



# 1996 MRS Fall Meeting/ICEM-96

December 2–6, 1996, Boston, Massachusetts

Boston Marriott, Westin Hotel/Copley Place, Sheraton Boston Hotel and Towers

Meeting Chairs: Werner Lutze, University of New Mexico; Karen Maex, IMEC; Karl Sieradzki, Arizona State University

The 1996 MRS Fall Meeting, through its 4,250 oral and poster presentations, will cover a range of cross-disciplinary topics ranging from superconductors, catalytic materials, and nanophase materials, to intermetallics, art and archaeology, and cement. Symposia will debut on electrochemical synthesis, materials for microsystems, solid-state chemistry of inorganic materials, morphological control in multiphase polymer systems, and low-dielectric-constant materials.

Knitted into this meeting is the International Conference on Electronic Materials (ICEM), a biennial conference sponsored by the International Union of Materials Research Societies (IUMRS). Eleven of the 35 symposia are under the auspices of ICEM. Fundamentals such as defects and interfaces will be covered, as will processing, device issues, and electronic packaging. Elemental and compound semiconductors, metals, oxides, and polymers are all incorporated.

In Symposium M, Control of Semiconductor Surfaces and Interfaces, a theoretical approach to the spontaneous emergence of quantum dots, for instance when indium and arsenic are deposited onto gallium arsenide, will be presented. The number and size of the dots has shown good agreement with experiment. Atomic layer manipulation, phenomena at metal-SiC and metal/GaN contacts, and real time and *ex situ* optical characterization are other features of this symposium.

Solid/electrolyte interfaces in electrochemical synthesis and modification of materials will be discussed in Symposium P. *In situ* STM can be used to probe the atomistic details of heteroepitaxial electrodeposition.

Symposium Q, Advances in Microcrystalline and Nanocrystalline Semiconductors—1996, will kick off with an award presentation to Kazunobu Tanaka, for receiving the N. Mott Award given by the *Journal of Noncrystalline Solids*, followed by a plenary session covering nano/microcrystalline semiconductor thin films, semiconductor quantum dots, and porous silicon.

Symposium N, III-V Nitrides, will cover nitride lasers, deposition and growth processes, design consideration of GaN-based surface emitting lasers, very low dislocation densities in GaN-AlGaN heterostructures, doping sources, and materials and device properties.

Reactive ion etching has emerged as an important technology for fabricating microsystems, as will be described in Symposium I. Metalorganic chemical vapor deposition, molecular beam epitaxy, and

ion implantation are incorporated into several other symposia.

To treat the problem of interconnect delay in small devices, Symposium H, Low-Dielectric Constant Materials, will examine some of the candidates being considered as dielectrics in integrated circuits, including polymers such as fluorinated heteroaromatic polyethers, amorphous silica, and diamondlike carbon.

Environmental, Safety, and Health Issues in IC Production will be presented in Symposium L, giving examples of how to reduce water and chemical use in semiconductor manufacturing, handle hazardous gases such as perfluoro compounds and hydrides, and optimize equipment and process methods.

Symposium C, Thin Films and Surfaces—Structure and Morphology, has been split into two parallel symposia, due to its size. Symposium Ca will look at the effect of surface stress and its effect on thin film epitaxy, near-surface mechanical behavior, and simulations of thin film growth. Symposium Cb will include extremely sensitive *in situ* measurements in real time of stresses developed during thin film growth, kinetics of phase transformations, and compliant substrates for heteroepitaxy.

Engineering interfaces to achieve optimized properties will be discussed in Symposium W. This involves characterizing the interfaces and connecting this information to mechanical properties, understanding the interface chemistry, and modeling. Mechanical properties of composites will be included.

Smart materials are an outlet for creativity, suggesting unique materials such as adaptive composites by embedding shape-memory-alloy fibers into a matrix. Such topics will be included in Symposium Y.

A new polymers angle at this meeting is Morphological Control in Multiphase Polymer Mixtures, Symposium BB. The influence of block type and architecture on microdomain structure in block copolymers will be discussed. These are novel polymeric materials exhibiting ordering patterns with unusual properties including ferroelectric switching.

Symposium CC, Neutron and X-Ray Scattering Studies of Materials, will start off with a session on correlated electrons and superconductors, including neutron-scattering studies of charge and spin stripe correlations in cuprates and nickelates, and another on experimental evidence for the dynamic John-Teller effect in  $\text{La}_{0.65}\text{Ca}_{0.35}\text{MnO}_3$ .

