

Preview

1992 MRS Fall Meeting

Boston, Massachusetts
November 30 - December 4

Meeting Chairs:

Carl C. Koch, North Carolina State University
Stephen J. Pennycook, Oak Ridge National Laboratory
Alice E. White, AT&T Bell Laboratories

Traveling deep into the microscopic world, the 1992 Fall MRS Meeting promises to be a dynamic and innovative one. This year's program includes 25 technical symposia with more than 3200 oral and poster presentations. New in the regular program this fall are symposia on fullerene materials, amorphous insulating thin films, nanophase and nanocomposite materials, polymer blends, ordered materials by design, biomolecular materials, textiles in composites, and energetic materials. Sessions will be held in the Marriott and Westin Hotels and in the theaters of Copley Place.

The session on ordered materials by design will look at materials synthesis from a different angle: using synthetic chemistry to build materials with defined symmetry and structure, in order to create sensors, waveguides, liquid crystalline materials, and tunable LEDs.

The goal of the symposium on polymer blends is the creation of tunable properties. This will be accomplished by structuring blends to make materials with properties intermediate between the starting materials, or with totally new properties.

The energetic materials symposium incorporates such topics as detection of mo-

lecular reaction products produced by combustion, separation and recombination of atoms subjected to shock impacts, and the monitoring of atomic interactions on a femtosecond scale.

The session on fullerene materials spans that topic from superconducting to endohedral and higher fullerenes. It includes nanotubes—tiny carbon cylinders, recently produced in gram quantities, which have spurred the imagination of researchers and engineers, inspiring them to dream up electrically and mechanically versatile nanocomposites.

The symposium on nanocomposites and nanophase materials will cover everything from ceramics with better structural properties to luminescence of quantum confined silicon crystallites and intercalated nanocomposites.

A large portion of the symposium on microcrystalline semiconductors delves into the issues that still confront scientists working on porous silicon. For example: for reasons that are still puzzling, the interesting properties of porous silicon rapidly degrade while the material is being processed.

The symposium on atomic-scale imaging of surfaces and interfaces will tour the

atomic world. Videos will demonstrate how atoms and molecules can be manipulated and chemical reactions controlled with the scanning tunneling microscope, and will show high resolution TEM of silicides forming and phases separating. Photoelectron diffraction holography, used to image atoms and magnetic moments near surfaces, will be discussed.

The symposium on evolution of surface and thin-film microstructure will hold four short afternoon panel discussions, each giving multiple views on a particular topic. The panel discussions will be based on results from a variety of analytical techniques probing surface roughness of heterostructures, CVD growth kinetics, misfit accommodation, and surface diffusion mechanisms.

Other symposia will cover superconductivity, beam-solid interactions, stability of microstructures, semiconductor heterostructures, chemical perspectives of microelectronic materials, laser ablation, silicon nitride ceramics, small confining systems, materials theory and modelling, disordered systems, solid state ionics, intermetallics, nuclear waste, and suspensions. For a list of all the technical symposia and session titles, see the matrix on the following pages.

Special Features

John A. Armstrong, IBM vice president, science and technology, will give the plenary address on "The Changing Role of Research Both in Industry and the University." His Monday evening address will focus on the end of the Cold War and the related emergence of high technology competition on a global scale, and the reappraisal of the role of research establishments both in industry and in universities.

The Von Hippel Award ceremony and lecture will be given Wednesday evening, along with the presentation of MRS Medal Awards and Graduate Student Awards.

At noon on Tuesday, in Symposium X, the first Turnbull Award Lecture will be given by Thomas R. Anthony, a physicist at General Electric and a world leader in low-pressure metastable diamond growth.

Symposium X will provide a set of lunch hour reviews designed for the nonspecialist. An example is Howard Katz' talk on "Tapes, Tinkertoys, Wires, and Waveguides: Making Molecules Stand Up, Sit Down, and Jump Through Hoops," which describes how molecular design can lead to desirable materials. Other topics will include complex fluids, ordered intermetallics, propellants, fullerenes, and biomolecular materials.

MRS Medal awardee lectures will be presented at noon on Friday. At lunch on Thursday, paralleling symposium X, a Grass Roots Education Session will give people interested in K-12 science education an opportunity to learn what teachers' needs are in this area and how technical professionals can contribute.

