Short Oral Presentation

Area 12:
PS-12
11:35-12:13 Meeting Room 1
Session Chair: S. Ohya (Univ. of Tokyo)
H. Shimizu (Tokyo Univ. of Agri. & Tech.)

10: Organic Materials Science, Device Physics, Applications and Printed Technologies

B-3: Fabrication and Characterization
9:30-11:15 Meeting Room 2
Session Chair: T. Hayashi (NTT Basic Res. Labs.)
M. Nakamura (NAIST)

9:30 B-3-01 (Invited)
Fundamentals and Applications of Nano-molecular devices
°N. Clement[1], [1.]NTT Basic Res. Labs. (Japan)

10:00 B-3-02
Electron Injection on Metal/n-doped Polymer Semiconductor
°S. Sakiyama[1], A. Yasukochi[1], T. Iwashita[1], K. Fujita[1], [1.]Kyushu Univ. (Japan)

10:15 B-3-03
Precipitation of thin film organic single crystals by a novel crystal growth method using electrospray and ionic liquid layer
°H. Ueda[1], K. Takeuchi[1], A. Kikuchi[1,2], [1.]Sophia Univ. (Japan), [2.]Sophia Nanotechnology Research Center (Japan)

10:30 B-3-04
Theoretical Studies of π-Conjugate Molecules Embedded in hexagonal boron nitride
W. Xie[1], T. Tamura[1], T. Yanase[1], T. Nagahama[1], °T. Shimada[1], [1.]Hokkaido Univ. (Japan)

10:45 B-3-05
A Design-analysis Flow Considering Mechanical Stability of Metal Masks for Organic CMOS Circuits
°*M. Shintani[1], K. Kuribara[2], Y. Ogasahara[2], M. Hiromoto[1], T. Sato[1], [1.]Kyoto Univ. (Japan), [2.]AIST (Japan)*

11:00 B-3-06
Dimer Formation of Pentacene by Heated Tungsten
°*A. Heya[1], N. Matsuo[1], [1.]Univ. of Hyogo (Japan)*

11:15-11:35 Coffee Break

Short Oral Presentation

Area 10:
PS-10
11:35-11:55 Meeting Room 2
Session Chair: T. Shimada (Hokkaido Univ.)
H. Endoh (NEC Corp.)

11:55-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

Joint Session (Area 7&10)

B-4: Nano and Molecular Photonics
14:00-15:00 Meeting Room 2
Session Chair: N. Nishiyama (Tokyo Tech)
T. Shimada (Hokkaido Univ.)

14:00 B-4-01 (Invited)
The Excitonics in Photonic Colloidal Nanostructures and Devices
H. Lee[1], Y. Kim[1], °S. Lee[1], [1.]Seoul National Univ. (Korea)

14:30 B-4-02
Optical Waveguides with Memory Effect Using Photochromic Material for Neural Network
°*K. Tanimoto[1], Y. Amemiya[1], S. Yokoyama[1], [1.]Hiroshima*

Univ. (Japan)

14:45 B-4-03
Electroluminescence Color Tuning between Green and Red in MOS Devices Fabricated by Spin-coating of (Tb + Eu) Organic Compounds on Si
T. Matsuda[1], °F. Hattori[1], H. Iwata[1], T. Ohzone[2], [1.]Toyama Prefectural Univ. (Japan), [2.]Dawn Enterprise Co., Ltd. (Japan)

15: Photovoltaic Materials and Devices

C-3: III-V Photovoltaics
9:30-10:30 Meeting Room 3
Session Chair: H. Suzuki (Univ. of Miyazaki)
T. Hoshii (Tokyo Tech)

9:30 C-3-01 (Invited)
Next-generation High Efficiency and Low Cost GaAs/Si Multijunction Solar Cells with Smart Stack Technology
°K. Makita[1], H. Mizuno[1], R. Oshima[1], T. Tayagaki[1], M. Baba[2], N. Yamada[2], H. Takato[1], T. Sugaya[1], [1.]AIST (Japan), [2.]Nagaoka Univ. of Tech. (Japan)

10:00 C-3-02
Improvement in Effective Optical Absorbency for the Bottom Cells of Mechanical Stacked Multi-Junction Solar Cells
°M. Hasumi[1], Y. Ogawa[1], K. Oshinari[1], T. Sameshima[1], [1.]Tokyo Univ. of Agri. & Tech. (Japan)

10:15 C-3-03
Investigation of the Open-Circuit Voltage in the Wide-Bandgap InGaP-based InP Quantum Dot Solar Cells
°T. Aihara[1], T. Tayagaki[1], Y. Nagato[2], Y. Okano[2], T. Sugaya[1], [1.]AIST (Japan), [2.]Tokyo City Univ. (Japan)

10:30-11:35 Coffee Break

Short Oral Presentation

Area 15:
PS-15
11:35-11:57 Meeting Room 3
Session Chair: M. Ikegami (Toin Univ. of Yokohama)
K. Ohdaira (JAIST)

Joint Session (Area 4&5&9&12)

D-3: Non von Neumann Computing II
9:30-11:10 Hagi Conference Room
Session Chair: T. Sakamoto (NEC Corp.)
I. Akita (Toyohashi Tech)

9:30 D-3-01 (Invited)
"More-than-Neumann" and "Beyond-Neumann" Architectures
°*T. Asai[1], [1.]Hokkaido Univ. (Japan)*

10:00 D-3-02
An Energy Efficient and High Speed Architecture for Convolution Computing Based on Binary RRAMs
°*C. Liu[1], R. Han[1], Z. Zhou[1], P. Huang[1], L. Liu[1], X. Liu[1], J. Kang[1], [1.]Peking Univ. (China)*

