Siemens Starts Up First Large-Scale Industrial Application of Excimer Lasers

For the first time, a major electronics company is using excimer lasers on a large-scale production line. Siemens, one of the European electronics giants, is using excimer lasers to generate cylindrical via holes in multilayer printed circuit boards used for its 7500 H90 mainframe computer.

"Extremely high levels of reliability and reproducibility are crucial," reports Friedrich Bachman, the project manager at Siemens, "and this unique application drills the critical holes with an aspect ratio of about one, and a diameter of 80 microns."

A pilot production line had been operating 18 months before being expanded and moved fully into production last August. The system now successfully uses nine specially designed Lambda Physik excimer lasers on a three-shift, six-day-a-week basis. A laser not meeting specifications can be replaced within one hour.

This large-scale industrial application is considered to be the first important breakthrough for the excimer laser.

NSF Seeks Nominations for 15th Waterman Award

The National Science Foundation's Alan T. Waterman Award Committee is seeking nominations of candidates for the 15th annual award. The award is intended to give recognition to an outstanding young researcher in any field of science, mathematics, or engineering, and to encourage further high quality research.

The Waterman Award was established by the U.S. Congress in 1975 to mark the 25th anniversary of the National Science Foundation and to honor Alan T. Waterman, the first NSF director.

In addition to a medal, the recipient receives up to $500,000 for up to three years of research or advanced study in the mathematical, physical, medical, biological, engineering, social or other sciences at the institution of the recipient's choice.

Candidates must be U.S. citizens or permanent residents and must be 35 years of age or younger, or not more than five years beyond receipt of the PhD degree by December 31 of the year they are nominated. Candidates should have sufficient personal accomplishments, outstanding capability, and exceptional promise for significant future achievement. In addition, candidates should exhibit quality, innovation, and potential for discovery in their research.

Nominations can be submitted by individuals, professional societies, industrial companies, and by other appropriate organizations within the scientific and educational communities.

Nominations for the 1990 award must be received by the award committee at the National Science Foundation by **December 31, 1989.** Announcement of the award will be made in May 1990.

For information and nomination forms, contact L.J. Hamaty, Executive Secretary, Alan T. Waterman Award Committee, National Science Foundation, 1800 G Street NW, Room 545, Washington, DC 20550; telephone (202) 357-7512.

J.C. Bravman Wins Teaching Award for Dedication and Interdisciplinary Research Program

John C. Bravman, assistant professor of materials science at Stanford University, Stanford, California, has earned the Walter J. Gores Award for excellence in teaching. Bravman was nominated by two dozen students and a dozen colleagues. They cited his heavy teaching load, an innovative interdisciplinary research program, and his accessibility to students as indicators of "round-the-clock dedication."

The award, presented during Stanford commencement ceremonies June 18, praised his inspiration to students, from beginning undergraduates to those in advanced research, as well as his "extraordinary effort in preparing class materials, leading to unusual clarity, thoroughness and engaging treatment of complex material."

Students and colleagues also praised Bravman's efforts to promote interdisciplinary research, that built "a well-traveled bridge between the Departments of Materials Science and Electrical Engineering." Bravman served as co-chair for a symposium at the 1988 MRS Fall Meeting (Thin Films: Stresses and Mechanical Properties) and is co-chair of the 1990 MRS Spring Meeting.

IEEE and Popov Society to Participate in Information Exchange on Optoelectronics

A delegation of technical experts from the Institute of Electrical and Electronics Engineers, Inc. (IEEE) will discuss optoelectronics topics with members of the A.S. Popov Society September 18 and 19 in Moscow.

The meeting with the Soviet radio and electronics society is part of the IEEE group's scheduled 10-day visit to the So-

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viet Union, which will include tours of research, educational, and industrial sites to assess the current state of optoelectronics in the Soviet Union. The agreement between the two societies calls for an exchange visit by Popov members to the United States.

Signed last fall in Munich, the agreement calls for the organizations to participate in cooperative activities involving technology exchanges for a two-year period ending January 1, 1991. Included among those activities are participation in conferences and workshops, visits and tours of research institutes and industrial facilities, and submission of publications and articles.

A. Wolfenden Named ASM Fellow

Alan Wolfenden, professor of mechanical engineering at Texas A&M University, has been elected a Fellow of ASM International for distinguished contributions to the fields of metals and materials.

A member of MRS, Wolfenden will receive the award at the ASM International Fall Meeting in Indianapolis, Indiana. It cites his research accomplishments on single-step deformation calorimetry, radiation damage, elastic moduli and damping of materials, as well as his promotion of the materials field among students.