Protein folding, pattern formation during film growth, and manipulation of DNA and

other materials with probe microscopies and laser tweezers will be addressed in Symposium EE. In a special session at 7 p.m. on Tuesday, Nobel Laureate Pierre-Gilles de Gennes will give a talk on surface flow of granular mixtures.

## Special Events

John P. McTague, Vice President of Technical Affairs at Ford Motor Company, will be the plenary speaker Monday evening. Von Hippel, Turnbull, MRS Medal, and graduate student awards will be presented during the awards ceremony Wednesday evening, followed by the Von Hippel award recipient's lecture and a wine and cheese reception.

Symposium X, *Frontiers of Materials Research*, presents a noontime series of reviews for the nonspecialist. Featured will be reflections on the evolution of polymer materials by de Gennes, options for disposal of weapons plutonium, a view of the Chernobyl nuclear plant accident 10 years later, recent developments in electron microscopy, electrical resistance of a carbon nanotube, nanophase materials, metallic glasses, and metallic corrosion ranging from rusty nails to atomic perspectives.

An interactive public affairs forum will feature members of the National Research Council Committee on Condensed Matter and Materials Physics and an IUMRS Forum will address policies and plans related to the future of materials research and education in the global community.

Sunday at 6:30 p.m., a junior faculty forum will address what it takes to get tenure, and at 7 p.m. a student mixer will be held. A two-day workshop on materials education will take place in Symposium JJ. A breakfast panel, "Alternative Careers: Life Beyond the Lab," is scheduled for Tuesday at 7 a.m., featuring scientists who have pursued careers in areas such as science policy, science journalism, and patent law. A career workshop is planned for Tuesday and a job placement service will be conducted Tuesday through Thursday. Meeting registrants also can benefit from poster sessions, a major exhibit, and tutorials integrated into the technical program. See the following pages for a matrix of symposia sessions, profiles of exhibitors, a registration form, and other information. If you need a program or would like to register, contact MRS at 412-367-3003; fax 412-367-4373; e-mail [info@mrs.org](mailto:info@mrs.org), or see the MRS Website <http://www.mrs.org/> for information.

MRS 1996 FALL MEETING SESSION SCHEDULE • December 2 - 6 • Boston, MA

Symposium	Location	Monday			Tuesday			Wednesday			Thursday			Friday	
		a.m.	p.m.	eve.	a.m.	p.m.	eve.	a.m.	p.m.	eve.	a.m.	p.m.	eve.	a.m.	p.m.
A: Materials Mod. & Synthesis by Ion Beam Processing	America Center (W)			P (W)											P (W)
B: Microstructure Evolution During Irradiation	America North (W)	Amer. Ctr.	Amer. Ctr.	P (W)						P (W)					
Ca: Structure and Evolution of Surfaces	Salon E (M)			P (S)						P (S)					
Cb: Thin Films: Surface and Morphology	Salon F (M)			P (S)						P (S)					P (S)
D: Prop./Applic. of Electronic Organic Mats. & Fullerenes	Republic B (S)			P (S)			P (S)			P (S)					P (S)
E: Defects in Electronic Materials	Essex Center (W)	TS					P (W)			P (W)					P (W)
F: Microstructural Evolution in Bulk Phases	Wellesley (M)						P (S)								
G: Atomic Resol. Microscopy of Surfaces & Interfaces	Yarmouth/Vineyard (M)									P (W)					
H: Low-Dielectric Constant Materials	Essex West (W)						TS								
I: Materials in Microsystems	Independence East (S)							TS							Comwl (S)
J: Electronic Packaging Materials Science IX	Essex East (W)		TS							P (W)					
K: Amorphous and Crystalline Insulating Thin Films IV	Fairfax A (S)			P (S)	TS										
L: Environ., Safety, and Health Issues in IC Production	Essex West (W)														
M: Control of Semiconductor Surfaces and Interfaces	Salon C/D (M)							P (S)							Salon E (M)
N: III-V Nitrides	America South (W)			P (W)				P (W)			P (W)				
O: Infrared Applic. of SC - Mats., Process., & Devices	Suffolk (M)							P (W)							
P: Electrochemical Synthesis and Modif. of Materials	Providence/Orleans (M)						Const. (S)				P (S)				
Q: Advances in Microcryst. & Nanocrystalline SC - 1996	Salon G (M)			P (S)											P (S)
R: Solid-State Chemistry of Inorganic Materials	Essex South (W)			P (W)				P (W)			P (W)				
S: Advanced Catalytic Materials III	Essex North/Center (W)							P (W)							
T: Glasses & Glass Formers - Current Issues	Simmons (M)							P (S)							Staffrd (W)
U: Biomats. Tech. - Molec. Struc.-Prop. Relationships	Independence East (S)														
V: Nanophase and Nanocomposite Materials II	Salon J/K (M)							P (W)			P (W)				
W: Interfacial Engineering for Optimized Properties	Salon H/I (M)							P (W)							
X: Frontiers of Materials Research	Salon G (M)														
Y: Adv. in Materials for Smart Systems - Fund. & Applic.	Commonwealth (S)							P (S)							P (S)
Z: High-Temperature Ordered Intermetallic Alloys	Salon A/B (M)			P (S)											P (W)
BB: Morph. Control in Multi-phase Polymer Mixtures	Hampton (S)														P (S)
CC: Neutron and X-Ray Scattering Studies of Materials	Fairfax B (S)														
DD: Materials Issues in Art and Archaeology V	Gardner (S)														
EE: Statistical Mechanics in Physics and Biology	Constitution (S)			P (S)				P (S)			P (S)				
FF: Dynamics in Small Confining Systems IV	Republic A (S)														Const. (S)
GG: High-T <sub>c</sub> Superconduct. - Interplay of Fund. & Appl.	Independence Center/West (S)			P (S)				P (S)							P (S)
HH: Hardened Cement Paste & Composites	St. George C/D (W)			P (W)											
II: Scientific Basis for Nuclear Waste Management XX	Staffordshire (W)			P (W)							P (W)				
JJ: Workshop on Materials Education	Regis (M)														Demo

