4th International Symposium on Atomic Level Characterizations for New Materials and Devices

ALC'03

sponsored by The 141st Committee on Microbeam Analysis
of Japan Society for the Promotion of Science (JSPS)
The Radisson Kauai Beach Resort, Kauai, Hawaii, U.S.A.
October 05 (Sun) to Oct. 10 (Fri), 2003

Final Program

Oct. 5 (Sun.)

Tutorial I

Room A: Pakalana+Ginger

Chairperson: H. Storms

9:40 10:20 The early history and future of the SEM
O.C. Wells 1

10:20 10:50 Break

10:50 11:30 Diffraction of X-rays and of electrons by helical molecules: Determination of the structure of DNA and carbon nanotubes
A.A. Lucas 3

11:30 12:10 Atomic level characterization as applied to developing cathodes of high brightness
R. Shimizu 5

12:10 13:40 Lunch

Tutorial II

Room A: Pakalana+Ginger

Chairperson: R. Shimizu

13:40 14:25 Improving the sensitivity of electron beam microanalytical techniques by enhanced X-ray spectrometry: X-ray microcalorimetry, silicon drift detector energy dispersive X-ray spectrometry, and polycapillary X-ray optics
D.E. Newbury , J. Small, K. Irwin, G. Hilton, D. Wollman, S. Barkan and J. Iwanczyk 6

14:25 15:10 Quantitative microanalysis and elemental imaging in the AEM
D.B. Williams and M. Watanabe 7

15:10 15:40 Break

Chairperson: R. Oiwa

15:40 16:25 Historical perspective on the development of ESCA and Auger instrumentation
P.W. Palmberg 8

16:25 17:10 Surface electron microscopy with slow electrons
E. Bauer 9

Mixer

Poolside

18:00 20:00

Oct. 6 (Mon.)

Opening

Room A: Pakalana+Ginger

8:30 8:50 Opening (presided over by the chair of excective committee)
Opening Address from The Chair of Organizing Committee
Address from Japan Society for the Promotion of Science (JSPS)
JSPS 141 Committee Awards Ceremony (presented by the chair of JSPS 141 committee)

Plenary Lectures

Room A: Pakalana+Ginger

Chairpersons: Y. Nihei and M. Hibino

8:50 9:35 Sum frequency generation-Vibrational spectroscopy characterization of surface monolayers: Catalytic reaction intermediates and polymer surfaces
G.A. Somorjai 10

Chairpersons: M. Hibino and Y. Nihei

9:35 10:20 1-MV field emission transmission electron microscope and its applications
A. Tonomura 11

10:20 10:50 Break

SPM, and Atomic and Molecular Manipulation I

Room A: Pakalana+Ginger

Chairpersons: S. Morita and H. Neddermeyer

10:50 11:20 Control of atomic and molecular dynamic processes on the nanoscale
M. Aono , T. Nakayama, T.Hasegawa, K. Terabe, Y. Kuwahara, M. Akai, A. Saitoh and Y. Okawa 12

11:20 11:50 Doing physics and chemistry with single atoms and molecules: The STM as operative tool
K.-H. Rieder 13

Student Award Ceremony and Short Presentations

Room A: Pakalana+Ginger

11:50 12:30 Ceremony (presided over by the program committee)
Awards presented by the chairperson of organizing committee
Short Presentations by the Winners
The phonon dispersion of a BC_3 film on NbB_2(0001) surface
H. Yanagisawa
First atomic-scale observations of two-dimensional liquefaction and solidification in real space
C. Liu
Development of coincidence transmission electron microscope- Application of waveform
K. Nishinaka
Novel structures of carbon layers on Pt(111) surface
T. Fujita
The soft X-ray analysis of fluorine from BaF_2 to HfF_4
K. Kaibuchi

12:30 14:20 Lunch

SPM, and Atomic and Molecular Manipulation II

Room A: Pakalana

Chairpersons: M. Aono, K. Rieder and P. Varga

14:20 14:50 Nanostructured surfaces: fabrication by size-selected clusters, characterization by local STM spectroscopy (SPELS) and application to immobilisation of proteins
R.E. Palmer 14

14:50 15:20 Atom selective imaging and mechanical atom manipulation based on noncontact atomic force microscope method
S. Morita and Y. Sugawara 21

15:20 15:50 Two-dimensional self-assembly of a hexagonal superlattice of metallic adatoms
W.-D. Schneider 22

15:50 16:10 Characterization of nanowires for photonic devices
C.J. Barrelet , Y. Wu, D.C. Bell and C.M. Lieber 23