10:20 D-3-03
Characteristics of Crystalline Oxide Semiconductor-based Single Transistor Multiplier for Analog Neural Network
°*T. Aoki[1], S. Harada[1], Y. Okamoto[1], T. Nakagawa[1], H. Inoue[1], T. Ikeda[1], Y. Kurokawa[1], Y. Shima[1], M. Jincho[1], M. Ikeda[2], S. Yamazaki[1], [1.]Semiconductor Energy Lab. Co., Ltd. (Japan), [2.]Univ. of Tokyo (Japan)*

10:40 D-3-04
A Study of Validation of an Evaluation Model of Accurate Thermal Stability Factor for MTJs Using Its Thermal Dependency
°*T. Saito[1,2,3], T. Endoh[1,2,3], [1.]Tohoku Univ. (Japan), [2.]ACCEL, JST (Japan), [3.]OPERA, JST (Japan)*

10:55 D-3-05
Design of an MTJ-Oriented Nonvolatile Lookup Table Circuit with Write-Operation Minimizing
°*D. Suzuki[1], T. Hanyu[1], [1]Tohoku Univ. (Japan)*

11:10-11:35 Coffee Break

Short Oral Presentation

Area 4:
PS-4
11:35-12:05 Hagi Conference Room
Session Chair: T. Sakamoto (NEC Corp.)

Short Oral Presentation

Area 5:
PS-5
12:05-12:25 Hagi Conference Room
Session Chair: T. Yoshida (Hiroshima Univ.)

12:25-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

Joint Session (Area 4&5&9&12)

D-4: Non von Neumann Computing III
14:00-15:15 Hagi Conference Room
Session Chair: J. Nitta (Tohoku Univ.)
Y. Nishi (Toshiba Corp.)

14:00 D-4-01 (Invited)
Neuromorphic computing with spintronic nanoscale oscillators
°*J. Torrejon[1], M. Riou[1], F. A. Araujo[1], S. Tsunegi[2], G. Khalsa[3], D. Querlioz[4], P. Bortolotti[1], V. Cros[1], A. Fukushima[2], H. Kubota[2], S. Yuasa[2], M. D. Stiles[3], J. Grollier[1], [1]Unite Mixte de Physisque, CNRS/Thales*

(France), [2.]AIST (Japan), [3.]National Inst. of Standards and Tech. (USA), [4.]Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Saclay (France)

14:30 D-4-02
Neuromorphic Transistor Achieved by Redox Reaction of WO_3 Thin Film
°M. Jayabalan[1,2], K. Kawamura[1,3], M. Takayanagi[1,3], T. Tsuchiya[1], T. Higuchi[3], R. Jayavel[2], K. Terabe[1], [1.]NIMS (Japan), [2.]Anna Univ. (India), [3.]Tokyo Univ. of Sci. (Japan)

14:45 D-4-03
Artificial neuron operations and spike-timing-dependent plasticity (STDP) using memristive devices for brain-inspired computing
°T. Marukame[1], R. Ichihara[1], M. Mori[1], Y. Nishi[1], S. Yasuda[1], T. Tanamoto[1], Y. Mitani[1], [1.]Toshiba Corp. (Japan)

15:00 D-4-04
Application of VO_2 metal-insulator transition to capacitor-less neuron circuits
°T. Yajima[1], T. Nishimura[1], A. Toriumi[1], [1.]Univ. of Tokyo (Japan)

03: CMOS Devices / Device Physics

E-3: TFETs
9:30-11:00 Tachibana Conference Room
Session Chair: T. Matsukawa (AIST)
S. Cho (Gachon Univ.)

9:30 E-3-01 (Invited)
Performance Evaluation of III-V Nanowire Broken-Gap TFETs Including Electron-Phonon Scattering Using an Atomistic Mode Space NEGF Technique Enabling Million Atoms NW Simulations.
°A. Afzalian[1], T. Vasen[1], P. Ramvall[1], D. Lemus[2], T. Kubis[2], M. Passlack[1], T. -M. Shen[3], J. Wu[3], [1.]TSMC, Leuven (Belgium), [2.]Purdue Univ. (USA), [3.]TSMC, Hsinchu (Taiwan)

10:00 E-3-02
Investigation of TFETs with Vertical Tunneling Path for Low Average Subthreshold Swing
°*S. Glass[1], N. von den Driesch[1], S. Strangio[2], C. Schulte-Braucks[1], T. Rieger[1], D. Buca[1], S. Mantl[1], Q. -T. Zhao[1], [1.]Forschungszentrum Juelich (Germany), [2.]Univ. of Udine (Italy)*

10:20 E-3-03
Performance Improvement of Ge-source/Si-channel Hetero-Junction Tunneling FETs: Effects of Annealing Gas and Drain Doping Concentration
°*T. -E. Bae[1], Y. Wakabayashi[1], R. Nakane[1], M. Takenaka[1], S. Takagi[1], [1.]Univ. of Tokyo (Japan)*

10:40 E-3-04
Ge p-channel Tunneling FETs with Steep Phosphorus Profile Source Junctions
°*R. Takaguchi[1], R. Matsumura[1], T. Katoh[1], M. Takenaka[1], S. Takagi[1], [1.]Univ. of Tokyo (Japan)*

11:00-11:35 Coffee Break

Short Oral Presentation

Area 3:
PS-3
11:35-12:07 Tachibana Conference Room
Session Chair: T. Miyata (Toshiba Memory Corp.)
Y. Fukuzaki (Sony Semiconductor Solutions Corp.)

