

Call for Papers: 1987 MRS Fall Meeting

The 1987 Fall Meeting of the Materials Research Society will include 21 topical symposia, a workshop on specimen preparation for transmission electron microscopy of materials, a forum on education in materials science and engineering, an equipment exhibit, a job placement center, and a short course program of approximately 20 courses. MRS extends a broad invitation to materials scientists and engineers to participate in all aspects of the meeting.

The symposia in the 1987 Fall Meeting will offer discussion on new materials development, new characterization methods, or new process technologies. Each symposium will provide an interdisciplinary forum for exchange of ideas on the latest research by experts in the field. Topics will be approached in a sophisticated manner, considering all physical, chemical and engineering insights. All symposia will be coordinated according to timing and content of sessions to minimize concurrency of presentations in common interest areas.

Papers which will contribute to the state of knowledge in a given area are solicited for all symposium topics. For additional information on a specific symposium, contact the symposium organizers listed at the end of the description for each symposium.

Abstracts are to be prepared in the **new MRS abstract format** and submitted to the organizers of the individual symposia. Except for Symposium AA, the **deadline for abstracts** to be in the hands of the symposium organizers is **June 12, 1987**.

For general information on the technical program for the meeting, contact any of the Program Chairs for the meeting:

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Barry E. Scheetz
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Late News Symposium AA

High-Temperature Superconductors

This symposium will be on the exciting, new high-temperature superconductors based on substituted perovskite compounds. It will afford an early opportunity to bring together scientists and technologists on this important, fast-moving topic.

A special late abstract deadline, **September 11, 1987**, will permit the latest news to be presented at the symposium.

Papers are solicited in the following areas:

- Relationships between preparation methods, structure, and superconducting properties
- Techniques for preparing conductors
- Properties of conductors
- Properties of high T_c superconductors related to uses other than conduction, e.g., tunnel junctions

Send abstracts in triplicate to M.B. Brodsky, to be received no later than **September 11, 1987**.

Symposium Organizers:

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Koichi Kitazawa
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Symposium A Fundamentals of Beam-Solid Interactions and Transient Thermal Processing

This symposium is devoted to fundamental aspects of energy beam-solid physical interactions, beam-induced phase transformations, beam-induced crystal growth, and other transient physical processes in semiconductors, metals, ceramics, polymers, and other materials. This symposium provides an interdisciplinary forum for scientists engaged in theoretical and experimental research on the interaction of photon, ion, and electron beams with solids, the thermodynamics and kinetics of phase transformations that can be induced by such interactions, and novel applications of these processes.

Papers are solicited in the following areas:

- Laser-solid interactions and ultrafast energy transfer mechanisms
- Ion and electron beam-solid interactions
- Beam-induced epitaxy and phase transformations
- Melting and rapid solidification

- Kinetics and thermodynamics of phase transformations
- Novel applications of transient thermal processing and beam-solid interactions

Send abstracts of contributed papers to M.J. Aziz at the address below.

Symposium Organizers:

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Bernd Stritzker
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(49) 24-6-161-3285

Symposium B Laser and Particle-Beam Chemical Processing for Microelectronics

Beam-controlled surface reactions are becoming increasingly important in thin-film deposition, etching, doping, and lithography. This symposium will develop a forum for discussing this emerging technology and the underlying science. New beam techniques for monitoring reactions or measuring the physical and electronic properties of surfaces will also be discussed. Papers are solicited in the following areas:

- Laser chemical vapor deposition and photochemical vapor deposition
- Laser-controlled etching in gases and liquids
- Ion-beam-assisted etching and deposition
- Electron-beam-stimulated reactions
- Laser-chemical doping of solids
- Focused ion beam processing
- New electron beam, ion beam, and laser diagnostics of processing reactions
- Laser photochemistry of adsorbed phases
- Technological applications of beam-stimulated processing
- New compounds and materials for beam-controlled processing

Symposium Organizers:

D.J. Ehrlich
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G.S. Higashi
1C-409
AT&T Bell Laboratories

Continued

Murray Hill, NJ 07974
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M.M. Oprysko
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(914) 945-2838

Symposium C Epitaxy of Semiconductor Layered Structures

This symposium will examine materials issues in epitaxial growth of semiconductor layered structures, focusing on molecular beam epitaxy and its competitors.