16:10 16:40 Break

16:40 17:10 STM study on the atomic structure of Ge(105) surface
Y. Fujikawa 24

17:10 17:30 Observation of graphitized SiC surfaces by STM
Y. Hisada , Y. Mitsuoka, S. Mukainakano, H. Suzuki, T. Aoyama and A. Ichimiya 25

Poster I

Pakalana + Ginger + Mokihana + Prefunction

19:00 22:00

P1-01 Characteristics of ion-beam-synthesized tantalum silicide film
J.H. Liang and W.M. Ruan 26

P1-02 Quantum mechanical designing of the optoelectronic yield for interband laser
E.A. Anagnostakis 27

P1-03 Theoretical X-ray satellite spectra emitted due to 4d spectator vacancy in the $L\beta_2$ region
S. Poonia 28

P1-04 Round robin test (RRT) for SIMS quantification by a Boron-doped Silicon thin film as a secondary reference material
K.J. Kim and D.W. Moon 29

P1-05 Novel structures of carbon layers on Pt(111) surface
T. Fujita , W. Kobayashi and C. Oshima 31

P1-06 Slow highly charged ions - a new tool for nanostructuring of surfaces ?
F. Aumayr , I. C. Gebeshuber, S. Cernusca and HP. Winter 32

P1-07 Growth and stability of thin Bi and pentacene films on Si(111) studied by LEEM
J.T. Sadowski , G.E. Thayer, T. Nagao, S. Yaginuma, T. Sakurai and R.M. Tromp 33

P1-08 Atomic level analysis of carbon and silicon by the scanning atom probe
O. Nishikawa , T. Murakami, M. Taniguchi and S. Kanemaru 34

P1-09 Element constituents of intercellular matrix of the cartilage of several vertebrates by ion microscopy on fresh frozen dried sections
K. Takaya , T. Takazakura, H. Takahashi, M. Sawataishi, M. Okabe and T. Yoshida 35

P1-10 Structural study of 1,4-cyclohexadiene adsorption on Si(001) surface by core level shift photoelectron diffraction
R. Gunnella , M. Shimomura, M. Munakata, T. Takano, T. Yamazaki, T. Abukawa and S. Kono 36

P1-11 Non-stoichiometric silicon-nitride as a diffusion barrier
G. Bilger , T. Voss and A. Strohm 38

P1-12 Chirality transfer from helical molecules into self-assembled monolayers
M. Parschau, R. Fasel and K.-H. Ernst 39

P1-13 Study of the Co/Ge(111) ultrathin film structure by X-ray photoelectron diffraction (XPED)
A. Tsuruta , W. G. Chu, K. Tamura, H. Ishii, M. Owari and Y. Nihei 40

P1-14 Photoemission spectroscopy and NEXAFS study on indium tin oxide cleaned by solvent, NaOH and oxygen plasma
B. Kim , K.-J. Kim, J. Han, T.-H. Kang, K.-W. Ihm, C. Jeon, C.-K. Hwang, C.-O. Kim, Y.-J. Jung, Y.-H. La and J.-W. Park 41

P1-15 Study of solid/solid interface by transmitted X-ray reflectivity
K. Inoue , A. Kitahara, K. Matsushita, H. Kikkawa, H. Nakabayashi, N. Ageishi and I. Takahashi 42

P1-16 Off-axis electron holography for 2D dopant profiling of ultra-shallow junctions
B.G. Frost , D.C. Joy and A. Thesen 43

Oct. 7 (Tue.)

Special Session: LEEM/PEEM

Room A: Pakalana

Organized by T. Koshikawa

10:30 11:00 Break

SPM, and Atomic and Molecular Manipulation III

Room A: Pakalana

Chairpersons: A. Ichimiya and W. Schneider

12:30 12:50 Towards atomic force microscopy up to 100 MHz and atomic resolution lateral force microscopy
H. Kawakatsu , S. Kawai, D. Kobayashi, S. Meguro and S. Kitamura 87

Surface and Interface Phenomena I

Room B: Ginger

Chairpersons: K. Oura and W. Heiland

11:00 11:30 Surface reconstructions of indium in two and three dimensions
A. Pavlovska 88

11:30 12:00 Chemical specific imaging and micro-spectroscopy of interfaces and dynamic surface processes with synchrotron-based techniques
M. Kiskinova 89

12:00 12:30 Growth of Pb quantum islands on the Si(111) surface and their quantum properties
T.T. Tsong 90

12:30 12:50 An investigation of Rh on alumina after treatments in high-temperature oxidizing/reducing conditions
K. Dohmae , T. Nonaka and Y. Seno 91

