Wednesday, September 20

Opening Session
Session Chair: T. Endoh, Tohoku Univ.
K. Shiraishi, Nagoya Univ.

9:00 Welcome Address
H. Ohno, Tohoku Univ.

9:05 PL-1-01
The Semiconductor Industry: Changed and Unchanged
T. Higashi, Tokyo Electron Ltd.

9:50 PL-2-01
What is Next in Computing? -A Semiconductor Perspective
P. Ranade, Intel Corp.

10:35 PL-2-02
Research on Nitride Semiconductors from the Dawn, through the Present, to the Future
T. Matsuoka, Tohoku Univ.

11:20 SSDM Award/SSDM Papar Award Ceremony

11:40-13:30 Lunch

Luncheon Seminar
12:00-13:00
ADVANTEST CORPORATION (Hagi Conference Room)
KEYSIGHT TECHNOLOGIES (Tachibana Conference Room)

Joint Session (Area 7&12)

A-1: Magneto-Optical Devices
13:30-15:15 Meeting Room 1
Session Chair: H. Shimizu (Tokyo Univ. of Agri. & Tech.)
H. Isshiki (Univ. of Electro-Communications)

13:30 A-1-01 (Invited)
Electric, Magnetic, and Optical Control of Multiferroics
°*M. Matsubara*[1], [1.]*Tohoku Univ. (Japan)*

14:00 A-1-02 (Invited)
Magneto-optical Spatial Light Modulator for 3D Holographic Display
°K. Aoshima[1], H. Kinjo[1], D. Kato[1], N. Funabashi[1], S. Aso[1], K. Machida[1], K. Kuga[1], T. Mishina[1], T. Ishibashi[2], H. Kikuchi[1], [1.]NHK Japan Broadcasting Corp. (Japan), [2.]Nagaoka Univ. of Tech. (Japan)

14:30 A-1-03
Ultra-compact Circular Polarized Metal/GaN Double-Spiral Cavity Lasers
°C. A. Lin[1], S. W. Liao[1], Y. H. Hsiao[1], C. L. Yu[1], H. C. Kuo[1], M. H. Shih[2], [1.]National Chiao Tung Univ. (Taiwan), [2.]RCAS, Academia Sinica (Taiwan)

14:45 A-1-04 (Invited)
Functional Oxides for Photonics
°J. Fompeyrine[1], F. Eltes[1], S. Abel[1], [1.]IBM Research - Zurich (Switzerland)

15:15-15:40 Coffee Break

12: Spintronics Materials and Devices

A-2: Spinorbitronics
15:40-17:25 Meeting Room 1
Session Chair: J. Nitta (Tohoku Univ.)
T. Kondo (Toshiba Corp.)

15:40 A-2-01 (Invited)
Magnetic Skyrmions in Confined Geometries
H. Du[1,2], C. Jin[1], X. Wang[3], R. Che[3], °M. Tian[1,2], [1.]Chinese Academy of Sci. (China), [2.]Anhui Univ. (China), [3.]Fudan Univ. (China)

16:10 A-2-02
Determination of Dzyaloshinskii-Moriya Interaction Energy by Extended Droplet Model
°S. Kim[1], P. -H. Jang[2], D. -H. Kim[1], M. Ishibashi[1], T. Taniguchi[1], T. Moriyama[1], K. -J. Kim[3,1], K. -J. Lee[2], T. Ono[1], [1.]Kyoto Univ. (Japan), [2.]Korea Univ. (Korea), [3.]KAIST (Korea)

16:25 A-2-03
Spin Orbit Torques in Heavy-Metal/Ferromagnet/Normal-Metal Trilayers
°*Y. Du[1,2], Y. -C. Lau[1,3], J. Nitta[2], M. Hayashi[1,3], [1.]Nat'l. Inst. for Mater. Sci. (Japan), [2.]Tohoku Univ. (Japan), [3.]Univ. of Tokyo (Japan)*

16:40 A-2-04
Device Size Dependence of Spin-orbit Torque Induced Magnetization Switching in W/CoFeB/MgO
°*C. Zhang[1], S. Fukami[1], S. DuttaGupta[1], H. Sato[1], H. Ohno[1], [1.]Tohoku Univ. (Japan)*

16:55 A-2-05
Detection of heating effect due to magneto-static surface spin wave in CoFeB film
°*K. Yamanoi[1], T. Kimura[1], [1.]Kyushu Univ. (Japan)*

17:10 A-2-06
Current Density Dependence of Asymmetric Magnetoresistance in Pt/Py Bilayers Under Various Magnetic Field Strength
°*T. Li[1], S. Kim[1], S. -J. Lee[2], S. -W. Lee[2], T. Koyama[3], D. Chiba[3], T. Moriyama[1], K. -J. Lee[2], K. -J. Kim[1,4], T. Ono[1,5], [1.]Kyoto Univ. (Japan), [2.]Korea Univ. (Korea), [3.]Univ. of Tokyo (Japan), [4.]KAIST (Korea), [5.]Osaka Univ. (Japan)*

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

B-1: Organic Devices
13:30-15:15 Meeting Room 2
Session Chair: H. Okada (Univ. of Toyama)
T. Matsushima (Kyushu Univ.)

13:30 B-1-01 (Invited)
Significant Lifetime Enhancement of Organic Light Emitting Diodes by Removing Residual Water during Device Fabrication
°*H. Murata[1], L. C. Duy[1], S. Oyama[1], H. Sakai[1], [1.]JAIST (Japan)*

14:00 B-1-02
Introducing optical resonators into polymer light-emitting electrochemical cells
°*T. Zhang[1], T. Sakanoue[1], T. Takenobu[1], [1.]Nagoya Univ. (Japan)*

14:15 B-1-03
Single-Crystal Perovskite $CH_3NH_3PbBr_3$ Prepared by Cast-capping Method for Light-Emitting Diodes
°*V. -C. Nguyen[1], H. Katsuki[1], F. Sasaki[2], H. Yanagi[1], [1.]NAIST (Japan), [2.]AIST (Japan)*

14:30 B-1-04 (Late News)
Compression of Organic Thin-films by Cold Isostatic Pressing for Enhanced Device Properties
°*Y. Esaki[1], T. Matsushima[1,2,3], C. Adachi[1,2,3], [1.]Kyushu Univ. (Japan), [2.]JST ERATO (Japan), [3.]WPI-I2CNER (Japan)*

