

American Vacuum Society meets in Houston

The 32nd National Symposium of AVS will feature an increased number of joint sessions, special sessions on electronic materials and vacuum technology in space, and the presentation of several awards.

Invited Papers

TUESDAY morning

Amorphous tetrahedral materials for macroelectronics. *J. Mort*
Thin-film display devices. *T. P. Brody*
Total-energy all-electron theory of surface structural electronic and magnetic properties. *A. J. Freeman, C. L. Fu, S. R. Chubb, E. Wimmer*
Reflection high-energy electron-diffraction studies of epitaxial growth on semiconductor surfaces. *P. I. Cohen, P. R. Pukite, J. M. Van Hove, C. S. Lent*
Recent developments in quantitative surface analysis by electron spectroscopy. *C. J. Powell*
Particle and impurity control in magnetic fusion devices. *A. Wootton*
Particle removal with alt-1 in textor. *G. J. Thomas, A. Pontau, K. Dippel, K. Finken, G. Campbell, R. Conn, D. Goebel, K. Leung*
Computer modeling of thin-film growth. *G. H. Gilmer*
Towards quantifications of thin-film growth morphology. *R. Messier*
Patterning of submicron VLSI circuits. *R. F. Pease*
Optoelectronics—materials and processes. *R. A. Laudise*
Problems and opportunities in erasable optical recording. *G. A. N. Connell*
Thin-film manufacturing processes used in flat-panel display devices. *M. Bayard*
Magnetic thin films, the opportunity and the challenge. *K. N. Maffitt*
Space technology today. *A. Cohen*
Remote manipulators in space and on Earth. *S. S. Sachdev*
Industrial materials-processing experiments on-board the space shuttle. *M. K. Debe*
Space-station technology experiments and uses. *R. A. Breckenridge*
The space telescope. *D. Tenerelli*
High-resolution electron energy-loss spectroscopy: Explored regions and the frontier. *J. L. Erskine*
The metal-electrolyte interface: A spectroscopic approach. *D. M. Kolb*

afternoon

Dynamical aspects of capillary instabilities in thin films. *D. J. Srolovitz*

Synchrotron x-ray scattering studies of semiconductor (111) surface reconstruction. *I. K. Robinson*
New results on scanning tunneling microscopy: Surface morphology of cleaved semiconductor surfaces. *R. M. Feenstra*
Novel aspects of tunneling in scanning microscopy and spectroscopy. *A. Baratoff*
Chemical effects in materials studies using Auger analysis. *R. R. Rye*
Ion cyclotron resonance heating in the divertor tokamak ASDEX. *K. Steinmetz, F. Wesner, H. Niedermeyer*
Lower hybrid heating and current drive and technology. *M. Porkolab*
The role of the plasma edge during ICRF heating on the PLT tokamak. *J. R. Wilson*
Electron cyclotron resonance heating in tandem mirrors. *B. W. Stallard*
The application of GeSi-Si heterostructures: Teaching an old dog new tricks. *J. C. Bean*
III-V molecular-beam epitaxy: Toward a concept of all uhv processing. *J. P. Harbison*
Progress in self-developing electron-beam resists. *M. Isaacson, E. Kratschmer*
MBE growth and application of epitaxial fluoride films. *L. J. Schowalter*
The technology and design criteria for high-through-put MBE systems. *D. Williams*
Artificially layered superconductors. *C. M. Falco*
Spin configurations and collective excitations in magnetic superlattices. *D. L. Mills*
Artificially layered materials. *J. Rowell*
Interfaces in metallic superlattices. *D. B. McWhan, C. Vettier*
Layered magnetic superlattices. *I. Schuller*
Performance characteristics of displacement-type vacuum pumps. *M. H. Hablanian*
Plasma-assisted CVD: Fundamentals and applications. *S. V. Nguyen*

WEDNESDAY

morning

Broad-beam ion sources: Present status and future directions. *H. R. Kaufman*
Large-area ion source for fusion. *K. N. Leung*
Prospects for printing VLSI circuits with large-area ion beams. *J. N. Randall*