Monday afternoon from 4:00 to 5:30, MRS will present a new type of forum, discussing societal issues of interest to the scientific community. This is being organized by Rustom Roy, Penn State.

The technical program will be complemented by short courses and tutorials related to symposia topics, an extensive equipment exhibit including tabletop displays, a job placement center, four evenings of poster sessions, a student mixer on Tuesday evening, and many other auxiliary events.

For further details about the meeting see the 1992 MRS Fall Meeting Program, which has been mailed to all MRS members. If you need a program or would like to register, call or fax the MRS Meetings Department (412)367-3003; fax (412)367-4373.



1992 FALL MEETING SYMPOSIUM PROCEEDINGS

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F: Microcrystalline Semiconductors — Materials Science & Devices

Editors: Y. Aoyagi, L.T. Canham,
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I: Laser Ablation in Materials Processing — Fundamentals and Applications

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1992 Fall Meeting Session Locator

Symposium	Location	Monday, November 30			Tuesday, December 1		
		a.m.	p.m.	eve	a.m.	p.m.	eve
AA: Fullerenes	Salon A/B (M)	AA1: Superconductivity I	AA2: Tubules/Novel Structures		AA3/H4: Superconductivity II Salon E (M)	AA4: Functionalization Chemistry	AA5: Posters
A: Beam-Solid Interactions	America South (W)	A1: Computer Simulations	A2: Electronic Excitation A3: Radiation Damage in Semiconductors	A4: Posters	A5: Optical Materials Damage A6: Damage in Ceramics	A7: Amorphization by Particle Beams A8: Recrystallization	
B: Surface & Thin Film Microstructures	America North (W)	B1: Surface Microstructure	B2: Surface Diffusion		B3/W2: Surface Evolution at High Resolution	B4: Chemical Vapor Deposition	B5: Posters
C: Stability of Microstructures	Salon G (M)	C1: Morphological Stability I	C2: Morphological Stability II	C3: Posters	C4: Grain Boundary Controlled Stabilities	C5: Complex Microstructures	C6: Posters
D: Semiconductor Heterostructures	America Center (W)	D1: III-V Epitaxy	D2: III-V Structures		D3: III-V Devices	D4: Si-Ge Epitaxy	D5: Posters
E: Chemical Perspectives of Microelectronics	Staffordshire (W)	E1: Compound Semiconductor Growth	E1: (continued) E2: Laser Assisted Metallization		E3: Metallization I	E4: Metallization II	E5: Posters
F: Microcrystalline Semiconductors	Essex South (W)	F1 and F2: Microcrystalline Si I and II	F3: Si Nanostructure F4: Si & GE Nanostructure		F5 and F6: Porous Si Characterization I and II	F7: Microcrystalline Si III F8: Polysilicon	F9: Posters
G: Amorphous Insulating Thin Films	Essex West (W)				G1: Preparation G2: Electronic Structure Defects in Silicon Nitride	G2: (continued) G3: Memory Devices	
