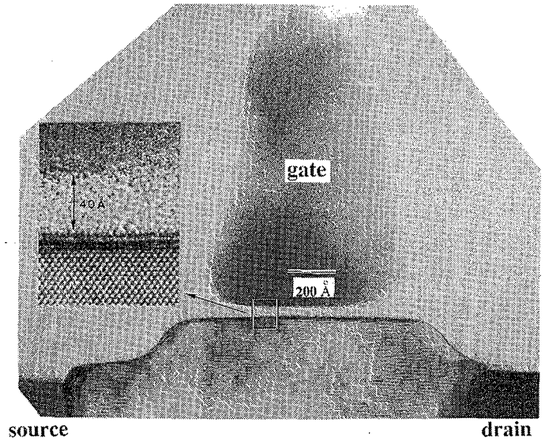
Non Profit
Organization
US Postage Paid
Los Altos, CA 94022
Permit No. 383

The
NORTHERN CALIFORNIA
ELECTRONIC MATERIALS
SYMPOSIUM

IEEE
TMS
Minerals • Metals • Materials



source drain

THE 24th ANNUAL

ELECTRONIC MATERIALS SYMPOSIUM

A One-Day Symposium on Electronic Materials
Featuring Authorities
Outstanding in their Fields

LE BARON HOTEL

1350 N. FIRST STREET

SAN JOSE, CALIFORNIA

Monday

March 25, 1996

8:00 AM

PROGRAM

Monday, March 25, 1996

Le Baron Hotel

****

8:00 Registration

MORNING SESSION (Fiesta Ballroom)

Session Chair: Dr. Bill Imler
Hewlett-Packard
San Jose, CA

8:30 **Welcoming Remarks and Introduction**
Dr. Emily Allen
San Jose State University, San Jose, CA

8:40 **"Technology Gaps in the SIA National Technology Roadmap and How Do We Fill Them"**
Dr. Chris Case
AT&T, Murray Hill, NJ

9:25 **"Research Toward More Reliable Solder Joints"**
Prof. J. W. Morris, Jr.
University of California, Berkeley, CA

10:10 **REFRESHMENTS** (Vendor Exhibit Area)

10:40 **"Materials Issues in High T_c Superconductors and Devices"**
Prof. Malcolm Beasley
Stanford University, Stanford, CA

11:30 **LUNCHEON**

12:15 **The twenty-second annual Ross Tucker Award**

12:25 **"New View of Jupiter: Galileo Probe Penetrates Jovian Atmosphere"**
Mr. Nick Vojvodich
Former Deputy Manager Galileo Probe, NASA-Ames, M.V., CA

AFTERNOON SESSION (Fiesta Ballroom)

Session Chair: Dr. Max Biberger
Applied Komatsu
Santa Clara, CA

1:30 **"Materials Problems and Physics Behind the Reliability of Semiconductor Lasers and LEDs"**
Prof. Pierre Petroff
University of California at Santa Barbara, Santa Barbara, CA

2:15 **"Recent Advances in Organic LEDs"**
Dr. Homer Antoniadis
Hewlett-Packard, Palo Alto, CA

3:00 **REFRESHMENTS** (Vendor Exhibit Area)

3:30 **"Growth and Characterization of Large Diameter Silicon Wafers for IC Manufacturing"**
Dr. Bobby Pitts
Motorola, Phoenix, AZ

4:15 **"Deep UV Lithography"**
Dr. Don Hofer
IBM, San Jose, CA

5:00 **HOSTED COCKTAIL PARTY**
(Vendor Exhibit Area)

****

****

VENDORS SHOW

8:00 - 5:00 **Vendors Exhibits**

****

GENERAL INFORMATION

The Symposium registration covers admission to the Symposium sessions, abstracts of the Symposium presentations, luncheon, a vendor's exhibit, and a partially hosted cocktail hour following the Symposium. Beverage tokens for the cocktail hour will be available in the vendor area during the afternoon sessions. Physical limitations require that attendance be limited to 400 registrants.

