

THE
NORTHERN CALIFORNIA
METALLURGICAL SECTION
OF
A I M E
PRESENTS
ELECTRONIC MATERIALS SYMPOSIUM

The properties of materials play a vitally important role in the development of electronic devices. The understanding of the mechanisms and limitations of these properties aids in the selection of the most suitable material for any particular application. This fact is not always appreciated by device engineers. It is therefore of prime importance that the manufacturer of electronic materials as well as the ultimate user of these materials, be aware of the problems involved in materials technology. The implications of this responsibility will be explored by the symposium speakers, who will deal with materials related problems for electronic devices of great economic value. The purpose then of this symposium is to discuss the underlying materials properties and limitations for several commercially important device technologies for materials specialists directly or indirectly involved in electronic device development. We therefore invite your participation, not only because we wish to promote the above materials philosophy, but also because we believe that we have brought together a truly outstanding group of scientists as speakers. There will be an opportunity to meet with the speakers and symposium attendees on an informal basis after the meeting.

CABANA HYATT HOUSE
4290 EL CAMINO REAL
PALO ALTO, CALIFORNIA 94306
FRIDAY
MARCH 23, 1973
8:00 A.M.

PROGRAM

Friday, March 23, 1973

Maximus South - Cabana Hyatt House

MORNING SESSION

Session Chairman: Dr. Eugene S. Meieran
Fairchild Semiconductor
Research and Development Laboratories
Palo Alto, California

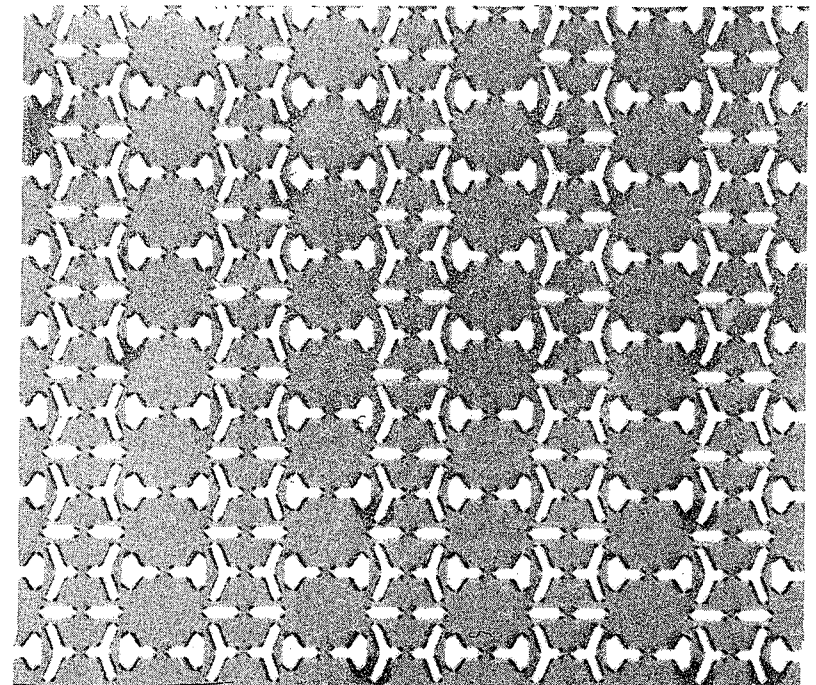
- 8:00 Registration
- 9:00 Welcoming Remarks and Introduction
Dr. K. S. Sree Harsha
Northern California Metallurgical Section of AIME
California State University at San Jose
- 9:15 "Fundamental Limitations of Microelectronic Devices"
Professor Carver A. Mead
California Institute of Technology
Pasadena, California
- 10:00 COFFEE BREAK
- 10:15 "Semiconductor Memories"
Dr. Andrew S. Grove
Intel Corporation
Santa Clara, California
- 11:00 "Materials Requirements for Charge Coupled Devices"
Dr. Gil F. Amelio
Fairchild Semiconductor, Research and Development
Palo Alto, California

- 12:00 LUNCH BREAK
- LUNCHEON SPEAKER: Professor William Shockley
- "The Invention of The Transistor Personal Reminiscences"
Stanford University
Stanford, California

AFTERNOON SESSION

Session Chairman: Dr. Thomas R. Cass
Hewlett-Packard Laboratory
Palo Alto, California