12:07-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

03: CMOS Devices / Device Physics

E-4: Negative-Capacitance Transistors
14:00-15:00 Tachibana Conference Room
Session Chair: M. Kobayashi (Univ. of Tokyo)
P. Su (NCTU)

14:00 E-4-01
Design of Steep Slope Negative Capacitance FinFETs for Dense Integration: Matching of Channel and Ferroelectric Capacitances
°H. Ota[1], J. Hattori[1], H. Asai[1], T. Ikegami[1], K. Fukuda[1], S. Migita[1], A. Toriumi[2], [1.]AIST (Japan), [2.]Univ. of Tokyo (Japan)

14:20 E-4-02
Investigation of Quantum-Induced VT Shift and Backgate-Modulated VT Properties for Ultra-Thin-Body InGaAs-OI/SOI Negative-Capacitance FETs
°S. -E. Huang[1], C. -L. Yu[1], W. -X. You[1], P. Su[1], [1.]National Chiao Tung Univ. (Taiwan)

14:40 E-4-03
Fringing Field Effects in Ferroelectric Negative Capacitance Field-Effect Transistors
°J. Hattori[1], K. Fukuda[1], T. Ikegami[1], H. Ota[1], S. Migita[1], H. Asai[1], A. Toriumi[2], [1.]AIST (Japan), [2.]Univ. of Tokyo (Japan)

11: Sensors and Materials for Biology, Chemistry and Medicine

F-3: Biosensors & Materials
9:30-11:00 Meeting Room 4
Session Chair: T. Tanaka (Tohoku Univ.)
S. Machida (Hitachi, Ltd.)

9:30 F-3-01 (Invited)
Diamond Quantum Sensors for Biological Application
°M. Hatano[1], H. Ishiwata[1], T. Iwasaki[1], [1.]Tokyo Tech (Japan)

10:00 F-3-02
Multiple Channel Detection of Cellular Activities by Ion Sensitive Transistors
°*S. Machida[1], [1.]Toyota Central R&D Labs. Inc. (Japan)*

10:15 F-3-03
Development of the Micro-electrode Device for Electrical Diagnosis and Cure for Skin Function
°*Y. Abe[1], K. Nagamine[1], M. Nakabayashi[1], T. Yamauchi[1], K. Yamasaki[1], M. Nishizawa[1], [1.]Tohoku Univ. (Japan)*

10:30 F-3-04
Ultra-sensitive biosensor with capacitive coupling-gate InGaZnO-based FET
°*K. Ito[1], K. Nishimura[1], K. Ikeda[2], K. Matsuzawa[2], T. Tezuka[2], T. Sakata[1], [1.]Univ. of Tokyo (Japan), [2.]Toshiba Corp. (Japan)*

10:45 F-3-05 (Late News)
Surface Modification with Aryldiazonium Salt Chemistry of Extended-Au Gate Field-Effect Transistor for Ultra-Sensitive Detection of Low-Molecular-Weight Biomarker
°*S. Nishitani[1], T. Sakata[1], [1.]Univ. of Tokyo (Japan)*

11:00-11:35 Coffee Break

Short Oral Presentation

Area 11:
PS-11
11:35-12:01 Meeting Room 4
Session Chair: T. Tokuda (NAIST)
T. Sakata (Univ. of Tokyo)

12:01-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

11: Sensors and Materials for Biology, Chemistry and Medicine

F-4: Bio-MEMS
14:00-15:15 Meeting Room 4
Session Chair: H. Tanaka (Panasonic Corp.)
T. Tokuda (NAIST)

14:00 F-4-01 (Invited)
Integrated photonics for miniature flow cytometry
°N. Verellen[1], D. Vercruysse[1], V. Rochus[1], B. D. Bois[1], A. Dusa[1], S. Kerman[1], M. Mahmud-Ul-Hasan[1], P. V. Dorpe[1], X. Rottenberg[1], L. Lagae[1], [1.]IMEC (Belgium)

14:30 F-4-02
A micro through-hole chip device for analyzing plasma-irradiation effects on proliferation of cells cultured in liquid media
Y. Nakanishi[1], M. Kobayashi[2], M. Sasaki[1], °S. Kumagai[1], [1.]Toyota Tech. Inst. (Japan), [2.]NAIST (Japan)

14:45 F-4-03
Label Free Detection of Prostate Specific Antigen Using Photonic Crystal Nanocavity Resonator
°A. K. Sana[1], Y. Amemiya[1], T. Ikeda[1], A. Kuroda[1], S. Yokoyama[1], [1.]Hiroshima Univ. (Japan)

15:00 F-4-04
Frequency-response curves of micropatterned hippocampal neurons: Effect of cell morphology on membrane impedance
°R. Matsumura[1], H. Yamamoto[1], S. Katsurabayashi[2], M. Niwano[1], A. Hirano-Iwata[1], [1.]Tohoku Univ. (Japan), [2.]Fukuoka Univ. (Japan)

07: Photonic Devices and Related Technologies

G-3: Novel Photonic Devices
9:30-11:15 Meeting Room 5
Session Chair: H. Isshiki (Univ. of Electro-Communications)
N. Ozaki (Wakayama Univ.)

