

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. Matsubara¹, ¹Tohoku Univ. (Japan)

14:00 A-1-02 (Invited)

Magneto-optical Spatial Light Modulator for 3D Holographic Display

°K. Aoshima¹, H. Kinjo¹, D. Kato¹, N. Funabashi¹, S. Aso¹, K. Machida¹, K. Kuga¹, T. Mishina¹, T. Ishibashi², H. Kikuchi¹, ¹NHK Japan Broadcasting Corp. (Japan), ²Nagaoka Univ. of Tech. (Japan)

14:30 A-1-03

Ultra-compact Circular Polarized Metal/GaN Double-Spiral Cavity Lasers

°C. A. Lin¹, S. W. Liao¹, Y. H. Hsiao¹, C. L. Yu¹, H. C. Kuo¹, M. H. Shih², ¹National Chiao Tung Univ. (Taiwan), ²RCAS, Academia Sinica (Taiwan)

14:45 A-1-04 (Invited)

Functional Oxides for Photonics

°J. Fompeyrine¹, F. Eltes¹, S. Abel¹, ¹IBM 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. Jin¹, X. Wang³, R. Che³, °M. Tian^{1,2}, ¹Chinese Academy of Sci. (China), ²Anhui Univ. (China), ³Fudan Univ. (China)

16:10 A-2-02

Determination of Dzyaloshinskii-Moriya Interaction Energy by Extended Droplet Model

°S. Kim¹, P. -H. Jang², D. -H. Kim¹, M. Ishibashi¹, T. Taniguchi¹, T. Moriyama¹, K. -J. Kim^{3,1}, K. -J. Lee², T. Ono¹, ¹Kyoto Univ. (Japan), ²Korea Univ. (Korea), ³KAIST (Korea)

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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. Nitta², M. Hayashi^{1,3}, ¹Nat'l. Inst. for Mater. Sci. (Japan), ²Tohoku Univ. (Japan), ³Univ. of Tokyo (Japan)

16:40 A-2-04

Device Size Dependence of Spin-orbit Torque Induced Magnetization Switching in W/CoFeB/MgO

°C. Zhang¹, S. Fukami¹, S. DuttaGupta¹, H. Sato¹, H. Ohno¹, ¹Tohoku Univ. (Japan)

16:55 A-2-05

Detection of heating effect due to magneto-static surface spin wave in CoFeB film

°K. Yamanoi¹, T. Kimura¹, ¹Kyushu Univ. (Japan)

17:10 A-2-06

Current Density Dependence of Asymmetric Magnetoresistance in Pt/Py Bilayers Under Various Magnetic Field Strength

°T. Li¹, S. Kim¹, S. -J. Lee², S. -W. Lee², T. Koyama³, D. Chiba³, T. Moriyama¹, K. -J. Lee², K. -J. Kim^{1,4}, T. Ono^{1,5}, ¹Kyoto Univ. (Japan), ²Korea Univ. (Korea), ³Univ. of Tokyo (Japan), ⁴KAIST (Korea), ⁵Osaka 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. Murata¹, L. C. Duy¹, S. Oyama¹, H. Sakai¹, ¹JAIST (Japan)

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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 CH₃NH₃PbBr₃ 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)*

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16:10 B-2-02

Temperature Dependence of Transport Properties in dinaphtho[2,3-b:2',3'-d] thiophene Thin-Film Transistors with MoO₃/Au Electrodes

S. Shaari^{1,2}, S. Naka¹, °H. Okada¹, ¹Univ. of Toyama (Japan), ²Univ. 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. Naka¹, °H. Okada¹, ¹Univ. of Toyama (Japan), ²Univ. Malaysia Perlis (Malaysia)

16:40 B-2-04

Influence of Surface Treatment of SiO₂ Gate Insulator for Pentacene-based OFETs with Nitrogen-doped LaB₆ Bottom-Contact Electrode Formation Process

°Y. Maeda¹, M. Hiroki¹, S. Ohmi¹, ¹Tokyo 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. Abe¹, H. Kojima¹, M. Kikuchi², T. Watanabe³, T. Koganezawa³, N. Yoshimoto², I. Hirosawa³, M. Nakamura¹, ¹NAIST (Japan), ²Iwate Univ. (Japan), ³Japan Synchrotron Radiation Research Institute (Japan)

17:10 B-2-06

Temperature Dependence of Carrier Mobility on Non-Peripherally Octahexyl-Substituted Copper Phthalocyanine

°Ken Watanabe¹, Koichi Watanabe¹, N. Tohnai¹, A. Fujii¹, M. Ozaki¹, ¹Osaka 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.)

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13:30 C-1-01 (Invited)

Crystal Growth of CZ-Si and Relationship between Carrier Lifetime and Defects

^oK. Kakimoto¹, Y. Miyamura¹, H. Harada¹, L. Qin¹, S. Nakano¹, ¹Kyushu Univ. (Japan)

14:00 C-1-02

Carrier Transport across ITO/MoO_x/SiO_x/Si Interfaces

^oT. Kamioka¹, Y. Hayashi¹, Y. Isogai¹, K. Nakamura², Y. Ohshita¹, ¹Toyota Technol. Inst. (Japan), ²Meiji Univ. (Japan)

14:15 C-1-03

Effect of starting point formation on the crystallization of amorphous silicon films by flash lamp annealing

^oD. Sato¹, K. Ohdaira¹, ¹JAIST (Japan)

14:30 C-1-04

Characteristics of Heavily Phosphorus-doped Gradient Si-rich Oxide Multilayer Thin Film Structure by Spin-on Method

^oP. -R. Huang¹, S. -C. Lin¹, P. -T. Lee¹, ¹National Chiao Tung Univ. (Taiwan)

14:45 C-1-05

Guiding Principle for Crystalline Si Photovoltaic Modules with High Tolerance against Acetic Acid

Y. Hara¹, ^oA. Masuda¹, ¹AIST (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

^oY. Shiratori¹, K. Nakada¹, S. Miyajima¹, ¹Tokyo 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. Yamada¹, ¹Tokyo Tech (Japan)

16:10 C-2-02

Analysis for Future Generation Solar Cells and Materials

°M. Yamaguchi¹, L. Zhu², H. Akiyama², Y. Kanemitsu³, H. Tampo⁴, H. Shibata⁴, K. -H. Lee¹, K. Araki¹, N. Kojima¹,
¹Toyota Tech. Inst. (Japan), ²Univ. of Tokyo (Japan),
³Kyoto Univ. (Japan), ⁴AIST (Japan)

16:25 C-2-03

Microstructural Characteristics of BaSi₂ Epitaxial Films Fabricated by Thermal Evaporation

°K. O. Hara¹, C. Yamamoto¹, J. Yamanaka¹, K. Arimoto¹, K. Nakagawa¹, N. Usami², ¹Univ. of Yamanashi (Japan),
²Nagoya 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. Stopa¹, T. Rueckes¹, ¹Nantero, Inc. (USA)

14:00 D-1-02

Differential Contact RRAM Pair for Advanced CMOS Logic NVM applications

°W. -T. Hsieh¹, C. -J. Lin¹, Y. -C. King¹, Y. -D. Chih², J. Chang², ¹National Tsing Hua Univ., Hsinchu (Taiwan),
²Taiwan Semiconductor Manufacturing Company (Taiwan)

14:20 D-1-03

Twin-bit Via RRAM in 16nm FinFET Logic Technologies

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°Y. -H. Shih¹, M. -Y. Hsu¹, Y. -C. King¹, C. -J. Lin¹,
¹National Tsing Hua Univ. (Taiwan), ²Taiwan
Semiconductor Manufacturing Company (Taiwan)

14:40 D-1-04

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

°M. Barlas¹, L. Grenouillet¹, E. Vianello¹, V. Delaye¹, T.
Dewolf¹, G. Audoit¹, N. Rambal¹, S. Bernasconi¹, C. Vizioz¹,
N. Posseme¹, S. Barnola¹, B. Bouix¹, O. Pollet¹, C.
Comboroure², N. Allouti¹, P. Rodriguez¹, V. Beugin¹, V.
Loup¹, C. Tallaron², S. Chevalliez², R. Coquand¹, C.
Jahan¹, S. Reboh¹, A. Toffoli¹, S. Barraud¹, L. Brevard¹, Y.
Morand¹, M. Vinet¹, O. Faynot¹, L. Perniola¹, ¹CEA-LETI
(France), ²STMicroelectronics (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. Tsuda¹, Y. Kawashima¹, K. Sonoda¹, A. Yoshitomi¹, T.
Mihara¹, S. Narumi¹, M. Inoue¹, S. Muranaka¹, T.
Maruyama¹, T. Yamashita¹, Y. Yamaguchi¹, D. Hisamoto²,
¹Renesas Electronics Corp. (Japan), ²Hitachi, Ltd. (Japan)

16:10 D-2-02

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

°T. -M. Wang¹, W. -Y. Chien¹, C. -L. Hsu¹, Y. -D. Chih², C. J.
Lin¹, Y. -C. King¹, ¹National Tsing Hua Univ. (Taiwan),
²Taiwan Semiconductor Manufacturing Company (Taiwan)