Surface crystallography in adsorption and catalysis. *L. D. Schmidt*
A theoretical and chemical view of surface chemistry. *R. Hoffmann*
Surface analysis of corrosion films and alloys. *N. S. McIntyre, T. C. Chan*
An historic overview of ICF: What have we learned? *A. J. Glass*
Nuclear-spin polarization of solid deuterium-tritium. *E. M. Fearon, R. G. Garza, E. R. Mapoles, P. C. Souers, R. T. Tsugawa, J. R. Gaines, J. D. Sater*
Heat and light in laser-materials interactions. *F. A. Houle*
Laser ablation of polymers. *J. T. C. Yeh*
Direct-laser writing of silicon and metal microstructures: Deposition, etching, real-time diagnosis and modeling. *I. P. Herman, A. F. Bernhardt, F. Magnotta, F. Mitlitsky, J. C. Whitehead, D. E. Kotecki, J. L. Kaschmitter, B. M. McWilliams*
Flexible semiconductor manufacturing to meet the demands of a changing market. *P. Losleben*
Advances in submicron process technologies. *A. T. Lowe*
Device and material requirements in VLSIs. *S. Asai*
Ion-implantation damage and rapid thermal processing in semiconductors. *J. Narayan*
Current low-temperature processing of VLSI in Japan. *K. Maeda*
Computer applications to vacuum science. *A. J. Lewellyn*
Plasma-assisted low-temperature epitaxy. *K. P. Pande, O. Aina*
Deposition of silicon dioxide and silicon nitride by remote plasma-enhanced CVD. *G. Lucovsky, P. D. Richard, D. V. Tsu, S. Y. Lin, R. J. Markunas*

afternoon

Structure-related optical properties of thin films. *H. A. Macleod*
Angular distribution of sputtered particles. *N. Winograd*
Recent developments concerning the chemistry and cohesion of grain boundaries. *C. L. White*
Microcellular foams via phase separation. *A. T. Young*
UV-assisted growth of II-VI compounds. *J. B. Mullin, S. J. C. Irvine*

The American Vacuum Society will hold its 32nd National Symposium 18–22 November 1985 at the Albert Thomas Convention Center and the Hyatt Regency Hotel in Houston, Texas. Of 56 sessions, 14 will be sponsored jointly—each by two or more divisions of AVS, reflecting the interdisciplinary nature of current research. In addition, AVS will sponsor a special topical conference on frontiers in electronic materials and processing, and the Vacuum Technology Division will sponsor a special session on vacuum technology in space. Registration will take place on Monday, 18 November, 4

pm–10 pm; Tuesday and Wednesday, 19–20 November, 7 am–5 pm; Thursday and Friday, 21–22 November, 8 am–2 pm.

The organizers also offer a companions' program, featuring tours of the Houston area, NASA's Manned Space Center and the City of Galveston.

Awards

At its awards luncheon on Wednesday, 20 November, AVS will present several awards; among them, the following:

Theodore E. Madey (National Bureau of Standards) will receive the Medard W. Welch Award "for his

investigations of surface processes at a fundamental level, especially the determination of adsorbed-molecule bonding geometries." Madey joined NBS as a research associate in 1963 after receiving his PhD from the University of Notre Dame; he was appointed a member of the technical staff in 1965. Madey has employed ultrahigh vacuum technology in his studies of surface phenomena, including electron emission, physisorption, chemisorption, catalysis and electron-solid reactions. More recently, he has used electron-stimulated desorption ion angular distributions to study surface structures.

Epitaxial crystallization of semiconductors stimulated by ion-beam irradiation. *J. S. Williams*
Real-time atomic-resolution observations of electron-beam-stimulated crystallization. *D. J. Smith, D. J. Ehrlich*

Photo-stimulated molecular-layer epitaxy. *J. Nishizawa*

UV-induced MO-CVD growth of GaAs. *P. Balk, H. Heinecke, C. Plass, H. Luth*

Photon-assisted OMVPE of CdTe. *D. W. Kisker*

Excimer-laser-induced deposition of InP: Crystallographic and mechanistic studies. *A. Appelbaum, D. Brasen, V. M. Donnelly, M. Geva*

IR-laser-assisted OMVPE growth. *K. A. Jones*

Low-temperature epitaxy by ionized cluster beam. *I. Yamada, H. Takaoka, H. Usui, T. Takagi*

Organization of Japanese science and technology with emphasis on III–V compound semiconductor technology. *W. E. Spicer*

Properties and applications of multiquantum well and superlattice structures. *K. Hess*

Interface engineering and band-gap engineering. *F. Capasso*

A bird's-eye assessment of the Japanese optoelectronics semiconductor lasers, LEDs and integrated optics. *W. T. Tsang*

Solid-state lasers in the near-ir and visible regions of the spectrum. *R. S. Bauer, R. D. Burnham*

Synthesis of III–V compound semiconductor materials: An assessment of R&D activities in the US and Japan. *D. M. Collins*