9:30 G-3-01
Deformable 1D Photonic Crystal Nanolasers for Planar Strain Identification
°T. -W. Lu[1], C. -C. Wu[1], P. -T. Lee[1], [1.]National Chiao Tung Univ. (Taiwan)

9:45 G-3-02
Sublattice Reversal in GaAs/Ge/GaAs (113)B heterostructures and its application to THz emitting devices based on a coupled multilayer cavity
°X. Lu[1], Y. Minami[1], N. Kumagai[2], T. Kitada[1], [1.]Tokushima Univ. (Japan), [2.]AIST (Japan)

10:00 G-3-03
CMOS Single-Photon Avalanche Diodes for Light Detection and Ranging in Strong Background Illumination
°W. -S. Huang[1], T. -H. Liu[1], D. -R. Wu[1], C. -M. Tsai[1], S. -D. Lin[1], [1.]National Chiao Tung Univ. (Taiwan)

10:15 G-3-04
Estimation of the Conversion Properties of Trench-Structured Silicon X-ray Photodiodes by the Side X-ray Irradiation Method
°T. Ariyoshi[1], Y. Takane[1], J. Iwasa[1], K. Sakamoto[1], A. Baba[1], Y. Arima[1], [1.]Kyushu Inst. of Tech. (Japan)

10:30 G-3-05
Compact Waveguide-Coupled Hybrid Plasmonic Nanotaper for Optical Trapping of Nanoparticles
°Y. -C. Lin[1], P. -T. Lee[1], [1.]National Chiao Tung Univ. (Taiwan)

10:45 G-3-06
Population trapping through spectral hole burning in $^{167}Er^{3+}$:Y_2SiO_5
M. IJspeert[1], G. Mariani[1], °T. Tawara[1,2], K. Shimizu[1], H. Omi[1,2], S. Adachi[3], H. Gotoh[1], [1.]NTT Basic Res. Labs. (Japan), [2.]NTT Nanophotonics Center (Japan), [3.]Hokkaido Univ. (Japan)

11:00 G-3-07 (Late News)
Room-Temperature Two-Color Lasing by Current Injection into a GaAs/AlGaAs Coupled Multilayer Cavity Fabricated by Wafer Bonding
°T. Kitada[1], X. Lu[1], Y. Minami[1], N. Kumagai[2], K. Morita[3], [1.]Tokushima Univ. (Japan), [2.]AIST (Japan), [3.]Chiba Univ. (Japan)

11:15-11:35 Coffee Break

Short Oral Presentation

Area 7:
PS-7
11:35-11:57 Meeting Room 5
Session Chair: N. Nishiyama (Tokyo Tech)

02: Interconnect Technologies, MEMS, and Reliability

H-3: Bump Interconnect
9:30-11:20 Meeting Room 6
Session Chair: S. Ogawa (AIST)
J. M. Song (National Chung Hsing Univ.)

9:30 H-3-01 (Invited)
Effect of Metallization on the Microstructural Evolution of Microbump under Electric Current Stressing
C. -W. Chen[1], °K. -L. Lin[1], [1.]National Cheng Kung Univ. (Taiwan)

10:00 H-3-02
Enhancement of Direct Cu Bonding via Pulsed Flash Light
°J. -M. Song[1], S. -Y. Liang[1], P. -H. Chiang[1], S. -K. Huang[2], Y. -T. Chiu[2], D. Tarng[2], C. -P. Hung[2], [1.]National Chung Hsing Univ. (Taiwan), [2.]Advanced Semiconductor Engineering Group (Taiwan)

10:20 H-3-03
Low Temperature Cu to Cu Direct Bonding in Atmosphere Environment Using Pillar-Concave Structure in 3D Integration

°*T. -C. Chou[1], [1.]National Chiao Tung Univ. (Taiwan)*

10:40 H-3-04
Development of a technology platform using advanced die-first FOWLP for highly integrated flexible hybrid electronics
°*T. Fukushima[1,2], A. Alam[1], A. Hanna[1], S. C. Jangam[1], A. Bajwa[1], S. S. Iyer[1], [1.]UCLA (USA), [2.]Tohoku Univ. (Japan)*

11:00 H-3-05
N5 BEOL Process Options Patterning flows Comparing 193immersion to Hybrid EUV or Full EUV
°*S. Lariviere[1], B. Briggs[1], C. Wilson[1], D. Wan[1], A. Mallik[1], S. Decoster[1], J. Bekaert[1], V. Blanco[1], M. Mao[1], S. Paolillo[1], B. K. Kotowska[1], J. Versluijs[1], J. Boemmels[1], D. Trivkovic[1], Z. Tokei[1], G. Mcintyre[1], D. Mocuta[1], [1.]IMEC (Belgium)*

11:20-11:35 Coffee Break

Short Oral Presentation

Area 2:
PS-2
11:35-11:49 Meeting Room 6
Session Chair: M. B. Takeyama (Kitami Inst. of Tech.)

Area 9:
PS-9
11:49-12:11 Meeting Room 6
Session Chair: K. Terabe (NIMS)
R. Moriya (Univ. of Tokyo)

12:11-14:00 Lunch

02: Interconnect Technologies, MEMS, and Reliability

H-4: Bonding Technologies
14:00-15:35 Meeting Room 6
Session Chair: M. Kodera (Toshiba Electronic Devices & Storage Corp.)
M. Fujino (Univ. of Tokyo)

14:00 H-4-01
Impacts of annealing on interfaces of Al foil/Si junctions by using surface activated bonding
°*K. Furuna[1], J. Liang[1], M. Matsubara[2], D. Marwan[2], Y. Nishio[2], N. Shigekawa[1], [1.]Osaka City Univ. (Japan), [2.]Toyo Aluminium K.K. (Japan)*

14:20 H-4-02
Fabrication of Mechanical Durable Glass Nanopillar with Bridged Structure
°*H. Kuwae[1], T. Sudo[1], K. Takayama[2], S. Shoji[1], J. Mizuno[1], [1.]Waseda Univ. (Japan), [2.]Asahi Glass Corp. (Japan)*