16:30 D-2-03

In-situ formation of Hf-based MONOS structure for

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nonvolatile memory application

°S. Kudoh¹, M. Tsukazaki¹, S. Ishimatsu¹, S. Ohmi¹, ¹Tokyo Tech (Japan)

16:50 D-2-04

23% Higher Performance 2D MLC/3D TLC NAND Flash Hybrid Solid-State Drive

°Y. Sakaki¹, T. Yamada¹, C. Matsui¹, Y. Yamaga¹, K. Takeuchi¹, ¹Chuo Univ. (Japan)

17:10 D-2-05

Read Disturb Improvement for 1znm TLC NAND Flash

°H. -N. Yoo¹, H. Shim¹, J. -W. Kim¹, K. -H. Noh¹, H. Chang¹, ¹SK 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. Choi¹, M. Jin¹, Jinju Kim¹, Jungin Kim¹, H. Sagong¹, Y. Kim¹, H. Shim¹, K. Kim¹, G. Kim¹, S. Lee¹, T. Uemura¹, J. Park¹, S. Shin¹, S. Pae¹, ¹Samsung Electronics Co., Ltd. (Korea)

14:00 E-1-02

Comprehensive Analysis of Low-frequency Noise Variability Components in Bulk and FDSOI (SOTB) MOSFETs

°K. Maekawa¹, H. Makiyama¹, Y. Yamamoto¹, T. Hasegawa¹, S. Okanishi¹, K. Sonoda¹, H. Shinkawata¹, T. Yamashita¹, S. Kamohara¹, Y. Yamaguchi¹, ¹Renesas Electronics Corp. (Japan)

14:20 E-1-03

Plasma Induced Damage Depending on Antenna Layers in

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Ring Oscillators

°R. Kishida¹, J. Furuta¹, K. Kobayashi¹, ¹Kyoto Inst. of Tech. (Japan)

14:40 E-1-04

Revisited Study for Fluorine Implantation Impact on NBTI for Automotive I/O Device

°T. Yoshida¹, K. Maekawa¹, S. Tsuda¹, T. Shimizu¹, M. Ogasawara¹, H. Aono¹, ¹Renesas 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. Yang¹, Q. -H. Luc¹, C. C. Chang¹, J. W. Lin¹, C. -C. F. Chiang¹, H. B. Do¹, M. T. H. Ha¹, S. H. Huynh¹, Y. D. Jin¹, T. A. Nguyen¹, Y. -C. Lin¹, E. Y. Chang¹, ¹National 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. Barraud¹, V. Lapras¹, M. P. Samson², B. Previtali¹, J. M. Hartmann¹, N. Rambal¹, C. Vizioz¹, V. Loup¹, C. Comboroure², F. Triozon¹, N. Bernier¹, D. Cooper¹, M. Vinet¹, ¹CEA-Leti (France), ²STMicroelectronics (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. Jo¹, W. -K. Kim¹, M. Takenaka¹, S. Takagi¹, ¹Univ. of Tokyo (Japan)

16:30 E-2-03

Single and Double Diffusion Breaks in 14nm FinFET and Beyond

°K. Miyaguchi¹, F. Bufler¹, T. Chiarella¹, P. Matagne¹, N. Horiguchi¹, A. D. Keersgieter¹, G. Eneman¹, A. Spessot¹, B. Parvais^{1,2}, D. Verkest¹, A. Mocuta¹, ¹IMEC (Belgium),
²Vrije Universiteit Brussel (Belgium)

16:50 E-2-04

Insights and Opportunities for Junctionless Gate-All-Around Lateral and Vertical Nanowire FETs

°A. Veloso¹, P. Matagne¹, E. Simoen¹, A. Chasin¹, B. Kaczer¹, D. Yakimets¹, D. Mocuta¹, N. Collaert¹, ¹IMEC (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. Kato¹, H. Matsui¹, H. Tabata¹, M. Takenaka¹, S. Takagi¹, ¹Univ. 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. Yang¹, P. -C. Su¹, Y. -S. Wu¹, C. -L. Hsieh¹, S. -K. Shen¹, ¹National 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. Haruta¹, M. Kubo¹, T. Noda¹, K. Sasagawa¹, T.

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Tokuda¹, J. Ohta¹, ¹NAIST (Japan)

14:15 F-1-03

An Integrated Photo-Plethysmography Recording Circuit for Trans-Nail Pulse-Wave Monitoring System

°Z. Qian¹, Y. Takezawa¹, K. Shimokawa¹, H. Kino¹, T. Fukushima¹, K. Kiyoyama², T. Tanaka¹, ¹Tohoku Univ. (Japan), ²Nagasaki Inst. of Applied Sci. (Japan)

14:30 F-1-04

CMOS-based Opical Energy Harvesting Circuit for Implantable and IoT Devices

°N. Wuthibenjaphonchai¹, M. Haruta¹, T. Noda¹, K. Sasagawa¹, T. Tokuda¹, M. Sawan², J. Ohta¹, ¹NAIST (Japan), ²Polytechnique Montreal (Canada)

14:45 F-1-05

A Compact Sweat Monitoring System with CMOS Capacitive Humidity Sensor for Wearable Health-Care Application

°Y. Mitani¹, K. Miyaji¹, S. Kaneko¹, T. Uekura¹, H. Momose², K. Johguchi¹, ¹Shinshu Univ. (Japan), ²Nishizawa 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}, ¹Univ. of Tokyo (Japan), ²Kawasaki Inst. of Industry Promotion (Japan)

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16:10 F-2-02

Respiratory Sensor Continuously Attached on the Abdomen

*M. Terasawa¹, M. Karita¹, S. Kumagai¹, °M. Sasaki¹,
¹Toyota Tech. Inst. (Japan)*

16:25 F-2-03

Wireless operation of EWOD by the on-chip CMOS silicon photovoltaic cell array

°Y. Okamoto¹, Y. Mita¹, ¹Univ. 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. Harashima¹, T. Morikawa¹, H. Kino¹, T. Fukushima¹, N. Katayama¹, T. Tanaka¹, ¹Tohoku Univ. (Japan)

16:55 F-2-05

Parallelized High Throughput Emulsification and Emulsion PCR for Clinical Use of BEAMing Technology

*°K. Cai¹, Y. Koya¹, K. Yasuko¹, N. Katsumi¹, T. Ayato¹,
¹Sysmex 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. Jo¹, W. Terashima^{1,2}, N. Maeda^{1,2}, T. -T. Lin², K. Wang², ¹RIKEN (Japan), ²RIKEN Center for Advanced Photonics (Japan)

16:10 G-2-02

Ultraviolet light emitting diodes grown on Si-implanted GaN template

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°P. -H. Liao¹, H. -Y. Cheng¹, M. -L. Lee², W. -C. Lai¹, J. -K. Sheu¹, ¹National Cheng Kung Univ. (Taiwan), ²Southern Taiwan Univ. of Sci. and Tech. (Taiwan)

16:25 G-2-03

Reduction of Impurity Incorporation into MOVPE-grown GaN films on ScAlMgO₄ Substrate

°T. Iwabuchi¹, S. Kuboya¹, C. Hagiwara¹, T. Tanikawa¹, T. Hanada¹, T. Fukuda², T. Matsuoka¹, ¹Tohoku Univ. (Japan), ²Fukuda Crystal Lab. (Japan)

16:40 G-2-04

Enhanced Hole Generation in Mg-doped AlN/AlGaN Superlattices with High Average Al Content

°K. Ebata¹, J. Nishinaka¹, Y. Taniyasu¹, K. Kumakura¹, ¹NTT 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. Kondo¹, S. Sato¹, T. Iwai¹, N. Yokoyama¹, ¹Fujitsu Labs. Ltd. (Japan)

14:00 H-1-02

Moisture Barrier Properties of Single-Layer Graphene Deposited on Cu Films for Cu Metallization

°P. Gomasang¹, T. Abe¹, K. Kawahara², Y. Wasai³, N. Nabatova-Gabain³, N. T. Cuong⁴, H. Ago², S. Okada⁵, K. Ueno^{1,6}, ¹Shibaura Inst. of Tech. (Japan), ²Kyushu Univ. (Japan), ³Horiba Ltd. (Japan), ⁴NIMS (Japan), ⁵Univ. of Tsukuba (Japan), ⁶SIT 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

^oR. Sundaram¹, T. Yamada¹, K. Hata¹, A. Sekiguchi¹, ¹AIST (Japan)

14:30 H-1-04

Pd-dot-size dependence of hydrogen sensors based on graphene FET for breath analysis

^oY. Sakamoto¹, K. Uemura¹, T. Ikuta¹, K. Maehashi¹, ¹Tokyo Univ. of Agri. & Tech. (Japan)

14:45 H-1-05

Intrinsic response of protein adsorption to graphene film on SiC substrate

^oY. Taniguchi¹, M. Tsubasa¹, Y. Ohno¹, M. Nagase¹, Y. Arakawa¹, Y. Imada¹, K. Minagawa¹, M. Yasuzawa¹, ¹Tokushima Univ. (Japan)