14:45 B-1-05
Photo-responsible polarization switching in TiOPc/P (VDF–TrFE) stacking films
°*Y. Koshiba[1], H. Horii[1], M. Morimoto[1,2], M. Misaki[1,3], T. Fukushima[1], K. Ishida[1], [1.]Kobe Univ. (Japan), [2.]Univ. of Toyama (Japan), [3.]Kindai Univ. Tech. Col. (Japan)*

15:00 B-1-06
Shape changes of azobenzene particles induced by linearly polarized laser light
°*Y. Ohdaira[1], Y. Ikeda[1], H. Oka[1], K. Shinbo[1], [1.]Niigata Univ. (Japan)*

15:15-15:40 Coffee Break

B-2: Organic Transistors
15:40-17:25 Meeting Room 2
Session Chair: A. Fujii (Osaka Univ.)
M. Yoshida (AIST)

15:40 B-2-01 (Invited)
Flexible Printed Organic TFT Devices and Potential Applications
°*S. Tokito[1], [1.]Yamagata Univ. (Japan)*

16:10 B-2-02
Temperature Dependence of Transport Properties in dinaphtho[2,3-b:2',3'-d] thiophene Thin-Film Transistors with MoO_3/Au Electrodes
S. Shaari[1,2], S. Naka[1], °H. Okada[1], [1.]Univ. of Toyama (Japan), [2.]Univ. Malaysia Perlis (Malaysia)

16:25 B-2-03
Studies on correlation of surface and electrical properties in pentacene and thienoacene-based organic thin film transistors
S. Sharri[1,2], S. Naka[1], °H. Okada[1], [1.]Univ. of Toyama (Japan), [2.]Univ. Malaysia Perlis (Malaysia)

16:40 B-2-04
Influence of Surface Treatment of SiO_2 Gate Insulator for Pentacene-based OFETs with Nitrogen-doped LaB_6 Bottom-Contact Electrode Formation Process
°Y. Maeda[1], M. Hiroki[1], S. Ohmi[1], [1.]Tokyo Tech (Japan)

16:55 B-2-05
Crystal Structure Analyses of Organic Semiconductor Thin Films with Variable-Temperature Two-Dimensional Grazing Incidence X-ray Diffraction
°R. Abe[1], H. Kojima[1], M. Kikuchi[2], T. Watanabe[3], T. Koganezawa[3], N. Yoshimoto[2], I. Hirosawa[3], M. Nakamura[1], [1.]NAIST (Japan), [2.]Iwate Univ. (Japan), [3.]Japan Synchrotron Radiation Research Institute (Japan)

17:10 B-2-06
Temperature Dependence of Carrier Mobility on Non-Peripherally Octahexyl-Substituted Copper Phthalocyanine
°Ken Watanabe[1], Koichi Watanabe[1], N. Tohnai[1], A. Fujii[1], M. Ozaki[1], [1.]Osaka Univ. (Japan)

15: Photovoltaic Materials and Devices

C-1: Si-based Solar Cells and Modules
13:30-15:15 Meeting Room 3
Session Chair: K. Ohdaira (JAIST)
Y. Kurokawa (Nagoya Univ.)

13:30 C-1-01 (Invited)
Crystal Growth of CZ-Si and Relationship between Carrier Lifetime and Defects
°*K. Kakimoto[1], Y. Miyamura[1], H. Harada[1], L. Qin[1], S. Nakano[1], [1.]Kyushu Univ. (Japan)*

14:00 C-1-02
Carrier Transport across ITO/MoO_x/SiO_x/Si Interfaces
°*T. Kamioka[1], Y. Hayashi[1], Y. Isogai[1], K. Nakamura[2], Y. Ohshita[1], [1.]Toyota Technol. Inst. (Japan), [2.]Meiji Univ. (Japan)*

14:15 C-1-03
Effect of starting point formation on the crystallization of amorphous silicon films by flash lamp annealing
°*D. Sato[1], K. Ohdaira[1], [1.]JAIST (Japan)*

14:30 C-1-04
Characteristics of Heavily Phosphorus-doped Gradient Si-rich Oxide Multilayer Thin Film Structure by Spin-on Method
°*P. -R. Huang[1], S. -C. Lin[1], P. -T. Lee[1], [1.]National Chiao Tung Univ. (Taiwan)*

14:45 C-1-05
Guiding Principle for Crystalline Si Photovoltaic Modules with High Tolerance against Acetic Acid
Y. Hara[1], °A. Masuda[1], [1.]AIST (Japan)

15:00 C-1-06 (Late News)
Characterization of Amorphous Silicon Passivation Layer Deposited by Facing Target Sputtering Using Temperature-Dependent Minority Carrier Lifetime Measurement
°*Y. Shiratori[1], K. Nakada[1], S. Miyajima[1], [1.]Tokyo Tech (Japan)*

15:15-15:40	**Coffee Break**

C-2: Compound Semiconductor Solar Cells
15:40-16:40 Meeting Room 3
Session Chair: T. Negami (Panasonic Corp.)
H. Araki (National Inst. of Tech. Nagaoka College)

15:40 C-2-01 (Invited)
Improvement in Performance of CIGS Solar Cells by Surface Modification
°A. Yamada[1], [1.]Tokyo Tech (Japan)

16:10 C-2-02
Analysis for Future Generation Solar Cells and Materials
°M. Yamaguchi[1], L. Zhu[2], H. Akiyama[2], Y. Kanemitsu[3], H. Tampo[4], H. Shibata[4], K. -H. Lee[1], K. Araki[1], N. Kojima[1], [1.]Toyota Tech. Inst. (Japan), [2.]Univ. of Tokyo (Japan), [3.]Kyoto Univ. (Japan), [4.]AIST (Japan)

16:25 C-2-03
Microstructural Characteristics of $BaSi_2$ Epitaxial Films Fabricated by Thermal Evaporation
°K. O. Hara[1], C. Yamamoto[1], J. Yamanaka[1], K. Arimoto[1], K. Nakagawa[1], N. Usami[2], [1.]Univ. of Yamanashi (Japan), [2.]Nagoya Univ. (Japan)

04: Advanced Memory Technology

D-1: ReRAM Technology
13:30-15:00 Hagi Conference Room
Session Chair: Z. Wei (Panasonic Corp.)
F. M. Lee (Macronix International Co., Ltd.)