- 1:15 "Recent Developments in Some Non-Silicon Materials"
Dr. Eugene J. Kunzler
Bell Telephone Laboratories, Inc.
Murray Hill, New Jersey
- 2:00 "Compound Semiconductor Materials for Light Emitting Diodes"
Dr. Forrest Williams
Monsanto Company
St. Peters, Missouri
- 2:45 BREAK
- 3:00 "Liquid Crystals, Design and Properties for Display Applications"
Dr. Ivan Haller
IBM Watson Research Center
Yorktown Heights, New York
- 3:45 "Materials for Magnetic Bubble Devices"
Dr. Robert Burmeister
Hewlett-Packard Laboratory
Palo Alto, California
- 4:30 PANEL DISCUSSION
MODERATOR: Dr. Lee F. Donaghey
University of California
Berkeley, California
- 5:30 LIBATIONS



GENERAL INFORMATION

1. The registration fee for the Symposium includes lunch at the Cabana Hyatt House. We are indeed honored to have as our luncheon speaker Professor William Shockley of Stanford University, who will speak on "The Invention of The Transistor-Personal Reminiscences."
2. A panel discussion is tentatively planned following the conclusion of the formal presentation of papers and will permit the speakers to entertain general questions from the symposium attendees.
3. An open cocktail hour, sponsored by Fairchild Semiconductor, Intel Corporation, and Hewlett-Packard Laboratories will follow the panel discussion, providing an opportunity for informal conversation with the speakers, and symposium guests.
4. We have purposely held the registration costs to a minimum, to encourage attendance. However, a surcharge will be required for those who do not pre-register by Friday, March 16, 1973. In order to plan the lunches that will be served, we urge you to register by mail in advance. No refunds of registration fees will be made after Friday, March 16, 1973.
5. Registration materials may be collected on arrival at the symposium. Since the sessions will begin promptly, we urge that you arrive at the Cabana Hotel early in order not to miss any portion of the symposium.
6. If you have further questions regarding the symposium, please contact one of the following:

Dr. K. S. Sree Harsha
212 Engineering Building
California State University
San Jose, California 95192
(408)277-2437

Dr. Eugene S. Meieran
Fairchild Research and Development Laboratory
4001 Miranda Avenue
Palo Alto, California 94304
(415) 493-7250

Dr. Thomas R. Cass
Hewlett-Packard Laboratories
1501 Page Mill Road
Palo Alto, California 94304
(415) 493-1501

Dr. Lee F. Donaghey
Department of Chemical Engineering
University of California
Berkeley, California 94720
(415) 642-2408



ABOUT THE SPEAKERS

DR. GIL F. AMELIO: Dr. Amelio received his Ph.D. degree in Physics from the Georgia Institute of Technology, Atlanta, Georgia in 1968. From 1962 to 1965 he worked for Information Sciences, Inc. of Atlanta, on the design and implementation of information retrieval systems and related computer software. In 1966 he joined the Physical Science Division of the Engineering Experiment Station at Georgia Tech where he was engaged in surface physics research and study of the Auger spectra of semiconductors. He participated in the development of medical electronics for heart research with an Emory University team, and in the development of scanning spectrophotometers for a local research company. In 1968 he joined the staff of Bell Telephone Laboratories in Murray Hill, New Jersey, where he was involved in the development of the silicon diode array camera and in pioneering research on charge-coupled devices. He joined Fairchild Camera and Instrument Corporation's Research and Development Laboratory in 1971, where he is now Director of Charge-Coupled Device Development.

DR. ROBERT A. BURMEISTER, JR.: Dr. Burmeister received his Ph.D. degree in Materials Science from Stanford University in 1965. His doctoral dissertation research was concerned with the crystal growth, crystalline imperfections and the electrical transport properties of CdSe. He joined Hewlett-Packard in 1965, and since then has been concerned with the preparation and characterization of electronic materials, including compound semiconductors, semiconducting alloys and magnetic rare earth oxides. At present he is the Head of the Materials Research Department of the Solid State Laboratory. Dr. Burmeister is a member of the AIME, and is currently serving on the Electronic Materials Committee.

DR. ANDREW S. GROVE: Dr. Grove received his Ph.D. degree in Chemical Engineering from the University of California, Berkeley in 1963. He then joined the research and Development Laboratory, Fairchild Semiconductor, Palo Alto, California and played a significant role in several major developments of semiconductor technology. In 1967 he was appointed Assistant Director of Research and Development. Dr. Grove holds several patents pertaining to surface-controlled semiconductor devices. He has written over forty technical papers on semiconductor device technology and related subjects and has authored the widely used book, "Physics and Technology of Semiconductor Devices." Dr. Grove has been a member of the Electronics Materials Committee of the AIME and served on the Administrative Committee of the Electron Devices Group of the IEEE. He is the recipient of the IEEE Region Six 1969 Achievement Award for his contributions to the MOS device field. In 1968 Dr. Grove participated in the founding of, and is now the Vice-President in charge of Operations at Intel Corporation.