Wolfenden is active in research on the structure/damping properties relations of advanced materials. He is currently on leave from Texas A&M in the Division of Materials Science and Technology at the Commonwealth Scientific and Industrial Research Organization in Melbourne, Australia, and in the Materials Division of the Australian Nuclear Science and Technology Organization near Sydney.

Los Alamos and Four Companies Enter into Superconductivity Collaborations

Los Alamos National Laboratory has signed cooperative research and development agreements in high temperature superconductivity with four U.S. high technology companies.

The agreements follow creation of the High Temperature Superconductivity Pilot Center at Los Alamos, one of three such centers established by the Department of Energy to foster collaborations between the national laboratories and industry and to help American industry develop high temperature superconducting materials for commercial applications.

AMP Incorporated, Harrisburg, Pennsylvania, is the first company to reach formal agreement to sponsor superconductivity research at Los Alamos. The firm, a leading producer of electrical and electronic connection devices, will work with Los Alamos on the radio-frequency characterization of thallium-based superconducting films.

Also working on the development of thin-film superconductors will be Du Pont and Hewlett-Packard. The three-way collaboration with Los Alamos will involve the equivalent of 25 or more researchers and an estimated $10 million worth of equipment and facilities. A formal agreement is expected to be concluded by October 1.

American Superconductor Corporation, Cambridge, Massachusetts, is the fourth industrial partner in the Pilot Center, offering expertise in processing high temperature superconducting materials in usable forms. Applications of the research in this collaboration could range from mineral exploration to radar circuitry.

NSF Estimates Modest Increases in 1989 R&D Spending

Estimates for 1989 company research and development expenditures indicate a modest 6% increase over 1988, according to *Science Resources Studies Highlights*, a report from the National Science Foundation (NSF).

U.S. firms are expected to spend more than $61 billion for R&D in 1989, a 2% increase over 1988 levels. The 1988 and 1989 growth rates in spending show slight increases from the 1985-87 period, but remain below those of the period from 1980-85.

Among the 66 companies responding to an NSF survey, industry officials most often correlated their estimated 1988 and 1989 R&D spending to sales and profits levels. For the 44 companies reporting R&D spending increases in both years, the most frequently cited reasons were increased sales and/or profits, development of new technologies, and necessary funding for promising new products.

The 22 companies with stable or decreasing R&D spending in 1988 and/or 1989

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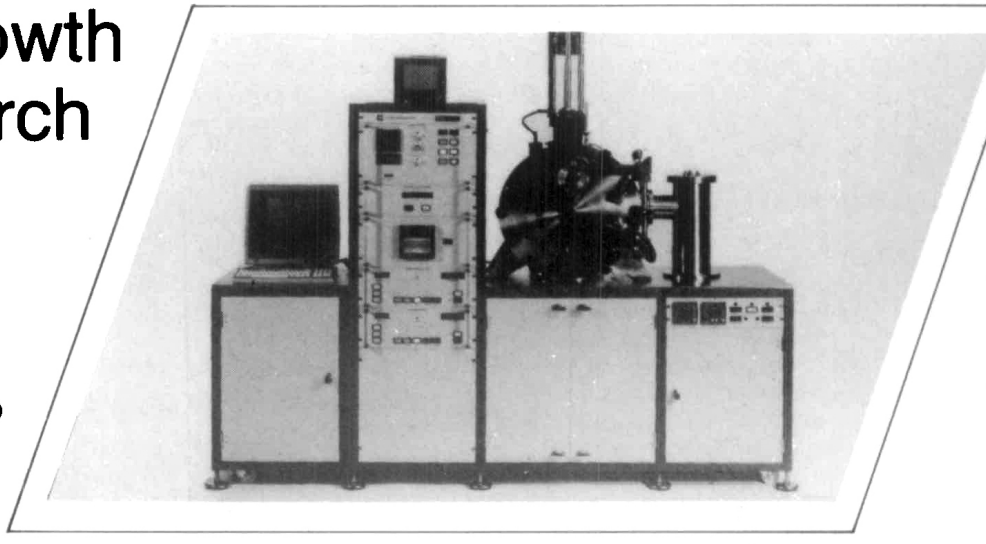

