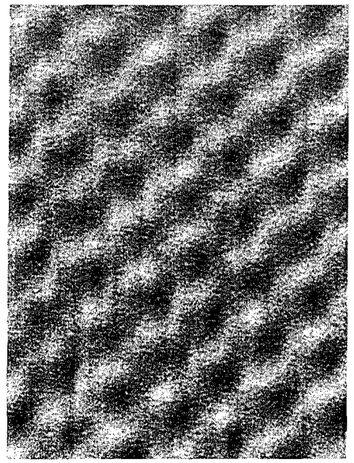
THE METALLURGICAL SOCIETY OF AIME

THE NORTHERN CALIFORNIA METALLURGICAL SECTION

FOUNDED 1871



2.45Å
Scanning Tunneling Micrograph of Graphite.

The

NORTHERN CALIFORNIA
METALLURGICAL SECTION

of
AIME

presents

THE FOURTEENTH ANNUAL

ELECTRONIC MATERIALS SYMPOSIUM

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

MARRIOTT HOTEL

GREAT AMERICA PARKWAY

SANTA CLARA, CALIFORNIA

Monday

March 24, 1986

7:30 A.M.

PROGRAM

Monday, March 24, 1986

Marriott Hotel

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7:30 Registration

MORNING SESSION (California Ballroom - Center)

Session Chairman: Dr. Robert L. Thornton
Xerox Palo Alto Research Center
Palo Alto, CA

8:30 **Welcoming Remarks and Introduction**
Dr. Douglas M. Collins
Hewlett-Packard Laboratories, Palo Alto, CA

8:40 **"A Review of Technical Trends in High-Density Memory Development."**
Dr. Yoshio Nishi
Toshiba Corporation, Kawasaki, Japan
presently with: Hewlett-Packard Co., Palo Alto, CA

9:30 **"Submicron Transistor Design for VLSI CMOS Technology."**
Dr. Kit M. Cham
Hewlett-Packard Laboratories, Palo Alto, CA

10:20 **REFRESHMENTS** (California Ballroom - Right)

10:50 **"Silicon Materials Science and Technology."**
Dr. John R. Carruthers
Intel Corp., Santa Clara, CA

11:45 **LUNCHEON** (California Ballroom - Left)

12:20 **Ross Tucker Award**

12:30 **"Unveiling the Sea Floor - New Views of Offshore California."**
Dr. Michael E. Field
USGS, Menlo Park, CA

AFTERNOON SESSION (California Ballroom - Ctr)

Session Chairman: Dr. Aare Onton
IBM Almaden Research Center
San Jose, CA

1:30 **"Scanning Tunneling Microscopy."**
Dr. Shirley Chiang
IBM Almaden Research Center, San Jose, CA

2:15 **"Organometallic Vapor Phase Epitaxy."**
Prof. Gerald B. Stringfellow
University of Utah, Salt Lake City, UT

3:00 **REFRESHMENTS** (California Ballroom - Right)

3:30 **"Laser Assisted Patterning of Microelectronic Materials."**
Dr. Robert J. von Gutfeld
IBM Watson Research Center, Yorktown Hts, NY

4:15 **"Metals and Silicides for Interconnections and Contacts."**
Prof. Krishna Saraswat
Stanford University, Stanford, CA

5:00 **HOSTED COCKTAIL PARTY**
(California Ballroom - Left)

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VENDOR'S SHOW (California Ballroom - Right)

8:00 - 5:00 **Vendor's Exhibits**

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GENERAL INFORMATION

The registration to the Symposium covers admission to the Symposium sessions, extended abstracts of the Symposium presentations, luncheon, a vendor's exhibit, and a partially hosted cocktail hour following the Symposium. Two tokens are included in the registration envelope. Physical limitations require that attendance be limited to the first 400 registrants.

Costs for the Symposium have been kept to a minimum to encourage attendance. A surcharge will be required from those who do not register by March 10, 1986, because of added costs for arrangements after that date. 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 10, 1986.

During the Symposium, the twelfth annual Ross N. Tucker Memorial Award will be presented to a Bay Area student in recognition of excellence in research.

We are honored to have Dr. Michael E. Field of the U.S. Geological Survey as our luncheon speaker. His talk will describe the fruits of new imaging technology applied to the underwater California coastline.

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 extended 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 7:30 A.M. The vendor area will be available for setup at 7:00 A.M.

