



MRS Councillor and former Von Hippel Award recipient, Walter L. Brown (left) of AT&T Bell Laboratories presents commemorative plaque signed by participants to Conference Chairman Rimini during the conference banquet.

It turns out that by changing the temperature and dose rate of the irradiation, the motion of the amorphous-to-crystalline interface can actually be reversed! Studies of diffusion of Cu, Ag, and Au in amorphous Si showed a concentration dependence. The magnitudes of the diffusion coefficients, when extrapolated to high temperatures, correlate remarkably well with those in crystalline silicon, implying that these species diffuse via a substitutional-like process.

Much effort in the ion beam community is devoted to removing the damage created by the implantation process. Recent results on high-temperature annealing of buried oxygen implants showed the creation of a buried SiO₂ layer from sub-stoichiometric doses and drastic reduction of the defects in the overlayer. The layer formation seems to proceed via growth and nucleation of SiO₂ precipitates which appear during the implant. Successful use of rapid thermal annealing (RTA) for damage removal and for activation of dopants and contacts in GaAs was reported by various groups, apparently making it the technique of choice (over conventional furnaces) for GaAs.

The talks and posters on beam-induced changes in multilayer structures (e.g., Si/Ge and AlAs/GaAs) generated a great deal of excitement. Although still very much a mystery, the novel mixing and diffusion effects that have been observed have potential applications for localized bandgap engineering on a single wafer. Furthermore, the observation of transient enhanced diffusion in Si following high-

temperature annealing of high-dose implants may provide clues to what is happening in the multilayers.

The use of ion beams in growth and etching of thin films was discussed by several groups. An innovative technique for depositing thin isotopic films by decelerating a high voltage ion beam is starting to yield information on fundamental particle-solid interactions. Using the sensitivity of ion scattering to different isotopes, the film-to-substrate interface can be studied during subsequent ion beam mixing or annealing. Furthermore, the application of ion beams during or after thin film growth can modify the film adhesion, strain, density, chemical composition, electrical resistivity, index of refraction, and microstructure. The ability to induce these changes in a very controllable way makes ion beam modification not only an extremely useful technique for tailoring materials to specific applications but also an ideal research technique.

The debate about using ion beams in VLSI technology continues with both camps (focused ion beams [FIBs] vs. masked ion beam lithography) making considerable progress. The Japanese are aggressively pursuing the FIB technology, and they reported 0.01-0.1 μm beam diameters with currents of 100-300 pA and energies from 100-200 keV. Their dose rate is high, 1X10⁻³ A/cm², but they observe that the critical dose for amorphization is actually below that of conventional ion beams. Another speaker described a sophisticated system for ion projection lithography. The system

offers blanket exposure with a step-and-repeat option and therefore a considerable speed advantage over FIBs. It may be that the two technologies will find different niches: FIBs in custom IC repairs, and ion beam lithography for large area implants.

The conference was a nice size: large enough to bring us up to date on a reasonable cross section of topics, but small enough to allow us to meet and exchange ideas with many of our distant colleagues. The ongoing development work on new machines (such as high current oxygen implanters and 2 MeV ion implanters) and new fabrication techniques (such as incorporation of ion beams in MBE growth) promise a very exciting technical program at the next IBMM meeting.

The IBMM international committee announced that IBMM '88 will be chaired by S. Namba and held in Japan. MRS cosponsorship of the IBMM series will continue and additional MRS cosponsored events are being planned to coincide with the 1988 venue in Japan.

Boehmische Physical Society Meets at IBMM '86

Since its inception, the Boehmische Physical Society, the members of which all have interests in particle-solid interactions, has taken advantage of the occurrence of conferences in related fields to hold its gatherings. In this way, "a significant fraction of Boehmische members are able to attend without additional travel expense," according to B. Manfred Ullrich, secretary of the society. Meetings are usually held in the evening and consist of a keynote address by a prominent scientist followed by, or sometimes coincident with, the sampling of various regional wines and cheeses. Talks

continued



S. Tom Picraux (Sandia National Laboratories) (left), 1987 MRS Fall Meeting Co-chairman, receives a Boehmische award from Jim Mayer.



Master of Ceremonies, Jim Mayer, opens the meeting of the Boehmische Physical Society at IBM '86.

have ranged from sputter-induced topology (R. Kelly) to hydrogen in glasses [including beer glasses] (W. Lanford).

At the IBM '86 meeting in Catania on Tuesday evening, June 10, 1986, the preliminaries of the Boehmische meeting ran true to form. Master of ceremonies, Jim Mayer (Cornell University), appeared sporting a T-shirt adorned with a profile caricature of IBM '86 chairman E. Rimini. A master of iconoclastic spellbinding anecdotes, Mayer proceeded to confer small tokens of appreciation on several in the audience who had recently been elevated or elected to positions requiring some form of recognition.

Representing somewhat of a topical de-



Jim Mayer (left) congratulates Jim Williams (MIT, Australia) during Boehmische proceedings.

parture from previous Boehmische events, the keynote address on this evening dealt with recent attempts to divert the flow of volcanic lava during the last eruption of Mount Etna. It was presented by University of Catania Professor Renato Cristofolini. Although particle-solid interactions played no obvious role, it was a fascinating tale of man against nature. Nature prevailed!

Returning to pursuits more commonly associated with the Boehmische Physical Society, the evening ended with an adequate supply of good Sicilian wine and cheer. The next Boehmische Society event will be a special symposium on "Atomic Collisions in Solids" to be held at Chalk River on July 11-13, 1987 to recognize the nearly 20 years of contributions to the field made by colleagues in the atomic collisions group at the Chalk River Lab which will shortly be dispersed.

E. N. KAUFMANN

Four Materials Conferences Held Recently in Taiwan

Four scientific conferences were held earlier this year, drawing international scientists for discussions on composites, superalloys, and semiconductors.

The International Conference on Advanced Composite Materials and Structures held in Taipei, Taiwan, May 19-23, 1986 was jointly sponsored by the Chinese Society for Materials Science, the Society of Theoretical and Applied Mechanics in the Republic of China, and the Institute of Fracture and Solid Mechanics of Lehigh University. The conference chairmen were

Professor George C. Sih and Dr. Shu-En Hsu. Approximately 200 participants attended from the local area and abroad.

More than 70 papers were presented in the conference. The topics discussed were:

- (1) Static and dynamic resistance of composites to crack growth and other modes of damage;
- (2) Thermodynamics and kinetics of processes at fiber-matrix interface and their effects on composite properties;
- (3) Fatigue resistance and aging of composites in hostile environments;
- (4) Vibrational damping characteristics in relation to composite microstructures and laminate structures;
- (5) Application of composite data and specimen data to design of structural components;
- (6) Predictive methodology for deformation and failure of composites;
- (7) Analytical and numerical modeling of composite system behavior;
- (8) Joining or bonding of composite components;
- (9) Nondestructive evaluation of composite systems;
- (10) Damage tolerance and inspection requirements for composites; and
- (11) Materials science of composites.

Achievements in theoretical and applied research on modern advanced composite materials were presented at this successful conference.

A superalloy workshop was held at National Tsing Hua University, Hsinchu, Taiwan, May 29-30, 1986. More than 20 papers were presented, and intermetallic compound and IN-718 were emphasized at the workshop. Professor John Tien of Columbia University was the invited speaker.

The 1986 annual conference of the Chinese Society for Materials Science was held in Taiwan, Taiwan, June 20-21, 1986; and a workshop on Compound Semiconductor Science and Technology was held at National Chiao Tung University, Hsinchu, Taiwan, March 13-14, 1986.