Costs for the Symposium have been kept to a minimum to encourage attendance. A discounted registration fee is available until March 18, 1996 because of the lower cost of handling preregistration and early arrangements commitments. To reserve your place at the Symposium and the luncheon, we urge you to register early by mail, using the attached form. No refunds of registration fees will be made after Monday, March 18, 1996.

During the Symposium, the twenty-second annual Ross N. Tucker Memorial Awards will be presented to two Bay Area graduate students in recognition of excellence in research.

We are excited to have **Nick Vojvodich**, former Deputy Manager of the Galileo Probe Project Office at NASA-Ames, as our luncheon speaker this year. Mr. Vojvodich will describe the probe/orbiter mission sequence, focus on the unique environments and technical challenges that the spacecraft designers faced, provide highlights of the probe design, and conclude with an update on the recent interesting scientific observations obtained by the probe as it descended through Jupiter's atmosphere.

The Symposium features a Vendor's exhibit. Information and displays of new materials, processing equipment, and analytical instruments will be presented by representatives of the manufacturers.

A partially hosted cocktail hour will follow the Symposium presentations. This provides an opportunity for informal discussions with Symposium speakers, vendors, and attendees.

Registration material and abstracts of the Symposium presentations will be provided at the registration booth.

The opening session will begin promptly at 8:30 A.M. Registration begins at 8:00 A.M. The vendor area will be available for setup at 7:00 A.M.

The Electronic Materials Symposium Committee exists to promote the understanding of electronic materials within the industrial and scientific communities of the San Francisco Bay Area. This committee organizes the annual Electronic Materials Symposium, featuring presentations on advanced electronic, magnetic and optical materials processing, characterization and devices by outstanding speakers who have made significant contributions to their fields. Proceeds of the Symposium are used to support electronic materials research and teaching in local universities.

Further questions regarding the Symposium should be directed to Dr. Emily Allen, SJSU, Department of Materials Engineering, One Washington Square, San Jose, CA 95192-0086,

Phone: (408) 924-4010, e-mail: elallen@isc.sjsu.edu.

ABOUT THE COVER

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

The cover photo shows a cross-sectional transmission electron micrograph through a Si FET with a gate length of 0.1 μm. The inset is a high resolution image of the 40 Å gate oxide.This photo is courtesy of Dr. Y.O Kim of AT&T in Murray Hill, NJ.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

ABOUT THE SPEAKERS

Dr. Homer Antoniadis received his B.Sc. in Physics from University of Ioannina, Greece in 1984 and his Ph.D. in Solid State Physics from Syracuse University in 1991. His thesis was on drift mobilities of amorphous silicon. In Dec. 1991 he joined the NSF Center for Photoinduced Charge Transfer at the University of Rochester and Xerox Corporation as a postdoctoral fellow. His research was concentrated on photocarrier generation and transport in electroactive polymers with emphasis on various organic optoelectronic devices like xerographic photoreceptors, photodiodes, photovoltaics and light-emitting-diodes. In Sept. 1994 he joined the Hewlett-Packard Labs in Palo Alto, CA, where he is working on the fabrication and development of thermally evaporated organic light-emitting-diodes.

Prof. Malcolm R. Beasley was born on January 4, 1940 in San Francisco, California. He attended secondary school in Silver Spring, Maryland, and received his Bachelor of Engineering Physics from Cornell University in 1962. He received his Ph.D. in Physics in 1968, also from Cornell University. He then went to Harvard University where he was a Research Fellow and subsequently a member of the Faculty. In 1974 he joined the Faculty of Stanford University where he became a full Professor of Applied Physics and (by courtesy) Electrical Engineering in 1979. He served as the Chairman of the Department of Applied Physics at Stanford from 1985-1989. In 1990 he was named the Theodore and Sydney Rosenberg Professor of Applied Physics. In September 1992 he was named Director of the Center for Materials Research. Professor Beasley was elected in 1993 to the National Academy of Sciences. He is the recipient of the Dean's Award for Superior Teaching at Stanford University. He has served as a consultant to the National Science Foundation, ARPA, and various industrial laboratories. He has also served on various panels of the National Research Council of the National Academy of Science.