15:00 H-1-06

Growth of Suspended Graphene Nanoribbons and its Optoelectronic Application

^oH. Suzuki¹, T. Kaneko¹, T. Kato¹, ¹Tohoku 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. Alam¹, N. -X. Hu², ^oM. R. Howlader¹, M. J. Deen¹, ¹McMaster Univ. (Canada), ²Xerox Research Center of Canada (Canada)

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16:10 H-2-02

Silicon Photonic Biosensors with MEMS Flow Control

°Y. Amemiya¹, A. K. Sana¹, Y. Nakashima¹, J. Maeda¹, S. Yokoyama¹, ¹Hiroshima Univ. (Japan)

16:30 H-2-03

Tilt Characteristics of a MEMS Accelerometer fabricated by Multi-layer Metal Technology

°I. Tsuji¹, M. Takayasu¹, H. Ito¹, D. Yamane¹, S. Dosho¹, T. Konishi^{1,2}, N. Ishihara¹, K. Machida¹, K. Masu¹, ¹Tokyo Tech (Japan), ²NTT Adv. Tech. Corp. (Japan)

16:50 H-2-04

The Fully Wireless Pressure Sensor Based on Endoscopic Image

°Y. Maeda^{1,2}, H. Mori¹, T. Nakagawa¹, H. Takao¹, ¹Kagawa Univ. (Japan), ²National Institute of Technology, Kagawa Collage (Japan)

17:10 H-2-05

Development of an Adhesive Plaster Size Current Sensor for Power Monitoring

°T. Yamashita¹, T. Itoh², R. Maeda¹, ¹AIST (Japan), ²Univ. of Tokyo (Japan)

17:30 H-2-06

Evaluation of Electrical Conductivity of CFRP by Surface Potential Distribution

°K. Kikunaga¹, N. Terasaki¹, ¹AIST (Japan)

08: Advanced Material Synthesis and Crystal Growth Technology
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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

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°R. Engel-Herbert¹, M. Brahlek¹, J. M Lapano¹, J. Roth¹,
¹Pennsylvania State Univ. (USA)

14:00 J-1-02

Growth and Magnetic Properties of Ruddlesden-Popper Series $\text{Sr}_{n+1}\text{V}_n\text{O}_{3n+1}$ Epitaxial Thin Films

°S. Fukuda¹, D. Oka¹, T. Fukumura¹, ¹Tohoku 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. Tateyama¹, H. Chiba^{1,2}, T. Kawashima¹, K. Washio¹,
¹Tohoku Univ. (Japan), ²Japan 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. Rutthongjan¹, ¹Kochi 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. Kinoshita¹, M. Karita¹, T. Nakano¹, Y. Inoue¹, T. Miwa²,
H. Nagaoka², ¹Shizuoka Univ. (Japan), ²JNC 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. Taniwaki¹, H. Yoshida¹, K. Arafune¹, A. Ogura², S. Satoh¹, Y. Hotta¹, ¹Univ. of Hyogo (Japan), ²Meiji 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. Ho¹, °C. -H. Yeh¹, W. -H. Wang², C. -H. Ho³, C. -W. Chen⁴, ¹National Tsing Hua Univ. (Taiwan), ²Academia Sinica (Taiwan), ³National Taiwan Univ. of Sci. and Tech. (Taiwan), ⁴National Taiwan Univ. (Taiwan)

16:10 J-2-02

Infrared Black Phosphorus Phototransistor with Electrostatically Tunable Responsivity

°L. Huang¹, W. C. Tan¹, L. Wang¹, C. Lee¹, K. -W. Ang¹, ¹National Univ. of Singapore (Singapore)

16:25 J-2-03

Modulation of Thermoelectric Performance by Using Electrolyte Gating Method

°K. Kanahashi¹, J. Pu², L. -J. Li³, M. Ishihara⁴, M. Hasegawa⁴, Y. -Y. Noh⁵, H. Ohta⁶, T. Takenobu², ¹Waseda Univ. (Japan), ²Nagoya Univ. (Japan), ³KAUST (Saudi Arabia), ⁴AIST (Japan), ⁵Dongguk Univ. (Korea), ⁶Hokkaido Univ. (Japan)

16:40 J-2-04

Detuning dependence of higher-order harmonic generation in monolayer transition metal dichalcogenides

°T. Tamaya^{1,2}, S. Konabe³, S. Kawabata^{1,2}, ¹AIST (Japan), ²CREST, Japan Sci. and Tech. Agency (Japan), ³Tokyo Univ. of Sci. (Japan)

16:55 J-2-05

Tailoring the Rashba Spin-Orbit Coupling in Colloidal Lead Sulfide Nanosheets

°M. M. Ramin Moayed¹, T. Bielewicz¹, M. S. Zoellner¹, C.

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Herrmann¹, C. Klinke¹, ¹Univ. of Hamburg (Germany)

17:10 J-2-06

Tunable spin splitting and spin relaxation in polar WSTe monolayer

^oM. A. U. Absor¹, F. Ishii², H. Kotaka³, M. Saito², ¹Gadjah Mada Univ. (Indonesia), ²Kanazawa Univ. (Japan), ³Osaka Univ. (Japan)

01: Advanced LSI Processing & Materials Science
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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

^oK. Kita¹, H. Kamata¹, J. Fei¹, ¹Univ. of Tokyo (Japan)

14:00 K-1-02

Direct Observation of Electrical Dipole and Atomic
Density at High-k Dielectrics/SiO₂ Interface

^oN. Fujimura¹, A. Ohta¹, M. Ikeda¹, K. Makihara¹, S. Miyazaki¹, ¹Nagoya Univ. (Japan)

14:20 K-1-03

Consideration on the interfacial dipole layer formation at
non-SiO₂ oxide interfaces in the examples of MgO/Al₂O₃
and HfO₂/Al₂O₃

^oJ. Fei¹, K. Kita¹, ¹Univ. of Tokyo (Japan)

14:40 K-1-04

Characterization of near-interface border-traps in GeO₂/Ge
gate stacks grown by low and high temperature thermal
oxidation using deep-level transient spectroscopy

^oW.-C. Wen¹, T. Sakaguchi¹, K. Yamamoto¹, D. Wang¹, H. Nakashima¹, ¹Kyushu Univ. (Japan)

15:00 K-1-05

Generalized Picture of Work Function of a Metal with Schottky Interface

°*T. Nishimura¹, T. Yajima¹, A. Toriumi¹, ¹Univ. 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 0.18 μ m Standard CMOS Process for Energy Harvesting

°*M. Yoshida¹, K. Miyaji¹, ¹Shinshu 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. Asano¹, T. Hirose¹, Y. Kojima¹, N. Kuroki¹, M. Numa¹, ¹Kobe 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. Karasawa¹, Y. Gotou¹, S. Hara¹, T. Fukuoka¹, K. Miyaji¹, ¹Shinshu 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. Lin¹, P. -C. Wu¹, T. -Y. Lin¹, Y. -C. Liu¹, W. -T. Hung¹, H. -H. Tsai¹, Y. -Z. Juang¹, ¹Chip 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. Takezawa¹, K. Shimokawa¹, Z. Qian¹, H. Kino¹, T. Fukushima¹, K. Kiyoyama², T. Tanaka¹, ¹Tohoku Univ. (Japan), ²Nagasaki Inst. of Applied Sci. (Japan)

Joint Session (Area 4&9)

M-1: Quantum 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. Yamaoka¹, ¹Hitachi, 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. Schmiedmayer⁴, W. J. Munro^{5,1}, ¹National Inst. of Informatics (Japan), ²Sokendai, The Graduate Univ. for Advanced Studies (Japan), ³Univ. of Vienna (Austria), ⁴Vienna Center for Quantum Sci. and Tech. (Austria), ⁵NTT Basic Res. Labs. (Japan)

14:30 M-1-03

Quantum Dipole in a Silicon Transistor: Quantum Simulation for Strongly Correlated System

°S. Saito¹, Z. Li¹, H. Yoshimoto², I. Tomita^{1,3}, Y. Tsuchiya¹, Y. Sasago⁴, H. Arimoto^{1,4}, F. Liu¹, M. K. Husain¹, D. Hisamoto⁴, H. N. Rutt¹, S. Kurihara², ¹Univ. of Southampton (UK), ²Waseda Univ. (Japan), ³Gifu College (Japan), ⁴Hitachi, Ltd. (Japan)

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14:45 M-1-04 (Late News)

Sarcosine as prostate cancer biomarker detection through H₂O₂ sensing by using nickel-oxide on Si nanowires
°A. Roy¹, S. Jana¹, J. T. Qiu¹, S. Maikap¹, ¹Chang Gung Univ. (Taiwan)

15:00 M-1-05 (Late News)

High pH sensitivity and low concentration detection of urea/H₂O₂ by using IrO_x/HfO_x membrane in electrolyte-insulator-semiconductor structure
°S. Jana¹, A. Roy¹, J. T. Qiu¹, S. Maikap¹, ¹Ghang Gung Univ. (Taiwan)