13:30 D-1-01 (Invited)
Physical modeling of carbon nanotube based nanoelectromechanical memory cell SET and RESET operations
°M. Stopa[1], T. Rueckes[1], [1.]Nantero, Inc. (USA)

14:00 D-1-02
Differential Contact RRAM Pair for Advanced CMOS Logic NVM applications
°W. -T. Hsieh[1], C. -J. Lin[1], Y. -C. King[1], Y. -D. Chih[2], J. Chang[2], [1.]National Tsing Hua Univ., Hsinchu (Taiwan), [2.]Taiwan Semiconductor Manufacturing Company (Taiwan)

14:20 D-1-03
Twin-bit Via RRAM in 16nm FinFET Logic Technologies

°*Y. -H. Shih[1], M. -Y. Hsu[1], Y. -C. King[1], C. -J. Lin[1], [1.]National Tsing Hua Univ. (Taiwan), [2.]Taiwan Semiconductor Manufacturing Company (Taiwan)*

14:40 D-1-04

OxRAM integration above FDSOI transistor drain: Integration approach and process impact on electrical characteristics

°*M. Barlas[1], L. Grenouillet[1], E. Vianello[1], V. Delaye[1], T. Dewolf[1], G. Audoit[1], N. Rambal[1], S. Bernasconi[1], C. Vizioz[1], N. Posseme[1], S. Barnola[1], B. Bouix[1], O. Pollet[1], C. Comboroure[2], N. Allouti[1], P. Rodriguez[1], V. Beugin[1], V. Loup[1], C. Tallaron[2], S. Chevalliez[2], R. Coquand[1], C. Jahan[1], S. Reboh[1], A. Toffoli[1], S. Barraud[1], L. Brevard[1], Y. Morand[1], M. Vinet[1], O. Faynot[1], L. Perniola[1], [1.]CEA-LETI (France), [2.]STMicroelectronics (France)*

15:00-15:40	**Coffee Break**

D-2: Flash Memory

15:40-17:30 Hagi Conference Room

Session Chair: K. Yamamoto (Toshiba Memory Corp.)
Y. Jono (Micron Memory Japan Inc.)

15:40 D-2-01 (Invited)

FinFET Split-Gate MONOS for Embedded Flash in 16/14nm-node and Beyond

°*S. Tsuda[1], Y. Kawashima[1], K. Sonoda[1], A. Yoshitomi[1], T. Mihara[1], S. Narumi[1], M. Inoue[1], S. Muranaka[1], T. Maruyama[1], T. Yamashita[1], Y. Yamaguchi[1], D. Hisamoto[2], [1.]Renesas Electronics Corp. (Japan), [2.]Hitachi, Ltd. (Japan)*

16:10 D-2-02

P-channel Differential Multiple-Time Programmable Memory Cells by Laterally Coupled Floating Metal Gate FinFETs

°*T. -M. Wang[1], W. -Y. Chien[1], C. -L. Hsu[1], Y. -D. Chih[2], C. J. Lin[1], Y. -C. King[1], [1.]National Tsing Hua Univ. (Taiwan), [2.]Taiwan Semiconductor Manufacturing Company (Taiwan)*

16:30 D-2-03

In-situ formation of Hf-based MONOS structure for

nonvolatile memory application
°*S. Kudoh[1], M. Tsukazaki[1], S. Ishimatsu[1], S. Ohmi[1], [1]Tokyo Tech (Japan)*

16:50 D-2-04
23% Higher Performance 2D MLC/3D TLC NAND Flash Hybrid Solid-State Drive
°*Y. Sakaki[1], T. Yamada[1], C. Matsui[1], Y. Yamaga[1], K. Takeuchi[1], [1]Chuo Univ. (Japan)*

17:10 D-2-05
Read Disturb Improvement for 1znm TLC NAND Flash
°*H. -N. Yoo[1], H. Shim[1], J. -W. Kim[1], K. -H. Noh[1], H. Chang[1], [1]SK Hynix Inc. (Korea)*

03: CMOS Devices / Device Physics

E-1: Reliability
13:30-15:15 Tachibana Conference Room
Session Chair: N. Sugii (Hitachi, Ltd.)
N. Mori (Osaka Univ.)

13:30 E-1-01 (Invited)
Reliability Characterizations for high-performance, low-power 10nm-FinFET technology
°*K. Choi[1], M. Jin[1], Jinju Kim[1], Jungin Kim[1], H. Sagong[1], Y. Kim[1], H. Shim[1], K. Kim[1], G. Kim[1], S. Lee[1], T. Uemura[1], J. Park[1], S. Shin[1], S. Pae[1], [1]Samsung Electronics Co., Ltd. (Korea)*

14:00 E-1-02
Comprehensive Analysis of Low-frequency Noise Variability Components in Bulk and FDSOI (SOTB) MOSFETs
°*K. Maekawa[1], H. Makiyama[1], Y. Yamamoto[1], T. Hasegawa[1], S. Okanishi[1], K. Sonoda[1], H. Shinkawata[1], T. Yamashita[1], S. Kamohara[1], Y. Yamaguchi[1], [1]Renesas Electronics Corp. (Japan)*

14:20 E-1-03
Plasma Induced Damage Depending on Antenna Layers in

Ring Oscillators
°*R. Kishida[1], J. Furuta[1], K. Kobayashi[1], [1.]Kyoto Inst. of Tech. (Japan)*

14:40 E-1-04
Revisited Study for Fluorine Implantation Impact on NBTI for Automotive I/O Device
°*T. Yoshida[1], K. Maekawa[1], S. Tsuda[1], T. Shimizu[1], M. Ogasawara[1], H. Aono[1], [1.]Renesas Electronics Corp. (Japan)*

15:00 E-1-05 (Late News)
Improved Performance and Sufficient Reliability $In_{0.53}Ga_{0.47}As$ FinFET Using NH3 Plasma Treatment
°*K. S. Yang[1], Q. -H. Luc[1], C. C. Chang[1], J. W. Lin[1], C. -C. F. Chiang[1], H. B. Do[1], M. T. H. Ha[1], S. H. Huynh[1], Y. D. Jin[1], T. A. Nguyen[1], Y. -C. Lin[1], E. Y. Chang[1], [1.]National Chiao Tung Univ. (Taiwan)*