Dr. Don Hofer received his Ph.D. in Physical Chemistry from the University of California, Davis in 1967. Dr. Hofer conducted postdoctoral research in high resolution nuclear magnetic resonance of solids at the University of Illinois, Urbana under a National Institutes of Health postdoctoral fellowship and joined the faculty of the University of Arizona, Tucson, as assistant professor in 1969. In 1974 Dr. Hofer moved to IBM where he has held a number of positions which include research staff member in x-ray lithography at the T.J. Watson Research Center, research staff member in lithography materials at the Almaden Research Center, manager of polymer materials for semiconductor packaging, Almaden Research Center, manager of thin film packaging, IBM Microelectronics Division and his present position as manager of lithography materials, Almaden Research Center. Dr. Hofer has conducted research in a number of areas of polymer materials for semiconductor packaging and interconnect, napthonovolac photoresists, 248 nm chemically amplified photoresists and presently, 193 nm chemically amplified photoresists.

Dr. Hofer has 16 patents and 93 publications in materials and processes for the semiconductor industry. He is currently a member of the American Chemical Society, Polymer Chemistry and Polymer Materials Science and Engineering Divisions and the Society for Photo Optical Instrumentation Engineers (SPIE).

Prof. J.W. Morris, Jr. is Professor of Metallurgy, Materials Science and Mineral Engineering, University of California, Berkeley and is also Program Leader, Structural Materials, Center for Advanced Materials, Lawrence Berkeley Laboratory. He received a B.S. in Metallurgical Engineering (1964) and an Sc.D. in Materials Science (1969) from MIT. He joined the faculty of Materials Science at the University of California, Berkeley and the staff of the Lawrence Berkeley Laboratory in 1971. His group's research has focused on the systematic design of engineering materials and has included research on alloy steels, advanced aluminum alloys and reliable interconnects for electronic devices. Current research in the area of electronic packaging includes work on the mechanisms of fatigue in Pb-Sn solder contacts and the mechanisms of electromigration failures in thin-film aluminum conductors. Prof. Morris' awards include the Hardy Gold Metal of the AIME, the Bradley Stoughton Teaching Award of the ASM, the AT&T Foundation Award of the ASEE, a Miller Research Fellowship and a Distinguished Teaching Award, University of California, Berkeley.

Prof. Pierre Petroff joined the faculty at UCSB in 1986 after working 15 years at AT&T Bell Laboratories where his research interests focused on defects, interfaces and molecular beam epitaxial growth in semiconductor structures and devices. He has innovated several spectroscopic techniques that allow for the simultaneous analysis/characterization of the structural and electronic properties of semiconductor defects and interfaces. These techniques are presently used in his laboratory to investigate the role of defects and interfaces on the lifetime of III-V compound lasers and heterojunction bipolar transistors. He has, for several years been involved with studies of nucleation and epitaxial growth processes and their influence on the structure of heterointerfaces in III-V compound semiconductors. This work has been the basis for his recent work on the growth of self assembled nanostructures using molecular beam epitaxy. Novel and highly perfect epitaxial structures, i.e., quantum wire superlattices, and quantum dots have been demonstrated and studied by his group using a variety of spectroscopic techniques. His most recent work, which focuses on the electronic properties of quantum wire and quantum dots structures and devices constitutes a major thrust of the National Science and Technology Center recently established at UCSB. His new research on nanomagnetic structures using self assembling techniques demonstrates the possibility of integrating nano-ferromagnets into a semiconductor structure.

