THE European Material Conference

First
Announcement
and
Call for Papers

European
Materials Research Society
Spring Meeting

E-MRS 2002
SPRING MEETING

Congress Center
(Palais de la Musique et des Congrès)
Strasbourg (France)

June 18 - 21, 2002

Scientific/Technical Symposia
&
Exhibition

http://www-emrs.c-strasbourg.fr

DEADLINE FOR ABSTRACT SUBMISSION :
January 14, 2002

Introduction

The European Materials Research Society (E-MRS), a non profit scientific association founded in 1983 is focussing on creating the synergy between interdisciplinary, innovative technologies, diffusing and exchanging information and promoting technology transfer from public institutions towards industry. The main objective of E-MRS is to promote and enhance the efficiency of research in European countries in the field of Advanced Materials; in addition, to give quick informations on the development of science and technology in their area in the rest of the world, through our links with other MRS societies belonging to the International Union (IUMRS).

The Spring 2002 Conference will include 19 symposia, among them the TTP 7 International Conference (Plasma), with a triple objective:
- Highlighting recent advances in the development, understanding modeling of advanced materials;
- Developing the interdisciplinary aspects in the RDT in the advanced materials field;
- Offering a forum to the international material communauty for fruitfull discussions, including young scientists and engineers.

Student awards for the best papers will be offered at each Symposium.
New Symposia topics will be offered, not only in the field of electronics and optics, but also to areas like colloids.

An EXHIBITION of products and services of interest to the materials community will complete the Conference

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Introduction

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E-MRS 2002 SPRING MEETING
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June 18-21, 2002

PROGRAM

Program

Symposium A	Atomic Scale Materials Design
Symposium B	Thin Film Chalcogenide Photovoltaic Materials
Symposium C	Colloid 2002
Symposium D	Physics and Chemistry of Advanced Laser Materials Processing
Symposium E	Advanced Characterisation of Semiconductor Materials and Devices
Symposium F	Organic Materials for Device Applications
Symposium G	TPP 7 Thermal Plasma Processes
Symposium H	Si-Based Optoelectronics: Advances and Future Perspectives
Symposium I	Synchrotron Radiation and Materials Science
Symposium J	Growth and Evolution of Ultrathin Films: Surface and Interface Geometric and Electronic Structure
Symposium K	Thin Film Materials for Large Area Electronics
Symposium L	Crystal Chemistry of Functional Materials II
Symposium M	N-Containing III-V Semiconductors: Fundamentals and Applications
Symposium N	Nano and Micro- Composite
Symposium O	The 300 mm Silicon Era: Material, Equipment, Technology
Symposium P	Advanced Materials for Microelectronics: Ferroelectrics and Low-k Dielectrics
Symposium Q	Current Trends in Nanotechnologies: From Materials to Systems
Symposium R	Microstructured Biomaterial Surfaces
Symposium S	Micro- and Nano- Structured Semiconductors

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Symposium A

ATOMIC SCALE MATERIALS DESIGN

Symposium A provides a forum for researchers applying atomic scale computations to industrial problems, and allows experimentalists to address the computational materials science community on their requirements for atomic scale modelling and simulation. Although the areas of application for atomic scale computation are diverse, the underlying principles, algorithms and techniques are similar. Computational materials science has matured to the point where technological problems related to materials design, processing, and chemical synthesis, are being investigated directly by atomic scale calculation. We seek submissions with application of atomic scale materials design to:

- Microelectronics and Optoelectronics
- Nanotechnology and Biotechnology
- Fine Chemicals
- Polymers
- Drug Design

New computer aided design tools springing from computational materials science, physics and chemistry are being applied to reduce design cycle times and to eliminate costly design by trial and error within material oriented industries. Thus, Symposium A will explore the means by which quantum Monte Carlo, ab initio quantum chemistry, density-functional theories and beyond, tight binding techniques, forcefield-based molecular dynamics and Monte Carlo simulations, molecular modelling, and mesoscale modelling are being applied to technology problems related to materials design and characterisation. We seek applications of atomic scale computation to:

- Solids, liquids, gases
- Surfaces and interfaces
- Molecules and clusters
- Catalysis
- Biological molecules, macromolecules, polymers
- Plasmas, chemical vapor deposition, atomic layer deposition, and materials processing
- Nanostructures

We also seek submissions discussing advances in electronic structure theory, which enable new problems to be investigated.

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Symposium B

THIN FILM CHALCOGENIDE PHOTOVOLTAIC MATERIALS

This symposium aims at providing a focussed meeting for scientists engaged in research and development of chalcogenide semiconducting materials (esp. CdS, CdTe, $CuInSe_2$, $CuInS_2$ and $Cu(In,Ga)(S,Se)_2$-related ones), as used in, or with potential use in solar cells. It is part of the successful series of E-MRS symposia (1999, 2000) on "Chalcogenide semiconductors for photovoltaics», which, starting in 2001, alternate with MRS Spring Meeting ones on «II-VI Compound Semiconductor Photovoltaic Materials». As has become custom, it will be organized with ample time for both structured and free discussion sessions, centered around the main **topics** of the symposium.

Thin-film photovoltaic (PV) technologies are being developed and readied for the market, to reduce the cost of solar energy conversion to electricity. Chalcogenide semiconductors, such as copper indium gallium diselenide ($Cu(In,Ga)Se_2$; CIGS), cadmium sulfide (CdS) and cadmium telluride (CdTe), together with transparent conducting oxides, are the critical materials for today's leading options in this area. Progress is continuously made both in terms of small cell efficiencies (with best thin-film cell performances of 16 and 18.8% obtained for CdTe- and CIGS-based cells) and in terms of larger area module efficiencies (over 12 and 11 % for CIGS and CdTe-based ones, respectively). Several companies have started pilot productions of large area modules. To reach the goals for inexpensive PV such as 15% modules, >15-year life time, and a selling price under 2 •/ W_{peak}, strong efforts in materials and device research need to be maintained at the highest possible level. Regular meetings involving both the academic and industrial partners are important to sustain the progress. Improving the understanding of material and device issues in cells, in modules and in the manufacturing processes, along with inputs from other related fields will promote further innovative developments. Because the emphasis is on Materials R&D, relevant to PV, rather than on PV technology, the symposium will complement rather than overlap with the various PV Solar Cell Specialist and Technology Conferences.