15:15-15:40 Coffee Break

Joint Session (Area 1&3)

E-2: Advanced Transistor Technology
15:40-17:30 Tachibana Conference Room
Session Chair: H. Morioka (Socionext Inc.)
O. Weber (CEA-Leti)

15:40 E-2-01 (Invited)
Stacked-Wires FETs for Advanced CMOS Scaling
°*S. Barraud[1], V. Lapras[1], M. P. Samson[2], B. Previtali[1], J. M. Hartmann[1], N. Rambal[1], C. Vizioz[1], V. Loup[1], C. Comboroure[2], F. Triozon[1], N. Bernier[1], D. Cooper[1], M. Vinet[1], [1.]CEA-Leti (France), [2.]STMicroelectronics (France)*

16:10 E-2-02
Effect of SiGe Layer Thickness in Starting Substrate on Electrical Properties of Ultrathin Body Ge-on-Insulator pMOSFET Fabricated by Ge Condensation
°*K. -W. Jo[1], W. -K. Kim[1], M. Takenaka[1], S. Takagi[1], [1.]Univ. of Tokyo (Japan)*

16:30 E-2-03
Single and Double Diffusion Breaks in 14nm FinFET and Beyond
°*K. Miyaguchi[1], F. Bufler[1], T. Chiarella[1], P. Matagne[1], N. Horiguchi[1], A. D. Keersgieter[1], G. Eneman[1], A. Spessot[1], B. Parvais[1,2], D. Verkest[1], A. Mocuta[1], [1.]IMEC (Belgium), [2.]Vrije Universiteit Brussel (Belgium)*

16:50 E-2-04
Insights and Opportunities for Junctionless Gate-All-Around Lateral and Vertical Nanowire FETs
°*A. Veloso[1], P. Matagne[1], E. Simoen[1], A. Chasin[1], B. Kaczer[1], D. Yakimets[1], D. Mocuta[1], N. Collaert[1], [1.]IMEC (Belgium)*

17:10 E-2-05
High Performance Top-Gate Zinc Oxide Thin Film Transistor (ZnO TFT) by Combination of Post Oxidation and Annealing
°*K. Kato[1], H. Matsui[1], H. Tabata[1], M. Takenaka[1], S. Takagi[1], [1.]Univ. of Tokyo (Japan)*

Joint Session (Area 5&11)

F-1: Advanced Materials & Measurement Circuits for Bio and Medical Applications
13:30-15:05 Meeting Room 4
Session Chair: C. H. Liu (National Tsing Hua Univ.)
T. Yoshida (Hiroshima Univ.)

13:30 F-1-01 (Invited)
The Next Generation Biochip: The Development of Polysilicon Nanowire Effect Transistor Based Biosensor Array
°*Y. -S. Yang[1], P. -C. Su[1], Y. -S. Wu[1], C. -L. Hsieh[1], S. -K. Shen[1], [1.]National Chiao Tung Univ. (Taiwan)*

14:00 F-1-02
A potable bioactive monitoring device for observing water transport in plants with a non-invasive technique
°*M. Haruta[1], M. Kubo[1], T. Noda[1], K. Sasagawa[1], T.*

Tokuda[1], J. Ohta[1], [1.]NAIST (Japan)

14:15 F-1-03
An Integrated Photo-Plethysmography Recording Circuit for Trans-Nail Pulse-Wave Monitoring System
°Z. Qian[1], Y. Takezawa[1], K. Shimokawa[1], H. Kino[1], T. Fukushima[1], K. Kiyoyama[2], T. Tanaka[1], [1.]Tohoku Univ. (Japan), [2.]Nagasaki Inst. of Applied Sci. (Japan)

14:30 F-1-04
CMOS-based Opical Energy Harvesting Circuit for Implantable and IoT Devices
°N. Wuthibenjaphonchai[1], M. Haruta[1], T. Noda[1], K. Sasagawa[1], T. Tokuda[1], M. Sawan[2], J. Ohta[1], [1.]NAIST (Japan), [2.]Polytechnique Montreal (Canada)

14:45 F-1-05
A Compact Sweat Monitoring System with CMOS Capacitive Humidity Sensor for Wearable Health-Care Application
°Y. Mitani[1], K. Miyaji[1], S. Kaneko[1], T. Uekura[1], H. Momose[2], K. Johguchi[1], [1.]Shinshu Univ. (Japan), [2.]Nishizawa Electric Meters Manufacturing Co., Ltd. (Japan)

15:05-15:40 Coffee Break

11: Sensors and Materials for Biology, Chemistry and Medicine

F-2: Bio and Micro Systems
15:40-17:10 Meeting Room 4
Session Chair: T. Sakata (Univ. of Tokyo)
H. M. Chen (NCTU)

15:40 F-2-01 (Invited)
Biodevice Technologies for Cancer Diagnosis Using Exosome-based Biomarkers
°T. Ichiki[1,2], [1.]Univ. of Tokyo (Japan), [2.]Kawasaki Inst. of Industry Promotion (Japan)

16:10 F-2-02
Respiratory Sensor Continuously Attached on the Abdomen
M. Terasawa[1], M. Karita[1], S. Kumagai[1], °M. Sasaki[1], [1.]Toyota Tech. Inst. (Japan)

16:25 F-2-03
Wireless operation of EWOD by the on-chip CMOS silicon photovoltaic cell array
°Y. Okamoto[1], Y. Mita[1], [1.]Univ. of Tokyo (Japan)

16:40 F-2-04
Development of Vertically-Stacked Multi-Shank Si Neural Probe Array with Sharpened Tip for Cubic Spatial Recording
°T. Harashima[1], T. Morikawa[1], H. Kino[1], T. Fukushima[1], N. Katayama[1], T. Tanaka[1], [1.]Tohoku Univ. (Japan)

16:55 F-2-05
Parallelized High Throughput Emulsification and Emulsion PCR for Clinical Use of BEAMing Technology
°K. Cai[1], Y. Koya[1], K. Yasuko[1], N. Katsumi[1], T. Ayato[1], [1.]Sysmex Corp. (Japan)

07: Photonic Devices and Related Technologies

G-2: GaN Photonic Devices
15:40-16:55 Meeting Room 5
Session Chair: S. Kuboya (Tohoku Univ.)
T. Tawara (NTT Basic Res. Labs.)