12:50 14:20 Lunch

Workshop I: High Depth Characterization of High-k Materials

Room A: Pakalana

Chairpersons: H. Yoshikawa and M. Schleberger

14:20 14:50 Characterization of high-k materials for the advancement of high-speed ULSIs
A. Nishiyama , M. Koike, T. Ino, M. Koyama and M. Ono 92

14:50 15:20 Ion scattering studies of alternate gate dielectrics
D.G. Starodub, L.V. Goncharova, S. Sayan, T. Nishimura, H. Schulte, E. Garfunkel and T. Gustafsson 93

15:20 15:50 Ultra-thin layers in microelectronics studied by LEIS
H.H. Brongersma 94

15:50 16:20 Analysis of alternating HfO_2/Al_2O_3 films grown on Si(001) by atomic layer deposition
Y. Kido , A. Tsuda, Y. Hoshino, T. Okazawa, T. Nishimura, T. Nabatame and A. Toriumi 95

16:20 16:50 Break

Sponsored Session I

16:50 17:50 "Surface Analysis and Nano-order Characterization" by JEOL
Introduction of Schottky type field emission electron probe microanalyzer
M. Takakura
Micrometer to nanometer surface characterization by XPS and SAM
T. Tazawa
Application of ambient and UHV SPMs
C. Mooney

Poster II

Pakalana + Ginger + Mokihana + Prefunction

19:00 22:00

P2-01 Characterization of ultrashallow As profiles using Medium Energy Ion Scattering (MEIS) before and after spike annealing
M.Takai , S. Ichihara, T. Nakagawa, H. Angelov and T. Lohner 96

P2-02 Monte Carlo simulation as applied to angle-resolved X-ray photo-electron spectroscopy
T. Iyasu , Z.-M. Zhang, R. Shimizu, T. Koshikawa, A. Tanaka, H. Yoshikawa and S. Fukushima 97

Oct. 8 (Wed.)

Special Session: Coherent Electron Source

Room A: Pakalana

Organized by C. Oshima

10:30 11:00 Break

Ion beam (Ion scattering , SIMS and instruments)

Room A: Pakalana

Chairpersons: Y. Kido, T. Gustafsson and H. Kang

Surface and Interface Analysis

Room B: Ginger

Chairpersons: S. Ichimura, R. Palmer and H. Brongersma

H. Takenaka 158

11:30 12:00 Oxidation mechanism of Si in the physical deposition of SiO_x
K.J. Kim and D.W. Moon 159

12:00 12:30 Imaging magnetic nanostructures by spin-polarized STM
M. Bode , O. Pietzsch, A. Kubetzka and R. Wiesendanger 20

12:30 12:50 Investigation of buried solid-solid interfaces using ion beam techniques
S. Thevuthasan , V. Shutthanandan, C.M. Wang, F. Gao and S. Maheswaran 18

Banquet ***Luau*** (Hawaiian style party)

17:30 Shel Lei Greeting and Mai Tai Reception
18:30 Call to Dinner
19:00 Dinner served
19:45 Dinner Show
20:30 End of Function

Oct. 9 (Thu.)

Special Session: Photoelectron Diffraction & Holography

Room A: Pakalana

Organized by Y. Nihei

8:30 9:00 3D atomic structural analysis of surface nano-sturucture by photoelectron diffraction and holography
Y. Nihei , H. Ishii, K. Tamura, W.-G. Chu and M. Owari 161

9:00 9:30 Probing local atomic structure and buried interfaces via holography and standing waves
C.S. Fadley 162

9:30 10:00 Growth morphologies and defect structure in hexagonal boron nitride monolayer films on Ni(111): a combined STM and XPD study
J. Osterwalder , W. Auwärter, M. Muntwiler and T. Greber 163

10:00 10:30 Surface structure determination by photoelectron diffraction and electron diffraction
S. Kono , M. Shimomura and T. Abukawa 164

10:30 11:00 Break

XPD and SIMS

Room A: Pakalana

Chairpersons: M. Owari and M. Bode

11:00 11:20 Determination of the absolute chirality of adsorbed molecules via XPD
R. Fasel, J. Wider, T. Greber, C. Quitmann and K.-H. Ernst 165

11:20 11:40 Stereoscopic photographs of atomic arrangement measured by display-type spherical mirror analyzer and circularly polarized light
H. Daimon 166

11:40 12:00 Deconvolution of SIMS depth profiles of As multiple delta-layers in silicon
J.W. Lee , K.J. Kim, H.K. Kim and D.W. Moon 167

12:00 12:30 Ion-induced emission microscopies – IIEM
B.L. Doyle 168

Nanodevices

Room B: Ginger

Chairpersons: S. Hayashi and A. Pavlovska

11:00 11:30 Using scanning tunneling microscopy as a tool for nanotechnology
A.J. Heinrich , C.P. Lutz, J.A. Gupta and D.M. Eigler 169