Further questions regarding the Symposium should be directed to Dr. Douglas M. Collins, Hewlett-Packard Laboratories, 1501 Page Mill Road, Bldg. 1U, Palo Alto, CA 94304; (415) 857-4673.

ABOUT THE COVER

A high-resolution scanning electron tunneling micrograph (STM) of the surface of graphitic carbon. The features detected are surface carbon atoms spaced at 2.45 Å.

ABOUT THE SPEAKERS

Dr. John R. Carruthers received his BS degree in Metallurgical Engineering from the University of Toronto in 1959, his MS degree from Lehigh University, and his PhD from the University of Toronto in Materials Science and Engineering in 1966. He worked as a member of the Technical Staff at Bell Laboratories in Allentown, PA from 1959 to 1963 on semiconductor crystal growth and characterization and developed the basic models for convection and segregation phenomena during the Czochralski growth of silicon. From 1967 to 1977, Dr. Carruthers worked for Bell Laboratories in Murray Hill, NJ on problems of oxide crystal growth. In 1975, he was appointed Head of the Glass and Crystal Growth Department, responsible for glass fiber R&D for optical communications. In 1977 he joined NASA in Washington, DC as Director of the Materials Processing in Space program and from 1981 to 1984 he managed the Materials Characterization Group at Hewlett-Packard Laboratories. In 1984, Dr. Carruthers joined Intel Corporation where he is currently the Manager of Components Research.

Dr. Kit M. Cham was born in Hong Kong. He received his PhD degree in applied physics from the Department of Engineering and Applied Science, Yale University in 1980. Since then he has been with the Hewlett-Packard Laboratories in Palo Alto, California. He is currently involved in the development of submicron CMOS technology. He has coauthored a book titled, *Computer-Aided Design and VLSI Device Development*. He is author or coauthor of 28 papers in the area of device phyiscs, transistor design, and process development.

Dr. Shirley Chiang received her A.B. degree summa cum laude in physics from Harvard University in 1976. After doing research using infrared emission spectroscopy to study adsorbates on surfaces, she received her Ph.D. in physics from the University of California, Berkeley, in 1983. She joined the research staff at the IBM San Jose Research Laboratory in 1983, where she has built an ultrahigh vacuum scanning tunneling microscope (STM) which has samples interchangeable in situ with a surface analysis system. Her current research interests include the use of the STM to study the relationship of surface structure to the chemical properties of reconstructed semiconductor and metal surfaces, metallic thin films, and adsorbates on metals. She is a member of the American Physical Society and the American Vacuum Society.

Dr. Michael E. Field is a marine geologist with the U.S. Geological Survey (U.S.G.S.) in Menlo Park, CA. He joined the U.S.G.S. in 1975 following his work as a research geologist with the U.S. Army Corps of Engineers Coastal Engineering Research Center. Dr. Field was educated at the University of Delaware (BS), Duke University (MS), and George Washington University (PhD). His studies have focused on active marine processes around the borders of continents, especially those such as landslides, earthquakes, and gas seeps that may pose hazards to offshore activities. In 1982, Dr. Field spent a year in Australia as an advisor for offshore strategic minerals and in 1984 began working with the Spanish in the Mediterranean Sea. Dr. Field is an assistant editor of the Journal of Sedimentary Petrology, serves on the editorial board of Marine Geology, and is a visiting lecturer in sedimentology at the University of California at Berkeley.

Dr. Yoshio Nishi received his BS and PhD degrees in metallurgy and electronic engineering from Waseda University and the University of Tokyo, Japan, respectively. He joined Toshiba R&D Center in 1962 where he worked in silicon materials, processes, device physics research and development. From 1968 to 1969 he was a research associate at Stanford Electronics Labs, Stanford, CA. After returning to Toshiba, he was in charge of VLSI R&D, mainly looking at implementation of VLSI memories starting from 64 kb to 1 Mb. In 1986, he joined Hewlett-Packard Laboratories as Director of the Silicon Process Laboratory. He is also a Consulting Professor of Electrical Engineering at Stanford University. He is a member of Japan Society of Applied Physics, a senior member of IEEE, and a member of the Electrochemical Society.

