSIA.

## SESSION A3:

Chairs: Christopher K. Harrison and David C. Morse  
Tuesday Morning, December 3, 2002  
Room 303 (Hynes)

### 8:30 AM \*A3.1

DEFECT MOTION AND ANNIHILATION IN THIN FILMS OF SPHERE-FORMING DIBLOCK COPOLYMERS. Matthew L. Trawick, Dan E. Angelescu, Christopher K. Harrison, Daniel A. Vega, Douglas H. Adamson, Paul M. Chaikin, and Richard A. Register, Princeton Materials Institute, Princeton University, Princeton, NJ.

### 9:00 AM \*A3.2

DEFECT-MEDIATED MELTING AND LONG-RANGE ORDER IN THIN DIBLOCK COPOLYMER FILMS. Dan E. Angelescu, Christopher K. Harrison, Parikshit A. Deshpande, Matthew L. Trawick, Paul M. Chaikin, Richard A. Register, Douglas H. Adamson, Stephen Y. Chou, Princeton University, Princeton Materials Institute, Princeton, NJ.

### 9:30 AM \*A3.3

THEORY OF T-JUNCTIONS AND SYMMETRIC TILT GRAIN BOUNDARIES IN PURE AND MIXED POLYMER SYSTEMS. Daniel Duque, Kirill Katsov, Michael Schick, University of Washington, Department of Physics, Seattle, WA.

### 10:00 AM BREAK

### 10:30 AM \*A3.4

EFFECT OF PACKING FRUSTRATION ON BLOCK COPOLYMER GRAIN BOUNDARIES. Mark W. Matsen, Polymer Science Centre, University of Reading, Reading, UNITED KINGDOM.

### 11:00 AM \*A3.5

THE GEOMETRY OF DEFECT PHASES. Randall Kamien,

Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA.

**11:30 AM \*A3.6**

UNDERSTANDING THE MORPHOLOGIES AND POLYMERIZATION MECHANISM OF HOMOPOLYMER AND BLOCK COPOLYMER BRUSHES BY LIVING ANIONIC SURFACE INITIATED POLYMERIZATION (LASIP) ON SURFACES. Rigoberto Advincula Mi-kyoung Park, University of Houston, Department of Chemistry, Houston, TX, and Department of Chemistry, University of Alabama at Birmingham, Birmingham, AL; George Sakellariou, Stergios Pispas, Nikos Hadjichristidis, Department of Chemistry, University of Athens, Athens, GREECE; Jimmy Mays, University of Tennessee, Department of Chemistry, Knoxville, TN.

SESSION A4:

Chairs: Rigoberto Advincula and Richard A. Register  
Tuesday Afternoon, December 3, 2002  
Room 303 (Hynes)

**1:30 PM \*A4.1**

DEFECTS IN 2D FILMS OF ASYMMETRIC BLOCK COPOLYMERS. R.A. Segalman, A. Hexemer, M.R. Hammond and E.J. Kramer, UCSB, Santa Barbara, CA.

**2:00 PM \*A4.2**

INFLUENCE OF MOLECULAR ARCHITECTURE ON DEFORMATION BEHAVIOR AND TOUGHNESS OF BLOCK AND GRAFT COPOLYMERS. Roland Weidisch, Institute of Polymer Research Dresden (IPF), GERMANY.

**2:30 PM A4.3**

MORPHOLOGY AND MECHANICAL PROPERTIES OF  $(AB)_n$  MULTIBLOCK COPOLYMERS. Kim Rasmussen, Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM.

**2:45 PM A4.4**

DEFECT NUCLEATION AND ANNIHILATION IN FLOW-ALIGNING POLYMERIC LIQUID CRYSTALS. Dana Grecov, Alejandro D. Rey, McGill Univ, Dept of Chemical Engineering, Montreal, Quebec, CANADA.

**3:00 PM BREAK**

**3:30 PM \*A4.5**

ORIGIN OF CHIRALITY IN LAMELLAE OF ARHIRAL POLYMER MOLECULES. Murugappan Muthukumar, Univ of Massachusetts, Amherst, MA.

**4:00 PM A4.6**

INTERFACIAL ENERGY DEPENDENCE OF MICRODOMAIN ORIENTATION IN SYMMETRIC DIBLOCK COPOLYMER THIN FILMS. Ting Xu, Yuqing Zhu, Samuel P. Gido, Thomas P. Russell, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA.

**4:15 PM A4.7**

NUCLEATION AND GROWTH OF CYLINDRICAL MORPHOLOGY AT TILT GRAIN BOUNDARIES IN LAMELLAR BLOCK COPOLYMER / HOMOPOLYMER BLENDS. Engin Burgaz and Samuel P. Gido, Polymer Science and Engineering Department, University of Massachusetts, Amherst, MA.

SESSION A5: POSTER SESSION

Chairs: Roland Weidisch and Dan E. Angelescu  
Tuesday Evening, December 3, 2002  
8:00 PM  
Exhibition Hall D (Hynes)

**A5.1**

DEFECT MODIFICATION OF THE FERROELECTRIC PROPERTIES AND MESOSTRUCTURES IN TERPOLYMER OF POLY(VINYLIDENE FLUORIDE-TRIFLUOROETHYLENE-CHLOROFLUOROETHYLENE). Hengfeng Li, Ying Kang Wang, Z.-Y. Cheng, and Q.M. Zhang, Materials Research Institute, The Pennsylvania State University, University Park, PA.