DR. IVAN HALLER: Dr. Haller is a Staff Member in the Physical Sciences Department at the IBM Thomas J. Watson Research Center, Yorktown Heights, New York, where he has been since 1960. His research interests in the past four years have centered on the chemistry and physics of liquid crystals. His other research interests have been in various aspects of photochemistry, spectroscopy and the interaction of electron beams with matter. His education includes a B.S. from the University of Technical Sciences, Budapest in 1956, and a Ph.D. in chemistry in 1961 from the University of California, Berkeley. Dr. Haller is a Fellow of the American Institute of Chemists. He is the author or co-author of over 25 publications and of several patents.

DR. EUGENE J. KUNZLER: Dr. Kunzler received his Ph.D. in Physical Chemistry from the University of California, Berkeley in 1950. Since joining Bell Laboratories in 1952, Dr. Kunzler has been involved in low temperature solid state research and has made significant contributions in the field of superconductivity. He directed the research which led to the discovery of high-field high-current superconductors and superconducting magnets. For his work on superconductors, he was awarded the Franklin Institute's John Price Wetherill Medal in 1964. Dr. Kunzler was head of the Metal Physics Research Department from 1961 to 1969 and has been Director of the Electronic Materials Laboratory since 1969. Among the responsibilities of his laboratory are materials for magnetic bubble devices, light emitting devices, microwave devices, heterostructure lasers and metallizations. He is a fellow of the American Physical Society.

PROFESSOR CARVER A MEAD: Professor Mead received his Ph.D. degree in Electrical Engineering in 1959 from the California Institute of Technology. He has been a member of the faculty of that institution since 1957. His research has contributed to the understanding of tunneling in solids, current flow mechanisms in thin dielectric films, metal-semiconductor barriers, band energies in semiconductors, and electronic processes in insulators. Professor Mead is the author of numerous papers which include research on surface properties of semiconductors. He has proposed and demonstrated the operation of a number of new solid state electronic devices and holds several U. S. patents. He is a fellow of the American Physical Society.

DR. WILLIAM SHOCKLEY: Dr. Shockley joined the Technical Staff of Bell Telephone Laboratories in 1936. During World War II, he was on special assignment with the U. S. Navy, directing research in anti-submarine warfare. He returned to Bell Telephone Laboratories after the war as Director of Solid State Physics Research, and in 1948 participated in the work that led to the invention of the transistor. For this work, Dr. Shockley was co-recipient of the 1956 Nobel Prize in Physics. After leaving Bell Telephone Laboratories in 1955, Dr. Shockley founded Shockley Semiconductor Laboratories. In 1963, he was appointed to the Alexander M. Poniatoff Chair of Engineering Science at Stanford University, the position he currently holds. Dr. Shockley is a world recognized expert in the field of solid state.

DR. FORREST WILLIAMS: Dr. Williams received his Ph.D. in Chemistry from Northwestern University in 1953. He then joined Monsanto Company as a research chemist. In 1966, he became the Manager of Semiconductor Materials, and is presently Product Manager for III-V Materials in the Electronic and Materials Department. Dr. Williams has played an active role in the AIME, and has served as Chairman of the Electronic Materials Committee. He has been awarded about thirty U. S. and Foreign patents. He has also published numerous journal articles, dealing with the properties of compound semiconductors.

ADVANCE REGISTRATION FORM

ELECTRONIC MATERIALS SYMPOSIUM

NAME	TITLE	ORGANIZATION	AIME MEMBER ()	OTHERS ()	STUDENT ()
MAILING ADDRESS					
City	State	Zip			

Symposium Registration Fees:

AIME Member	\$7.50	Registration until March 16, 1973	Registration after March 16, 1973
Students	3.00		\$10.00
Others	15.00		5.00
			20.00

Make checks payable to: "N. Cal. Met. Soc. AIME". Please do not send P. O. numbers.

Send to: Dr. K. S. Sree Harsha
212, Engineering Building
California State University
San Jose, California 95192
(408) 277-2437

Please pass on this information to colleagues who may wish to attend the symposium. More than one person may register by merely supplying the information listed above and the appropriate registration fees.