H: Superconductors	Salon E (M)	H1: Fundamentals	H2: High Frequency Response of Superconductors	H3: Posters	H4/AA3: Superconductivity II	H5: Thin Films and Superlattices	H6: Posters
I: Laser Ablation	Salon C/D (M)				I1: Polymer Ablation and Materials Patterning	I2: Wide Band-Gap Materials and Metals	
J: Nanophase & Nanocomposite Materials	Salon H/I (M)				J1: Chemical Synthesis	J2: Physical Synthesis	
K: Silicon Nitride Ceramics	Salon J/K (M)	K1: Si ₃ N ₄ Based Ceramics	K2: Powder Synthesis		K3: Grain Boundary Phases and Glasses	K4: Microstructure Development	
L: Intermetallic Alloys	Salon F (M)	L1: Structure and Phase Stability	L2: Defects	L3: Posters	L4: Deformation-High Temp. Strength and Fatigue	L5: Fracture and Environmental Effects	
M: Dense Suspensions	Orleans/Provincetown (M)	M1: Fundamental Aspects of Dispersed Suspensions	M2: Flow and Microstructure I		M3: Flow & Microstructure II M4: Flow Behavior of Important Materials	M5: Cement-Based Materials	M6: Posters
N: Dynamics in Small Confining Systems	Regis (M)	N1: Structure and Dynamics of Polymers at an Interface A	N2: Structure and Dynamics of Polymers at an Interface B		N3: Dynamics and Thermodynamics of Confined Gases and Liquids A	N3: Dynamics and Thermodynamics of Confined Gases and Liquids B	
O: Materials Theory & Modeling	Essex Center (W)	O1: Development In Methods	O1: (continued) O2: Semiconductors		O3: Defects and Fracture	O4: Alloys and Composites	
P: Disordered Systems: Fractals Scaling, Dynamics	Yarmouth/Vineyard (M)		P1: Granular Materials		P2: Slow Relaxation	P3: Geo- and Micro-Mechanics	P4: Posters
Q: Polymer Blends	Theater	Q1: Blends I	Q2: Blends and Copolymers	Q3: Posters	Q4: Structure and Dynamics	Q5: Surfaces and Interfaces	
R: Ordered Materials By Design	Theater	R1: Surface Multilayers & Polar Polymer Films	R2: Surface Monolayers	R3: Posters	R4: Molecular Engineering I	R5: Molecular Engineering II	
S: Biomolecular Materials	Theater				S1: Lessons from Nature	S2: Cellular Synthesis	
T: Textiles in Composites	Adams (W)	T1: Modeling and Properties	T2: Applications		T3: Fibers		
U: Solid State Ionics	Cape Cod/Hyannis (M)	U1: Insertion Compounds	U2: Insertion Compounds		U3: Polymer Electrolytes	U4: Polymer Electrolytes and Electrodes	
V: Nuclear Waste Management	Theater	V1: Radionuclide Chemistry I	V2: Radionuclide Chemistry II V3: Spent Fuel V4: Container Alteration		V5: Natural Analogues V6: Near-Field Interactions	V7: Microbiological Influenced Corrosion	
W: Atomic Scale Imaging	St. George B/C/D (W)		W1		W2/B3: Surface Evolution at High Resolution American North (W)	W3	W4: Posters
X: Frontiers of Materials Research			X1: 12:05-1:25 Salon C/D (M)			Turnbull Lecture X2: 12:05-1:25 Salon F (M)	
Y: Energetic Materials	Essex East (W)	Y1: Structure and Stability	Y2: Deformation, Fracture and Initiation		Y3: Shock Phenomena	Y4: Crystals: Growth and Behavior	