Topical lecture and discussion sessions, emphasizing important issues for future directions and reviewing the basis of compound semiconductor thin film cells, will be organized on:

- Transparent conductors for substrate and superstrate cells
- Design rules for high efficiency cells
- Characterization and quality control of compound semiconductor films and interfaces
- Properties and problems of Cu_2S-CdS cells – What did we learn?

Papers are solicited in areas, that include, in addition to those of the topical sessions:

PREPARATION
- methods, growth models for bulk materials and thin films
- issues of large area film manufacturing

PROPERTIES
- bulk material properties, incl . defect chemistry & physics
- electronic properties and structure;
- surface and interface properties

THEORY
- single and composite materials preparation
- material properties

POLY- vs. SINGLE CRYSTAL
- granular nature of materials,
- grain boundaries & surfaces

QUALITY CONTROL
- control of (opto)electronic properties
- general quality control of materials and devices

NEW DEVELOPMENTS
- in materials and material combinations & forms / structures

MODELLING
- for all relevant subjects

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Symposium B

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Symposium C

$2^{c}o^{ll}o^{id}2$
(COLLOID 2002)

Colloids are studied in environmental science for their transport properties as well as in various research and development areas for their applications. Their production or generation process requires investigations that make use of analytical tools for characterising these particles. Since full characterisation is not straightforward, it is anticipated that combining separation and bulk analysis techniques should provide substantial characterisation when the single particle analysis is not possible…

In environmental science, numerous groups involved in subsurface water as well as in surface water analysis are extensively studying colloid occurrence, generation and behaviour with emphasis on their role in contaminant transport. The two first sessions will concern the status of the research for diluted systems, and the research and development of analytical techniques and their application for environmental or specific systems.

In bio-physical-chemistry studies, colloid specific size distribution, porosity or affinity are investigated. Research and development for ultra-fine particle production and quality control as well as the understanding of colloid behaviour in conditions mimicking natural systems are of prime importance. However, the analytical tools remain key instruments for the characterisation of the particles. The last session will concern the status of the research in concentrated phases with emphasis on colloid behaviour in model systems with functional activity.

The symposium $2^{c}o^{ll}o^{id}2$ (colloid 2002) will therefore attract experts having a variety of research orientations, encourage the exchange of scientific results and present advanced studies in this broad domain.

Invited speakers and paper topics:

- Michal Borkovec (Université de Genève, Switzerland): "Colloids in subsurface environments".
- Clemens Walther (Forschungszentrum Karlsruhe, Germany): "Colloid breakdown detection compared to other single particle analytical techniques".
- Pierre Levitz (Ecole Polytechnique, Paris Sud, France): "Liquid-solid transitions of disk-like colloids (laponite clay): Structure, stability and jamming".

Info via: **colloid2002@psi.ch**

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Symposium D

PHYSICS AND CHEMISTRY OF ADVANCED LASER MATERIALS PROCESSING

As a tradition of E-MRS annual meetings, this 4-day symposium is aiming to provide an interdisciplinary forum for the discussion of recent advances in research and applications of Laser processing of materials. The symposium will address all basic aspects of physics and chemistry of laser-solid interactions with special emphasis on such hot topics as ultrashort pulse lasers in surface processing and formation of nanomaterials. Several sessions will be dedicated to prospective applications in micro- and nanoengineering of materials, micro- and optoelectronics, large area electronics, biology, sensing, environmental protection and monitoring.
Both oral and poster presentations are welcome. On the basis of outstanding abstracts some authors will be encouraged to present their results as an invited talk. Contributions will be published in an archived and refereed journal

Papers are solicited, but not limited, on the following **topics**:

- Basic mechanisms of photo-induced interactions with materials
  - Light interaction with solids ...
  - Photochemistry and chemical processing
  - Photothermal processing
  - Modeling photo-induced interactions
- Laser-assisted surface modification and microengineering
  - Crystallization, doping, etching, cleaning, patterning, …
  - Laser direct-write deposition, synthesis of 3D microstructures
- Laser nanoengineering
  - Formation of nanomaterials, nanoparticles, nanocomposites
  - Lasers in nanotechnology
- Pulsed Laser Deposition
  - Growing of thin films and multilayers,
  - Diagnostics of laser induced plasmas
- Ultrashort pulses in surface processing:
  - High power laser-material interaction
  - Physical and chemical aspects
  - Debris free (micro) machining and structuring
  - Industrial issues: system implementation, reliability
- Laser applications in industry
  - Microelectronics, optoelectronics, medecine, biomedicals,…

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Symposium E

ADVANCED CHARACTERISATION OF SEMICONDUCTOR MATERIALS AND DEVICES

Fabrication of advanced microelectronics and optoelectronic devices requires an improvement of the techniques used for material and device characterisation. The aim of this Symposium is to promote and encourage interactions between academic and industrial research (instrument manufacturers, IC industry and materials suppliers) to address scientific and technological challenges to improve analytical methods and to novel characterisation techniques. The most widely used semiconductor material is silicon and it will be for the coming years. However, the introduction of larger wafers (450 mm wafers are already planned) will require significant improvements in characterisation and metrology. With the use of larger wafer dimensions the single wafer value significantly increases so that interest grows for non-destructive characterisation techniques with respect to the single device or the entire wafer. Many methods can be destructive or not depending on sample preparation. Novel sample preparation procedures, non-destructive for the wafer, will be also considered. The intent is to identify the techniques matching the requirements for large diameter wafers and future device generations and to establish their sensitivity, properties and application limits. We are considering silicon-based technology and materials such as Si, SiGe, ferroelectrics and SiC. Many materials are used for silicon device fabrication such as silicon substrates, oxide layers, dielectrics, and conductive materials. In those materials the improvements will be both in their properties and dimensions (characterisation of smaller and smaller structures towards atomic resolution). Characterisation of devices include carrier profiling, with particular emphasis on ultra shallow junctions, interface and surface properties considering their impact on the device characteristics, and sub-micron structure definition. Ferroelectric based non-volatile memories need characterisation of material properties as well as correlation between morphological, electrical and device properties. Silicon carbide is quite an interesting material for power and high-speed devices. Its characterisation is peculiar due to several properties (hardness, transparency, and so on). 3C-SiC can be epitaxially grown on silicon so that its integration with silicon technology is possible. Methods to determine defects, carrier profiles and other properties in silicon carbide will be also discussed.
Among the various characterisation methods scanning probe microscopy is acquiring an increasing relevance due to the several probes that are going to be developed. Microscopies on several parameters are now possible with a very high resolution, often near the physical limits. In the symposium the new methods proposed will be discussed with a particular attention to their limits.
In the symposium particular attention will be paid to discussions. After each presentation the participants will have the possibility to raise many questions and round table discussions will be organised during the meeting. The contributions should evidence the characteristics of the technique and methodology proposed and considers its limits and applications.

