

## The MRS Short Course Program: Past, Present, and Future

As we enter 1990, the MRS Short Course Program is very different from what it was in the fall of 1982 when the first short course was offered at an MRS meeting. That first short course, developed by L. Ralph Dawson of Sandia National Laboratories, was on "Liquid Phase Epitaxy Techniques." Since then, under the guidance of three enthusiastic and dedicated Continuing Education Committee Chairs, L. Ralph Dawson, Alton D. Romig Jr., and Carol M. Jantzen, the Short Course Program has developed into a broadly based and important service-oriented educational program for MRS members and the materials science community. The program's primary goal is to provide high-quality, relevant topical courses which complement and enhance the technical programs at MRS meetings.

More than 50 courses have been developed over the past few years by the Continuing Education Committee. Committee members with different areas of technical expertise, together with the short course manager, are responsible for guiding this controlled growth. Care is taken to ensure that each new course is distinctly different from existing MRS courses. A multidisciplinary program continues to evolve with the development of new topical courses of timely interest to the materials science community, such as those on high-temperature superconductivity and dia-

mond films. At the same time, core courses on materials characterization and on the preparation and fabrication of materials provide a balanced and innovative educational program. Seven of the 18 courses being offered at the 1990 MRS Spring Meeting are new and illustrate the diversity of the program:

- Compound Semiconductor Epitaxy and Processing,
- Polysilicon Thin Films and Interfaces—A Submicron VLSI Manufacturing Perspective,
- Materials Processing in Thermal Plasmas,
- Microwave Interactions with Dielectric Materials,
- Ion Source Fundamentals,
- Ceramic Packaging of Integrated Circuits: Designs, Processes and Applications, and
- Materials Processing by Vapor Phase Techniques.

Some general statistics may be of interest: short course registrants account for between 11 and 15% of the total number of MRS meeting attendees; over 70% of the total number of course registrants at MRS meetings have advanced degrees; between 57 and 67% of the short course registrants also register for the MRS meeting. These data strongly indicate that the MRS Short Course Program is meeting its primary

goal of presenting courses that complement MRS symposia.

The number of applications for student scholarships at each meeting is steadily increasing, indicating that the program is meeting another goal—to provide an educational resource to universities by assisting undergraduate and graduate students who are interested in entering the materials science field.

The MRS On-Site Short Course Program is the vehicle through which MRS courses are presented at the facilities of industrial and government organizations, or at the meetings of other technical groups or societies. This program is becoming increasingly popular as industry recognizes the value and benefits of a high-quality, cost-effective, efficient form of education for persons not normally able to travel to an MRS meeting. The program provides for tailoring the technical contents of courses to the needs of the attendees.

The Materials Research Society has members who are dedicated educators and who can offer a real service to materials science by becoming more involved with the grassroots of materials science education. If you are interested in getting involved, please contact Carol M. Jantzen, chair of the MRS Continuing Education Committee, (803) 725-2374.

Vivienne Harwood Mattox  
MRS Short Course Manager

### Columbia Shuttle Mission Carries Special Significance for Materials Scientists and MRS

Materials scientists have several reasons to take special note of the current mission of NASA's space shuttle Columbia. The mission, presently scheduled for January to deploy the Hughes Syncom-IV communications satellite, is also to rescue from its precarious orbit a 5 1/2-year old scientific satellite with 56 microgravity experiments aboard. At the same time Columbia astronauts are carrying the banner of the Materials Research Society.



The MRS banner was included in Columbia's "Official Flight Kit" at the request of NASA mission specialist Bonnie Dunbar, a member of the shuttle crew. The kit's purpose is to fly ceremonial or presentational items such as state or national flags.

Dunbar, a ceramics engineer and aerospace technologist, was the plenary speaker for the 1987 MRS Spring Meeting. In November 1989 she asked MRS President Robert Chang if the MRS banner could be

made available for the Columbia flight. MRS sent Dunbar the banner "to carry aloft for us in recognition of the crucial role that materials play in our lives," said Chang. "As both a materials scientist and an astronaut, Bonnie must have a very special appreciation of the importance of materials."

The scientific satellite Columbia is to retrieve is NASA's Long Duration Exposure Facility (LDEF), placed in orbit by the shuttle Challenger in April 1984. The LDEF's 56 experiments involve, among others, the effects of atomic oxygen and solar radiation on materials intended for space station components and other space hardware. Its retrieval, originally scheduled for 1986, was delayed by the Challenger disaster. This year, however, it became clear that if NASA didn't take steps to save it, the satellite would be drawn into the Earth's atmosphere and disintegrate upon reentry.

MRS counts among its nearly 10,000 members many who are involved directly in the research and development of materials for space applications, and has sponsored symposia on this topic and many others. MRS works with other materials societies in the United States and other nations to promote, through scientific meetings and publications, the multidisciplinary sharing of research on optical fibers, superconductors, composites, polymers, and many other advanced materials.

"Advances in space materials technology," Chang notes, "derive from many fields—physics, ceramics, chemistry, metallurgy, to name a few. Microgravity experiments depend for their success on interdisciplinary teamwork, something NASA and MRS both are known for. That kind of teamwork is what we're trying to promote throughout the materials sciences."