Papers are solicited on the following topics:

- Molecular beam epitaxial growth of Group IV, III-V, and II-VI compound semiconductor layers and superlattices
- Fundamentals of epitaxial growth
- Physics and chemistry of epitaxial interfaces
- Epitaxial metals and insulators
- Related subjects (e.g. epitaxial perfection and doping profile using MOCVD, novel techniques for epitaxy, noncrystalline superlattices, interfacial metal-semiconductor reactions)

Symposium Organizers:

Raymond T. Tung
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Symposium D Multilayers: Synthesis, Properties, and Nonelectronic Applications

So far, the most widely studied area in synthetic multilayers has been the electronic properties of semiconductor superlattices, which has been the subject of many meetings. This symposium will provide a forum for presenting and discussing growing activities in other areas of artificial multilayer materials: metallic and insulator and the nonelectronic properties of semiconductor multilayers.

Papers are solicited in areas relating to both fundamental and applied aspects of multilayer research and development. Areas to be addressed include, but are not limited to:

- Multilayer characterization (x-ray scattering, TEM, SEM, Auger)
- Atomic transport (diffusion, coarsening)
- Phase stability in multilayers (theory, thermodynamics, strained layer structures)

- Multilayer properties (magnetic, superconductive, mechanical, elastic)
- Multilayer applications (memory structures, x-ray optics, VLSI interconnects, tribology)

Send abstracts of contributed papers to F. Spaepen at the address below.

Symposium Organizers:

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Symposium E Defects in Electronic Materials

Numerous new issues on the fundamental properties of defects and of the impact of defects on semiconductor technology continue to arise. This symposium will examine fundamental defect properties of elemental and compound semiconductors and the role played by defect-related phenomena in technological applications.

Papers are solicited in areas relating to fundamental and/or technologically relevant studies, both theoretical and experimental, of defects in semiconductors. Areas to be addressed include:

- Spectroscopy of point defects and defect complexes
- Hydrogen in semiconductors, passivation mechanisms, and physics of H-related complexes
- Metastable defects (e.g. EL2, DX centers)
- Studies of defect structure, diffusion, and reactions
- Defects in superlattices and heterojunctions
- Defects in device structures or due to fabrication

Symposium Organizers:

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Symposium F SiO₂ and Its Interfaces

The properties of SiO₂ are one of the main reasons for the predominance of Si in microelectronic devices, but fundamental understanding of these properties is still evolving. This symposium will review recent progress and discuss the latest results of ongoing research. The emphasis of the symposium will be on fundamental understanding of the reactions that underlie growth (thermal oxidation, CVD, etc.), ways to selectively enhance growth and the properties of the resulting films, interfaces, and substrates. Both theoretical and experimental work on structural, electronic, and thermodynamic properties will be included. Work on related materials, such as silicon nitride or oxynitride, the oxidation of silicides, etc. will be included, especially if results are contrasted with corresponding results in SiO₂.

Papers are solicited in any of the above topical areas.

Symposium Organizers:

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Sokrates T. Pantelides
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(914) 945-1207

Symposium G Polysilicon Films and Interfaces

This symposium is devoted to the science and applications of polysilicon films and their interfaces, highlighting current scientific and technological issues related to polysilicon and also promoting a dialogue between industry and the academic world.

Papers are solicited for the following topics:

- Preparation and characterization: fabrication of poly-crystal and bi-crystal Si films, structure and electrical transport properties of grain boundaries
- Kinetics: grain growth, DIGM in doped poly-Si, grain boundary diffusion, passivation, segregation, dopant activation, oxidation, and rapid thermal annealing
- Interfaces: structure, reactions and properties of poly-Si/metal, poly-Si/SiO₂, and poly-Si/single crystal Si interfaces
- Applications: bipolar emitters and base contacts, FET gates and trench capacitors,

Continued

resistors, thin film transistors, display devices, sensors, and solar cells

Send abstracts of contributed papers to C.Y. Wong at the address below.

Symposium Organizers:

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K.N. Tu
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Symposium H

Silicon-on-Insulator and Buried Metals in Semiconductors

The symposium is the sequel to the successful one devoted to the same topic at the 1985 MRS Fall Meeting. The forum aims to provide for an open discussion of all silicon-on-insulator technologies and other methods for fabricating buried insulator structures in semiconductors. This symposium will be expanded this year to include buried metal structures in semiconductors, and will emphasize the materials science and the devices and circuits that thus become possible. Methods for fabricating these structures include high-energy implantation, recrystallization from the melt, and epitaxial growth. Despite the use of the word silicon in the title, papers describing developments with III-V and other semiconductors over insulators and metals are specifically encouraged.