Topics of solicited papers include, but are not limited to:
- Characterisation of large diameter wafers (up to 450 mm)
- Determination of low impurity concentration (TXRF, AAS, IMS, SIMS, TOF-SIMS, …)
- Wafer cleaning and inspections (TXRF, static SIMS, …)
- Lifetime measurements (mPCD, SPV, Elymat, Epi-t, time-resolved photoluminescence
- Defect density and properties (infrared, TEM, XRD)
- 1D and 2D submicron carrier profiling (SRP, SSRM, SCM, Hall measurements, etching, electron holography…)
- Scanning probe and nanoscale techniques: NSOM, KPFM, Nanoscale microscopy and spectroscopy, , TUNADielectrics and interfaces characterisation (in particular low and high k dielectrics)
- Devices structures imaging and critical dimension (CD SEM, CD AFM, TEM, …)

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Invited Speaker:

- R. Shikler (Tel:-Aviv Univ., Israel): "Nanoscale Potential Measurements using KPFM"
- R.K. Ahrenkiel (NREL, USA): "Advanced Methods for Measurements of Minority Carrier lifetimes and Diffusion Length"
- A. Cullis (Univ. Sheffield, UK): "Recent Studies on EFTEM, EDX/TEM,...applied to Shallow Implants."
- M. Servidori (CNR, Italy): "Grazing Incidence Diffuse X-ray Scattering (GIDXS) Investigation of Ultra-shallow Implanted Structures"
- S. Huth (Max-Planck, Germany): "Lock-in IR Thermography a Novel Tool for Material and Device Characterization"
- W. Triftshauser (Universität der Bundeswehr München, Germany): "Lifetime Measurements with a Scanning Positron Microscope"

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Symposium E

ORGANIC MATERIALS FOR DEVICE APPLICATIONS

The application of organic materials to electrical, opto-electronic, and photonic devices is strongly interdisciplinary, requiring collaboration among many fields. The aim of this conference is to cover a broad range of research from basic chemistry and materials science through applications and technology. An overview of the state of the art of established technologies will be presented as well as promising results from newly emerging fields. Emphasis will be placed on the following **topics**:

Materials, Science and Characterisation
Chemistry - New Materials
Growth and characterization of ordered materials (single crystals, self assembly)
Micro structuring and Patterning
Charge carrier injection and transport
Superconductivity and quantum confinement
Structural, electrical and optical properties
Interfaces

Technology and Applications
OLEDs and displays
Lasers, microcavities, and photonic bandgaps
Organic transistors and circuits
Molecular devices and Carbon Nanotubes
Sensors and Microactuators

Tentative list of Invited Speakers:
B. Batlogg (ETH Zürich, Switzerland)
T. Beierlein (IBM Zürich, Switzerland)
J. Collet (CNRS, France)
C. Dekker (Delft University, Netherlands)
G. Horowitz (CNRS Thiais, France)
W. Salaneck (University Linköping, Sweden)
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Symposium F

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Symposium G

TPP 7 THERMAL PLASMA PROCESSES

Plasma processes are well developed in the fields of thermal plasmas and high energy densities of ions, electrons, photons and are all linked to mass, momentum and energy transfer phenomena. The main applications are devoted to cutting, drilling, welding, spraying, plasma transferred arc reclamation, particle spheroidization, ultrafine particle synthesis, plasma assisted CVD, surface treatments, thin and thick coatings, extractive metallurgy, waste destruction high purity plasma processes including RF plasma and plasma laser for silica or silicon treatments. The evolution of such processes is aimed to a better on line control with the development of new sensors rather simple, cheap and able to work in harsh environment. It allows to achieve a better reproducibility and reliability of the plasma processes.

TPP7 will be devoted to :

- The state of the art of our present knowledge in
  - process modelling with for example CFD codes adapted to plasma flows, with or without an electric field, produced by d.c., rf or microwave discharge
  - measurement techniques in symmetric or asymmetric plasma which are in steady or unsteady state
  - thermodynamic and transport properties
  - plasma surface interactions with a special emphasize on the phenomena in the boundary layer, sticking and accommodation coefficients…
  - role of metastable states in the plasma flow or in the boundary layer
- The new plasma processes related for example to the use of micro torches in welding and cutting, reactive plasma spraying, ultra fine particles production, plasma assisted CDV…
- The on-line controls adapted to the different processes with the corresponding sensors as well as the robotization of processes
- The plasma material interactions including the different means used to characterize the obtained products : bulk materials, powders, coatings, surface modification…

The scientific sessions which are proposed are the following :

- Fundamental mechanisms in plasma processes
- Plasma composition, enthalpy, transport properties at equilibrium, under kinetic conditions, with a unique temperature or multi-temperature
- Optical diagnostics, mass spectrometry, enthalpy or Langmuir probes
- On line controls with optical, mechanical or electrical sensors, TRELIBS, ICP, analysis…
- Plasma surface interactions : thick and thin coatings, PTA reclamation, surface treatment including ageing…
- Materials synthesis : metals, ceramics fullerene, diamond like carbon, composites…
- Waste treatment (solids, liquids an gases) by plasma processes
- Pulsed plasma processes including arc, RF or corona treatments
- Special layers deposition for renewable energy such as SOFC fuel cell, photovoltaic thin layers and particles interactions

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Si-BASED OPTOELECTRONICS: ADVANCES AND FUTURE PERSPECTIVES

Symposium H

Si-based optoelectronic devices are the important hardware that is expected to have a large impact to the further development of device technology, in view of monolithically integrating optoelectronic devices and conventional CMOS ICs onto one Si chip using main steam Si-technology. Since the first topical conference, as one of the E-MRS symposia, organized in 1998, large efforts have been made in the field. There have been many new technical approaches, developments, and findings towards practically useful Si-based optoelectronic materials and devices with a reasonable optical efficiency, low production cost, and full processing compatibility with the existing Si-technology. The present symposium is to create a forum, where to bring researchers and engineers together for presentation of the latest result and to foster the new ideas that could possibly lead to further advancement of Si-based optoelectronics, and giving impact to the relevant industries in the area.