15:40 G-2-01 (Invited)
Current Status and Future of III-Nitride Ultraviolet and THz Emitters
°H. Hirayama[1,2], M. Jo[1], W. Terashima[1,2], N. Maeda[1,2], T. -T. Lin[2], K. Wang[2], [1.]RIKEN (Japan), [2.]RIKEN Center for Advanced Photonics (Japan)

16:10 G-2-02
Ultraviolet light emitting diodes grown on Si-implanted GaN template

°*P. -H. Liao[1], H. -Y. Cheng[1], M. -L. Lee[2], W. -C. Lai[1], J. -K. Sheu[1], [1.]National Cheng Kung Univ. (Taiwan), [2.]Southern Taiwan Univ. of Sci. and Tech. (Taiwan)*

16:25 G-2-03
Reduction of Impurity Incorporation into MOVPE-grown GaN films on $ScAlMgO_4$ Substrate
°*T. Iwabuchi[1], S. Kuboya[1], C. Hagiwara[1], T. Tanikawa[1], T. Hanada[1], T. Fukuda[2], T. Matsuoka[1], [1.]Tohoku Univ. (Japan), [2.]Fukuda Crystal Lab. (Japan)*

16:40 G-2-04
Enhanced Hole Generation in Mg-doped AlN/AlGaN Superlattices with High Average Al Content
°*K. Ebata[1], J. Nishinaka[1], Y. Taniyasu[1], K. Kumakura[1], [1.]NTT Basic Res. Labs. (Japan)*

Joint Session (Area 2&13)

H-1: Nanocarbon Interconnects and Applications
13:30-15:15 Meeting Room 6
Session Chair: T. Minari (NIMS)
T. Arie (Osaka Prefecture Univ.)

13:30 H-1-01 (Invited)
Nanocarbon application including interconnects and thermal interface materials
°*D. Kondo[1], S. Sato[1], T. Iwai[1], N. Yokoyama[1], [1.]Fujitsu Labs. Ltd. (Japan)*

14:00 H-1-02
Moisture Barrier Properties of Single-Layer Graphene Deposited on Cu Films for Cu Metallization
°*P. Gomasang[1], T. Abe[1], K. Kawahara[2], Y. Wasai[3], N. Nabatova-Gabain[3], N. T. Cuong[4], H. Ago[2], S. Okada[5], K. Ueno[1,6], [1.]Shibaura Inst. of Tech. (Japan), [2.]Kyushu Univ. (Japan), [3.]Horiba Ltd. (Japan), [4.]NIMS (Japan), [5.]Univ. of Tsukuba (Japan), [6.]SIT Res. Center for Green Innov. (Japan)*

14:15 H-1-03
Developing Lightweight High Electrical Performance Carbon Nanotube-Cu Wire Composites as Alternatives to Cu
°*R. Sundaram[1], T. Yamada[1], K. Hata[1], A. Sekiguchi[1], [1.]AIST (Japan)*

14:30 H-1-04
Pd-dot-size dependence of hydrogen sensors based on graphene FET for breath analysis
°*Y. Sakamoto[1], K. Uemura[1], T. Ikuta[1], K. Maehashi[1], [1.]Tokyo Univ. of Agri. & Tech. (Japan)*

14:45 H-1-05
Intrinsic response of protein adsorption to graphene film on SiC substrate
°*Y. Taniguchi[1], M. Tsubasa[1], Y. Ohno[1], M. Nagase[1], Y. Arakawa[1], Y. Imada[1], K. Minagawa[1], M. Yasuzawa[1], [1.]Tokushima Univ. (Japan)*

15:00 H-1-06
Growth of Suspended Graphene Nanoribbons and its Optoelectronic Application
°*H. Suzuki[1], T. Kaneko[1], T. Kato[1], [1.]Tohoku Univ. (Japan)*

15:15-15:40 Coffee Break

02: Interconnect Technologies, MEMS, and Reliability

H-2: MEMS & Sensors
15:40-17:50 Meeting Room 6
Session Chair: H. Kanaya (Kyushu Univ.)
S. Itabashi (NTT Advanced Tech. Corp.)

15:40 H-2-01 (Invited)
Pharmaceutical Contaminants and pH Sensing using MWCNTs based Electrodes
A. U. Alam[1], N. -X. Hu[2], °M. R. Howlader[1], M. J. Deen[1], [1.]McMaster Univ. (Canada), [2.]Xerox Research Center of Canada (Canada)

16:10 H-2-02
Silicon Photonic Biosensors with MEMS Flow Control
°*Y. Amemiya[1], A. K. Sana[1], Y. Nakashima[1], J. Maeda[1], S. Yokoyama[1], [1.]Hiroshima Univ. (Japan)*

16:30 H-2-03
Tilt Characteristics of a MEMS Accelerometer fabricated by Multi-layer Metal Technology
°*I. Tsuji[1], M. Takayasu[1], H. Ito[1], D. Yamane[1], S. Dosho[1], T. Konishi[1,2], N. Ishihara[1], K. Machida[1], K. Masu[1], [1.]Tokyo Tech (Japan), [2.]NTT Adv. Tech. Corp. (Japan)*

16:50 H-2-04
The Fully Wireless Pressure Sensor Based on Endoscopic Image
°*Y. Maeda[1,2], H. Mori[1], T. Nakagawa[1], H. Takao[1], [1.]Kagawa Univ. (Japan), [2.]National Institute of Technology, Kagawa Collage (Japan)*

17:10 H-2-05
Development of an Adhesive Plaster Size Current Sensor for Power Monitoring
°*T. Yamashita[1], T. Itoh[2], R. Maeda[1], [1.]AIST (Japan), [2.]Univ. of Tokyo (Japan)*

17:30 H-2-06
Evaluation of Electrical Conductivity of CFRP by Surface Potential Distribution
°*K. Kikunaga[1], N. Terasaki[1], [1.]AIST (Japan)*

08: Advanced Material Synthesis and Crystal Growth Technology

J-1: Oxide based Materials
13:30-15:15 Meeting Room 7
Session Chair: T. Nagata (NIMS)
T. Yamaguchi (Kogakuin Univ.)