Wednesday, December 2			Thursday, December 3			Friday, December 4	
a.m.	p.m.	eve	a.m.	p.m.	eve	a.m.	p.m.
AA6: Endohedral and Higher Fullerenes	AA7: Solid C ₆₀		AA8: Superconductivity III	AA9: Nonlinear Optics and Surfaces	AA10: Posters	AA11: C ₆₀ and C ₇₀	
A9: Ion Implantation in Metals A10: Beam Applications in Semiconductors	A11: Finely Focused Beams		A12: Direct Ion Beam Deposition A13: Kinetics & IBAD	A14: IBAD Applications A15: Laser Processing and Surface Modification	A16: Posters A17: Posters	A18: Ion Beam Mixing A19: Buried Layers & Mesotaxy	
B6: Surface Evolution: Adatoms, Steps and Morphology	B7: Interface Roughness		B8: Orientation in Epitaxy B9: Misfit Accommodation	B10: Misfit Accommodation Mechanisms	B11: Posters	B12: Surfactants B13: Structure/Properties	B14: Solid Phase Epitaxy B15: Diamond Thin Films
C7: Instabilities Induced by External Fields	C8: Instabilities in Thin Films						
D6: Photonic Properties of Si Heterostructure	D7: II-VI and IV-VI Semiconductor Heterostructures		D8: Silicides, Metals and Ohmic Contacts	D9: Nitrides and Insulators	D10: Posters		
E6: Novel Si Based Materials	E7: Si Materials		E8: Dielectrics	E9: Novel Materials and Growth Techniques			
F10: Laser Processing of Polysilicon F11: Thermal Processing	F12: Si Nanostructure Theory F13: Porous Si Passivation	F14: Posters	F15: III-V Quantum Dots F16: III-V and II-VI Quantum Dots I	F17: Quantum Dots II F18: Porous Si	F19: Posters	F20 & F21: Optoelectronic Properties/Devices of Porous Si I and II	
G4: Preparation of Silicon Dioxide G5: SiO ₂ Defects	G5: (continued) G6: Silicon Oxynitride Thin Films		G7: TFT's and Submicron Devices	G8: Low and High Dielectric Constant Materials	G9: Posters	G10: SOI Technology G11: Dielectrics for Passivation of Compound Semiconductors	
H7: Flux Pinning and Critical Currents	H8: Vortices and Flux Motion	H9: Posters	H10: Junctions and Thin-Film Devices	H11: Applications	H12: Posters	H13: Single Crystals H14/H8: Pulsed Laser Deposition Salon C/D (M)	H15: Bulk Materials
I3: Pulsed Laser Deposition Dynamics	I4: Deposition of Nitride and Tribological Films		I5: Pulsed Laser Deposition of Epitaxial Oxides	I6: Deposition of Thin Films	I7: Posters	I8/H14: Pulsed Laser Deposition	
J3: Nanocomposite Materials	J4: Nanocomposites: Thin Films and Multilayers	J5: Posters	J6: Characterization, Applications	J7: Properties and Applications			
K5: Si ₃ N ₄ Alloys and Composites	K6: Mechanical Performance		K7: Applications	K8: Corrosion and Oxidation			
L6: Material Processing	L7: Oxidation and Advanced Fe- and Ni-Based Intermetallics	L8: Posters	L9: Advanced Titanium Aluminides	L10: Advanced Intermetallics			
M7: Ceramic Materials							
N5/P5: Flow/Relaxation in Porous Media Yarmouth/Vineyard (M)	N6: Dynamics and Thermodynamics of Confined Gases and Liquids C	N7: Posters	N8				
O5: Surfaces, Growth and Transport	O6: Ionic Systems	O7: Posters	O8: Clusters and Polymeric Systems	O9: Perturbations in Crystals			
P5/N5: Flow/Relaxation in Porous Media	P6: Spatial Organization	P7: Posters	P8: Morphology of Non-Equilibrium Growth Process				
Q6: Polymer Blends							
R6: Conjugated Polymers	R7: Self-Assembling Polymers						
S3: Non-Cellular Synthesis I	S4: Non-Cellular Synthesis II		S5: Structural and Mechanical Properties Orleans/Provincetown (M)	S6: Applications Orleans/Provincetown (M)			
U5: Theory	U6: Materials and Techniques		U7: Materials and Techniques	U8: Materials and Techniques			
V8: Glass and Crystalline Waste Forms V9: Glass Leaching	V10: Long-Term Prediction	V11: Posters	V12: Performance Assessment: Geological Systems Salon G (M)	V13: Performance Assessment: Engineered Barrier Systems Salon G (M)		V14: Cementitious Materials Salon G (M)	
W5	W6						
	X3: 12:05-1:25 Salon C/D (M)			X4: 12:05-1:25 Salon C/D (M) Grass Roots Education 12:05-1:25 Salon A/B (M)			X5: 12:05-1:25 Salon F (M) MRS Medal Awardee Lectures
Y5: Statics, Kinematics and Dynamics	Y6: Processes, Performance and Propellants						