# SOCIETY OF VACUUM COATERS

## 33rd ANNUAL TECHNICAL CONFERENCE April 29-May 4, 1990 • New Orleans, Louisiana

The Annual Technical Conference of the Society of Vacuum Coaters is a forum for the interchange of information between persons engaged in the use and development of vacuum coatings for large and small-scale applications. Papers will be presented in conference technical sessions on May 2-4, that will feature the following topics:

**Contamination Control, Process Technology, Optical Coating, Vacuum Web Coating, Compact Disc and Media Technology, Vacuum Technology, Industrial Thin Films, and New Product and Equipment Development.**

The overall conference program schedule is designed to enable registrants to attend technical sessions and participate in the Education Program and Equipment Exhibit.

### PLENARY SESSION: May 2

The Plenary Session will feature the following invited talks:

#### **'Engineered Surfaces for Engineered Materials'**

James Huebner, GE Plastics, Pittsfield

#### **'Progress and Barriers to Progress in Optical Coatings'**

H. Angus Macleod, Optical Sciences Center, University of Arizona, Tucson

#### **'Plasma Polymerization'**

Hugh S. Munro, Strategic Group for Surface Research, Courtaulds Research, Coventry, UK

#### **'Recent Advances in Physical Vapor Deposition'**

Ziegfried Schiller, Manfred Von Ardenne Institute, Dresden, DDR

#### **'The Vacuum Industry in the 90s'**

Gary L. Parr, Research and Development Magazine

### EQUIPMENT EXHIBIT: May 2-3

The SVC Equipment Exhibit will feature over 70 exhibits and will provide an excellent opportunity for conference attendees to interact with both users and suppliers to the vacuum coating industry. The reception/dinner on May 2 and lunch on May 3 held in the exhibit area are social highlights of the conference.

### EDUCATION PROGRAM: April 29-May 2

Courses will be presented by the Society of Vacuum Coaters, American Vacuum Society and Materials Research Society.

#### **Society of Vacuum Coaters**

- April 30-May 1 Practical Aspects of Optical Coatings
- April 29-30 Understanding Vacuum Systems
- May 1 Practical Aspects of Compact Disc Process Manufacturing
- May 1 Process Technology Workshops on Vacuum Technology and Web Coating

#### **American Vacuum Society**

- April 29 Hard Coatings by PVD Methods
- May 1 Pumping Hazardous Gases
- May 1-2 Advanced Vacuum System Design
- May 2 Sputter Deposition

#### **Materials Research Society**

- April 29-30 Film Formation, Adhesion, Surface Preparation and Characterization of Thin Film Structures
- May 1 Fundamentals and Applications of Ion Beam Assisted Deposition
- May 2 Plasma Etching



### MATERIALS RESEARCH SOCIETY

#### SHORT COURSE PROGRAM:

**April 29-May 2**

#### **MRS P-14 Film Formation, Adhesion, Surface Preparation and Characterization of Thin Film Structures**

Sunday and Monday, April 29-30

Course Fee: \$535

The properties, reproducibility and stability of films formed by atomistic deposition processes depend on the details of the substrate surface, surface preparation, atom nucleation, interface formation and film growth. This two-day course will cover the fundamental aspects of the various stages of film formation for films formed by vacuum deposition, sputter deposition and ion plating under both reactive and non-reactive conditions. The important interrelationships between the deposition process, process parameters and film properties will be discussed. Methods of monitoring, controlling and modifying the various stages of film formation will be discussed. Methods of characterizing the composition, microstructure and functional properties will be described and related to the unique nature of the films formed by the various deposition processes. The basic properties of film-substrate adhesion and residual film stress will be discussed in detail.

**Instructor: Donald M. Mattox**

**IP Industries**

#### **MRS F-10 Fundamentals and Applications of Ion Beam Assisted Deposition**

Tuesday, May 1

Course Fee: \$345

It has been demonstrated that the use of controlled concurrent bombardment by energetic particles during atomistic film deposition can change the film properties in desirable ways. However uncontrolled bombardment can lead to undesirable effects. The use of bombardment during deposition has been termed Ion Bombardment Assisted Deposition (IBAD). This course will discuss basic phenomena associated with IBAD processing and the use of IBAD techniques to control and modify film properties. IBAD processes have been used to produce unique materials such as diamond-like films, metastable materials and unique electronic and optical materials. Commercial equipment that is available for IBAD processing and some applications of the technique will be discussed. Comparison with other ion beam process will be given and future trends in the area will be proposed.

**Instructor: James K. Hirvonen**

**Spire Corporation**

#### **MRS F-02 Plasma Etching**

Wednesday, May 2

Course Fee: \$345

Plasma etching is a powerful tool to pattern films and avoid the pollution problems associated with wet chemical etching. The etching process is very sensitive to process parameters and an understanding of the nature of the process is essential to developing and maintaining a reproducible process. This course will discuss the fundamentals of gas flow, plasma generation, plasma chemistry, plasma-surface interaction, ion enhanced surface kinetics and process kinetics. Practical applications of plasma etching and the design of plasma reactors for specific applications will be presented. Specialized etching properties and applications such as selective etching, anisotropic etching and endpoint detection will be discussed. Some safety aspects associated with the handling of etch gases and the design of gas handling and etch processing systems will be presented.

**Instructor: G. Kenneth Herb**

**SEMATECH**

For conference and short course registration information, contact the SVC Administrative Office:

**Telephone (505) 298-7624 Fax (505) 298-7942**