The symposium will deal with all aspects related to materials processing and device solutions that concern the following **topics** (but not limited to)

- Optoelectronic materials and devices using Si-based heterostructures and nanostructures;
- Integration of photonics with Si CMOS technology
- Si-based optical modulators and switches
- Si-based waveguide technology and devices
- Rare-earth doping in Si
- Near- and far-infrared photodetectors on Si
- Quantum cascade phenomena in Si-based structures
- Electroluminescnce in Si-based materials
- Theoretical modeling of novel Si-based materials for optical applications
- Optical micro-electro-mechanical (MEM) devices and systems
- Polymer- and molecular organics-based optoelectronics in connection with Si chip technology
- Display technology

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SYNCHROTRON RADIATION AND MATERIALS SCIENCE

Symposium I

Synchrotron Radiation techniques have an important impact on the characterisation of advanced materials; the sophistication and resolution of these techniques has greatly improved with the recent availability of third generation sources which provide photon beams of unprecedented brilliance. In all synchrotron radiation laboratories a wide range of materials is studied: semiconductors, oxides, superconductors, metals, catalysts and others. Synchrotron radiation techniques allow a refinement in the characterisation of these materials - their bulk, their surfaces - and of the interfaces between them which is often not attainable with laboratory sources. The sheer speed of developments makes this an appropriate time to hold a workshop the main objective of which is to bring together synchrotron radiation specialists and materials scientists. To name a few recent developments:

The availability of micron- and sub-micron sized beams has led to the possibility of performing micro-diffraction with unprecedented resolution and of mapping the chemical state of elements via micro x-ray absorption spectroscopy, important in many industrial and environmental issues. The combination of microscopy and spectroscopy (spectro-microscopy) allows mapping of the chemical or magnetic state of elements and is becoming an important tool for the development of new electronic and magnetic nanometric materials and devices and provides insight in catalytic reactions. Also, it is a unique technique to study the spatial organization of highly correlated materials. Such techniques are important in resolving subtle environmental issues such as the oxidation state of chemical and nuclear contaminants. Small beams allow one to probe very small sample volumes under extreme conditions of pressure and temperature.

The coherence of the X-ray beam allows an easy use of phase sensitive techniques. Phase imaging, combined with three-dimensional reconstruction, is providing new insight in structures that have limited absorption contrast (soft condensed matter systems formed by low-Z atoms only, or by phases of very similar densities). The coherence of x-ray beams has also allowed extending dynamic light scattering to opaque materials, providing information on the time-correlation of their structural evolution. Inelastic x-ray scattering has reached very high energy resolution, allowing to access a region of energy - momentum space previously not accessible, providing novel information on collective modes in glasses.

Full control of photon beam polarization has allowed the development of dichroism techniques - in absorption, photoemission and diffraction - which are providing new information on magnetic and highly correlated metals and oxides.

More established techniques such as photoemission, absorption and diffraction are taking advantage of the properties of third generation sources by improving resolution (in real and reciprocal space, in time and in energy) and detection limits (e.g. in fluorescence x-ray absorption or trace element analysis applied to impurities or surfaces). New combinations of techniques have been developed, for example diffraction anomalous fine structure (DAFS) which is able to provide site and chemically selective information.

The purpose of this workshop is to bring together synchrotron radiation specialists and scientists active in materials science from academia, public and private research. The objective is to provide a forum in which materials scientists can learn about the opportunities which synchrotron radiation techniques can provide and in which synchrotron radiation specialists can face the challenges of materials science systems.

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E-MRS

Symposium I

Partial list of topics:

- Synchrotron radiation studies of:
  - Magnetic materials
  - Semiconductors
  - Nanostructures
  - Surfaces and interfaces
  - Engineering materials
  - Mesoporous and microporous materials
  - Highly correlated oxides
  - Biomaterials
- Advances in SR techniques devoted to:
  - Time – resolved experiments
  - Systems under extreme conditions
  - Laterally resolved experiments
- Novel/combination techniques

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Symposium J

GROWTH AND EVOLUTION OF ULTRATHIN FILMS: SURFACE AND INTERFACE GEOMETRIC AND ELECTRONIC STRUCTURE

The preparation and characterization of thin films has progressed to a point where the atomic structure of films only a few monolayers thick can be controlled and routinely used in modern technology. These films have physical properties that may be quite different from those of the respective bulk material. Moreover, self-organization of thin films on surfaces may lead to one-dimensional or point-like structures with unexpected properties. Such structures may thus serve as low dimensional quantum physics laboratories in materials research, and may be applied in novel technological devices. The symposium will cover investigations, at the atomic level, of surfaces and interfaces which form the basis for ultrathin films, and their evolution in growth and post-growth processes. Emphasis will be on surface and thin film atomic morphology and electronic structure, dynamics of growth, and self-organization of low-dimensional structures. Novel experimental approaches such as single atom or molecule manipulation, application of mechanical loads, and novel scanning probe techniques, are welcome.

Topics of interest:

- Self-organized pattern formation in thin films, nanostructures
- Nucleation processes during growth, and surface self-diffusion
- Cluster interaction with substrates
- Mechanisms of surface and thin-film ripening and coarsening
- Comparison of near- and far-from-equilibrium mechanisms of epitaxial growth
- Diffusion of adatom and vacancy clusters
- Driven atomic motion on surfaces
- Morphology effects on magnetic thin films and multilayers
- The role of surface morphology and film microstructure on surface chemistry
- New experimental techniques to characterize physics at the nanoscale including magnetic, electronic, chemical, and tribological properties.