13:30 J-1-01 (Invited)
Utilizing Reflection High Energy Electron Diffraction to Map Growth Windows in Hybrid Molecular Beam Epitaxy

°*R. Engel-Herbert[1], M. Brahlek[1], J. M Lapano[1], J. Roth[1], [1.]Pennsylvania State Univ. (USA)*

14:00 J-1-02
Growth and Magnetic Properties of Ruddlesden-Popper Series $Sr_{n+1}V_nO_{3n+1}$ Epitaxial Thin Films
°*S. Fukuda[1], D. Oka[1], T. Fukumura[1], [1.]Tohoku Univ. (Japan)*

14:15 J-1-03
Comparative study of Al and V co-doped ZnO thin films on quartz, polyethylene terephthalate, and polycarbonate substrates
°*C. Tateyama[1], H. Chiba[1,2], T. Kawashima[1], K. Washio[1], [1.]Tohoku Univ. (Japan), [2.]Japan Society for the Promotion of Sci. Res. Fellowships for Young Scientists (Japan)*

14:30 J-1-04
Composition Control of ZnMgO Thin-films by Mist Chemical Vapor Deposition
°*P. Rutthongjan[1], [1.]Kochi Univ. of Technology (Japan)*

14:45 J-1-05
Mist CVD process including successive deposition of Al_2O_3, Fe catalyst layers and carbon nanotubes for high density forest
°*T. Kinoshita[1], M. Karita[1], T. Nakano[1], Y. Inoue[1], T. Miwa[2], H. Nagaoka[2], [1.]Shizuoka Univ. (Japan), [2.]JNC Petrochemical (Japan)*

15:00 J-1-06
Investigation of the effective net charge of strontium silicate layers on silicon substrates at changing annealing condition
°*S. Taniwaki[1], H. Yoshida[1], K. Arafune[1], A. Ogura[2], S. Satoh[1], Y. Hotta[1], [1.]Univ. of Hyogo (Japan), [2.]Meiji Univ. (Japan)*

15:15-15:40 Coffee Break

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

J-2: 2D Materials and Devices
15:40-17:25 Meeting Room 7
Session Chair: K. Nagashio (Univ. of Tokyo)
T. Takenobu (Nagoya Univ.)

15:40 J-2-01 (Invited)
Two-Dimensional Materials: from Contact to Device Applications
P. -W. Chiu[1,2], P. -H. Ho[1], °C. -H. Yeh[1], W. -H. Wang[2], C. -H. Ho[3], C. -W. Chen[4], [1.]National Tsing Hua Univ. (Taiwan), [2.]Academia Sinica (Taiwan), [3.]National Taiwan Univ. of Sci. and Tech. (Taiwan), [4.]National Taiwan Univ. (Taiwan)

16:10 J-2-02
Infrared Black Phosphorus Phototransistor with Electrostatically Tunable Responsivity
°L. Huang[1], W. C. Tan[1], L. Wang[1], C. Lee[1], K. -W. Ang[1], [1.]National Univ. of Singapore (Singapore)

16:25 J-2-03
Modulation of Thermoelectric Performance by Using Electrolyte Gating Method
°K. Kanahashi[1], J. Pu[2], L. -J. Li[3], M. Ishihara[4], M. Hasegawa[4], Y. -Y. Noh[5], H. Ohta[6], T. Takenobu[2], [1.]Waseda Univ. (Japan), [2.]Nagoya Univ. (Japan), [3.]KAUST (Saudi Arabia), [4.]AIST (Japan), [5.]Dongguk Univ. (Korea), [6.]Hokkaido Univ. (Japan)

16:40 J-2-04
Detuning dependence of higher-order harmonic generation in monolayer transition metal dichalcogenides
°T. Tamaya[1,2], S. Konabe[3], S. Kawabata[1,2], [1.]AIST (Japan), [2.]CREST, Japan Sci. and Tech. Agency (Japan), [3.]Tokyo Univ. of Sci. (Japan)

16:55 J-2-05
Tailoring the Rashba Spin-Orbit Coupling in Colloidal Lead Sulfide Nanosheets
°M. M. Ramin Moayed[1], T. Bielewicz[1], M. S. Zoellner[1], C.

Herrmann[1], C. Klinke[1], [1]Univ. of Hamburg (Germany)

17:10 J-2-06
Tunable spin splitting and spin relaxation in polar WSTe monolayer
°*M. A. U. Absor[1], F. Ishii[2], H. Kotaka[3], M. Saito[2], [1]Gadjah Mada Univ. (Indonesia), [2]Kanazawa Univ. (Japan), [3]Osaka Univ. (Japan)*

01: Advanced LSI Processing & Materials Science

K-1: Interface Engineering
13:30-15:20 Meeting Room 8
Session Chair: H. Nohira (Tokyo City Univ.)
S. Yoshida (Sony Semiconductor Solutions Corp.)

13:30 K-1-01 (Invited)
Interface Dipole Layers between Two Dielectrics: Considerations on Physical Origins and Opportunities to Control Their Formation
°*K. Kita[1], H. Kamata[1], J. Fei[1], [1]Univ. of Tokyo (Japan)*

14:00 K-1-02
Direct Observation of Electrical Dipole and Atomic Density at High-k Dielectrics/SiO_2 Interface
°*N. Fujimura[1], A. Ohta[1], M. Ikeda[1], K. Makihara[1], S. Miyazaki[1], [1]Nagoya Univ. (Japan)*

14:20 K-1-03
Consideration on the interfacial dipole layer formation at non-SiO_2 oxide interfaces in the examples of MgO/Al_2O_3 and HfO_2/Al_2O_3
°*J. Fei[1], K. Kita[1], [1]Univ. of Tokyo (Japan)*

14:40 K-1-04
Characterization of near-interface border-traps in GeO_2/Ge gate stacks grown by low and high temperature thermal oxidation using deep-level transient spectroscopy
°*W. -C. Wen[1], T. Sakaguchi[1], K. Yamamoto[1], D. Wang[1], H. Nakashima[1], [1]Kyushu Univ. (Japan)*

15:00 K-1-05
Generalized Picture of Work Function of a Metal with Schottky Interface
°*T. Nishimura[1], T. Yajima[1], A. Toriumi[1], [1.]Univ. of Tokyo (Japan)*

15:20-15:40 Coffee Break

05: Advanced Circuits and Systems

K-2: Advanced Power Converters and Packaging Technologies
15:40-17:15 Meeting Room 8
Session Chair: H. Lin (National Chung Hsing Univ.)
I. Akita (Toyohashi Tech)