Prof. Krishna C. Saraswat received the BE degree in electronics and telecommunications in 1968 from Birla Institute of Technology and Science, Pilani, India, and the MS and PhD degrees in Electrical Engineering in 1969 and 1974, respectively, from Stanford University. He worked at Texas Instruments, Dallas, Texas from 1969 to 1970, and since then has been with Stanford University, where he is presently Professor of Electrical Engineering (Research) and Director of the Center for Research on Manufacturing Science for VLSI. At Stanford he has worked on problems related to the physics and technology of silicon devices and integrated circuits. He is currently involved in research on manufacturing science and technology for VLSI. His interests include multilayer interconnections, ohmic contacts to shallow junctions, ultrathin dielectrics for submicron MOS gates, process modeling, and equipment modeling. Prof. Saraswat is a senior member of IEEE, member and councillor of the northern California section of the Electrochemical Society, and member of Sigma Xi. He has authored and coauthored over 100 technical papers.

Prof. Gerald B. Stringfellow received his PhD degree in Materials Science from Stanford University after receiving his BS degree in Ceramic Engineering from the University of Utah. From 1967 to 1980 he was with Hewlett-Packard Laboratories in Palo Alto. in 1979 he spent 6 months at the Max Planck Institute for Solid State Physics in Stuttgart, West Germany as a Von Humboldt U.S. Senior Scientist. Since 1980 he has been Professor of Materials Science and Engineering and Electrical Engineering at the University of Utah in Salt Lake City. During the last 18 years his research interests have centered on the III/V semiconductors, especially ternary and quaternary alloys. His interests include the fundametal thermodynamics of mixing, epitaxial techniques for alloy growth, and their electrical and optical properties. He has published approximately 100 papers. Recently he has concentrated on the organometallic vapor phase epitaxial (OMVPE) technique for the growth of high band gap alloys such as AlGaInP, and the thermodynamically metastable, small gand gap alloys such as GaInAsSb.

Dr. Robert J. von Gutfeld received his physics degrees from Queens College (BS) 1954, Columbia University (MA) 1957, and New York University (PhD) in 1965. In 1957 he joined Sperry Gyroscope to work on the design of electron beams for travelling wave tubes. Since 1960 he has worked at the IBM Thomas J. Watson Research Center in Yorktown Heights, NY on a variety of subjects utilizing lasers and studying their interactions with materials. His most recent work has concentrated on laser enhanced plating and etching for maskless patterning. Drs. von Gutfeld and L. T. Romankiw received the 1984 Research Award from the Electrodeposition Division of the Electrochemical Society for aspects of this work. Dr. von Gutfeld is a member of the American Society for Nondestructive Testing and the Electrochemical Society. He is a fellow of the American Physical Society and presently is Chairman of the American Physical Society, New York State Section.

1986 Ross Tucker Award Recipient

To be announced

CONFERENCE COMMITTEE

Michael Deal Stanford University	*Frank Perlaki* Hewlett-Packard
Robert M. Fisher Lawrence Berkeley	*Kurt Petersen* NovaSensor
A. Joshi Lockheed	*Dilip Rajdev* GTE
Vincent Marrello IBM	*Lynn M. Roylance* Hewlett-Packard
James McVittie Stanford University	*Krishna Saraswat* Stanford University
Eugene Meieran Intel	*Robert L. Thornton* Xerox
Aare Onton IBM	

CONFERENCE CHAIRMAN

Douglas M. Collins
Hewlett-Packard Laboratories
1501 Page Mill Road, Bldg. 1U
Palo Alto, California 94304
(415) 857-4673

CONFERENCE SUPPORT

We are greatful to the following companies which pledged their support of this symposium by the printing date of this program:

Ashland Chemical	**Surface Science Laboratories**
Kevex Corp.	**Technical Instruments**
Microscopes West Inc.	**Union Carbide/Linde Div.**

REGISTRATION FORM - 1986 14th AIME ELECTRONIC MATERIALS SYMPOSIUM

Name: _____ Title: _____

Organization: _____

Mailing Address: _____

City, State: _____ ZIP: _____

	Before March 10, 1986	After March 10, 1986
( ) Registration Fee	$45	$55
( ) Full-Time Registered Student	$15	$20

Make check payable to: "No. Cal. Met. Section, AIME", and send with the above information to: Dr. Douglas M. Collins, Hewlett-Packard Laboratories, 1501 Page Mill Road, Bldg. 1U, Palo Alto, CA 94304. (415) 857-4673. Do not send purchase orders. Please make sure your name and affiliation are clearly identified.