11:30 12:00 Self-assembled nanotube networks for nano-device applications
Y. Homma 170

12:00 12:20 Structure analysis of molecular scale single crystal silicon nanowires

Y. Wu , C.J. Barrelet, D.C. Bell and C.M. Lieber 171

12:20 12:40 Photoluminescence characterization of nano-size defects in sub-surface region of silicon wafers
K. Tanahashi and H.Y. Kaneta 172

12:40 14:00 Lunch

Workshop II: Low Damage High Depth Resolution by Low Energy Ion Sputtering

Room A: Pakalana

Chairpersons: Y. Takai and J. Rabalais

14:00 14:30 Shallow junctions and characterization of silicon ULSI's
B. Mizuno 173

14:30 15:00 Application of metal cluster complex ion beam for low damage sputtering
T. Fujimoto , T. Mizota, H. Nonaka, A. Kurokawa and S. Ichimura 174

15:00 15:30 High resolution Auger depth profiling by sub-keV ion sputtering
M. Inoue , R. Shimizu, H.-I. Lee and H.J. Kang 175

15:30 16:00 Sub-nm depth resolution in sputter depth profiling by low energy ion bombardment
H.-I. Lee, D.W. Moon, H.C. Shin, S.K. Oh and H.J. Kang 176

16:00 16:30 Break

Sponsored Session II

Room A: Pakalana

16:30 17:30 "Imaging and Analysis Equipment Contributing to the Advancement of Nanotechnology" by HITACHI

Development of the HD-2300 scanning transmission electron microscope
H. Inada, S. Watanabe, H. Tanaka, S. Aizawa, W. Shimoyama, T. Ohashi, T. Hashimoto, S. Isakozawa and K. Nakamura

Hitachi's R&D for providing systems and equipment that our customers demand
N. Osakabe

Sponsored Session III

Room A: Pakalana

17:30 18:30 "Challenge for Surface and Nanoscale Characterization" by ULVAC-PHI

Activity on surface characterization in ULVAC-PHI and Physical Electronics USA
R. Oiwa

Custom system and unique systems for nanotechnology in ULVAC-PHI
M. Taguchi

TEM & REM I

Room A: Pakalana

Chairpersons: T. Hirayama and H. Rose

20:20 20:50 Accurate measurements of valence electron and induction distribution in superconductors and magnetic materials using advanced electron microscopy
Y. Zhu 160

20:50 21:20 REM investigation of the dynamic of step on silicon
J-J. Métois 183

Surface and Interface Phenomena II

Room A: Pakalana

Chairpersons: K. Dohmae and M. Kiskinova

21:20 21:40 Self-recovery function of Sc-O/W(100) system as Schottky emitter
S. Iida, T. Nagatomi and Y. Takai 17

21:40 22:00 Precise SIMS depth profiling of SiGe structures using convolution and backside measurement

T. Kono , S. Soga, Y. Koyama, K. Sako, H. Imai, Y. Furukawa, T. Kobayashi, K. Kanekiyo, K. Matsumoto, M. Toita, H. Mochizuki and H. Imai 19

22:00 22:20 Infrared spectroscopic investigations of solid film doped polycyclic aromatic hydrocarbons
M.N. Khan , P. Kumar, M. Husain and Z.H. Zaidi 30

Oct. 10 (Fri)

50 Years Anniversary of Bi-prism

Room A: Pakalana

Chairpersons: R. Shimizu and Y. Zhu

8:30 9:00 50 years of electron biprism - 50 years of exciting electron physics
H. Lichte 177

9:00 9:30 Electron wave interference by a biprism and its application to study two dimensional electric potential distributions in silicon
T. Hirayama , Z. Wang, T. Kato, K. Yamamoto, N. Kato, K. Sasaki and H. Saka 179

9:30 10:00 Electron holography realized by electron biprism and coherent electron source
N. Osakabe 180

10:00 10:30 Break

TEM & REM II

Room A: Pakalana

Chairpersons: N. Osakabe and J. Métois

10:30 11:00 Prospects for aberration-free electron microscopy
H. Rose 181

11:00 11:30 Phase transmission electron microscopy with aberration correction based on active defocus modulation
Y. Takai , T. Kawasaki and Y. Kimura 182

11:30 11:50 Electron beam induced deposition of nano-structures with transmission electron microscopy
M. Tanaka , M. Shimojo, K. Mitsuishi, M. Han, Z.-Q. Liu and K. Furuya 185

Closing

11:50 12:05
The Chairperson of JSPS 141 Committee