Shaded blocks indicate scheduled symposium sessions.

(M) = Boston Marriott; no evening posters • (S) = Sheraton; Posters: Grand Ballroom/Constitution • (W) = Westin; Posters: America Ballroom  
 TS = Tutorial Session • P = Poster Session

# MRS 1996 FALL MEETING

## Boston, MA

### ▼ Location/Lodging/Travel

**Boston Marriott/Copley Place**  
 110 Huntington Avenue  
 Boston, MA 02116  
 (800) 228-9290  
 (617) 236-5800 (Direct)  
 Fax (617) 236-5885  
 Rate: \$123/Single\*  
 \$137/Double\*

**Westin Hotel/Copley Place**  
 10 Huntington Avenue  
 Boston, MA 02116  
 (800) 228-3000  
 (617) 262-9600 (Direct)  
 Fax (617) 424-7483  
 Rate: \$127/Single\*  
 \$142/Double\*

**Sheraton Boston Hotel and Towers**  
 Prudential Plaza  
 39 Dalton Street  
 Boston, MA 02199  
 (617) 236-2000 (Main Desk)  
 (617) 236-2020 (Reservations)  
 Fax (617) 236-6095  
 Rate: \$115/Single\*  
 \$125/Double\*

\* plus Massachusetts tax

**DEADLINE FOR HOTEL RESERVATIONS:  
 November 1, 1996**

A block of rooms has been reserved for MRS meeting attendees at the Boston Marriott, Westin, and Sheraton Boston Hotels. **Call or fax your preferred hotel and refer to the Materials Research Society's meeting to receive the special rates.**

A list of alternate lodging accommodations can be obtained via e-mail (info@mrs.org) or fax request to MRS Member Services, (412) 367-4373.

#### ► Airline Transportation

The official travel management company for the Materials Research Society's 1996 Fall Meeting is Giselle's Travel Bureau. They will guarantee the lowest fares on any airline at time of booking. A special discount has been arranged with American Airlines which includes 5% off the lowest available fare or 10% off nonrestricted coach fares. Call Giselle's, 1-800-523-0100, Monday - Friday, 7:30 a.m. - 5:30 p.m. PST, or Fax (916) 565-0936, and mention the Materials Research Society's meeting.

MRS meeting attendees receive the following travel benefits and services: • Lowest fares on any airline guaranteed • Computerized driving instructions from Logan International Airport to your hotel • Car rental savings

#### ► Local Transportation

Shuttle service to the Boston Marriott, Westin, and Sheraton Boston Hotels from Logan International Airport departs every half-hour, 7:00 a.m.-7:00 p.m., from the designated shuttle stop in front of each terminal.

There is a free shuttle from airport terminals to the airport subway station (The "T"). Copley Station is within one block of the Marriott, Westin, and Sheraton Hotels on the "Green Line."