Dr. Bobby Pitts received his B.S. from John Hopkins University in 1987 and his Ph.D. in 1994 from Cornell University, both in Electrical Engineering. He completed his dissertation studies on the growth and characterization of GaInAsP on GaAs by low pressure organometallic vapor phase epitaxy (OMVPE). In 1994, he joined the Semiconductor Product Sector (SPS) at Motorola in Tempe, Arizona working on process development of GaAs power amplifiers for land mobile communications. In September 1995, Dr. Pitts joined the Microprocessor and Memory Technologies Group (MMTG) of Motorola in Austin, Texas where he is responsible for the development of materials and epitaxy for the 300 mm Si conversion program. He has published and presented eight papers in the area of compound semiconductor epitaxial growth.

Mr. Nick S. Vojvodich attended Stanford University-receiving a bachelor of science degree in Mechanical Engineering (1957), a master of science degree in Aeronautics and Astronautics (1958) and completed his course requirements for a Ph.D. (1967). Mr. Vojvodich joined the staff of the NASA Ames Research Center located at Moffett field in July of 1958. During his 28 years at Ames, Nick worked on the Apollo, Space Shuttle and Pioneer Venus programs, with his re-entry research activities resulting in over 20 technical papers. He has held a variety of technical and project management positions at Ames. In 1973 Mr. Vojvodich completed a six month temporary assignment in Washington, D.C. where he was a member of a U.S. house appropriations committee four man panel that reviewed two major military programs: The A-10 Aircraft and the Patriot Missile System. In 1984 Nick was a member of NASA's agency wide 200 man definition team at Houston that was responsible for the initial planning and design leading to the procurement of NASA's next major manned program- the Space Station. In his last major position at Ames, he was Deputy Manager of the Galileo Probe Project Office, responsible for developing an atmospheric entry system which recently successfully studied the giant planet Jupiter.

1996 Ross Tucker Award Recipients

Yong Chen
Department of Materials Science
University of California at Berkeley
"Surface roughness and dislocations in lattice-mismatched semiconductor thin films"

G. Jeffrey Snyder
Department of Applied Physics
Stanford University
"Magnetic and transport properties of some metallic, ferromagnetic, perovskite oxides"

1995 EMS Undergraduate Grant Recipients

Prof. Burford Furman
Mechanical Engineering
San Jose State University
"Fabrication of a battery powered STM/AFM"

Prof. Art Diaz
Materials Engineering Department
San Jose State University
"Fabrication of an electrochemical display device"

SYMPOSIUM COMMITTEE

Max Biberger Applied Komatsu	*Eugene Haller* UCB/LBNL	*Laura King* Conductus
Kent Carey HP	*Jerry Hurst* IBM	*Fernando Ponce* Xerox
David Fork Xerox	*Bill Imler* HP	*Robert Thornton* Xerox
Judy Glazer HP	*Dah-Bin Kao* National Semi.	*John Yue* AMD

SYMPOSIUM CHAIR

Emily Allen
Materials Engineering Department, SJSU
One Washington Square, San Jose, CA 95192-0086
(408) 924-4010, elallen@isc.sjsu.edu

SYMPOSIUM SPONSORS

Northern California Section of TMS
IEEE Electron Devices Society, Santa Clara Valley Chapter

REGISTRATION FORM - 24th ANNUAL ELECTRONIC MATERIALS SYMPOSIUM (1996)

Name: _____ Title: _____

Organization: _____ Mailstop: _____

Mailing Address: _____

City, State: _____ ZIP: _____

Symposium Date: March 25, 1996	Registration Fee	Pre-registration by March 18, 1996
Regular Registration (please circle)	$85	$70
Full-Time Registered Student	$35	$20

Make check payable to: Electronic Materials Symposium and send with the above information to: Dr. Emily Allen, Department of Materials Engineering, SJSU, One Washington Square, San Jose, CA 95192-0086. Any questions should be directed to Dr. Allen at (408) 924-4010 or elallen@isc.sjsu.edu. Do not send purchase orders. The Tax ID number for the Symposium is: 25-1484913. Please make sure your name and affiliation are clearly identified. Credit card charges not accepted.