15:15-15:40	Coffee Break
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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. Reita¹, ¹CEA-Leti (France)

16:10 M-2-02 (Invited)

Emulating Synaptic Plasticity in Neuromorphic Systems with Resistive Memories
°S. L. Barbera¹, E. Vianello¹, T. Werner¹, B. D. Salvo¹, L. Perniola¹, ¹CEA-Leti (France)

16:40 M-2-03 (Invited)

Low Power Deep Neural Network Hardware Based on Memristive Crossbar Circuits
°I. Kataeva¹, S. Ohtsuka¹, ¹DENSO Corp. (Japan)

17:10 M-2-04

Predictive Analysis of Randomness in 3D RRAM-based Physically Unclonable Security Primitive
°J. Kim¹, H. Nili², G. C. Adam^{2,3}, D. Strukov², O. Kavehei¹,
¹RMIT Univ. (Australia), ²Univ. of California Santa Barbara (USA), ³National 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. Kawano¹, H. Matsumura¹, Y. Yagishita¹, Y. Nakasha¹, T. Takahashi¹, N. Hara¹, ¹Fujitsu Ltd. (Japan)

14:00 N-1-02

A Wide-Range Variable-Frequency Resonant Tunneling Diode Oscillator Based on a Novel MEMS Phase Shifter

°T. Yamashita¹, D. Nakano¹, M. Mori¹, K. Maezawa¹, ¹Univ. 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. Suzuki¹, S. Shibuya¹, Y. Isobe¹, ¹Tokyo 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. Yao¹, Y. C. Lin¹, H. T. Hsu¹, T. J. Huang¹, M. S. Lin², Y. C. Wang¹, Z. Y. Huang¹, S. M. Sze¹, E. Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan), ²National Tsing Hua Univ. (Taiwan)

14:45 N-1-05

Study of enhance mode π -gate InAs HEMT for logic application

°Y. -C. Wang¹, J. -N. Yao¹, Y. -C. Lin¹, H. -T. Hsu¹, T. -J. Huang¹, C. -Y. Huang¹, E. Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan)

15:00 N-1-06

First Demonstration of GaSb p-Channel Schottky

Wednesday, September 20

MOSFET with Pt Source/Drain

°M. L. Tsai¹, Y. P. Chang¹, C. H. Chien¹, ¹National 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}, ¹AIXTRON SE (Germany), ²RWTH Aachen Univ. (Germany)

16:10 N-2-02

Thermodynamic Analysis of the Surface Reactions in GaN MOVPE

°K. Sekiguchi¹, H. Shirakawa¹, K. Chokawa¹, M. Araidai¹, Y. Kangawa^{1,2}, K. Kakimoto², K. Shiraishi¹, ¹Nagoya Univ. (Japan), ²Kyushu Univ. (Japan)

16:25 N-2-03

Improved mobility in InAlN/AlGaN two-dimensional electron gas heterostructures with an atomically-smooth heterointerface

°D. Hosomi¹, Y. Miyachi¹, T. Egawa¹, M. Miyoshi¹, ¹Nagoya 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. Senzaki¹, M. Miyazato^{1,4}, M. Ryo^{1,4}, M. Miyajima^{1,4}, Y. Yonezawa¹, T. Kato¹, K. Kojima¹, H. Okumura¹, ¹AIST (Japan), ²Toray Research Center Inc. (Japan), ³SHOWA DENKO K.K. (Japan), ⁴Fuji Electric Co. Ltd. (Japan)

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16:55 N-2-05

Fabrication of MSM-Type Photodetector Using Sn-Doped α -Ga₂O₃ Films Grown by Mist Chemical Vapor Deposition
°K. Rikitake¹, T. Kobayashi¹, T. Yamaguchi¹, T. Onuma¹, T. Honda¹, ¹Kogakuin Univ. (Japan)

17:10 N-2-06 (Late News)

AlN metal-semiconductor field-effect transistors using Si-ion implantation

°H. Okumura^{1,2}, S. Suihkonen³, J. Lemettinen³, A. Uedono¹, T. Palacios², ¹Univ. of Tsukuba (Japan), ²MIT (USA), ³Aalto 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. Sometani¹, M. Okamoto¹, T. Hatakeyama¹, Y. Iwahashi¹, M. Hayashi^{1,2}, D. Okamoto³, H. Yano³, S. Harada¹, Y. Yonezawa¹, H. Okumura¹, ¹AIST (Japan), ²DENSO Corp. (Japan), ³Univ. of Tsukuba (Japan)

14:00 O-1-02

First Principles Study of the effect of Hydrogen Annealing effects on SiC MOSFETs

°K. Chokawa¹, K. Shiraishi¹, ¹Nagoya Univ. (Japan)

14:15 O-1-03

Kinetics of Enhanced Oxide Growth on 4H-SiC in O₂ and H₂O Coexisting Ambient

°K. Ishinoda¹, K. Kita¹, ¹Univ. of Tokyo (Japan)

14:30 O-1-04

Oxidation-induced Lattice Distortion at 4H-SiC (0001)

Wednesday, September 20

Surface Characterized by Surface Sensitive In-plane X-ray
Diffractometry

°A. D. Hatmanto¹, K. Kita¹, ¹Univ. of Tokyo (Japan)

14:45 O-1-05

Hole Trapping in SiC-MOS Devices Evaluated by Fast-CV
Method

*°M. Hayashi^{1,2}, M. Sometani¹, T. Hatakeyama¹, H. Yano³, S.
Harada¹, ¹AIST (Japan), ²DENSO Corp. (Japan), ³Univ.
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. Kutsuki¹, Y. Murakami¹, Y. Watanabe², T. Onishi¹, K.
Yamamoto³, H. Fujiwara¹, T. Ito¹, ¹Toyota Motor Corp.
(Japan), ²Toyota Central R&D Labs. Inc. (Japan),
³DENSO Corp. (Japan)*

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

^oN. Clement¹, ¹NTT Basic Res. Labs. (Japan)

10:00 B-3-02

Electron Injection on Metal/n-doped Polymer
Semiconductor

^oS. Sakiyama¹, A. Yasukochi¹, T. Iwashita¹, K. Fujita¹,
¹Kyushu 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

^oH. Ueda¹, K. Takeuchi¹, A. Kikuchi^{1,2}, ¹Sophia Univ.
(Japan), ²Sophia Nanotechnology Research Center
(Japan)

10:30 B-3-04

Theoretical Studies of π -Conjugate Molecules Embedded
in hexagonal boron nitride

W. Xie¹, T. Tamura¹, T. Yanase¹, T. Nagahama¹, ^oT.
Shimada¹, ¹Hokkaido Univ. (Japan)

Thursday, September 21

10:45 B-3-05

A Design-analysis Flow Considering Mechanical Stability of Metal Masks for Organic CMOS Circuits

^oM. Shintani¹, K. Kuribara², Y. Ogasahara², M. Hiromoto¹, T. Sato¹, ¹Kyoto Univ. (Japan), ²AIST (Japan)

11:00 B-3-06

Dimer Formation of Pentacene by Heated Tungsten

^oA. Heya¹, N. Matsuo¹, ¹Univ. 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. Lee¹, Y. Kim¹, ^oS. Lee¹, ¹Seoul National Univ. (Korea)

14:30 B-4-02

Optical Waveguides with Memory Effect Using Photochromic Material for Neural Network

^oK. Tanimoto¹, Y. Amemiya¹, S. Yokoyama¹, ¹Hiroshima

Thursday, September 21

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. Matsuda¹, °F. Hattori¹, H. Iwata¹, T. Ohzone², ¹Toyama Prefectural Univ. (Japan), ²Dawn 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. Makita¹, H. Mizuno¹, R. Oshima¹, T. Tayagaki¹, M. Baba², N. Yamada², H. Takato¹, T. Sugaya¹, ¹AIST (Japan), ²Nagaoka 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. Hasumi¹, Y. Ogawa¹, K. Oshinari¹, T. Sameshima¹, ¹Tokyo 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. Aihara¹, T. Tayagaki¹, Y. Nagato², Y. Okano², T. Sugaya¹, ¹AIST (Japan), ²Tokyo 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. Asai¹, ¹Hokkaido Univ. (Japan)*

10:00 D-3-02

An Energy Efficient and High Speed Architecture for
Convolution Computing Based on Binary RRAMs

°*C. Liu¹, R. Han¹, Z. Zhou¹, P. Huang¹, L. Liu¹, X. Liu¹, J. Kang¹, ¹Peking Univ. (China)*

10:20 D-3-03

Characteristics of Crystalline Oxide Semiconductor-based
Single Transistor Multiplier for Analog Neural Network

°*T. Aoki¹, S. Harada¹, Y. Okamoto¹, T. Nakagawa¹, H. Inoue¹, T. Ikeda¹, Y. Kurokawa¹, Y. Shima¹, M. Jincho¹, M. Ikeda², S. Yamazaki¹, ¹Semiconductor Energy Lab. Co., Ltd. (Japan), ²Univ. 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}, ¹Tohoku Univ. (Japan), ²ACCEL, JST (Japan), ³OPERA, JST (Japan)*

Thursday, September 21

10:55 D-3-05

Design of an MTJ-Oriented Nonvolatile Lookup Table
Circuit with Write-Operation Minimizing

°D. Suzuki¹, T. Hanyu¹, ¹Tohoku 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. Torrejon¹, M. Riou¹, F. A. Araujo¹, S. Tsunegi², G.