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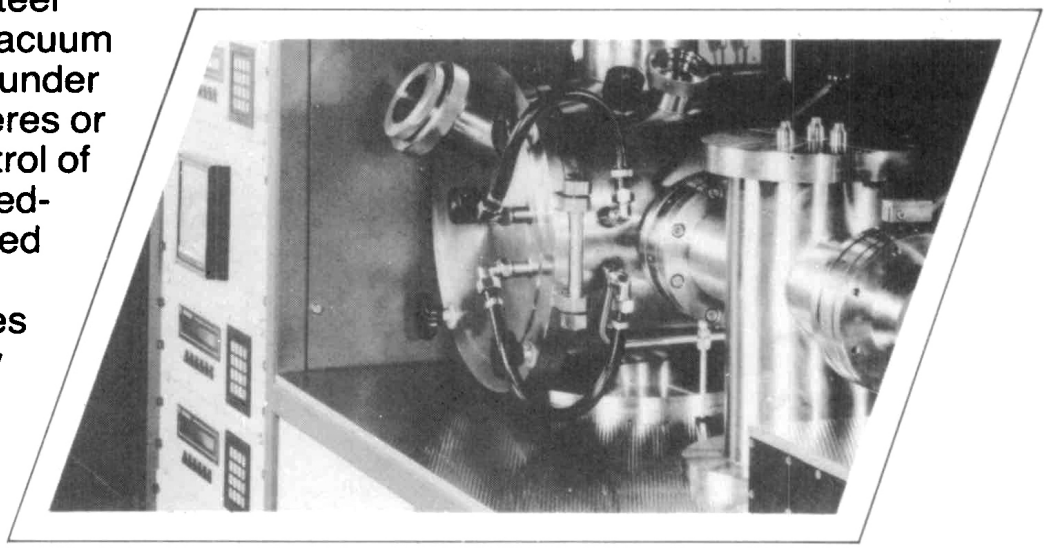

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generally reported lower sales or profits, greater emphasis on cost reduction programs, and closer ties between their R&D and manufacturing operations.

R&D spending varied widely among the major R&D-performing industries. The chemical industry projected R&D spending increases of 8% in 1988 and 10% in 1989. In contrast, the motor vehicles industry predicted a decline in R&D spending of 2% in 1988, and no growth in 1989.

All companies were asked about the effect of the October 1987 stock market decline on R&D spending. The respondents reported no effects on R&D budgets, although many companies were in some difficulty after having allocated funds for stock repurchase plans.

This report, the seventh in a series, is based on mail responses to an annual NSF inquiry, and on interviews with R&D officials in the major R&D-performing industries. The participating companies accounted for half of all U.S. company-funded R&D expenditures.

The report (NSF 89-310, May 10, 1989) is available from the NSF Division of Science Resources Studies, 2000 L Street NW, Washington, DC 20550.

Durham University's Interdisciplinary Research Centre to Focus on Polymers

Durham University is the site of a new Interdisciplinary Research Centre dedicated to strategic research in polymer chemistry, physics, and process engineering.

Together with colleagues at Leeds and Bradford Universities, Durham staff will operate the new facility—one of four Interdisciplinary Research Centres (IRCs) in the United Kingdom—in efforts to investigate and develop new plastics with a wide range of industrial and other uses. The Durham IRC will provide a focal point for the future development of this field of science in the United Kingdom, a link between academic and industrial research, and a more substantial source of trained polymer scientists and technologists.

The four IRCs were announced by the Science and Engineering Research Council (SERC) following consideration of 44 bids in seven areas of science. Total SERC funding for these centers amounts to £40.6 million over six years.

Update: Diamond Coatings on Silicon Chips

Updated information is now available on a report, "Diamond Coatings Grown on Silicon Chips," in the June *MRS BULLETIN*, p. 8. Since the initial release of their findings the researchers have concluded that their identification of diamond films is incorrect. What they perceived as diamond reflections during x-ray diffraction were $\lambda/2$ contaminants insufficiently removed and fortuitously shifted to almost exactly the expected diamond diffraction angles. Details of the original and revised findings, as well as the possible structure of the films actually achieved, are available in *Technology Update on Diamond Films* (MRS Extended Abstracts No. 19, p. 9-13) or in *Optical Materials: Processing and Science* (MRS Symposium Proceedings Vol. 152, p. 9-13).

A.W. Sleight Appointed to Endowed Chair at Oregon State University

Arthur W. Sleight, a pioneer and international leader in the field of superconductivity, has begun his appointment as Milton Harris Chair of Materials Science at Oregon State University, Corvallis, Oregon. The new position in the OSU Department of Chemistry is the first endowed chair at the university, with $1 million contributed by Milton Harris, a well-known polymer chemist and OSU alumnus.

Until July, when his new appointment began, Sleight was research leader of the Central Research and Development Department at E.I. duPont de Nemours and Company, Inc., Wilmington, Delaware. During this past academic year he was on sabbatical leave at the University of California at Santa Barbara.

As a solid state chemist and researcher on superconductivity, Sleight has received numerous professional awards and 11 patents and has produced about 200 scientific publications. He is also a member of the Presidential Commission on Superconductivity.