Papers are solicited in the following areas:

- Implanted oxygen and nitrogen
- Melt recrystallization
- Heteroepitaxial growth
- Porous silicon
- Lateral epitaxial overgrowth
- Origins and characterization of defects
- Novel buried layer techniques
- Devices and circuits

Symposium Organizers:

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James C. Sturm
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Symposium I

Electronic Packaging Materials Science

Packaging in the electronics industry includes the various aspects of encapsulation, mounting, and electrical interconnection involved in fabricating devices and their assembly into components and systems. Packaging thus encompasses several different technologies and involves many diverse aspects of materials science. This symposium will be organized according to three levels of packaging:

- Level 0: On-chip
- Level 1: Chip carrier
- Level 2: Interconnect systems

The common themes important to all three of these levels of packaging will be stressed. Papers are solicited which contribute to fundamental aspects of packaging in the following areas:

- Properties of thin films and bulk materials
- New materials for packaging
- Interfaces between semiconductors, metals, ceramics, and polymers
- Interfaces and their properties (e.g. adhesion, interfacial stress, and electrical properties)
- Mechanical and thermal management
- Soldering and other interconnects
- Failure mechanisms

Send abstracts of contributed papers to K.A. Jackson at the address below.

Symposium Organizers:

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(312) 391-3128

Symposium J

Structure-Property Relationships in Optical Materials

This symposium will address structure-property relationships in solid-state optical materials, including conventional optical materials (high bandgap dielectrics) and semiconductors (low bandgap dielectrics). Papers addressing any relevant optical or

thermal properties are invited, particularly on the relation of structure to the following properties:

- Linear refractive index and birefringence
- Second harmonic generation coefficients
- Electro-optic coefficients
- Nonlinear refractive index
- Laser-induced damage
- Photorefractivity
- Thermal conductivity and thermal expansion
- Zero thermal expansion materials
- Elastic constants
- Mechanical strength or fracture toughness

Symposium Organizers:

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Symposium K

Nonlinear Optical Properties of Polymers

Conjugated (π -electron) polymers have recently emerged as a class of materials with large nonlinear optical coefficients and sub-picosecond response times. The large values for the third-order susceptibility, $\chi^{(3)}$, reported for polydiacetylene, polyacetylene, and liquid crystalline polymers such as polybenzothiazole establish this class of materials as potentially important for future technological applications. Understanding the origin of the large nonlinear response in these materials is only beginning. This symposium will examine the nonlinear optical properties of polymers and organic solids.

Papers are solicited in areas relating to fundamental studies of nonlinear optical properties of polymers and organic solids. Areas to be addressed include, but are not limited to:

- Third harmonic generation, three and four wave mixing, dc field-induced second harmonic generation, etc. to characterize and evaluate these polymers as nonlinear optical materials
- Use of time-resolved optical techniques to study dynamics of nonlinear processes
- Materials synthesis, processing, and polishing with the goal of optical quality uniform oriented films of polymers with anisotropic optical passages

Continued

• Theoretical studies of the origin of the large $\chi^{(3)}$ in conjugated polymers, including excitons and polaritons and the special role of electron-phonon coupled excitations in 1d

• Design, fabrication, and evaluation of NLO devices based on polymers

Send abstracts of contributed papers to A.J. Heeger at the address below.

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Donald R. Ulrich
AFOSR
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Symposium L Polymer Surfaces, Interfaces, and Adhesion

Cosponsored by Society of Plastics Engineers

Polymers have a wide range of applications extending from structural composites to microelectronic packaging. This symposium will focus on the fundamental understanding of the microscopic aspects of surfaces and interfaces of polymers and their relationship to adhesion in polymeric composite materials. This symposium will provide a forum to bring together researchers in various disciplines of polymer physics, chemistry, and materials science.