#### ► Parking

A parking garage is adjacent to the meeting hotels.

#### ► Child Care

Check with the Concierge Desk at the individual hotels for a comprehensive roster of licensed and bonded sitters.

## MRS 1996 Fall Meeting Symposium Tutorial Program

MONDAY • DECEMBER 2	TUESDAY • DECEMBER 3
<b>Symposium E</b> 8:30 a.m. - noon <b>Magnetic and Laser Resonance Techniques</b> Essex Center - Westin	<b>Symposium H</b> 5:00 - 8:00 p.m. <b>Low-Dielectric Constant Materials for Deep-Submicron Interconnects</b> Essex West - Westin
<b>Symposium J</b> 2:00 - 5:00 p.m. <b>Revolution in Packaged Electronics</b> Essex East - Westin	<b>Symposium I</b> 3:30 - 7:00 p.m. <b>Plasma Etching in Microtechnology</b> Independence East - Sheraton Boston
(This cell is intentionally blank)	<b>Symposium K</b> 9:00 - 11:15 a.m. <b>Silicon on Insulator (SOI) - Materials Synthesis, Device Operation and Characterization Techniques</b> Fairfax A - Sheraton Boston

**MAIL** Return this form with payment to:

MRS Member Services  
9800 McKnight Road  
Pittsburgh, PA 15237-6006

**PHONE**

Call MRS Member Services, (412) 367-3003, between 8:00 a.m. and 5:00 p.m. Eastern time. **Telephone registration requires credit card payment;** have your credit card and this form in front of you for easy reference.

**FAX**

Transmit this form via fax to MRS Member Services, (412) 367-4373, in service 24 hours every day. **Fax registration requires credit card payment.**

## Preregistration Deadline: November 15, 1996

### A Meeting Preregistration

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- \$275 MRS Member     \$ 75 MRS Student Member     \$105 Retired  
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After November 15, 1996:

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Student registration will not be processed without proof of full-time student status. All registrations include complimentary MRS membership through December 31, 1997.

Enter total here and in **Payment Options** box. **TOTAL \$** \_\_\_\_\_

Symposium interest (please check all that apply):

- A  Cb  F  I  L  O  R  U  Y  CC  FF  II  
 B  D  G  J  M  P  S  V  Z  DD  GG  JJ  
 Ca  E  H  K  N  Q  T  W  BB  EE  HH

### B Proceedings (published after this meeting)

These rates apply only to meeting attendees and MRS members. Nonmembers must contact MRS headquarters for prices.

	No. Copies	Total
A: Ion Beam Processing.....	\$50 x _____	= \$ _____
B: Microstructure Evolution During Irradiation.....	\$55 x _____	= \$ _____
Ca: Structure/Evolution of Surfaces.....	\$50 x _____	= \$ _____
Cb: Thin Films Structure & Morphology.....	\$50 x _____	= \$ _____
E: Defects in Electronic Materials II.....	\$55 x _____	= \$ _____
H: Low-Dielectric Constant Materials II.....	\$45 x _____	= \$ _____
I: Materials for Mechanical & Optical Microsystems.....	\$55 x _____	= \$ _____
J: Electronic Packaging Materials Science IX.....	\$52 x _____	= \$ _____
K: Insulating Thin Films-1996.....	\$52 x _____	= \$ _____
L: Environmental/Safety in IC-Production.....	\$55 x _____	= \$ _____
M: Semiconductor Surfaces & Interfaces.....	\$45 x _____	= \$ _____
N: III-V Nitrides.....	\$50 x _____	= \$ _____
O: Infrared Applications of Semiconductors.....	\$55 x _____	= \$ _____
P: Electrochemical Synthesis of Materials.....	\$48 x _____	= \$ _____
Q: Micro/Nanocrystalline Semiconductors-1996.....	\$55 x _____	= \$ _____
R: Solid-State Chemistry of Inorganics.....	\$55 x _____	= \$ _____
S: Advanced Catalytic Materials-1996.....	\$55 x _____	= \$ _____
T: Glasses & Glass Formers.....	\$55 x _____	= \$ _____
U: Biomaterials & Biologically-Inspired Materials.....	\$55 x _____	= \$ _____
V: Nanophase & Nanocomposite Materials II.....	\$53 x _____	= \$ _____
W: Interfacial Engineering.....	\$55 x _____	= \$ _____
Y: Materials for Smart Systems II.....	\$50 x _____	= \$ _____
Z: High-Temperature Intermetallic Alloys VII.....	\$55 x _____	= \$ _____
BB: Multiphase Polymer Mixtures.....	\$55 x _____	= \$ _____
DD: Art & Archaeology V.....	\$52 x _____	= \$ _____
EE: Statistical Mechanics in Physics & Biology.....	\$55 x _____	= \$ _____
FF: Dynamics in Small Confining Systems III.....	\$52 x _____	= \$ _____
II: Nuclear Waste Management XX.....	\$55 x _____	= \$ _____
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### C Journal of Materials Research 1997