(M) = Marriott
(W) = Westin

All poster sessions will be held in America Ballroom (W)

TRAVEL ARRANGEMENTS

The official travel management company for the Materials Research Society's 1992 Fall Meeting is the Travel Bureau of Sacramento.

They will guarantee the lowest fares on any airline at time of booking. Call and ask for MRS Group 001:

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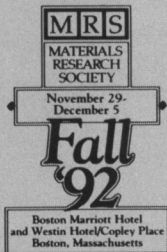
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Short Course and Tutorial Program

Characterization of Materials

C-01 Modern Materials Analysis Techniques
Instructors: James A. Borders, Kenneth H. Eckelmeyer, and Michael R. Keenan
November 30-December 2\$795

C-14 Scanning Tunneling Microscopy and Atomic Force Microscopy
Instructor: Dawn A. Bonnell • December 2\$395

C-16 Scanning Electron Microscopy: Applications to Electronic Materials and Devices
Instructor: Alton D. Romig, Jr. • December 2-3\$595

C-18 TEM Specimen Preparation in the Physical Sciences
Instructor: Ronald M. Anderson • November 30-December 1\$450

C-20 Optical Characterization of III-V Semiconductor Epitaxial Layers
Instructor: Gary W. Wicks • December 3\$395

C-23 X-Ray Diffraction Characterization of Semiconductor Wafers
Instructors: Mary Halliwell and Isabella Bassignana • December 2\$395

C-27 Materials Research and Analysis Using In Situ and Ex Situ Spectroscopic Ellipsometry
Instructor: John A. Woollam • December 1\$395

Preparation and Fabrication of Materials

F-04 Materials and Processing Aspects of Advanced VLSI Assembly and Packaging
Instructor: Shankara K. Prasad • December 3-5\$795

F-10 Fundamentals and Applications of Ion Beam Assisted Deposition
Instructor: James K. Hirvonen • December 2\$395

P-04 Film Formation, Adhesion, and Surface Preparation
Instructor: Donald M. Mattox • December 1\$395

P-07 Sol-Gel Processing
Instructors: C. Jeffrey Brinker and George W. Scherer • December 4-5\$595

Preregistration Tuition

P-22 Fundamentals of Epitaxial Growth Techniques for Compound Semiconductors

Instructor: L. Ralph Dawson • November 30-December 1\$595

P-23 Excimer Laser Ablation and Etching of Materials

Instructor: James H. Brannon • November 30\$195

P-24 Contamination Control in PVD Systems

Instructor: Donald M. Mattox • December 4\$395

Advanced Materials

M-04 Optoelectronic Materials, Processes, and Devices

Instructor: Mool C. Gupta • December 4-5\$595

M-15 Biological Processes for Materials Synthesis

Instructor: Mark Alper • November 30\$395

M-16 Ferroelectric Thin Films

Instructors: Angus I. Kingon and James F. Scott • November 30-December 1\$450

M-17 Science and Technology of Nanostructured Materials

Instructor: Horst W. Hahn • November 30\$395

M-18 Diamond Films: Growth and Properties

Instructors: Robert Nemanich, Jeffrey T. Glass, and Jesko Von Windheim
December 3\$395
Special Registration/Cancellation Deadline: November 13, 1992

Techniques

T-05 Plasma Technology for Thin Film Deposition

Instructor: Donald M. Mattox • December 3\$395

T-10 Crystallographic Databases for Chemical and Material Analyses

Instructors: Alan D. Mighell, Ronald M. Anderson, John R. Rodgers, and Mark Holomany Coordinator: Winnie Wong-Ng • December 4\$395

Tutorial Program

TP-1 Transfer of Technology from R&D to Manufacturing

Instructors: Donald M. Mattox and Alton D. Romig, Jr. • November 30\$75

TP-2 Fractals in Materials Science

Instructor: James E. Martin • November 30\$75

TP-3 Fullerenes

Instructors: Mildred S. Dresselhaus and Peter C. Eklund • November 29\$75

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There are special discounted tuition fees for specific course combinations. Facilities registering three or more persons at the same time in one MRS Short Course or Tutorial receive a 20% discount for the third and all additional persons.

Registration Information

Call (412) 367-3003 or Fax (412) 367-4373 and ask for the Short Course Office to request a copy of the short course brochure and information about student scholarships.

EQUIPMENT EXHIBIT

Boston Marriott Hotel
Tuesday-Thursday, December 1-3, 1992

As part of the 1992 Fall Meeting, a major equipment exhibit and table-top display program will be held to present analytical and processing equipment closely paralleling the nature of the technical symposia. The exhibit will be in the Boston Marriott Hotel and table-top display on the fourth floor of the Westin Hotel. The technical program has been arranged to allow meeting participants ample opportunity to visit the exhibit.

Exhibit Hours

Tuesday noon - 7:00 p.m.
Reception 5:00 p.m. - 7:00 p.m.
Wednesday 9:30 a.m. - 5:00 p.m.
Thursday 9:30 a.m. - 2:00 p.m.

Partial List of 1992 Fall Equipment Exhibitors

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