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Symposium K

THIN FILM MATERIALS FOR LARGE AREA ELECTRONICS

The aim of this symposium is to bring together scientists working on materials and devices for Large Area Electronics. Active matrix addressing of LCDs is currently the largest application of Large Area Electronics. Alternative display technologies (FED, EL, ...) are also important. In addition, the symposium will cover other applications such as large area sensors (X-ray-, colour-, and bio- sensors), imagers, MEMS and NEMS, etc. One material to be emphasised in the symposium is poly- and microcrystalline Silicon. Other materials related to Large Area Electronics (polymers, dielectrics, thin film alloys, conductive oxides) will also be included. Also of interest are novel approaches to materials deposition and processing such as low temperature/high rate deposition, crystallisation, passivation, etching, etc.

Scope & Topics

1-Poly and Microcrystalline silicon :
- -Fabrication techniques : CVD processes (PECVD, LPCVD,...), laser crystallization, rapid thermal processing
- -Structural and electronic properties

2 -Materials for field emission displays

3-Other materials
- -insulating layers, highly conductive interconnect materials, polymers,…

4-Surfaces and Interfaces

5-Characterization (in-situ, ex-situ)

6-Devices (TFT, displays, sensors, MEMS ....)
- modelling
- related technologies (etching, patterning, ...)
- organic TFTs and LEDs
- displays on plastic

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Symposium L

CRYSTAL CHEMISTRY OF FUNCTIONAL MATERIALS II

This symposium will investigate the relationship between features at atomic level such as crystal chemistry and crystal structure and macroscopic physical properties. Phase diagrams which represent the heterogeneous phase relations of multi component systems and which are based on the relevant crystal chemistry serve as a framework for interpreting the microscopic - macroscopic relations. Regarding thin films, the interplay between rate controlled growth and in situ monitoring provides additional opportunities for atomic level structure control.

There will be sessions on the following **topics**:

- Crystal chemistry, crystal structure, defects, and non-stoichiometry
- Phase equilibria and thermodynamics
- Processing of bulk ceramics, thin films, and single crystals
- Relations between the physical properties and the crystal chemistry
- New materials

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Symposium M

N-CONTAINING III-V SEMICONDUCTORS: FUNDAMENTALS AND APPLICATIONS

Nitrogen containing III-N-V' alloys, such as Ga(In)NAs and Ga(In)NP have in recent years emerged as a subject of considerable theoretical and experimental research interest due to their very attractive physical properties and a wide range of possible device applications. Unlike all conventional ternary III-V semiconductor alloys, such as AlGaAs, GaInAs, GaInP, etc, where the band gap energy of the alloy can be reasonably approximated as a weighted linear average of the band gaps of the parental binary compounds, N-containing anion-mixed III-V alloys exhibit a huge bowing of the band gap energy. This remarkable fundamental property of N-containing III-V ternary and quaternary alloys, combined with the possibility to engineer the alloy lattice constant by optimizing the N content, offers the promise of major improvements in the performance of electronic and optoelectronic devices, in particular those within the spectral window for fiber-optic communications. Highly efficient light emitting devices operating at room temperature have already been demonstrated. In order to fully explore the potential applications of this exciting materials system, however, our understanding of many fundamental properties and key materials and device issues needs to be significantly improved and advanced.

The symposium will bring together an international group of experts in theory, growth, characterization and device applications of the N-containing III-V semiconductors, to identify and address important fundamental physical properties and key materials and device issues so that rapid progress can be promoted.

The symposium will include, but will not be limited to, the following **topics**:
- materials synthesis, epitaxial growth
- thermodynamic stability and phase separation
- surface characterization and analysis
- doping control
- impurities, extended and point defects
- electronic structure (band structure, band offsets, etc)
- recombination mechanisms and lifetimes
- non-radiative processes
- carrier transport properties
- high-performance devices
- novel applications

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Symposium N

NANO AND MICRO- COMPOSITE

The use of particulate materials (fillers) for enhancement of polymer properties dates back to the earliest years of the polymer industry. Initially used as extending agents to reduce the cost of, polymer based products; fillers were soon recognized to be an integral component in many applications involving polymers, particularly in reinforcement. In spite of the widespread use of polymer composites throughout the polymer industry, a satisfactory understanding of the fundamental mechanism of the properties of these materials has eluded researchers.
The scope of this symposium includes research in the structure, properties and production all types of polymer composite materials, to explore issues, concepts and techniques utilized by various segments of the polymer composites communities. These materials include filled systems (carbon black, fumed silica, precipitated silica, inorganic, ferromagnetic particles, colloids, fullerenes-based particles, filled polymer foams, etc.), systems in which polymers act as binders, advanced Nano and Micro composites systems, block and segmented polymer systems, molecular composites and blends. The focus of the symposium is on the elucidation of structure-property relationships leading towards predictive capabilities and the design of materials with enhanced properties.
Recent developments in these materials include advanced Nano and Micro composites materials tailored for certain properties and utilizing Nano structured clays (natural and synthetic), dual phase filler systems and molecular composites. Enhancement of the application potential for these materials relies on a broader understanding of more commonly used heterogeneous materials. Further elucidation of surface and hydrodynamic effects in filler-filler and filler polymer interactions has increased understanding of reinforcement mechanisms. Advances in characterization techniques such as NMR, neutron scattering (elastic and inelastic scattering) and reflectometry, x-ray scattering have also provided improved opportunities for understanding these materials.
The computer modeling aspects related to these subjects will also part of this program.