An assessment of US and Japanese R&D on metal contacts to GaAs devices. *J. W. Woodall*

III–V compound insulated gate field-effect transistors. *H. H. Wieder*

Equipment and manufacturing techniques for optoelectronics. *R. I. Scace*

Quadrupole residual gas analyzers. *P. H. Dawson*

A mass spectrometer system to determine very low levels of helium in small solid and liquid samples. *H. Farrar IV, B. M. Oliver*

Frequency effects in plasma etching. *D. L. Flamm*

THURSDAY

morning

A review of thin films for magnetic recording. *A. H. Eltoukhy*

Magneto-optic recording materials. *M. H. Kryder, D. A. Hairston, H.-P. D. Shieh*

Recent advances in electron- and photon-stimulated desorption. *T. E. Madey*

Recent results on the role of low-energy ion-surface interactions during crystal growth from the vapor phase. *J. E. Greene*

Non-bulk-like physical properties of thin films due to ion bombardment during film growth. *E. Kay*

The design, construction and testing of the tandem mirror-fusion-test-facility vacuum vessel. *J. Gerich*

Schottky barrier and electronic states at Ni silicide–Si interfaces. *M. Liehr, F. K. Legoues, P. S. Ho, H. L. Evans, E. S. Yang*

Multilevel VLSI interconnection: An optimum approach? *K. V. Srikrishnan, P. A. Totta*

Materials and design for advanced MLC packages. *E. H. Kraft*

Structure, bonding reactivity and synthesis of thin polymer films. *D. T. Clark*

afternoon

Thin-film characterization for neutrino mass measurement. *G. J. Clark, M. A. Frisch, P. Chaudhari, M. F. Bregman, P. Batson*

X-ray photoelectron and Auger electron forward scattering: A structural probe for studying ultrathin epitaxial films and interfaces. *W. F. Egelhoff Jr*

UHV SEM studies of epitaxial crystal growth. *J. A. Venables*

Aspects of depth profiling. *K. Wittmaack*

Molecular-beam epitaxy systems. *J. R. Arthur*

Materials and technologies for multilevel metallizations in VLSI. *A. N. Saxena*

Refractory metals and silicides for VLSI applications. *K. Saraswat*

Dielectrics for very-large-scale integration. *R. Singh*

Metallization and interconnects for post-Mb DRAM applications. *A. K. Sinha*

Reliability of VLSI interconnects. *P. B. Ghate*

The standardization and temperature correction of calibrated leaks. *G. M. Solomon*

New concepts in molecular gas flow. *D. J. Santeler*

Physics and chemistry of beryllium. *A. J. Stonehouse*

The behavior of graphite in fusion reactors. *B. T. Kelly*

FRIDAY

morning

Thin-film sensors and transducers. *J. C. Anderson*

The role of thin films in integrated solid-state sensors. *K. K. Wise*

Time- and angle-resolved UPS studies of crystal surfaces and interfaces. *R. Haight*

Dynamic effects in laser-induced surface reactions on the nanosecond time scale. *R. B. Hall*

Characterization of surface-modified materials. *I. L. Singer*

Optical techniques in plasma diagnostics. *T. Miller*

Energy losses in gases. *A. Gras-Marti, I. Abril, J. A. Valles-Abarca*

Laser spectroscopy of sputtered atoms. *D. M. Gruen, M. J. Pellin, C. E. Young, W. F. Calaway*

Process modeling for submicron CMOS VLSI. *J. P. Krusius*

Modeling photoresist development. *A. Neureuther*

Models for the thermal oxidation of silicon. *E. A. Irene, E. A. Lewis*

Modeling of dopant diffusion during rapid thermal annealing. *R. B. Fair*

Application of FIB technology to maskless ion implantation in a MBE-grown GaAs or AlGaAs epitaxial layer for three-dimensional pattern doping crystal growth. *E. Miyauchi, H. Hashimoto*

Atomic structure of semiconductor interfaces. *E. J. Van Loenen, J. F. Van Der Veen*

Ion-beam mixing in silicides and metal–Si systems. *J. C. Liu, L. S. Hung, J. W. Mayer*