14:40 H-4-03
Influence of atomic species of fast atom bombardment for surface activated bonding interface of germanium
°*M. Fujino[1], G. Kono[1], T. Suga[1], [1.]Univ. of Tokyo (Japan)*

15:00 H-4-04
Bonding and Debonding of Si/Glass based on SAB Method Combined with Hydrophilic Treatment
°*K. Takeuchi[1], Y. Matsumoto[2], T. Suga[1], [1.]Univ. of Tokyo (Japan), [2.]Lan Technical Service Co., Ltd. (Japan)*

15:20 H-4-05 (Late News)
Au thin film wafer bonding after degas annealing for MEMS packaging
°*T. Matsumae[1], Y. Kurashima[1], H. Takagi[1], [1.]AIST (Japan)*

13: Applications of Nanotubes, Nanowires, and Graphene and related 2D materials

J-3: 2D Materials and Devices II
9:30-11:15 Meeting Room 7
Session Chair: K. Maehashi (Tokyo Univ. of Agri. & Tech.)
T. Kato (Tohoku Univ.)

9:30 J-3-01 (Invited)
Novel Graphene Devices
Y. -C. Qiao[1], H. Tian[1], L. -Q Tao[1], N. -Q. Deng[1], Y. -T. Li[1], Y. -X. Li[1], Y. Pang[1], Y. Yang[1], °T. -L. Ren[1], [1.]Tsinghua Univ.

(China)

10:00 J-3-02
Low-Resistance Contact to Single-Layer MoS_2 by Depositing Ultrathin High-k Dielectric with Remote N_2 Plasma Treatment as Tunneling Layer
°*Q. Qian[1], Z. Zhang[1], M. Hua[1], J. Wei[1], J. Lei[1], K. J. Chen[1], [1.]Hong Kong Univ. of Sci. and Tech. (Hong Kong)*

10:15 J-3-03
Quantitative study of interfacial properties in monolayer MoS_2 FET
°*N. Fang[1], K. Nagashio[1], [1.]Univ. of Tokyo (Japan)*

10:30 J-3-04
Conductance control by tunneling-barrier thickness optimizations in $Fe/Al_2O_3/MoS_2$ structure
°*N. Hayakawa[1], I. Muneta[1], T. Ohashi[1], K. Matsuura[1], J. Shimizu[1], K. Kakushima[1], K. Tsustui[1], H. Wakabayashi[1], [1.]Tokyo Tech (Japan)*

10:45 J-3-05
Resonant Enhancement of Band-to-band Tuneling in In-plane MoS_2/WS_2 Heterojunctions
°*T. Kuroda[1], N. Mori[1], [1.]Osaka Univ. (Japan)*

11:00 J-3-06
Demonstration of p-type graphene barristor using a Schottky contact between graphene and p-type organic semiconductor
°*K. Han[1], Y. J. Kim[1], S. Heo[1], C. -H. Kim[1], J. H. Kim[1], S. -Y. Kim[1], H. J. Hwang[1], S. K. Lee[1], H. J. Lee[1], M. -H. Yoon[1], B. H. Lee[1], [1.]Gwangju Inst. of Sci. and Tech. (Korea)*

11:15-11:35	**Coffee Break**

Short Oral Presentation

Area 13:
PS-13
11:35-12:25 Meeting Room 7
Session Chair: K. Nagashio (Univ. of Tokyo)
S. Hara (Hokkaido Univ.)

12:25-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

13: Applications of Nanotubes, Nanowires, and Graphene and related 2D materials

J-4: Low-Dimensional Materials and Devices
14:00-15:15 Meeting Room 7
Session Chair: H. Kageshima (Shimane Univ.)
T. Kawai (NEC Corp.)

14:00 J-4-01
Random Telegraph Noise in *h*-BN under Constant-Voltage Stress Test
°*Y. Hattori[1], T. Taniguchi[2], K. Watanabe[2], K. Nagashio[1,3], [1.]Univ. of Tokyo (Japan), [2.]NIMS (Japan), [3.]PRESTO-JST (Japan)*

14:15 J-4-02
Electronic States of Silicene and Germanene on Amorphous Alumina
°*M. Araidai[1], M. Kurosawa[1], A. Ohta[1], K. Shiraishi[1], [1.]Nagoya Univ. (Japan)*

14:30 J-4-03
Oxygen-Induced Structural Deterioration and Effective Encapsulation of Few-Layer 1T′-$MoTe_2$ Thin Film
Z. Xie[1], L. Yang[1], H. Wu[1], J. Li[1], X. Lou[1], R. Zhu[1], H. Chang[1], °W. Zhang[1], [1.]Huazhong Univ. of Sci. and Tech. (China)

14:45 J-4-04
A Theoretical Investigation On MoS_2 Nanopore Power Generators
°*Z. Huang[1], M. Tsutsui[2], Y. Zhang[1], Y. H. He[1], X. S. Miao[1], M. Taniguchi[2], [1.]Huazhong Univ. of Sci. and Tech. (China), [2.]Osaka Univ. (Japan)*

15:00 J-4-05 (Late News)
Chemical Sensing using Graphene-based Surface-Acoustic-Wave Sensor
°*S. Okuda[1,2], T. Ono[1], Y. Kanai[1], M. Shimatani[2], S. Ogawa[2], T. Ikuta[1,3], K. Inoue[1], K. Maehashi[1,3], K. Matsumoto[1], [1.]Osaka Univ. (Japan), [2.]Mitsubishi Electric Corp. (Japan), [3.]Tokyo Univ. of Agri. & Tech. (Japan)*

01: Advanced LSI Processing & Materials Science

K-3: Ge MOS
9:30-11:25 Meeting Room 8
Session Chair: K. Yamamoto (Kyushu Univ.)
M. Kadoshima (Renesas Electronics Corp.)