**A5.2**

NETWORK STRUCTURES OF THE POLYMERS DERIVED FROM METHACRYLATE TYPE CROSS-LINKING AGENTS. Ken Hosoya, Hiroshi Aoki, Masako Takeuchi, Tohru Ikegami, Nobuo Tanaka, Kyoto Institute of Technology, Dept. of Polymer Science, Matsugasaki, Sakyo-ku, Kyoto, JAPAN.

**A5.3**

SINGLE SHOT OF ArF LASER-INDUCED PHOTOCHEMICAL NUCLEATION OF COPPER ON POLYETHYLENE-TEREPHTHALATE SURFACE. Hirotu Tokunaga, Masataka Murahara, Tokai Univ, Department of Electrical Engineering, Hiratsuka, Kanagawa, JAPAN.

**A5.4**

MOLECULAR MODELING OF PLANAR DEFECTS IN PENTACENE. Paul Miska, Lawrence Drummy, David C. Martin, Department of Materials Science and Engineering and the Macromolecular Science and Engineering Center, University of Michigan, Ann Arbor, MI.

**A5.5**

INFLUENCE OF DISTORTION OF THE LINEAR CHARACTER OF THE POLYETHYLENE CHAIN ON ITS STRUCTURE AND PHYSICO-MECHANICAL PROPERTIES. Svetlana Artamonova, Alexandra Artamonova, Institute of Physical Chemistry RAN, Moscow, RUSSIA.

**A5.6**

POLYMER INDUCED SELF-ORGANIZING CARBON NANOTUBE FILMS. Rory Leahy, Andrew Minett, Sakina Benrezzak, Dept of Physics, Trinity College Dublin, Dublin, IRELAND; Gordon Chambers, FOCAS, Dublin Institute of Technology, Dublin, IRELAND; Alan Dalton, University of Texas at Dallas, Dallas, TX; Marc in het Panhuis, Functional Materials Group, Dept of Physics, Trinity College Dublin, Dublin, IRELAND.

**A5.7**

MODELING OF DISLOCATION FORMATION AND PLASTIC DEFORMATION OF AN ORIENTED CRYSTALLINE POLYMER. Ulmas Gafurov, Institute of Nuclear Physics, Tashkent, UZBEKISTAN.

**A5.8**

THE QUANTUM-CHEMICAL MODELING OF DEFECT FORMATION AND ELECTRONIC STRUCTURE OF A POLYMETHYLENE CHAIN. Ulmas Gafurov, Vitaliy Bruskov, Institute of Nuclear Physics, Tashkent, UZBEKISTAN.

SESSION A6:

Chairs: Gregory C. Rutledge and Ian W. Hamley  
Wednesday Morning, December 4, 2002  
Room 303 (Hynes)

**8:30 AM \*A6.1**

HIERARCHICAL SELF-ASSEMBLY OF NANOSTRUCTURES ON DIBLOCK COPOLYMER SCAFFOLDS. Heinrich M. Jaeger, University of Chicago, James Franck Institute and Department of Physics, Chicago, IL.

**9:00 AM \*A6.2**

AN ULTRA-SMALL ANGLE X-RAY SCATTERING STUDY OF HIGH PRESSURE CRYSTALLIZED ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE. Mary Turell, Philippe Scherrer, Anuj Bellare, Department of Orthopaedic Surgery, Brigham & Women's Hospital, Harvard Medical School, Boston, MA.

**9:30 AM A6.3**

THE EFFECT OF NUCLEATING AGENTS ON THE CRYSTALLIZATION OF POLYPROPYLENE THIN FILMS. Marlon L. Walker, Surface and Microanalysis Science Division; Archie P. Smith and Alamgir Karim, Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD.

**9:45 AM A6.4**

THE EFFECT OF PHASE SEPARATION ON CRYSTALLIZATION IN POLYOLEFIN BLEND. Go Matsuba, Katsumi Shimizu, Howard Wang, Zhi-Gang Wang, Charles C. Han, National Institute of Standards and Technology, Polymers Division, Gaithersburg, MD.

**10:00 AM BREAK**

**10:30 AM \*A6.5**

NOVEL SURFACE MORPHOLOGY AND ORDERING IN LIQUID CRYSTAL DIBLOCK COPOLYMER ULTRATHIN FILMS. Jung-Sheng Wu, Paula T. Hammond, MIT, Dept of Chemical Engineering, Cambridge, MA.

**11:00 AM A6.6**

Abstract Withdrawn

11:15 AM A6.7

MOLECULAR ORGANIZATION OF BRANCHED POLYMERS. A.  
Rastogi, J. Hobbs, S. Rastogi, V.B.F. Mathot, The Dutch Polymer  
Institute, Dept Chemical Engineering, Eindhoven University of  
Technology, Eindhoven, THE NETHERLANDS.