Khalsa³, D. Querlioz⁴, P. Bortolotti¹, V. Cros¹, A.

Fukushima², H. Kubota², S. Yuasa², M. D. Stiles³, J.

Grollier¹, ¹Unite Mixte de Physique, CNRS/Thales

Thursday, September 21

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

14:30 D-4-02

Neuromorphic Transistor Achieved by Redox Reaction of WO₃ Thin Film

°M. Jayabalan^{1,2}, K. Kawamura^{1,3}, M. Takayanagi^{1,3}, T. Tsuchiya¹, T. Higuchi³, R. Jayavel², K. Terabe¹, ¹NIMS (Japan), ²Anna Univ. (India), ³Tokyo 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. Marukame¹, R. Ichihara¹, M. Mori¹, Y. Nishi¹, S. Yasuda¹, T. Tanamoto¹, Y. Mitani¹, ¹Toshiba Corp. (Japan)

15:00 D-4-04

Application of VO₂ metal-insulator transition to capacitorless neuron circuits

°T. Yajima¹, T. Nishimura¹, A. Toriumi¹, ¹Univ. 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. Afzalian¹, T. Vasen¹, P. Ramvall¹, D. Lemus², T. Kubis², M. Passlack¹, T. -M. Shen³, J. Wu³, ¹TSMC, Leuven (Belgium), ²Purdue Univ. (USA), ³TSMC, Hsinchu (Taiwan)

Thursday, September 21

10:00 E-3-02

Investigation of TFETs with Vertical Tunneling Path for Low Average Subthreshold Swing

[°]*S. Glass¹, N. von den Driesch¹, S. Strangio², C. Schulte-Braucks¹, T. Rieger¹, D. Buca¹, S. Mantl¹, Q. -T. Zhao¹,
¹Forschungszentrum Juelich (Germany), ²Univ. 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. Bae¹, Y. Wakabayashi¹, R. Nakane¹, M. Takenaka¹, S. Takagi¹,
¹Univ. of Tokyo (Japan)*

10:40 E-3-04

Ge p-channel Tunneling FETs with Steep Phosphorus Profile Source Junctions

[°]*R. Takaguchi¹, R. Matsumura¹, T. Katoh¹, M. Takenaka¹, S. Takagi¹,
¹Univ. 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. Ota¹, J. Hattori¹, H. Asai¹, T. Ikegami¹, K. Fukuda¹, S. Migita¹, A. Toriumi², ¹AIST (Japan), ²Univ. 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. Huang¹, C. -L. Yu¹, W. -X. You¹, P. Su¹, ¹National Chiao Tung Univ. (Taiwan)

14:40 E-4-03

Fringing Field Effects in Ferroelectric Negative Capacitance Field-Effect Transistors

°J. Hattori¹, K. Fukuda¹, T. Ikegami¹, H. Ota¹, S. Migita¹, H. Asai¹, A. Toriumi², ¹AIST (Japan), ²Univ. 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. Hatano¹, H. Ishiwata¹, T. Iwasaki¹, ¹Tokyo Tech (Japan)

Thursday, September 21

10:00 F-3-02

Multiple Channel Detection of Cellular Activities by Ion Sensitive Transistors

°S. Machida¹, ¹Toyota 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. Abe¹, K. Nagamine¹, M. Nakabayashi¹, T. Yamauchi¹, K. Yamasaki¹, M. Nishizawa¹, ¹Tohoku Univ. (Japan)

10:30 F-3-04

Ultra-sensitive biosensor with capacitive coupling-gate InGaZnO-based FET

°K. Ito¹, K. Nishimura¹, K. Ikeda², K. Matsuzawa², T. Tezuka², T. Sakata¹, ¹Univ. of Tokyo (Japan), ²Toshiba 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. Nishitani¹, T. Sakata¹, ¹Univ. 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

^oN. Verellen¹, D. Vercruyse¹, V. Rochus¹, B. D. Bois¹, A. Dusa¹, S. Kerman¹, M. Mahmud-Ul-Hasan¹, P. V. Dorpe¹, X. Rottenberg¹, L. Lagae¹, ¹IMEC (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. Nakanishi¹, M. Kobayashi², M. Sasaki¹, ^oS. Kumagai¹, ¹Toyota Tech. Inst. (Japan), ²NAIST (Japan)

14:45 F-4-03

Label Free Detection of Prostate Specific Antigen Using Photonic Crystal Nanocavity Resonator

^oA. K. Sana¹, Y. Amemiya¹, T. Ikeda¹, A. Kuroda¹, S. Yokoyama¹, ¹Hiroshima Univ. (Japan)

15:00 F-4-04

Frequency-response curves of micropatterned hippocampal neurons: Effect of cell morphology on membrane impedance

^oR. Matsumura¹, H. Yamamoto¹, S. Katsurabayashi², M. Niwano¹, A. Hirano-Iwata¹, ¹Tohoku Univ. (Japan), ²Fukuoka 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. Lu¹, C. -C. Wu¹, P. -T. Lee¹, ¹National 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. Lu¹, Y. Minami¹, N. Kumagai², T. Kitada¹, ¹Tokushima Univ. (Japan), ²AIST (Japan)

10:00 G-3-03

CMOS Single-Photon Avalanche Diodes for Light

Detection and Ranging in Strong Background Illumination

°W. -S. Huang¹, T. -H. Liu¹, D. -R. Wu¹, C. -M. Tsai¹, S. -D. Lin¹, ¹National 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. Ariyoshi¹, Y. Takane¹, J. Iwasa¹, K. Sakamoto¹, A. Baba¹, Y. Arima¹, ¹Kyushu Inst. of Tech. (Japan)

10:30 G-3-05

Compact Waveguide-Coupled Hybrid Plasmonic Nanotaper for Optical Trapping of Nanoparticles

°Y. -C. Lin¹, P. -T. Lee¹, ¹National Chiao Tung Univ. (Taiwan)

10:45 G-3-06

Population trapping through spectral hole burning in

¹⁶⁷Er³⁺:Y₂SiO₅

M. IJspeert¹, G. Mariani¹, °T. Tawara^{1,2}, K. Shimizu¹, H. Omi^{1,2}, S. Adachi³, H. Gotoh¹, ¹NTT Basic Res. Labs.

(Japan), ²NTT Nanophotonics Center (Japan), ³Hokkaido Univ. (Japan)

Thursday, September 21

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. Kitada¹, X. Lu¹, Y. Minami¹, N. Kumagai², K. Morita³,
¹Tokushima Univ. (Japan), ²AIST (Japan), ³Chiba 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. Chen¹, °K. -L. Lin¹, ¹National Cheng Kung Univ. (Taiwan)

10:00 H-3-02

Enhancement of Direct Cu Bonding via Pulsed Flash Light

°J. -M. Song¹, S. -Y. Liang¹, P. -H. Chiang¹, S. -K. Huang²,
Y. -T. Chiu², D. Tarng², C. -P. Hung², ¹National Chung Hsing Univ. (Taiwan), ²Advanced 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

Thursday, September 21

°T. -C. Chou¹, ¹National 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. Alam¹, A. Hanna¹, S. C. Jangam¹, A. Bajwa¹, S. S. Iyer¹, ¹UCLA (USA), ²Tohoku Univ. (Japan)

11:00 H-3-05

N5 BEOL Process Options Patterning flows Comparing 193immersion to Hybrid EUV or Full EUV

°S. Lariviere¹, B. Briggs¹, C. Wilson¹, D. Wan¹, A. Mallik¹, S. Decoster¹, J. Bekaert¹, V. Blanco¹, M. Mao¹, S. Paolillo¹, B. K. Kotowska¹, J. Versluijs¹, J. Boemmels¹, D. Trivkovic¹, Z. Tokei¹, G. Mcintyre¹, D. Mocuta¹, ¹IMEC (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)

Thursday, September 21

14:00 H-4-01

Impacts of annealing on interfaces of Al foil/Si junctions by using surface activated bonding

°K. Furuna¹, J. Liang¹, M. Matsubara², D. Marwan², Y. Nishio², N. Shigekawa¹, ¹Osaka City Univ. (Japan), ²Toyo Aluminium K.K. (Japan)

14:20 H-4-02

Fabrication of Mechanical Durable Glass Nanopillar with Bridged Structure

°H. Kuwae¹, T. Sudo¹, K. Takayama², S. Shoji¹, J. Mizuno¹, ¹Waseda Univ. (Japan), ²Asahi Glass Corp. (Japan)

14:40 H-4-03

Influence of atomic species of fast atom bombardment for surface activated bonding interface of germanium

°M. Fujino¹, G. Kono¹, T. Suga¹, ¹Univ. of Tokyo (Japan)

15:00 H-4-04

Bonding and Debonding of Si/Glass based on SAB Method Combined with Hydrophilic Treatment

°K. Takeuchi¹, Y. Matsumoto², T. Suga¹, ¹Univ. of Tokyo (Japan), ²Lan Technical Service Co., Ltd. (Japan)

15:20 H-4-05 (Late News)

Au thin film wafer bonding after degas annealing for MEMS packaging

°T. Matsumae¹, Y. Kurashima¹, H. Takagi¹, ¹AIST (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. Qiao¹, H. Tian¹, L. -Q. Tao¹, N. -Q. Deng¹, Y. -T. Li¹, Y. -X. Li¹, Y. Pang¹, Y. Yang¹, °T. -L. Ren¹, ¹Tsinghua Univ.