9:30 K-3-01
A new kinetic model for thermal oxidation of Ge
°*X. Wang[1], T. Nishimura[1], T. Yajima[1], A. Toriumi[1], [1.]Univ. of Tokyo (Japan)*

9:50 K-3-02
Ge Oxidation does not follow the Deal-Grove Mechanism
H. Li[1], °J. Robertson[1], [1.]Cambridge Univ. (UK)

10:10 K-3-03
Impact of reaction kinetics at GeO_2/Si for high-performance SiGe gate stacks
°*W. Song[1], A. Toriumi[1], [1.]Univ. of Tokyo (Japan)*

10:30 K-3-04
Role of Y-doping into GeO_2 in Ge gate stack reliability
°*X. Tang[1,2], A. Toriumi[1], [1.]Univ. of Tokyo (Japan), [2.]Nanjing Univ. (China)*

10:50 K-3-05
Ge and O Valence States in GeO_x Interfacial Layer on Hole Mobility of Low EOT Ge pMOSFET
°J. -S. Li[1], S. -H. Yi[1], W. -Y. Hsu[1], J. Huang[1], C. -W. Hsu[1], T. -Y. Wu[1], D. -B. Ruan[1], K. -S. Chang-Liao[1], [1]National Tsing Hua Univ. (Taiwan)

11:10 K-3-06 (Late News)
Dependence of Channel Mobility on Substrate Impurity Concentration for Metal Source/Drain Ge MOSFETs
°T. Sakaguchi[1], K. Akiyama[1], K. Yamamoto[1], D. Wang[1], H. Nakashima[1], [1]Kyushu Univ. (Japan)

11:25-11:35 Coffee Break

Short Oral Presentation

Area 1:
PS-1
11:35-11:47 Meeting Room 8
Session Chair: H. Itokawa (Toshiba Memory Corp.)

11:47-14:00 Lunch

01: Advanced LSI Processing & Materials Science

K-4: Process Technology
14:00-15:30 Meeting Room 8
Session Chair: L. Grenouillet (CEA-Leti)
G. Nakamura (Tokyo Electron Ltd.)

14:00 K-4-01 (Invited)
Ion implantation technology for advanced ULSI devices
°T. Kuroi[1], [1]Nissin Ion Equipment Co., Ltd. (Japan)

14:30 K-4-02
CMOS Integration of Thermally Stable Diffusion and Gate Replacement (D&GR) High-k/Metal Gate Stacks in DRAM Periphery Transistors
°E. Dentoni Litta[1], R. Ritzenthaler[1], T. Schram[1], A. Spessot[1], B. O'Sullivan[1], Y. Ji[2], G. Mannaert[1], C. Lorant[1], F. Sebaai[1], A. Thiam[1], M. Ercken[1], S. Demuynck[1], N. Horiguchi[1],

[1.]IMEC (Belgium), [2.]SK Hynix (Korea)

14:50 K-4-03
S/D Contact Solutions to Enable Contact Resistivity <1E-9 for 5nm and Beyond
°C. -Y. Chang[1], F. A. Khaja[1], K. E. Hollar[1], K. V. Rao[1], S. Munnanqi[1], Y. Chen[1], M. Okazaki[1], Y. -C. Huang[1], X. Li[1], H. Chung[1], O. Chan[1], C. Lazik[1], M. Jin[1], H. Zhou[1], A. Mayur[1], R. Hung[1], N. Kim[1], [1.]Applied Materials, Inc (USA)

15:10 K-4-04
Hot-C^+-Ion Implantation Optimization for Forming Nano-SiC Region at Surface (100)SOI Substrate
°T. Mizuno[1], Y. Omata[1], S. Nakada[1], T. Aoki[1], T. Sasaki[2], [1.]Kanagawa Univ. (Japan), [2.]Toshiba Nanoanalysis Corp. (Japan)

08: Advanced Material Synthesis and Crystal Growth Technology

M-3: Group IV Materials
9:30-11:00 Meeting Room 2
Session Chair: T. Sadoh (Kyushu Univ.)
H. Tatsuoka (Shizuoka Univ.)

9:30 M-3-01 (Invited)
Recent progress of crystal growth, conductivity control and solar cells of semiconducting barium disilicide
°T. Suemasu[1], [1.]Univ. of Tsukuba (Japan)

10:00 M-3-02
Growth of 2D Crystal of Group-IV Elements on Epitaxial Ag (111)
°K. Ito[1], A. Ohta[1], M. Kurosawa[1], M. Araidai[1], M. Ikeda[1], K. Makihara[1], S. Miyazaki[1], [1.]Nagoya Univ. (Japan)

10:15 M-3-03
Structural and Photoluminescence Properties of Si-based Nanosheet Bundles Rooted on Si Substrates
P. Yuan[1], R. Tamaki[2], S. Kusazaki[1], N. Atsumi[1], Y. Saito[1], Y. Kumazawa[1], N. Ahsan[2], Y. Okada[2], °H. Tatsuoka[1],

[1.]Shizuoka Univ. (Japan), [2.]Univ. of Tokyo (Japan)

10:30 M-3-04
SiC Nano-Dots in Bulk-Si SubstrateFabricated by Hot-C^+-Ion Implantation Technique
°*T. Mizuno[1], S. Nakada[1], M. Yamamoto[1], S. Irie[1], Y. Omata[1], T. Aoki[1], T. Sameshima[2], [1.]Kanagawa Univ. (Japan), [2.]Tokyo Univ. of Agri. & Tech. (Japan)*