General areas of this symposium include:
- Mathematics and Thermodynamics Tools to study the composites
- Developments in Modeling of Properties - Mechanisms of Reinforcement.
- Advanced Nano and Micro- Composites
- Developments in the Mechanism of Reinforcement
- Filled Elastomeric and Structural Materials - Rubber Toughened Materials
- Structure Property Relations, Materials Aging
- Adhesion, Filler Surfaces and Filler-Filler Interactions
- Technology and Applications of micro/nano composites
- Posters Session

Invited Speakers (Tentative)
Manfred Klüppel (DIK), Gert Heinrich (Continental AG), Claude Tricot (L'Université de Clermont Ferrand), D. Goritz (Univ. Regensburg), J. Noordermeer (DSM, Netherlands), Patrick Bertrand, (PCPM/PCL), T.W. Zerda, (TCU), Francoise Ehrebuger-Dolle (CNRS, Laboratoire de Spectrometrie Physique), Walter Waddell (Exxon), Erik Geissler (CNRS), Lilliane Léger (Collège de France), Emmanuel Giannelis (Cornell U.), Marilyn Hawley (Los Alamos Nat. Lab) ….more to come

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Symposium N

Symposium O

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THE 300 mm SILICON ERA: MATERIAL, EQUIPMENT, TECHNOLOGY

During the years 1999 ... 2001 the activities to prepare the introduction of the next larger diameter of silicon into the semiconductor technology received a substantial boost.
The aim of this symposium is to provide an overview on R & D activities to transform the semiconductor industry to 0,1 micron design rules and large silicon substrates.
The symposium should bring together scientists from universities and research laboratories, and engineers from the semiconductor industry, equipment- and materials vendors in order to discuss the issues mentioned. This scientific meeting continues the efforts of the E-MRS started with the First International Scientific Conferences on “Techniques and Challenges for 300 mm Silicon” in 1998, the Symposium “Advances in Silicon Substrates” in 1999 and the Symposium “Sub-Quarter-Micron Silicon Issues in the 200/300 mm Conversion Era” in 2000.

Scope and Topics

- Advanced 300 mm silicon wafers, annealed wafers
- Metrology equipment for 100 nm technology node in particular for flatness measurement, geometry measurement and surface inspection
- New materials: e.g. SOI, SiGe, isotopically pure Si
- New processes and process equipment for 100 nm technology node
- Review of wafer specifications for 100 nm ... from the point of view of a device manufacturer
- Progress in high k, low k materials
- New measurement techniques

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Symposium P

ADVANCED MATERIALS FOR MICROELECTRONICS: FERROELECTRICS AND LOW-K DIELECTRICS

Ferroelectric materials have attracted great attention of semiconductor industry due to their potentialities for advanced non-volatile memories (FERAM's) but also for adding new on-chip functionality as integrated large capacitors.
Moreover, the requirements of fundamental development; for interconnect systems must meet the high-speed transmission needs of chip beyond the 100 nm technology node. In this respect, new interconnect materials combined with low-K dielectrics can provide suited performances..
Other related, developing areas, including low-loss electro-optical devices, high-response piezoelectric materials and piezoelectric materials for micro machines and micro sensors, will be of interest for the symposium.
Continuing progress in all these areas strongly depends on improving our understanding of the materials science involved in the functioning, synthesis and integration of these new applicative materials.
This symposium intends to be forum for discussion relevant to current progress, and thereto will cover a wide range of both scientific and technological **topics**.

Contributions are solicited in:

- Fundamentals of ferroelectric film properties (ferroelectric, piezoelectric, pyrolectric, dielectric,), including progress in modeling and characterization techniques, ferroelectric domain physics and phase transitions,
- Ferroelectric materials synthetic techniques, understanding of the growth mechanisms in thin film processes, low-temperature processes, and new materials,
- Electrode (including conductive oxide barrier) materials and their interaction with ferroelectric material growth and/or properties,
- Reliability physics and material defect studies,
- Technology issues for ferroelectric integration in semiconductor processes, such as: interaction of ferroelectric with insulating materials, H2 induced degradation and H2 barrier materials, etch processes and related material damage, recovery processes and new integration technologies,
- Low K dielectrics: theoretical and experimental aspects including dielectric mechanisms in ultra thin materials,
- Metallization: integration of copper for the interconnect and alternative,
- Issues for the 100nm technology node such as advances in CMP processing and in MLM (multi level metallizzation), 100nm-lithographic considerations, new CVD materials and barrier /seed layers.

Symposium P

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CURRENT TRENDS IN NANOTECHNOLOGIES: FROM MATERIALS TO SYSTEMS

Symposium Q

This E-MRS Symposium is aimed to give an overview of the current status of the wide field of Nanotechnology which thrives from the most advanced results in chemistry, physics, biology, engineering, medical and materials science and contributes to cross-disciplinary training. This new area is concerned with materials and systems whose structures and components are exhibit novel and significantly improved physical, chemical and biological properties, phenomena and processes due to their nanoscale size. Thus we call for papers giving the latest information on research and development in nanotechnology which is expected to have a profound impact on science and society comparable to that of information technology.

Particular emphasis will be put on long-term fundamental nanoscience and engineering research. Another objective of the symposium is to encourage the cross-fertilization and to cover developments in fields like semiconductor electronics, materials science, biophysics and energy conversion. All aspects of nanotechnology will receive a suitable focus, including all steps from theory to metrology, and from experimental procedures to real fabrication problems.

The symposium will include, but not will be limited to, the following **topics**:

- Materials and manufacturing including organic and inorganic nanometric layers, self-organization of nanostructured semiconductors and metals, hetero-nanostructures, nanocrystalline and nanoporous particles, nanocomposites, ceramics, improved printing as well as nanofabrication on a chip;
- Polymer-based nanometric-scale systems, including dendritic polymers and analogous nanometrically organized polymers, nanoparticles-reinforced polymeric materials and other hybrid systems;
- Nanometric scale systems and processes based on ion, electron and laser beams, including nanoparticles formation and engineering in matrix, ion tracks and related applications, nanofeaturing and nanopatterning;
- New standards for measurements at nanoscale, including nanoscale microscopy and spectroscopy, instruments for manipulation, computational capabilities, as well as techniques allowing to measure and manipulate supramolecules to complements and extend prior measurements derived from ensemble average;
- Nanoelectronics and computer technology, including quantum dots, quantum wires and other nanostructured devices, communication systems with higher transmission frequencies and more efficient utilization of the optical spectrum, small electronic storage devices with higher capacities, as well as integrated nanosensor systems;
- Biotechnology-related nanosystems including proteins, nucleic acids, lipids, carbohydrates and their non-biological mimics, integration of biological building blocks into synthetic materials and devices, allowing to combine biological functions with otherwise desirable materials properties, as well as biological molecules arrays;
- Nanosystems for energy and environment, including the use of nanostructured materials for surface reactivity and as catalyst supports, porous materials for the removal of ultrafine contaminants, etc.
- Theory including simulation and design of nanoscale systems.