15:40 K-2-01
A 190mV Start-up Voltage Doubler Charge Pump with CMOS Gate Boosting Technique in 0.18μm Standard CMOS Process for Energy Harvesting
°*M. Yoshida[1], K. Miyaji[1], [1.]Shinshu Univ. (Japan)*

16:00 K-2-02
A Wide Load Range Switched Capacitor DC-DC Converter with Adaptive Bias Comparator for Ultra-Low-Power Power Management Integrated Circuit
°*H. Asano[1], T. Hirose[1], Y. Kojima[1], N. Kuroki[1], M. Numa[1], [1.]Kobe Univ. (Japan)*

16:20 K-2-03
Comparisons of Wire Bonding and Flip-Chip Bonding Assembly in High Frequency Hysteretic DC-DC Buck Converters
°*Y. Karasawa[1], Y. Gotou[1], S. Hara[1], T. Fukuoka[1], K. Miyaji[1], [1.]Shinshu Univ. (Japan)*

16:40 K-2-04
A Compact Size, Wide-Range Efficiency, and Self-biasing CMOS-IPD Rectenna Using 2.5D Wafer-level Packing for a Biomedical Wireless Power Transfer System
°*K. -C. Lin[1], P. -C. Wu[1], T. -Y. Lin[1], Y. -C. Liu[1], W. -T. Hung[1], H. -H. Tsai[1], Y. -Z. Juang[1], [1.]Chip Implementation*

Center (Taiwan)

17:00 K-2-05 (Late News)
Wide-range bioelectrical impedance analysis circuit with GIDL-controlled ultrasmall current and ultralow frequency square wave generator
°*Y. Takezawa[1], K. Shimokawa[1], Z. Qian[1], H. Kino[1], T. Fukushima[1], K. Kiyoyama[2], T. Tanaka[1], [1.]Tohoku Univ. (Japan), [2.]Nagasaki Inst. of Applied Sci. (Japan)*

Joint Session (Area 4&9)

M-1: Quamtum vs Classical
13:30-15:15 Meeting Room 2
Session Chair: T. Sakamoto (NEC Corp.)
T. Tanamoto (Toshiba Corp.)

13:30 M-1-01 (Invited)
CMOS Ising Computing for Combinatorial Optimization Problems
°*M. Yamaoka[1], [1.]Hitachi, Ltd. (Japan)*

14:00 M-1-02 (Invited)
Scalability of diamond-based quantum information devices
°*K. Nemoto[1,2], M. Hanks[2,1], M. Trupke[3,4], J. Schmiedmayer[4], W. J. Munro[5,1], [1.]National Inst. of Informatics (Japan), [2.]Sokendai, The Graduate Univ. for Advanced Studies (Japan), [3.]Univ. of Vienna (Austria), [4.]Vienna Center for Quantum Sci. and Tech. (Austria), [5.]NTT Basic Res. Labs. (Japan)*

14:30 M-1-03
Quantum Dipole in a Silicon Transistor: Quantum Simulation for Strongly Correlated System
°*S. Saito[1], Z. Li[1], H. Yoshimoto[2], I. Tomita[1,3], Y. Tsuchiya[1], Y. Sasago[4], H. Arimoto[1,4], F. Liu[1], M. K. Husain[1], D. Hisamoto[4], H. N. Rutt[1], S. Kurihara[2], [1.]Univ. of Southampton (UK), [2.]Waseda Univ. (Japan), [3.]Gifu College (Japan), [4.]Hitachi, Ltd. (Japan)*

14:45 M-1-04 (Late News)
Sarcosine as prostate cancer biomarker detection through H2O2 sensing by using nickel-oxide on Si nanowires
°*A. Roy[1], S. Jana[1], J. T. Qiu[1], S. Maikap[1], [1.]Chang Gung Univ. (Taiwan)*

15:00 M-1-05 (Late News)
High pH sensitivity and low concentration detection of urea/H_2O_2 by using IrO_x/HfO_x membrane in electrolyte-insulator-semiconductor structure
°*S. Jana[1], A. Roy[1], J. T. Qiu[1], S. Maikap[1], [1.]Ghang Gung Univ. (Taiwan)*

15:15-15:40 Coffee Break

M-2: Non von Neumann Computing I
15:40-17:25 Meeting Room 2
Session Chair: T. Tanamoto (Toshiba Corp.)
Y. Nishi (Toshiba Corp.)

15:40 M-2-01 (Invited)
Memory devices in Neuromorphic Computing Systems
°*C. Reita[1], [1.]CEA-Leti (France)*

16:10 M-2-02 (Invited)
Emulating Synaptic Plasticity in Neuromorphic Systems with Resistive Memories
°*S. L. Barbera[1], E. Vianello[1], T. Werner[1], B. D. Salvo[1], L. Perniola[1], [1.]CEA-Leti (France)*

16:40 M-2-03 (Invited)
Low Power Deep Neural Network Hardware Based on Memristive Crossbar Circuits
°*I. Kataeva[1], S. Ohtsuka[1], [1.]DENSO Corp. (Japan)*

17:10 M-2-04
Predictive Analysis of Randomness in 3D RRAM-based Physically Unclonable Security Primitive
°*J. Kim[1], H. Nili[2], G. C. Adam[2,3], D. Strukov[2], O. Kavehei[1], [1.]RMIT Univ. (Australia), [2.]Univ. of California Santa Barbara (USA), [3.]National Inst. for R&D in Microtechnologies (Romania)*

06: Compound Semiconductor Electron Devices & Related Technologies

N-1: High-Speed and High-Frequency Devices
13:30-15:15 Meeting Room 3
Session Chair: A. Wakejima (Nagoya Inst. of Tech.)
K. Maezawa (Univ. of Toyama)

13:30 N-1-01 (Invited)
THz Circuitry Designs Based on InP and CMOS Devices
°Y. Kawano[1], H. Matsumura[1], Y. Yagishita[1], Y. Nakasha[1], T. Takahashi[1], N. Hara[1], [1.]Fujitsu Ltd. (Japan)

14:00 N-1-02
A Wide-Range Variable-Frequency Resonant Tunneling Diode Oscillator Based on a Novel MEMS Phase Shifter
°T. Yamashita[1], D. Nakano[1], M. Mori[1], K. Maezawa[1], [1.]Univ. of Toyama (Japan)