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afternoon

Compositionally modulated amorphous semiconductor superlattices. *B. Abeles*

LEED and physisorption studies of the Ge(111) surface. *M. B. Webb*

Film growth, wetting and epitaxy. *J. G. Dash*

Design of plasma etching and deposition systems. *H. Y. Kumagai*

Diagnostics in plasma processing. *J. W. Coburn*

Surface thermography. *M. Ulrickson*

The use of electric probes in plasmas. *B. Lipschultz*

Thin-gate dielectrics in VLSI circuits. *D. A. Baglee*

Recent advances in SiO₂ technology. *H. W. Lam*



MADEY



VOSSEN



HIMPSEL

He is currently studying the effects of structure on the reactivity of adsorbed molecules, the mechanisms by which surfaces incur electron- and photon-induced radiation damage and the kinetics of catalytic reactions over well-characterized surfaces. Madey served as president of AVS in 1981 and has also served as chairman of its Surface Science Division. He is a delegate to the International Union of Vacuum Science, Technique and Applications and is a member of the editorial board of the *Journal of Vacuum Science and Technology*. Madey is currently the deputy chief of the NBS Surface Science Division and group leader of surface structure and kinetics.

John L. Vossen (RCA Laboratories, Princeton, New Jersey) will receive the Albert Nerken Award "for his insightful contributions into the control of thin-film deposition and etching processes and his application of these technologies to product development." Upon his graduation in 1958 from St. John's College in Pennsylvania, Vossen joined the Semiconductor and Materials Division of RCA, where he helped develop tantalum solid electrolytic capacitors and hybrid microcircuits. He transferred to the Communications Systems Division in 1962, where he led a group developing advanced thin-film hybrid microcircuits. In 1965 Vossen became a member of the technical staff, working on thin-film deposition and etching processes in glow-discharge environments. He was appointed the first head of the thin-film technology group at RCA, which focuses on thin-film deposition and etching processes in vacuum. Vossen has contributed to the development of many devices and processes—semiconductor devices, video-disk processes and electro-optical devices, among others. In addition, he pioneered the implementation and application of rf sputter deposition of thin films.

Franz J. Himpsel (IBM Thomas J. Watson Research Center) will receive the Peter Mark Award "for his contributions to the understanding of the electronic structure of materials through the use of angle-resolved energy-band mapping, surface core-level spectroscopy and inverse photoemission spectroscopy." Himpsel received his PhD in physics from the University of Munich in 1976 for work performed at DESY in Hamburg. He then joined the IBM group headed by Dean E. Eastman as a visiting investigator conducting photoemission studies at the University of Wisconsin Synchrotron Radiation Center. He became a member of the IBM staff in 1980 and manager in 1982. Himpsel was one of the first researchers to combine angle-resolved photoemission with synchrotron radiation to achieve a tunable

light source. He has determined the ferromagnetic exchange splitting between majority and minority spin bands in ferromagnets and has mapped two-dimensional energy bands for surface and adsorbate states. Himpsel used synchrotron radiation to resolve the core-level shifts at the Si-SiO₂ interface. He has recently developed a tunable photon detector capable of greater resolution than achieved before, enabling him to map unoccupied orbitals of adsorbates and conduction bands and surface states of semiconductors. Himpsel is now the manager of surface science at IBM in Yorktown Heights.

The AVS Shop Note Award for the best shop note published in JVST in the preceding year will be presented to B. Belamy and C. Colomer for their article "A uhv compatible and miniaturized evaporator used as a controlled source of high melting point metal vapor." In addition, AVS will announce the winners of its student prizes and the recipient of the Russell and Sigurd Varian Fellow Award, which recognizes excellence in graduate studies in vacuum science and technology.

Short courses, exhibit and bulletin

AVS will offer 26 short courses on a wide variety of topics, including: vacuum technology, techniques and design; operating and maintaining vacuum-pumping systems; vacuum sealing and joining techniques; interfacing vacuum equipment with computers; vacuum leak detection; laser deposition and etching; sputter deposition and ion-beam processes; plasma etching and RIE; thin-film deposition and etching; applied thin-film optics; chemical-vapor deposition for electronics; multilevel interconnections and contacts for VLSI; characterizing films and coatings; uhv design and practices; spatially resolved microanalysis; partial pressure analysis and applications; surface analysis and ion spectroscopies; IC processing; pumping hazardous gases; ion implantation processing; surface science and analysis; and cryopumping.

There will also be a special lecture on photography in space and a lecture on the aurora borealis sponsored by SPS.

More than 125 companies, laboratories and organizations will display equipment for the production, control and analysis of films, materials and surfaces at the annual exhibit, which will be held in the east hall of the Convention Center. Exhibit hours will be: Tuesday, 19 November, noon-7 pm; Wednesday, 20 November, 11 am-6 pm; and Thursday, 21 November, 10 am-3 pm.

AVS will maintain an employment-opportunities bulletin board throughout the Symposium in the west hall, upper level. □