Papers are solicited in the following topical areas:

• Chemical and structural nature of polymer surfaces and interfaces, particularly in contact with other materials

• Mechanical properties of polymer composite interfaces, especially microstructural aspects of adhesion

Symposium Organizers:

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Paul S. Ho
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Richard P. Wool
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Symposium M Biomedical Materials and Devices

This symposium, the sequel to the very successful one at the 1985 MRS Fall Meeting, will bring together scientists, engineers, and clinicians working with all types of biomedical materials and devices. Papers are solicited for, but not limited to, the following areas:

- Alloplasts for cranioplasty
- Analytical techniques and methodology for biomaterials
- Artificial heart
- Biocompatibility and tissue interfaces of biomaterials
- Bioelectronic materials and devices for sensors, neural prostheses and pain
- Blood cell and plasma substitutes
- Bone graft substitutes
- Cardiovascular materials and devices
- Catheter materials for interventional radiology and medical imaging
- Controlled drug delivery and removal systems
- Dental materials
- Devices and materials for therapeutic plasmapheresis, cytapheresis, and dialysis
- Artificial organs
- In-vitro and in-vivo biomaterials evaluation
- Lipid bilayers
- Liposomes as biomaterials
- Novel materials and techniques
- Ophthalmic biomaterials
- Orthopedic materials and prostheses
- Percutaneous devices
- Plastic surgery and biomaterials
- Skin substitutes
- Standardization and control of biomedical materials and devices
- Structure and properties of biomaterials

Symposium Organizers:

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Beverly L. Giammara
Graduate Programs and Research
University of Louisville
Louisville, KY 40292
(502) 588-6616

Symposium N Plasma-Assisted Deposition of New Materials

This symposium will focus on the vapor deposition of new materials by plasma-assisted processes and also address the related fundamental issues of plasma chemistry and plasma/solid interactions. It is anticipated to be a forum for understanding the fundamental roles of chemistry and particle bombardment during nonthermal-equilibrium film growth. In particular, the area of diamond and related materials film growth will be highlighted and will feature invited speakers from Russia, Japan, Poland, and the United States.

Papers are solicited in the following areas:

- Preparation methods: plasma-assisted CVD; ion sputtering; ion-plating; dc, rf, microwave plasma; and organometallic input gases
- New materials, including not only new phases but also new compositions, unique properties, or new configurations (e.g. on polymer substrates, multilayer structures, optical fibers)
- Plasma chemistry and plasma/solid interaction relations to film growth
- Diamond, c-BN, β -SiC
- Oxides, nitrides, carbides, borides, silicides, metal alloys, etc.

Symposium Organizers:

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Symposium O Microstructure and Properties of Catalysts

One of the main goals in catalysis science is the deliberate design of catalytic structures optimized for activity and selectivity toward a desired reaction product. Attaining this goal remains a challenging problem for scientists in a broad range of disciplines, including materials scientists, synthesis chemists, physical chemists, physicists, and theorists. This symposium will bring together researchers from these disciplines to compare and discuss the latest results which establish clear relationships between structure and catalytic properties.

Papers are solicited from all areas of catalysis science which address the goal of unraveling structure/property relationships of catalysts. Areas to be addressed include, but are not limited to:

- Physical characterization techniques (e.g. NMR, (S)TEM, SIMS, EXAFS, IR, Mössbauer, powder x-ray diffraction, powder neutron diffraction, diffusion measurements, sorption measurements)
- Catalytic properties, reaction mechanisms

Continued

- Synthesis of oxides, hydroxides, zeolites, clays, and pillared clays
 - Theoretical studies of catalyst properties
- Send abstracts of contributed papers to M.M.J. Treacy at the address below.

Symposium Organizers:

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J.M. White
University of Texas at Austin
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**Symposium P
Scientific Basis for Nuclear Waste
Disposal XI**

This symposium will focus on recent scientific advances and technical aspects of nuclear waste disposal. The eleventh in a series, this symposium is intended to be interdisciplinary, including contributions from metallurgy, glass science, ceramics, geoscience, radiation chemistry, and chemical engineering. Invited panels of experts will define and debate key areas of current studies on materials and related sciences. Papers are solicited in the following areas:

- Barrier materials selection and characterization
- Waste form performance (spent fuel, glass, others)
- Container corrosion/degradation
- Radiation effects
- Waste package system tests
- Natural analogue studies
- Disposal of non-high-level radioactive wastes
- Radionuclide migration in repository environments
- Predictive assessments of waste package performance
- Validation of assessment models

Send abstracts of contributed papers to M.J. Apter at the address below.

Symposium Organizers:

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**Symposium Q
Fly Ash and Coal Conversion
By-Products: Characterization,
Utilization, and Disposal IV**

This will be the fourth symposium dealing with characterization, utilization, and disposal of fly ash and other by-products of coal combustion and conversion (bottom ash, boiler slag, gasification ash, etc.). A continuing feature of these symposia has been the emphasis on use of modern materials characterization tools to understand the structure, properties, and reactions during utilization or disposal. The fourth symposium will also feature papers on residues from advanced SO₂ control, resource recovery, ash beneficiation, engineering applications, and groundwater quality at waste disposal sites.