(China)

10:00 J-3-02

Low-Resistance Contact to Single-Layer MoS₂ by Depositing Ultrathin High-k Dielectric with Remote N₂ Plasma Treatment as Tunneling Layer

°Q. Qian¹, Z. Zhang¹, M. Hua¹, J. Wei¹, J. Lei¹, K. J. Chen¹,
¹Hong Kong Univ. of Sci. and Tech. (Hong Kong)

10:15 J-3-03

Quantitative study of interfacial properties in monolayer MoS₂ FET

°N. Fang¹, K. Nagashio¹, ¹Univ. of Tokyo (Japan)

10:30 J-3-04

Conductance control by tunneling-barrier thickness optimizations in Fe/Al₂O₃/MoS₂ structure

°N. Hayakawa¹, I. Muneta¹, T. Ohashi¹, K. Matsuura¹, J. Shimizu¹, K. Kakushima¹, K. Tsustui¹, H. Wakabayashi¹,
¹Tokyo Tech (Japan)

10:45 J-3-05

Resonant Enhancement of Band-to-band Tunneling in In-plane MoS₂/WS₂ Heterojunctions

°T. Kuroda¹, N. Mori¹, ¹Osaka 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. Han¹, Y. J. Kim¹, S. Heo¹, C. -H. Kim¹, J. H. Kim¹, S. -Y. Kim¹, H. J. Hwang¹, S. K. Lee¹, H. J. Lee¹, M. -H. Yoon¹, B. H. Lee¹, ¹Gwangju 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

^o*Y. Hattori¹, T. Taniguchi², K. Watanabe², K. Nagashio^{1,3},
1¹Univ. of Tokyo (Japan), 2²NIMS (Japan), 3³PRESTO-JST (Japan)*

14:15 J-4-02

Electronic States of Silicene and Germanene on Amorphous Alumina

^o*M. Araidai¹, M. Kurosawa¹, A. Ohta¹, K. Shiraishi¹,
1¹Nagoya Univ. (Japan)*

14:30 J-4-03

Oxygen-Induced Structural Deterioration and Effective Encapsulation of Few-Layer 1T'-MoTe₂ Thin Film

*Z. Xie¹, L. Yang¹, H. Wu¹, J. Li¹, X. Lou¹, R. Zhu¹, H. Chang¹,
o^oW. Zhang¹, 1¹Huazhong Univ. of Sci. and Tech. (China)*

14:45 J-4-04

A Theoretical Investigation On MoS₂ Nanopore Power Generators

°Z. Huang¹, M. Tsutsui², Y. Zhang¹, Y. H. He¹, X. S. Miao¹,
M. Taniguchi², ¹Huazhong Univ. of Sci. and Tech. (China),
²Osaka Univ. (Japan)

15:00 J-4-05 (Late News)

Chemical Sensing using Graphene-based Surface-Acoustic-Wave Sensor

°S. Okuda^{1,2}, T. Ono¹, Y. Kanai¹, M. Shimatani², S. Ogawa²,
T. Ikuta^{1,3}, K. Inoue¹, K. Maehashi^{1,3}, K. Matsumoto¹,
¹Osaka Univ. (Japan), ²Mitsubishi Electric Corp. (Japan),
³Tokyo 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. Wang¹, T. Nishimura¹, T. Yajima¹, A. Toriumi¹, ¹Univ. of
Tokyo (Japan)

9:50 K-3-02

Ge Oxidation does not follow the Deal-Grove Mechanism

H. Li¹, °J. Robertson¹, ¹Cambridge Univ. (UK)

10:10 K-3-03

Impact of reaction kinetics at GeO₂/Si for high-performance SiGe gate stacks

°W. Song¹, A. Toriumi¹, ¹Univ. of Tokyo (Japan)

10:30 K-3-04

Role of Y-doping into GeO₂ in Ge gate stack reliability

°X. Tang^{1,2}, A. Toriumi¹, ¹Univ. of Tokyo (Japan), ²Nanjing
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. Li¹, S. -H. Yi¹, W. -Y. Hsu¹, J. Huang¹, C. -W. Hsu¹, T. -Y. Wu¹, D. -B. Ruan¹, K. -S. Chang-Liao¹, ¹National 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. Sakaguchi¹, K. Akiyama¹, K. Yamamoto¹, D. Wang¹, H. Nakashima¹, ¹Kyushu 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. Kuroi¹, ¹Nissin 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 Litta¹, R. Ritzenthaler¹, T. Schram¹, A. Spessot¹, B. O'Sullivan¹, Y. Ji², G. Mannaert¹, C. Lorant¹, F. Sebaai¹, A. Thiam¹, M. Ercken¹, S. Demuynck¹, N. Horiguchi¹,

Thursday, September 21

¹IMEC (Belgium), ²SK Hynix (Korea)

14:50 K-4-03

S/D Contact Solutions to Enable Contact Resistivity <1E-9 for 5nm and Beyond

°C. -Y. Chang¹, F. A. Khaja¹, K. E. Hollar¹, K. V. Rao¹, S. Munnangi¹, Y. Chen¹, M. Okazaki¹, Y. -C. Huang¹, X. Li¹, H. Chung¹, O. Chan¹, C. Lazik¹, M. Jin¹, H. Zhou¹, A. Mayur¹, R. Hung¹, N. Kim¹, ¹Applied Materials, Inc (USA)

15:10 K-4-04

Hot-C⁺-Ion Implantation Optimization for Forming Nano-SiC Region at Surface (100)SOI Substrate

°T. Mizuno¹, Y. Omata¹, S. Nakada¹, T. Aoki¹, T. Sasaki², ¹Kanagawa Univ. (Japan), ²Toshiba 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. Suemasu¹, ¹Univ. of Tsukuba (Japan)

10:00 M-3-02

Growth of 2D Crystal of Group-IV Elements on Epitaxial Ag (111)

°K. Ito¹, A. Ohta¹, M. Kurosawa¹, M. Araidai¹, M. Ikeda¹, K. Makihara¹, S. Miyazaki¹, ¹Nagoya Univ. (Japan)

10:15 M-3-03

Structural and Photoluminescence Properties of Si-based Nanosheet Bundles Rooted on Si Substrates

P. Yuan¹, R. Tamaki², S. Kusazaki¹, N. Atsumi¹, Y. Saito¹, Y. Kumazawa¹, N. Ahsan², Y. Okada², °H. Tatsuoka¹,

Thursday, September 21

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

10:30 M-3-04

SiC Nano-Dots in Bulk-Si Substrate Fabricated by Hot-C⁺-
Ion Implantation Technique

^oT. Mizuno¹, S. Nakada¹, M. Yamamoto¹, S. Irie¹, Y. Omata¹,
T. Aoki¹, T. Sameshima², ¹Kanagawa Univ. (Japan), ²Tokyo
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

^oT. Iwahashi¹, M. Kurosawa^{1,2,3}, N. Uchida⁴, Y. Ohishi⁵, T.
Maeda⁴, O. Nakatsuka^{1,6}, S. Zaima⁶, ¹Grad. Sch. of Eng.,
Nagoya Univ. (Japan), ²IAR, Nagoya Univ. (Japan),
³PRESTO-JST (Japan), ⁴NERI-AIST (Japan), ⁵Grad. Sch.
of Eng., Osaka Univ. (Japan), ⁶IMaSS, 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 ($\sim 170^\circ\text{C}$)

$^\circ$ T. Sugino¹, K. Moto¹, R. Matsumura¹, H. Ikenoue¹, M. Miyao¹, T. Sadoh¹, ¹Kyushu Univ. (Japan)

14:15 M-4-02

Dopants behavior in polycrystallization of heavily doped $\text{Ge}_{1-x}\text{Sn}_x$ layer using pulsed laser annealing in water

$^\circ$ K. Takahashi^{1,2}, M. Kurosawa^{1,3}, H. Ikenoue⁴, M. Sakashita¹, O. Nakatsuka¹, S. Zaima¹, ¹Nagoya Univ. (Japan), ²JSPS Res. Fellow (Japan), ³PRESTO-JST (Japan), ⁴Kyushu Univ. (Japan)

14:30 M-4-03

Grain Boundary Engineering of Solid-Phase Crystallized Ge on Glass by Controlling Atomic Density of Precursor

$^\circ$ R. Yoshimine¹, K. Toko¹, T. Suemasu¹, ¹Univ. of Tsukuba (Japan)