10:45 M-3-05
Sb-doping effect on thermal and electrical properties of Ge-rich $Ge_{1-x}Sn_x$ layers
°*T. Iwahashi[1], M. Kurosawa[1,2,3], N. Uchida[4], Y. Ohishi[5], T. Maeda[4], O. Nakatsuka[1,6], S. Zaima[6], [1.]Grad. Sch. of Eng., Nagoya Univ. (Japan), [2.]IAR, Nagoya Univ. (Japan), [3.]PRESTO-JST (Japan), [4.]NERI-AIST (Japan), [5.]Grad. Sch. of Eng., Osaka Univ. (Japan), [6.]IMaSS, Nagoya Univ. (Japan)*

11:00-11:35 Coffee Break

Short Oral Presentation

Area 8:
PS-8
11:35-12:05 Meeting Room 2
Session Chair: A. Kikuchi (Sophia Univ.)
T. Iwai (Fujitsu Labs. Ltd.)

12:05-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

08: Advanced Material Synthesis and Crystal Growth Technology

M-4: Germanium based Semiconductors
14:00-15:15 Meeting Room 2
Session Chair: H. Tatsuoka (Shizuoka Univ.)
A. Kikuchi (Sophia Univ.)

14:00 M-4-01
High Substitutional-Sn-Concentration GeSn-on-Insulator by Weak-Laser-Irradiation-Enhanced Solid-Phase Crystallization at Low-Temperature (~170°C)
°*T. Sugino[1], K. Moto[1], R. Matsumura[1], H. Ikenoue[1], M. Miyao[1], T. Sadoh[1], [1]Kyushu Univ. (Japan)*

14:15 M-4-02
Dopants behavior in polycrystallization of heavily doped $Ge_{1-x}Sn_x$ layer using pulsed laser annealing in water
°*K. Takahashi[1,2], M. Kurosawa[1,3], H. Ikenoue[4], M. Sakashita[1], O. Nakatsuka[1], S. Zaima[1], [1]Nagoya Univ. (Japan), [2]JSPS Res. Fellow (Japan), [3]PRESTO-JST (Japan), [4]Kyushu Univ. (Japan)*

14:30 M-4-03
Grain Boundary Engineering of Solid-Phase Crystallized Ge on Glass by Controlling Atomic Density of Precursor
°*R. Yoshimine[1], K. Toko[1], T. Suemasu[1], [1]Univ. of Tsukuba (Japan)*

14:45 M-4-04
Effects of Deposition Temperature of Amorphous Precursors on Solid-Phase Crystallized $Si_{1-x}Ge_x$ Thin Films on an Insulator
°*D. Takahara[1], K. Toko[1], R. Yoshimine[1], T. Suemasu[1], [1]Univ. of Tsukuba (Japan)*

15:00 M-4-05
Deposition mechanism of thin Si and Ge films promoted by liquid-phase reduction under ballistic hot electron incidence
°*R. Suda[1], A. Kojima[1], N. Mori[2], J. Shirakashi[1], N. Koshida[1], [1]Tokyo Univ. of Agri. & Tech. (Japan), [2]Osaka Univ. (Japan)*

06: Compound Semiconductor Electron Devices & Related Technologies

N-3: GaN Device Technologies I
9:30-11:00 Meeting Room 3

Session Chair: K. Tsuda (Toshiba Infrastructure Systems & Solutions Corp.)
N. Shigekawa (Osaka City Univ.)

9:30 N-3-01 (Invited)
Monolithically Integrated GaN-on-Si Power Circuits
°*R. Reiner[1], P. Waltereit[1], B. Weiss[1], S. Moench[2], R. Quay[1], O. Ambacher[3], [1.]Fraunhofer IAF (Germany), [2.]Univ. of Stuttgart (Germany), [3.]Univ. of Freiburg (Germany)*

10:00 N-3-02
Unpassivated AlGaN/GaN HEMTs with Ideal Sub-threshold Swing (~60mV/decade) on Extremely High Quality Free-standing GaN Substrate
°*X. Liu[1], H. Gu[1], K. Li[1], J. He[1], K. Lai[1], D. Zhu[1], Y. Lu[1], W. He[1], J. Fang[2], J. Wang[3], H. -C. Kuo[4], Z. Liu[5], W. Liu[6], K. -W. Ang[5], Y. Hao[2], K. Xu[3], J. -P. Ao[1,2], [1.]Shenzhen Univ (China), [2.]Xidian Univ. (China), [3.]SINANO, CAS (China), [4.]National Chiao Tung Univ. (Taiwan), [5.]National Univ. of Singapore (Singapore), [6.]Fudan Univ. (China)*

10:15 N-3-03
Impact of Crystal Orientation on Ohmic Contact Resistance of Enhancement-Mode pGaN Gate High Electron Mobility Transistors on 200 mm Si Substrates
°*M. Van Hove[1], [1.]IMEC (Belgium)*

10:30 N-3-04
Threshold voltages of Al_2O_3/AlGaN/GaN and AlTiO/AlGaN/GaN metal-insulator-semiconductor devices
°*S. P. Le[1], T. Ui[1], D. D. Nguyen[1], T. Suzuki[1], [1.]JAIST (Japan)*

10:45 N-3-05
Drain-induced barrier lowering in normally-off AlGaN-GaN MOSFETs with single- or double-recess overlapped gate
°*T. Sato[1], K. Uryu[1], J. Okayasu[1], M. Kimishima[1], T. Suzuki[2], [1.]Advantest Labs. Ltd. (Japan), [2.]JAIST (Japan)*

11:00-11:35 Coffee Break

Short Oral Presentation

Area 6:
PS-6
11:35-12:03 Meeting Room 3
Session Chair: T. Suzuki (JAIST)
K. Tsuda (Toshiba Infrastructure Systems & Solutions Corp.)