14:15 N-1-03
Etching Control in Side-Recess Formation of High Electron Mobility Transistor for High-Responsivity Terahertz Detector
°S. Suzuki[1], S. Shibuya[1], Y. Isobe[1], [1.]Tokyo Tech (Japan)

14:30 N-1-04
Enhanced-Mode InAs QWFETs with the Source Connected Field Plate Technique for Low Power Logic Applications
°J. N. Yao[1], Y. C. Lin[1], H. T. Hsu[1], T. J. Huang[1], M. S. Lin[2], Y. C. Wang[1], Z. Y. Huang[1], S. M. Sze[1], E. Y. Chang[1], [1.]National Chiao Tung Univ. (Taiwan), [2.]National Tsing Hua Univ. (Taiwan)

14:45 N-1-05
Study of enhance mode π-gate InAs HEMT for logic application
°Y. -C. Wang[1], J. -N. Yao[1], Y. -C. Lin[1], H. -T. Hsu[1], T. -J. Huang[1], C. -Y. Huang[1], E. Y. Chang[1], [1.]National Chiao Tung Univ. (Taiwan)

15:00 N-1-06
First Demonstration of GaSb p-Channel Schottky

MOSFET with Pt Source/Drain
°*M. L. Tsai[1], Y. P. Chang[1], C. H. Chien[1], [1.]National Chiao Tung Univ. (Taiwan)*

15:15-15:40 Coffee Break

Joint Session (Area 6&8&14)

N-2: Advanced Growth of Widegap Semiconductors
15:40-17:25 Meeting Room 3
Session Chair: N. Shigekawa (Osaka City Univ.)
T. Nagata (NIMS)

15:40 N-2-01 (Invited)
Recent Progress in MOCVD Technology: III-Nitrides and 2D Nanomaterials
°*M. Heuken[1,2], [1.]AIXTRON SE (Germany), [2.]RWTH Aachen Univ. (Germany)*

16:10 N-2-02
Thermodynamic Analysis of the Surface Reactions in GaN MOVPE
°*K. Sekiguchi[1], H. Shirakawa[1], K. Chokawa[1], M. Araidai[1], Y. Kangawa[1,2], K. Kakimoto[2], K. Shiraishi[1], [1.]Nagoya Univ. (Japan), [2.]Kyushu Univ. (Japan)*

16:25 N-2-03
Improved mobility in InAlN/AlGaN two-dimensional electron gas heterostructures with an atomically-smooth heterointerface
°*D. Hosomi[1], Y. Miyachi[1], T. Egawa[1], M. Miyoshi[1], [1.]Nagoya Inst. of Tech. (Japan)*

16:40 N-2-04
Relationship between Current Density and Stacking Fault Expansion Origin in Forward Degradation of 4H-SiC PiN Diodes
°*S. Hayashi[1,2], T. Yamashita[1,3], J. Senzaki[1], M. Miyazato[1,4], M. Ryo[1,4], M. Miyajima[1,4], Y. Yonezawa[1], T. Kato[1], K. Kojima[1], H. Okumura[1], [1.]AIST (Japan), [2.]Toray Research Center Inc. (Japan), [3.]SHOWA DENKO K.K. (Japan), [4.]Fuji Electric Co. Ltd. (Japan)*

16:55 N-2-05
Fabrication of MSM-Type Photodetector Using Sn-Doped α-Ga_2O_3 Films Grown by Mist Chemical Vapor Deposition
°*K. Rikitake[1], T. Kobayashi[1], T. Yamaguchi[1], T. Onuma[1], T. Honda[1], [1.]Kogakuin Univ. (Japan)*

17:10 N-2-06 (Late News)
AlN metal-semiconductor field-effect transistors using Si-ion implantation
°*H. Okumura[1,2], S. Suihkonen[3], J. Lemettinen[3], A. Uedono[1], T. Palacios[2], [1.]Univ. of Tsukuba (Japan), [2.]MIT (USA), [3.]Aalto Univ. (Finland)*

14: Power Devices and Materials

O-1: SiC Power Devices and Related Technologies
13:30-15:15 Meeting Room 4
Session Chair: H. Fujiwara (Toyota Motor Corp.)
D. Hisamoto (Hitachi, Ltd.)

13:30 O-1-01 (Invited)
Accurate Evaluation of Fast Threshold Voltage Shift for SiC MOS Devices Under Various Gate Bias Stress Conditions
°*M. Sometani[1], M. Okamoto[1], T. Hatakeyama[1], Y. Iwahashi[1], M. Hayashi[1,2], D. Okamoto[3], H. Yano[3], S. Harada[1], Y. Yonezawa[1], H. Okumura[1], [1.]AIST (Japan), [2.]DENSO Corp. (Japan), [3.]Univ. of Tsukuba (Japan)*

14:00 O-1-02
First Principles Study of the effect of Hydrogen Annealing effects on SiC MOSFETs
°*K. Chokawa[1], K. Shiraishi[1], [1.]Nagoya Univ. (Japan)*

14:15 O-1-03
Kinetics of Enhanced Oxide Growth on 4H-SiC in O_2 and H_2O Coexisting Ambient
°*K. Ishinoda[1], K. Kita[1], [1.]Univ. of Tokyo (Japan)*

14:30 O-1-04
Oxidation-induced Lattice Distortion at 4H-SiC (0001)

Surface Characterized by Surface Sensitive In-plane X-ray Diffractometry
°*A. D. Hatmanto[1], K. Kita[1], [1.]Univ. of Tokyo (Japan)*

14:45 O-1-05
Hole Trapping in SiC-MOS Devices Evaluated by Fast-*CV* Method
°*M. Hayashi[1,2], M. Sometani[1], T. Hatakeyama[1], H. Yano[3], S. Harada[1], [1.]AIST (Japan), [2.]DENSO Corp. (Japan), [3.]Univ. of Tsukuba (Japan)*

15:00 O-1-06 (Late News)
Effect of Surface Roughness of Trench Sidewalls on Channel Mobility in 4H-SiC Trench MOSFETs
°*K. Kutsuki[1], Y. Murakami[1], Y. Watanabe[2], T. Onishi[1], K. Yamamoto[3], H. Fujiwara[1], T. Ito[1], [1.]Toyota Motor Corp. (Japan), [2.]Toyota Central R&D Labs. Inc. (Japan), [3.]DENSO Corp. (Japan)*