Sleight has been an active participant in MRS meetings since the Society was founded in 1973, having served on several committees and as a symposium organizer.

Superconductive Components Receives Grant from Edison Materials Technology Center

Superconductive Components, Inc. has received a Core Technology Project Grant from the Edison Materials Technology Center to develop electronic devices for use as detectors of millimeter wave radiation. The agreement unites the Columbus, Ohio based company with Wright Patterson Air Force Base and Ohio State University to pursue technological development and accompanying commercial applications.

Under terms of the agreement, thin film-high temperature superconductive technology will be used to produce super-sensing devices to fit detection systems currently used by the U.S. Department of Defense.

The Edison Materials Technology Center is a not-for-profit Ohio-based corporation created to assure the growth and prosperity of Ohio commercial technology.

Wesleyan University and ATM Receive High Tech Partnership Grant

Advanced Technology Materials, Inc. (ATM) and Wesleyan University, both based in Connecticut, have been awarded a 1989 Connecticut Cooperative High Technology Research and Development Grant.

Over the next two years ATM and Wesleyan will study the properties of metals on clean and oxidized silicon surfaces and how these properties affect electrical contacts and semiconductor devices. The project will be funded by a $200,000 award, about half coming from the state of Connecticut and half from ATM.

The program, which provides state grants to be matched by business contributions for joint research projects, has received $5 billion from the state since it began in 1984. Connecticut businesses have contributed $7 million, exceeding the equal match required. These state and corporate funds have supported 43 projects, conducted by 7 universities and 28 businesses. In 1989-90, state funds of almost $2 million will be awarded.

Four MRS members will collaborate on the ATM-Wesleyan project. Dale L. Doering, professor of physics at Wesleyan, will lead two students, while Charles P. Beetz, Peter S. Kirlin, and Duncan W. Brown will represent ATM. □

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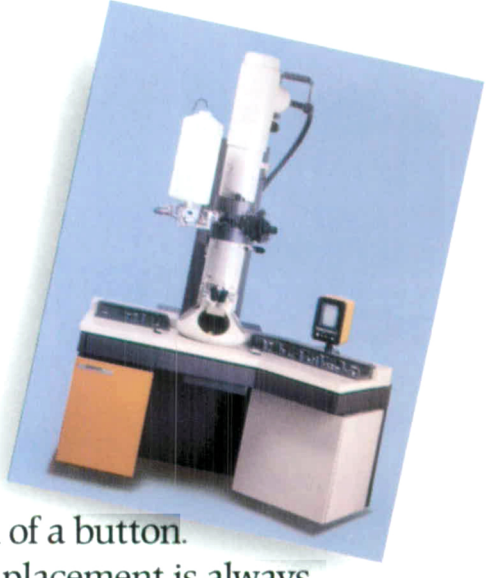

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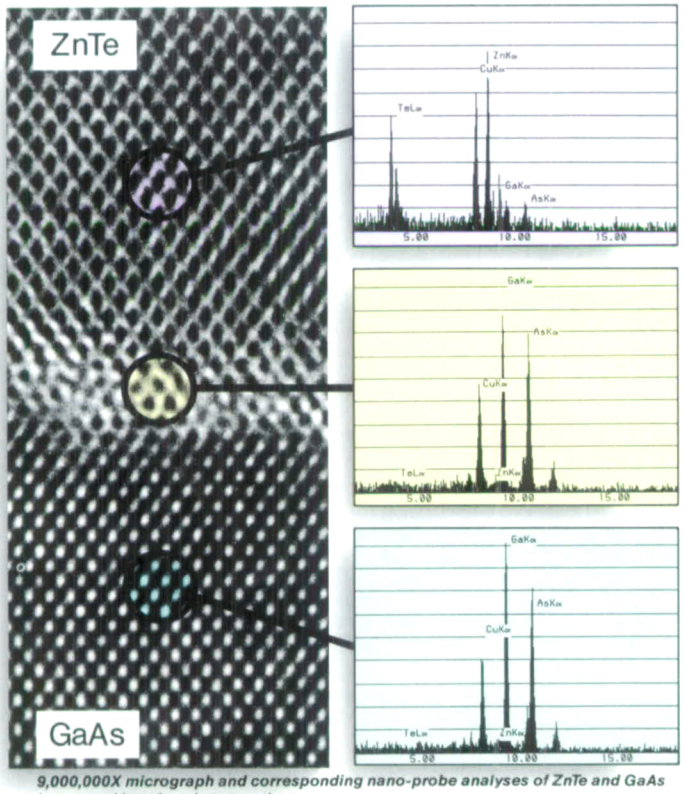

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