12:03-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

06: Compound Semiconductor Electron Devices & Related Technologies

N-4: GaN Device Technologies II
14:00-15:15 Meeting Room 3
Session Chair: S. Suzuki (Tokyo Tech)
S. Ozaki (Fujitsu Labs. Ltd.)

14:00 N-4-01 (Invited)
High Frequency GaN HEMTs for RF MMIC Applications
M. Micovic[1], °D. F. Brown[1], D. Regan[1], J. Wong[1], Y. Tang[1], F. Herrault[1], D. Santos[1], S. D. Burnham[1], J. Tai[1], E. Prophet[1], I. Khalaf[1], C. McGuire[1], H. Bracamontes[1], H. Fung[1], A. Schmitz[1], [1.]HRL Labs. (USA)

14:30 N-4-02
High Performance Tri-Gate AlGaN/GaN Power HEMTs
°J. H. Lee[1], C. C. Hsu[1], Y. C. Lin[1], J. N. Yao[1], C. Y. Wu[1], E. Y. Chang[1], [1.]National Chiao Tung Univ. (Taiwan)

14:45 N-4-03
Back-gate effect on p-channel GaN MOSFETs on Polarization-Junction Substrate
°T. Hoshii[1], R. Takayama[1], A. Nakajima[2], S. Nishizawa[3], H. Ohashi[1], K. Kakushima[1], H. Wakabayashi[1], K. Tsutsui[1],

[1.]Tokyo Tech (Japan), [2.]AIST (Japan), [3.]Kyushu Univ. (Japan)

15:00 N-4-04 (Late News)
MOVPE Growth Behavior of AlGaN/GaN Heterostructures with AlGaN Directly on RIE-GaN Showing a High Electron Mobility (>1300 cm^2/Vs)
°A. Yamamoto[1], K. Kanatani[1], S. Makino[1], M. Kuzuhara[1], [1.]Univ. of Fukui (Japan)

14: Power Devices and Materials

O-3: Ga2O3 and Diamond Power Devices
9:30-11:00 Meeting Room 4
Session Chair: T. Makino (AIST)
D. Hisamoto (Hitachi, Ltd.)

9:30 O-3-01 (Invited)
Characterization of Ga_2O_3 MOSFETs for Low to Medium Power Applications
°G. H. Jessen[1], K. Chabak[1], A. Green[2,1], N. Moser[3,1], J. McCandless[2,1], K. Leedy[1], A. Crespo[1], S. Tetlak[1], [1.]Air Force Research Lab. (USA), [2.]KBRwyle (USA), [3.]George Mason Univ. (USA)

10:00 O-3-02 (Invited)
Normally Off Diamond Metal-Oxide-Semiconductor Field-Effect-Transistor with Inversion Mode
°T. Matsumoto[1,2], H. Kato[2], T. Makino[2], M. Ogura[2], D. Takeuchi[2], T. Inokuma[1], N. Tokuda[1,2], S. Yamasaki[2], [1.]Kanazawa Univ. (Japan), [2.]AIST (Japan)

10:30 O-3-03
Threshold control of diamond MESFET by MWCVD growth conditions
°H. Kawashima[1], H. Umezawa[1], S. Ohmagari[1], R. Tamano[2], T. Saito[2], Y. Mokuno[1], [1.]AIST (Japan), [2.]Osaka Pref. Univ. (Japan)

10:45 O-3-04
Normally-off Diamond p-FET Application in Cascode with

Breakdown Voltage over 1.7 kv
°*T. Bi[1], J. Niu[1], N. Oi[1], M. Inaba[1], T. Sasaki[1], K. Hiroshi[1], [1.]Waseda Univ. (Japan)*

11:00-11:35 Coffee Break

Short Oral Presentation

Area 14:
PS-14
11:35-11:57 Meeting Room 4
Session Chair: H. Fujiwara (Toyota Motor Corp.)
T. Makino (AIST)

11:57-14:00 Lunch

Luncheon Seminar
12:45-13:45
EAG Nano Science Corporation (Hagi Conference Room)
Springer Nature (Tachibana Conference Room)

14: Power Devices and Materials

O-4: Silicon Power Devices and Related Technologies
14:00-15:00 Meeting Room 4
Session Chair: S. Matsumoto (Kyushu Inst. of Tech.)
D. Hisamoto (Hitachi, Ltd.)

14:00 O-4-01
Current conduction in H_2O-grown ALD-Al_2O_3 films on Si substrates
°*S. Okubo[1], D. Matsumura[1], K. Horikawa[1], A. Hiraiwa[1,2], H. Kawarada[1], [1.]Waseda Univ. (Japan), [2.]Nagoya Univ. (Japan)*

14:15 O-4-02
Structure Based Compact Model for Output Capacitance of Trench Field-Plate MOSFET to Enable Power Loss Prediction
°*K. Kobayashi[1], M. Sudo[1], I. Omura[1], [1.]Kyushu Inst. of Tech. (Japan)*

14:30 O-4-03
A Novel Edge Termination Design for Superjunction VDMOS
°*C. -H. Cheng[1], C. -F. Huang[1], K. -Y. Lee[2], [1.]National Tsing Hua Univ. (Taiwan), [2.]National Taiwan Univ. (Taiwan)*

14:45 O-4-04
Temperature Distribution Imaging inside Power Devices by Real-Time Simulation
°*A. Watanabe[1], R. Nagao[1], I. Omura[1], [1.]Kyushu Inst. of Tech. (Japan)*