- Subscription at U.S. Member Rate (one per registrant).....  \$75  
Subscription at Non-U.S. Member Rate (one per registrant).....  \$88  
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### D Tutorials

(Optional Course Materials for Preregistrants)

Meeting attendees may participate in all tutorial sessions at no additional fee. Tutorial notes are available only to those who preregister for the tutorial.

To preregister and receive tutorial notes, check the appropriate tutorial(s) below.

There is no refund for cancellation; however, tutorial notes will be provided.

- FTE Magnetic and Laser Resonance Techniques.....\$25  
 FTH Low-Dielectric Constant Materials for Deep-Submicron Interconnects.....\$25  
 FTI Plasma Etching in Microtechnology.....\$25  
 FTJ Revolution in Packaged Electronics.....\$25  
 FTK Silicon on Insulator (SOI) - Materials Synthesis, Device Operation and Characterization Techniques.....\$25

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**A** Meeting Preregistration (from left) \$ \_\_\_\_\_

**B** Proceedings (from left) \$ \_\_\_\_\_

**C** Journal of Materials Research (from left) \$ \_\_\_\_\_

**D** Tutorials (from above) \$ \_\_\_\_\_

**TOTAL FEES PAID** \$ \_\_\_\_\_

#### Cancellation/Refunds

If you have already registered but are unable to attend the meeting, **you must notify MRS in writing of your request for a refund.** Refunds will be made upon receipt of this written notice, less a \$25 service charge. If you apply a portion of this refund to member dues or any MRS publications, the service charge will be waived. **MRS will not honor requests made more than one calendar month after the close of the meeting.**

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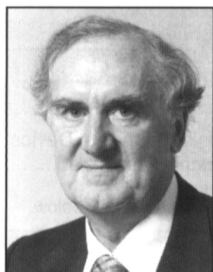
# MRS 1996 FALL MEETING

## Boston, MA

### AWARD PRESENTATIONS

The MRS Award Ceremony will be held on Wednesday evening, December 4, at 6:00 p.m., in the Boston Marriott Hotel, Salon E, followed by a wine and cheese reception. The Von Hippel, Turnbull Lecturer, MRS Medal, and Graduate Student Awards will be presented during this ceremony.

#### Von Hippel Award

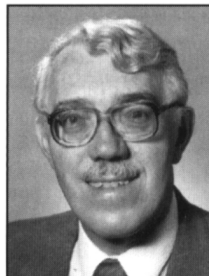


**Sir Alan H. Cottrell**  
Cambridge University  
United Kingdom

"The Art of Simplification in  
Materials Science"

**Talk Presentation**  
Wednesday, December 4, 6:00 p.m.  
Awards Ceremony  
Salon E, Boston Marriott

#### Turnbull Lecturer Award

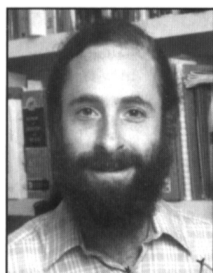


**Robert E. Newnham**  
The Pennsylvania State University  
Materials Research Laboratory

"Molecular Mechanisms in Smart  
Materials"

**Talk Presentation**  
Monday, December 2, 10:00 a.m.  
Symposium Y, Session Y1.5  
Commonwealth Room  
Sheraton Boston

#### MRS Medal Award



**Jerry D. Tersoff**  
IBM T.J. Watson Research Center

"Strain Relaxation and the  
Morphology of Thin Films"

**Talk Presentation**  
Tuesday, December 3, 5:00 p.m.  
Symposium Ca, Session Ca5.11  
Salon E, Boston Marriott

#### Graduate Student Awards

The Society presents the Graduate Student Award to graduate students who are presenting significant and timely research at the 1996 Fall Meeting as an author or co-author of a symposium paper. Check the *Meeting Guide* on site for the Graduate Student Award Special Talk Session schedule which will be held on Monday, December 2, at 12:00 noon.