Symposium Q

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DEADLINE FOR ABSTRACT SUBMISSION :
January 14, 2002

E-MRS

Symposium R

MICROSTRUCTURED BIOMATERIAL SURFACES

This E-MRS symposium is aimed to give an overview of the current status of microstructred biomaterial surfaces. Thus we call for papers giving the latest information on research and development in this field. Special emphasis is laid on the ability of this kind of micropatterned surfaces to control cells behaviour (shape and size). Another main topic will deal with the potential applications of microstrucured surfaces in the biomedical field.

Scope & Topics:
Application of micropatterned surfaces in the field of:
- bones
- teeth
- cardiovascular
- miscellaneous

List of the invited speakers:
1) bones
Norberto Roveri: "Biomimetic growth of hydroxyapatite nanocristals and their influence on bone tissue cells behaviour"
2) cardiovascular
Agnese Magnani: "Endothelial cells behaviour on micro and nanostrictured surfaces"
3) miscellaneous
Ulrich Schwarz: "Mesaurement of cellular forces at focal adhesion using elastic micropatterned substrates"

Symposium Organizers:

Rolando BARBUCCI
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Symposium S

MICRO- AND NANO- STRUCTURED SEMICONDUCTORS

Objectives: The goal of this symposium is to address the recent developments in the area of micro and nano structured semiconductors and to provide a common forum for scientists from fields of synthesis, characterisation and device applications. It will also cover fundamental issues in crystal growth, surface and interface atomistic structure and electronic structure.
The materials systems of interest include porous silicon, microcrystals, nanocrystals and epitaxially grown Quantum Dots made of silicon and compound semiconductors.
New insights on novel physical synthesis such as ion implantation, laser abration, gas evaporation and epitaxial growth and chemical synthesis are of particular interest. Emphasis will also be placed on size and position control of nanostructures by self-assembling. Of relevant importance are also the optical and electrical properties unique to nanostructures of semiconductors. A better understanding of the nucleation and growth of islands in heteroepitaxy is also a major concern of this symposium.

Areas of particular interest include:

- Porous silicon
- Physical and chemical synthesis
- Growth mechanisms
- Electrical and optical properties
- Novel device applications
- Structural characterisation (stress relaxation, strain fields, defects)
- Doping studies
- Surface and interface phenomena
- Heteroepitaxy and self-assembling processes
- Electronic structures: modelling

Symposium Organizers:

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A description of each symposium is given in this announcement. Any information regarding a specific symposium can be obtained by contacting the symposium organisers.
For general information regarding the conference contact the E-MRS General Secretary, P. SIFFERT.

or under **http://www-emrs.c-strasbourg.fr**

CONFERENCE SECRETARIAT

P. SIFFERT
E-MRS 2002 SPRING MEETING
BP 20, 67037 Strasbourg Cedex 2, France
Phone: (+33) 3 88 10 65 43 - Fax: (+33) 3 88 10 63 43
emrs@phase.c-strasbourg.fr

Address for express mail:
P. Siffert, E-MRS, Campus CNRS, 23 rue du Loess, 67200 Strasbourg, France

CONFERENCE LANGUAGE IS ENGLISH.

CONFERENCE VENUE

The Conference will be held at the
Congress Center (Palais de la Musique et des Congrès)
Place de Bordeaux, Strasbourg, France
from June 18 to June 21, 2002.

TRANSPORTATION

By car: Strasbourg is easily accessible via the european motorway network.

By train: Fast and frequent trains connect Strasbourg to all european capitals and major cities. You can obtain a reduced rate on the national french railway network SNCF: please ask for a control card (see registration form) which has to be shown when buying the ticket at any travel agency, This control card must be kept with the ticket and must be stamped at the conference desk before the return trip.
This discount is only valid for round trips within France.

By plane: Strasbourg International Airport is located 17 km to the south-west of Strasbourg and 15 min by freeway (except during peak hours). Airport shuttles are also operating directly from Frankfurt (Lufthansa) and Zurich (Swissair) airports.
In addition, Paris Charles de Gaulle and Frankfurt airports have direct plane connection to Strasbourg airport.

The Congress Center (Palais de la Musique et des Congrès) could be easily reached with the local transportation network of the city of Strasbourg.

HOTEL RESERVATION

A certain number of rooms have been booked for E-MRS Conference participants in hotels of various categories.
The Hotel Reservation Form will be enclosed in the 2nd Annoucement or under http://www-emrs.c-strasbourg.fr (issue: November 2001)

General Information

REGISTRATION

Every attendee (including chairpersons, authors, presenting authors, Invited Speakers, Scientific Committee members...) has to fill and send a registration form to E-MRS.

To be included in the list of participants dispatched at the conference, your registration form has to be received by E-MRS not later than May 20, 2002.

REGISTRATION FEES

1. **FULL RATE**
including one proceedings, breaks, lunches, E-MRS membership for one year and Materials Today Bulletin.
BEFORE MAY 3, 2002 412 Euro net
AFTER MAY 3, 2002 488 Euro net

2. **STUDENT RATE**
including breaks, lunches.
Students have to give evidence of their university registration
BEFORE MAY 3, 2002 259 Euro net
AFTER MAY 3, 2002 305 Euro net

PAYMENT OF FEES

Payment should be made in euro for the net total amount due. The following possibilities are offered:
- Cheque (to the order of E-MRS)
- Bank draft:
Bank: BANQUE POPULAIRE
Address: BP 401/R1, 67001 Strasbourg Cedex, France
Account: ASS. EMRS CONFERENCES
Nr. 17607/00001/111 913 85439/11
Bank transfer charges will be at a minimum provided you instruct your bank as follows:
Please pay through S.W.I.F.T. to BPRS FR 2A
BANQUE POPULAIRE
BP 401/R1
67001 Strasbourg Cedex France
affiliable C.C.B.P. (Paris)
- Credit card (Carte Bleue, Visa, Eurocard/ Mastercard)

VISA ASSISTANCE

Citizen having passports from certain countries need a visa to enter France. If you need any assistance to obtain your visa, please contact, as soon as possible (indicated us your address, date and place of birth and your passport number):

ATTENTION: VISA ASSISTANCE
E-MRS 2002 SPRING MEETING
BP 20, 67037 Strasbourg Cedex 2, France
Fax: (+33) 3 88 10 63 43
emrs@phase.c-strasbourg.fr

FINANCIAL SUPPORT

Limited possibilities for financial support exist within the budget of each symposium. For any request of funding, please contact the chairpersons.

