light traveling in glass fibers were due largely to impurities in the glass and not to some fundamental limitation. Get enough of the impurities out, they predicted, and they would have the right stuff for optical fibers. Four years later, a group of glass researchers at Corning Glass confirmed the prediction by making the first glass fibers with sufficiently low light loss. By this time, solid state scientists also had made headway in the kinds of lasers and detectors that would have to be on the ends of optical fibers. A quarter of a century later, optical communications has become a society-changing technology. With them, information superhighways are paved.

IVAN AMATO

FOR FURTHER READING: Sami Faltas, "The Invention of Fibre-Optic Communications," *History and Technology* **5** (1988) pp. 31–49; R. Kompfer, "Optics at Bell Laboratories—Optical Communications," *Applied Optics* **11** (November, 1972) pp. 2412–2425; Tingye Li, "Advances in Optical Fiber Communications: An Historical Perspective," *IEEE Journal on Selected Areas in Communications* **SAC-1** (April, 1983) pp. 356–372; J.B. MacChesney, "The Materials Development of Optical Fibers: A Case History," *Journal of Materials Education* **11** (1989) pp. 325–356; Ira Magaziner and Mark Patinkin, *The Silent War: Inside the Global Business Battles Shaping America's Future* (see chapter on Corning Glass), Vintage Books (New York, 1989); "A Revolution of Light: The Invention of Low-Loss Optical Fiber," a pamphlet published by Corning Incorporated, Opto Electronics Group.

CONFERENCE REPORT

Ion-Beam Modification of Optics to Autos Treated at IBMM'95

The Ninth International Conference on Ion Beam Modification of Materials (IBMM'95), chaired by J.S. Williams of the Australian National University (ANU), was held at ANU in Canberra, Australia, from February 5-10, 1995. More than 300 participants attended the conference from 33 countries. Over 420 abstracts were accepted, and papers were delivered in either poster or oral sessions. The location of the conference contributed to a higher than normal participation from Asia. Scientists from 33 countries attended the conference, the highest participation coming from Japan, followed by the United States, Germany, and Australia. In addition to IBMM'95, six informal supporting workshops, addressing key ion beam and materials issues, were held at various locations both before and after the conference. The 30-50 participants attending these workshops had ample time for discussion. The workshops were enjoyable and extremely stimulating, scientifically.

IBMM'95 covered traditional topics of this conference series but highlighted areas of particular relevance to the Australian research effort and areas that were internationally topical. Major topic areas included basic ion interactions, low energy processes, defects in semiconductors, high fluence implantation and phase formation, applications in electronics and optoelectronics, ion-beam modification of nonsemiconductors, and novel ion-beam equipment and techniques.

The conference was organized into 15 oral sessions, including three plenary presentations covering areas of general interest; 22 specialist invited papers and 51 contributed oral presentations; and three poster sessions. Several scientific highlights covered a diverse spectrum of materials and ion-beam processing methods. These included both conventional and novel applications of ion beams such as optical displays and optoelectronics, motor vehicle and tooling parts, coatings tailored for desired properties, studies of fundamental defect properties, the production of novel (often buried) compounds, and the treatment of biomedical materials.

The study of nanocrystals produced by ion implantation in a range of host matrices (plenary paper by H.H. Andersen, Denmark), particularly for optoelectronics applications (as indicated in a paper by H.A. Atwater, Caltech), was one especially new and exciting development. Despite several decades of study, major progress was reported at the conference in understanding defect evolution in semiconductors and the role of defects in transient impurity diffusion. A complete oral session was devoted to this topic, led by an invited presentation from D.J. Eaglesham, AT&T Bell Laboratories. The use of implantation to tune or isolate optical devices and in forming optically active centers and waveguides in semiconductors (S. Coffa, Catania), polymers, and oxide ceramics (A. Polman, Amsterdam) was a major focus of several presentations at the conference. The combined use of ion-beam methods and more conventional means of growing and modifying buried compounds and three-dimensional-layered structures featured prominently, the main progress excellently reviewed in the plenary paper of S. Mantl, Julich. The formation of hard coatings by ion-assisted deposition or direct implantation (D. McKenzie, Sydney and J.C. Barbour, Sandia) was also an area which showed much recent progress. Ion-beam techniques had also developed a pace, particularly those based on plasma immersion ion implantation or alternative techniques for large area surface treatment (such as papers by J. Conrad, Wisconsin and I.G. Brown, Berkeley). Finally, the use of ion beams for the direct treatment of cancerous tissue (K.M. Horn, Sandia) was also a particularly novel and interesting application of ion beams.

In addition to several industrial sponsors and the ANU, the Australian Materials Research Society and the International Union of Materials Research Societies (IUMRS) cosponsored the conference.

J.S. WILLIAMS