Contributed papers are solicited in any of the above areas.

Symposium Organizers:

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**Symposium R
Bonding in Cementitious Composites**

Evidence is increasing that the enhancement of concrete strength by adding condensed silica fume (microsilica) is largely due to improvement in the bonding between the hydration products and the aggregate. It has also been suggested that improvements in bonding also reduce the permeability of concrete. In addition, with the increasing use of fiber reinforcement, there is great interest in both the mechanical properties and microstructure of the interfacial region in fiber-reinforced cements and concretes.

This symposium will consider the effects of *all* the interfacial regions in concrete (cement-aggregate, cement-fiber, concrete-reinforcing steel, etc.) on the properties of these composite materials.

Papers are requested on any aspects of the effects of the interfacial zones on either the mechanical properties or the durability (but *not* the structural behavior) of cementitious composites. Papers are particularly requested on the following topics:

- Microstructure of the cement-aggregate, cement-steel, etc., interfaces
- Fracture mechanics of the interfaces
- Micromechanics of the interfacial region

- Measurements of bond strength
- Interfaces (or bonding) specifically with fibers
- Relationship between bond strength and the mechanical properties of the composites

Submit abstracts to S. Mindess at the address below.

Symposium Organizers:

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**Symposium S
Fractal Aspects of Materials:
Disordered Systems**

Fractal concepts have found their widest use in disordered materials, where they are being used at an accelerating rate to describe and understand structure, transport, dynamics, and many other characteristics. The number of publications mentioning fractals is currently doubling every 15 months, as the popularity of previous MRS fractals symposia reflects. This year's symposium will bring together workers in fractal materials and those interested in disorder or related materials that aren't necessarily fractal.

Papers are solicited in all materials science areas involving fractals or disorder: scattering, fractal measures, percolation, reaction kinetics, fracture, and other related topics.

Symposium Organizers:

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Continued

Workshop W
Workshop on Specimen Preparation
for Transmission Electron Microscopy
of Materials

The importance of transmission electron microscopy in materials research is well established. In the scientific literature, however, there is little discussion of specimen preparation. This is unfortunate, since many individuals have developed novel methods for surmounting problems associated with the preparation of TEM samples from important categories and configurations of materials. This symposium, to be held in a workshop format, will provide a forum for exchanging information on these methods. A series of invited papers will address topics of interest to a broad spectrum of investigators. Contributed papers describing novel methods and techniques are solicited. All contributed papers will be presented in the poster format, allowing a maximum amount of time for discussion between authors and attendees.

Papers related to all categories of materials are solicited. Specific topics of interest include, but are not limited to:

- Rapid fabrication of cross-section samples
- Alleviating problems associated with differential ion-milling rates
- Design and construction of specialized TEM specimen holders
- Cleavage and ultramicrotomy for solid-state materials
- Production of artifacts during specimen preparation

Send abstracts of contributed papers in triplicate to J.C. Bravman at the address below.

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Symposium X
Frontiers of Materials Research

This luncheon-time series will consist of 30–40 minute lectures (given by leaders in a field) of a definitely didactic nature. The lectures will give nonspecialists an overview of the latest developments in one of the frontier areas of materials research.

These lectures will be published in *Journal of Materials Education* as part of the NSF Project EMMSE, a not-for-profit educational venture developed by the worldwide materials science community.

Symposium Organizer:

Rustum Roy
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Forum Y
Education in Materials Science and
Engineering: The Changing Role of
University, Industry, and Government
Interactions

Since materials science and engineering constitutes the enabling technology for structures and devices, this field is a key factor in global economic competition. The

leaders in this field must come from our research universities. How can future higher education in materials be designed to prepare them? What do employers of these future leaders want? What should they want? This symposium will explore these questions.

Since materials science makes its economic impact through engineering, the symposium will open with a broad look at the state of engineering research and at especially promising areas of materials science.

The symposium will address the question of how universities should organize programs in materials in three different sessions:

- Materials education within the materials community—accredited materials programs
- Materials education within “satellite” areas—physics, chemistry, engineering
- Industrial and government needs and expectations for materials education

Symposium Organizers:

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