14:45 M-4-04

Effects of Deposition Temperature of Amorphous Precursors on Solid-Phase Crystallized $\text{Si}_{1-x}\text{Ge}_x$ Thin Films on an Insulator

$^\circ$ D. Takahara¹, K. Toko¹, R. Yoshimine¹, T. Suemasu¹, ¹Univ. 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

$^\circ$ R. Suda¹, A. Kojima¹, N. Mori², J. Shirakashi¹, N. Koshida¹, ¹Tokyo Univ. of Agri. & Tech. (Japan), ²Osaka 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. Reiner¹, P. Waltereit¹, B. Weiss¹, S. Moench², R. Quay¹,
O. Ambacher³, ¹Fraunhofer IAF (Germany), ²Univ. of
Stuttgart (Germany), ³Univ. of Freiburg (Germany)

10:00 N-3-02

Unpassivated AlGaIn/GaN HEMTs with Ideal Sub-threshold Swing (~60mV/decade) on Extremely High Quality Free-standing GaN Substrate

°X. Liu¹, H. Gu¹, K. Li¹, J. He¹, K. Lai¹, D. Zhu¹, Y. Lu¹, W. He¹, J. Fang², J. Wang³, H. -C. Kuo⁴, Z. Liu⁵, W. Liu⁶, K. -W. Ang⁵, Y. Hao², K. Xu³, J. -P. Ao^{1,2}, ¹Shenzhen Univ (China), ²Xidian Univ. (China), ³SINANO, CAS (China), ⁴National Chiao Tung Univ. (Taiwan), ⁵National Univ. of Singapore (Singapore), ⁶Fudan 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 Hove¹, ¹IMEC (Belgium)

10:30 N-3-04

Threshold voltages of Al₂O₃/AlGaIn/GaN and AlTiO/AlGaIn/GaN metal-insulator-semiconductor devices

°S. P. Le¹, T. Ui¹, D. D. Nguyen¹, T. Suzuki¹, ¹JAIST (Japan)

10:45 N-3-05

Drain-induced barrier lowering in normally-off AlGaIn-GaN MOSFETs with single- or double-recess overlapped gate

°T. Sato¹, K. Uryu¹, J. Okayasu¹, M. Kimishima¹, T. Suzuki²,
¹Advantest Labs. Ltd. (Japan), ²JAIST (Japan)

Thursday, September 21

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. Micovic¹, °D. F. Brown¹, D. Regan¹, J. Wong¹, Y. Tang¹,
F. Herrault¹, D. Santos¹, S. D. Burnham¹, J. Tai¹, E.
Prophet¹, I. Khalaf¹, C. McGuire¹, H. Bracamontes¹, H.
Fung¹, A. Schmitz¹, ¹HRL Labs. (USA)*

14:30 N-4-02

High Performance Tri-Gate AlGaIn/GaN Power HEMTs

*°J. H. Lee¹, C. C. Hsu¹, Y. C. Lin¹, J. N. Yao¹, C. Y. Wu¹, E.
Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan)*

14:45 N-4-03

Back-gate effect on p-channel GaN MOSFETs on
Polarization-Junction Substrate

*°T. Hoshii¹, R. Takayama¹, A. Nakajima², S. Nishizawa³, H.
Ohashi¹, K. Kakushima¹, H. Wakabayashi¹, K. Tsutsui¹,*

Thursday, September 21

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

15:00 N-4-04 (Late News)

MOVPE Growth Behavior of AlGa_N/Ga_N

Heterostructures with AlGa_N Directly on RIE-Ga_N

Showing a High Electron Mobility (>1300 cm²/Vs)

°A. Yamamoto¹, K. Kanatani¹, S. Makino¹, M. Kuzuhara¹,

¹Univ. 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 Ga₂O₃ MOSFETs for Low to Medium Power Applications

°G. H. Jessen¹, K. Chabak¹, A. Green^{2,1}, N. Moser^{3,1}, J.

McCandless^{2,1}, K. Leedy¹, A. Crespo¹, S. Tetlak¹, ¹Air Force

Research Lab. (USA), ²KBRwyle (USA), ³George 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. Kato², T. Makino², M. Ogura², D.

Takeuchi², T. Inokuma¹, N. Tokuda^{1,2}, S. Yamasaki²,

¹Kanazawa Univ. (Japan), ²AIST (Japan)

10:30 O-3-03

Threshold control of diamond MESFET by MWCVD growth conditions

°H. Kawashima¹, H. Umezawa¹, S. Ohmagari¹, R. Tamano²,

T. Saito², Y. Mokuno¹, ¹AIST (Japan), ²Osaka Pref. Univ.

(Japan)

10:45 O-3-04

Normally-off Diamond p-FET Application in Cascode with

Thursday, September 21

Breakdown Voltage over 1.7 kv

°*T. Bi¹, J. Niu¹, N. Oi¹, M. Inaba¹, T. Sasaki¹, K. Hiroshi¹,*
¹Waseda 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 H₂O-grown ALD-Al₂O₃ films on Si substrates

°*S. Okubo¹, D. Matsumura¹, K. Horikawa¹, A. Hiraiwa^{1,2},*
H. Kawarada¹, ¹Waseda Univ. (Japan), ²Nagoya 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. Kobayashi¹, M. Sudo¹, I. Omura¹, ¹Kyushu Inst. of Tech. (Japan)*

Thursday, September 21

14:30 O-4-03

A Novel Edge Termination Design for Superjunction
VDMOS

°C. -H. Cheng¹, C. -F. Huang¹, K. -Y. Lee², ¹National Tsing
Hua Univ. (Taiwan), ²National Taiwan Univ. (Taiwan)

14:45 O-4-04

Temperature Distribution Imaging inside Power Devices
by Real-Time Simulation

°A. Watanabe¹, R. Nagao¹, I. Omura¹, ¹Kyushu Inst. of
Tech. (Japan)

Thursday, September 21

Short Oral Presentation

Area 1:

PS-1

11:35-11:47 Conference building Meeting Room 8
Session Chair: H. Itokawa (Toshiba Memory Corp.)

Area 2:

PS-2

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

Area 3:

PS-3

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

Area 4:

PS-4

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

Area 5:

PS-5

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

Area 6:

PS-6

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

Area 7:

PS-7

11:35-11:57 Conference building Meeting Room 5
Session Chair: N. Nishiyama (Tokyo Tech)

Area 8:

PS-8

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

Thursday, September 21

Area 9:

PS-9

11:49-12:11 Conference building Meeting Room 6

Session Chair: K. Terabe (NIMS)

R. Moriya (Univ. of Tokyo)

Area 10:

PS-10

11:35-11:55 Conference building Meeting Room 2

Session Chair: T. Shimada (Hokkaido Univ.)

H. Endoh (NEC Corp.)

Area 11:

PS-11

11:35-12:01 Conference building Meeting Room 4

Session Chair: T. Tokuda (NAIST)

T. Sakata (Univ. of Tokyo)

Area 12:

PS-12

11:35-12:13 Conference building Meeting Room 1

Session Chair: S. Ohya (Univ. of Tokyo)

H. Shimizu (Tokyo Univ. of Agri. & Tech.)

Area 13:

PS-13

11:35-12:25 Conference building Meeting Room 7

Session Chair: K. Nagashio (Univ. of Tokyo)

S. Hara (Hokkaido Univ.)

Area 14:

PS-14

11:35-11:57 Exhibition building Meeting Room 4

Session Chair: H. Fujiwara (Toyota Motor Corp.)

T. Makino (AIST)

Area 15:

PS-15

11:35-11:57 Conference building Meeting Room 3

Session Chair: M. Ikegami (Toin Univ. of Yokohama)

K. Ohdaira (JAIST)

Thursday, September 21

POSTER SESSION

15:30-17:30 Exhibition Hall 1, 2

01: Advanced LSI Processing & Materials Science

(6 Papers)

PS-1-01

Schottky Barrier Heights of Metal Silicides on Si and Ge

°J. Robertson¹, H. Li¹, ¹Cambridge Univ. (UK)

PS-1-02

Characterization of Deep Trapping States in Chemical Vapor Deposited Silicon Nitride by Deep Level Transient Spectroscopy

°N. Shinoda¹, T. Kikuchi¹, ¹Toshiba Corp. (Japan)

PS-1-03

First Study of High-Ge-Content Si_{0.16}Ge_{0.84} Gate Stack by Low Pressure Oxidation

°J. -L. Zhang¹, W. -L. Lee¹, M. -L. Tsai¹, G. -L. Luo², C. -H. Chien¹, ¹National Chiao Tung Univ. (Taiwan), ²National Nano Device Labs. (Taiwan)

PS-1-04

Oxidation Enhancement Characteristics of SrTi_xMg_{1-x}O_{3-δ} Catalyst for Low Temperature Gate Oxide Formation

°H. F. Sun¹, A. Ikeda¹, T. Asano¹, ¹Kyushu Univ. (Japan)