General Information

DEADLINE FOR ABSTRACT SUBMISSION :
January 14, 2002

E-MRS

General Information

ABSTRACT SUBMISSION

Abstract must be received at E-MRS General Secretariat not later than January 14, 2002.
We strongly encourage you to submit your abstract before the relevant deadline.

Abstracts should be prepared using the «Abstract Model» inserted in the 2nd Announcement and Call of papers or under http://www-emrs.c-strasbourg.fr (issue: November 2001)

Online Submission

Available on December 2001. 2nd Announcement and Call of papers. IFollow the instructions given under http://www-emrs.c-strasbourg.fr

Papers will be selected by the scientific committee of each symposium.

Authors will be notified of acceptance and mode of presentation of their papers by March 12, 2002.

E-mail Submission

Abstracts (Microsoft Word - Times Roman font - 12 pts- or ASCII file / only plain text, no figures, no formulae...) should be sent as attached document by e-mail to:
emrs.abstract2002@phase.c-strasbourg.fr
Subject of your mail and title of the attached document:
Symposium Letter/Name of the first author.
Send one e-mail per abstract.

PROCEEDINGS

Full length papers will be published in a Proceedings Volume by ELSEVIER/NORTH HOLLAND. Submitted papers will be refereed. Instructions to Authors will be dispatched together with the notification of acceptance of the abstract.
All articles should be submitted on the first day of the conference (or date of arrival).

CONFERENCE SCIENTIFIC PROGRAM

The complete scientific program will be availabe through Internet: http://www-emrs.c-strasbourg.fr
during May 2002

POSTERS

The maximum size for the poster is:
Vertical 1,10 m and horizontal 0,90 m.
The poster board will be full white board.

General Information

GRADUATE STUDENT AWARDS

E-MRS announces the availability of awards (up to 2 per symposium) for graduate students conducting research and a topic to be addressed in the symposia planned for the E-MRS 2002 Spring Meeting. Each award will consist of a cash grant of 110 Euro, to be presented during the Conference, a diploma and a waiver of the meeting registration fees.
Criteria for selection are:
- Participation at the E-MRS 2002 Spring Meeting as an attendee and author or co-author of a symposium paper.
- Outstanding performance in the conduct of this project and promise for future substantial achievement in materials research as judged by the faculty advisor.
- Significant and timely research results.
Application materials required:
- Application form obtained by writing to the E-MRS Secretariat
E-MRS - Student Awards, BP 20
67037 Strasbourg Cedex 2, France
- Fax: (+33) 3 88 10 63 43
- Abstract of paper to be presented at the meeting or of relevant thesis or publication
- Letter of support from research supervisor.
Submit the complete application to the E-MRS Secretariat.
Deadline for complete application is April 15, 2002.
Finalists will be notified directly by the concerned symposium organizator.

PLENARY SESSION

A plenary session is scheduled for Wednesday June 19, 2002.

CONFERENCE RECEPTION

Each participant is invited to attend the Conference Reception on Wednesday June 19, 2002. During this session, the E-MRS Graduate Student Award Winners will get their prices.

DEADLINE FOR ABSTRACT SUBMISSION :
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IMPORTANT DEADLINES

- January 14, 2002: Deadline for abstract submission.
- March 15, 2002: Notification of acceptance and mode of presentation.
- April 15, 2002: Deadline for completed Application for Graduate Student Awards.
- May-June, 2002: Notification of Graduate Student Awards finalists.
- May 3, 2002: Deadline of registration fees discount: Please notice that the discount rate is only applicable for **REGISTRATION FORM AND PAYMENT** received by May 3, 2002.
- After May 3, 2002: Additional charge for registration fees.
- May 20, 2002: Registrations received after this date will not be included in the list of participants.
- June 18, 2002: Deadline for reception of full manuscripts (or date of arrival).

General Information

The European Materials Research Society E-MRS has been organizing annual conferences in Strasbourg since 1983. This event has become the most popular meeting of the "Advanced Materials" community working in Europe in R&D&T of materials and processes.

Today, the E-MRS Spring Conference is the largest Material Forum in Europe. Well over thousand European material scientists, engineers, physicists and chemists as well as scientists from overseas especially from Japan and the USA, have been attending the conferences annually and are expected to return in Spring 2002 to present the latest scientific and technical reports in the field. This year again the Conference program includes 19 symposia running in parallel with a good balance from fundamental and applied R&D&T with medium and short term perspectives.

The INDUSTRIAL EXHIBITION will display advanced products and services of interest for the community. Its location is scheduled in close vicinity of conference halls and directly linked to the poster sessions. We would like to take advantage of this opportunity in order to present alongside the greatest European material Forum an important and extensive industrial exhibition of scientific equipment. The Exhibition is scheduled for

June 19 - 20, 2002.

The exhibit will be convenient to the technical session rooms and scheduled to coincide with the technical program. For exhibitors, that will mean an excellent opportunity to meet just the right customers and disseminate information effectively. For meeting attendees, it will offer the convenience of visiting with multiple vendors all under one roof. So, plan to pick up some literature, enjoy a hands-on product demonstration, or meet face to face with company representatives.

We cordially invite you and your company to take part in this event. For more detailed information please contact the E-MRS General Secretary, P. Siffert, at your earliest convenience. We will send you our information package.

EQUIPMENT EXHIBITION
E-MRS 2002 SPRING MEETING
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Exhibition

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67037 Strasbourg Cedex 2
France

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