### SPECIAL FUNCTIONS



#### IUMRS International Forum on Materials Research and Education Policy

Monday, December 2, 1:30 - 5:30 p.m.  
Cape Cod/Hyannis, Boston Marriott

#### Public Affairs Forum

Tuesday, December 3, 8:00 - 9:00 a.m.  
Boston Marriott

"The Future of Condensed Matter and Materials Physics"

#### Plenary Session



**John P. McTague**  
Vice President of Technical Affairs  
Ford Motor Company

"Where in the World is *Science and  
Technology* Going?"

Monday, December 2, 6:00 p.m.  
Salon E, Boston Marriott

# 1996 Fall Meeting Symposium Proceedings

Place your order today for proceedings of the 1996 MRS Fall Meeting in Boston and SAVE!

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INCLUDING  
**The 1996 ICEM Meeting**  
International Conference on Electronic Materials

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ISBN: 1-55899-342-8 Code: 438-B  
\$50.00 \$60.00 MRS Member  
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**B: Microstructure Evolution During Irradiation**

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**Cb: Thin Films—Structure and Morphology**

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**E: Defects in Electronic Materials II**

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**H: Low-Dielectric Constant Materials II**

Editors: K. Uram, H. Treichel, A.C. Jones, A. Lagendijk  
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**J: Electronic Packaging Materials Science IX**

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**K: Amorphous and Crystalline Insulating Thin Films—1996**

Editors: W.L. Warren, J. Kanicki, R.A.B. Devine, M. Matsumura, S. Cristoloveanu, Y. Homma  
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**L: Environmental, Safety, and Health Issues in IC Production**

Editors: R. Reif, A. Bowling, A. Tonti, M. Heyns  
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\$55.00 \$65.00 MRS Member  
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\$73.00 \$86.00 Non-U.S.

**M: Control of Semiconductor Surfaces and Interfaces**

Editors: S.M. Prokes, O.J. Glemboki, S.K. Brierley, J.M. Woodall, J.M. Gibson  
ISBN: 1-55899-352-5 Code: 448-B  
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Tuesday, December 3	Noon - 6:30 p.m. <i>Complimentary Reception will be held at the Marriott on Tuesday evening from 5:00 p.m. - 6:30 p.m.</i>	9:30 a.m. - 5:00 p.m.
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# 1996 MRS Fall Meeting Exhibit

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Fax: (413) 585-0126  
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WWW: <http://www.mmr.com>  
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#U406, 408

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## Morton International - Metalorganics

#W30

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(800) 832-1518  
Fax: (505) 294-5772  
E-mail: mrsemi@rt66.com

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Santa Clara, CA 95054  
Telephone: (408) 982-0840  
Fax: (408) 982-0252  
E-mail: nandk@ix.netcom.com

n&k Technology makes thin film characterization products that simultaneously and unambiguously determine:

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## ◆ National Electrostatics Corporation #U416

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Middleton, WI 53562-0310  
Telephone: (608) 831-7600  
Fax: (608) 256-4103  
E-mail: nec@well.com

National Electrostatics Corporation manufactures ion beam systems with energies from below 100 keV to the 100's of MeV region for a wide variety of applications including materials analysis and modification. These systems include dedicated RBS, ERD, NRA and PIXE systems. NEC also has available a wide variety of beam handling and vacuum components. (see ad in this issue)

## ◆ Neocera, Inc. #U507

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Fax: (608) 273-5046  
E-mail: KSTAHL@nicolet.com

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Fax: (608) 831-4461  
E-mail: billsgammato@Noran.com  
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## ◆ Noranda Advanced Materials #W38

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Fax: (418) 872-2894  
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E-mail: green@rhk-tech.com

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Tucson, AZ 85714  
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Fax: (520) 741-2200

E-mail: RMCBTLI@aol.com  
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West Palm Beach, FL 33407  
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E-mail: SIJS@ix.netcom.com  
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#U429  
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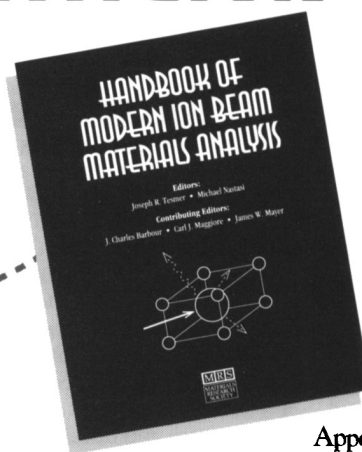
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