PS-1-05

Effect of High Pressure Annealing on the Reliability of FDSOI Tunneling FET

°S. C. Kang¹, D. Lim², S. K. Lim¹, J. Noh¹, S. -M. Kim¹, S. K. Lee¹, C. Choi², B. H. Lee¹, ¹Gwangju Inst. of Sci. and Tech. (Korea), ²Hanyang Univ. (Korea)

PS-1-06 (Late News)

High-hole mobility GeSn on glass formed by solid-phase crystallization using an atomic density controlled precursor

°K. Moto^{1,2}, K. Toko¹, R. Yoshimine¹, T. Suemasu¹, ¹Univ. of Tsukuba (Japan), ²JSPS Res. Fellow (Japan)

02: Interconnect Technologies, MEMS, and Reliability
(7 Papers)

PS-2-01

Performance of WCN Diffusion Barrier for Cu Through Silicon Vias

Y. T. Kim¹, °S. Lee^{2,1}, B. Ju², ¹Korea Inst. of Sci. and Tech. (Korea), ²Korea Univ. (Korea)

PS-2-02

Optimization of Narrow Width Effect on Titanium Thermistor in Uncooled Antenna-Coupled Terahertz Microbolometer

°A. Banerjee¹, H. Satoh¹, Y. Sharma¹, N. Hiromoto¹, H. Inokawa¹, ¹Shizuoka Univ. (Japan)

PS-2-03

Fatigue Testing of Poly-SiGe Film Using Microresonator

°A. Uesugi¹, T. Namazu¹, ¹Aichi Inst. of Tech. (Japan)

PS-2-04

Characterization of TiHfN ternary alloy films as a new barrier

°M. B. Takeyama¹, M. Sato¹, ¹Kitami Inst. of Tech. (Japan)

PS-2-05

Effect of the crystallinity on the grain boundary diffusion of copper atoms in electroplated copper thin-film interconnections

°K. Suzuki¹, H. Sakamoto¹, H. Miura¹, ¹Tohoku Univ. (Japan)

PS-2-06

Facile approach of enhanced heat mitigation between 3D stacked layers by Introducing a sub micron thick heat spreading materials

°C. H. Kumar¹, A. K. Panigrahi¹, P. Supraja¹, N. Paul¹, S. G. Singh¹, ¹Indian Inst. of Tech. -Hyderabad (India)

PS-2-07 (Late News)

Investigation of Transient Thermal Dissipation in Three-Dimensional Stacked ICs

°Y. Araga¹, H. Shimamoto¹, S. Melamed¹, K. Kikuchi¹, M. Aoyagi¹, ¹AIST (Japan)

03: CMOS Devices / Device Physics

(16 Papers)

PS-3-01

Ge-on-insulator tunneling FET with abrupt source junction by snowplow effect of NiGe

°R. Matsumura^{1,2}, T. Katoh¹, R. Takaguchi¹, M. Takenaka¹, S. Takagi¹, ¹Univ. of Tokyo (Japan), ²JSPS Res. Fellow (Japan)

PS-3-02

Performance enhancement of GOI tunneling FETs with source junctions formed by low energy BF₂ ion implantation

T. Katoh¹, °R. Matsumura¹, R. Takaguchi¹, M. Takenaka¹, S. Takagi¹, ¹Univ. of Tokyo (Japan)

PS-3-03

Switching Time Analysis of Negative Capacitance UTB GeOI MOSFETs

°P. -C. Chiu¹, V. P. -H. Hu¹, ¹National Central Univ. (Taiwan)

PS-3-04

III-V Heterojunction TFET with Bandgap Engineering for Performance Enhancement and Ambipolar Leakage Suppression

°C. -T. Wang¹, V. P. -H. Hu¹, ¹National Central Univ. (Taiwan)

PS-3-05

Short Channel Modeling of Tunnel FET's

°K. Fukuda¹, H. Asai¹, J. Hattori¹, T. Mori¹, Y. Morita¹, W. Mizubayashi¹, M. Masahara¹, S. Migita¹, H. Ota¹, K. Endo¹, T. Matsukawa¹, ¹AIST (Japan)

PS-3-06

Enhancement of Capacitance Benefit by Drain Offset

Structure in TFET Circuit Speed Associated with Tunneling Probability Increase

^oH. Asai¹, T. Mori¹, T. Matsukawa¹, J. Hattori¹, K. Endo¹, K. Fukuda¹, ¹AIST (Japan)

PS-3-07

Benchmarking the Impact of Work Function Variations on Cell Stability of Low-Voltage 6T SRAMs with Non-planar and Planar TMDFETs

^oC. -T. Zheng¹, P. Su¹, C. -T. Chuang¹, ¹National Chiao Tung Univ. (Taiwan)

PS-3-08

Improved Hetero-Gate-Dielectric Tunnel Field-Effect Transistors

W. Y. Choi¹, ^oJ. W. Lee¹, ¹Sogang Univ. (Korea)

PS-3-09

Numerical Design for Power Integrity Analysis of Tunnel Field Effect Transistors

^oC. Tanaka¹, T. Tanamoto¹, M. Koyama¹, ¹Toshiba Corp. (Japan)

PS-3-10

Effects of Si Recess Structure on Performance and Reliability in High Voltage n-MOSFETs

C. -Y. Chen¹, J. F. Chen¹, ^oY. -L. Tsai¹, H. -T. Hsu², H. -P. Hwang², ¹National Cheng Kung Univ. (Taiwan),
²Powerchip Tech. Corp. (Taiwan)

PS-3-11

Theoretical Investigation of the Performance Improvement in GeSn/SiGeSn hetero Line Tunneling FET (HL-TFET)

^oH. Wang¹, G. Han¹, Y. Liu¹, C. Zhang¹, J. Zhang¹, Y. Hao¹,
¹Xidian Univ. (China)

PS-3-12

Ge-cap Quantum Well Bulk FinFET for 5nm node CMOS Integration

^oE. D. Kurniawan^{1,2}, S. -Y. Yang¹, Y. -Y. Yang¹, K. -H. Peng¹,
V. Thirunavukkarasu^{1,2}, Y. -H. Lin³, Y. -C. Wu¹, ¹National

Tsing Hua Univ. (Taiwan), ²*Academia Sinica (Taiwan)*,
³*National United Univ. (Taiwan)*

PS-3-13 (Late News)

Hot-carrier Induced Drastic Off-state Leakage Current Degradation in STI-based N-channel LDMOS

°*K. Takahashi¹, K. Komatsu¹, T. Sakamoto¹, K. Kimura¹, F. Matsuoka¹, ¹Toshiba Electronic Devices & Storage Corp. (Japan)*

PS-3-14 (Late News)

TCAD simulation of planar single-gate Si tunnel FET with average subthreshold swing less than 60 mV/dec for 0.3 V operation

°*K. Kukita¹, T. Uechi¹, J. Shimokawa¹, M. Goto¹, Y. Yokota¹, S. Kawanaka¹, T. Tanamoto², M. Koyama², H. Tanimoto¹, S. Takagi³, ¹Toshiba Memory Corp. (Japan), ²Toshiba Corp. (Japan), ³Univ. of Tokyo (Japan)*

PS-3-15 (Late News)

Multi- V_T with Metal Gate Work-function Modulation by PLAD Implants for Ge FinFET Applications

°*S. D. Kothari¹, H. Nejad², N. Variam², S. Lodha¹, ¹Indian Inst. of Tech. Bombay (India), ²Applied Materials Inc. (USA)*

PS-3-16 (Late News)

Low-Temperature Microwave Annealing Process for $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}$ MOSFETs

°*J. W. Lin¹, Q. -H. Luc¹, K. S. Yang¹, C. -C. Chang¹, C. -C. Fan Chiang¹, H. B. Do¹, H. M. T. Ha¹, S. H. Huynh¹, Y. D. Jin¹, T. A. Nguyen¹, Y. -C. Lin¹, E. Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan)*

04: Advanced Memory Technology

(15 Papers)

PS-4-01

Resistive Switching in V_2O_3 Thin Films Induced by Current Sweeps and Voltage Pulses

°*M. Menghini¹, P. Homm¹, C. Vets¹, B. Van Bilzen¹, J. P.*

Locquet¹, ¹KU Leuven (Belgium)

PS-4-02

Non-Destructive Observation of Chemical State in ReRAM by Laser-excited Photoemission Electron Microscopy

°J. Kawakita^{1,2}, H. Shima^{2,3}, Y. Naitoh^{2,3}, H. Akinaga^{2,3}, T. Taniuchi^{1,2}, S. Shin^{1,2}, ¹Univ. of Tokyo (Japan), ²AIST-UTokyo Advanced Operando-Measurement Tech. Open Innovation Lab. (OPERANDO-OIL) (Japan), ³AIST (Japan)

PS-4-03

Role of Al₂O₃ Thin Layer to Improve The Switching Properties in Ta₅Si₃ Based CBRAM Device

°D. Kumar¹, R. Aluguri¹, U. Chand¹, S. Chandrasekaran¹, T. -Y. Tseng¹, ¹National Chiao Tung Univ. (Taiwan)

PS-4-04

The effect of TiW thickness on non-polar to bipolar switching transformation in ZrO₂-based CBRAM

°S. Chandrasekaran¹, F. M. Simanjuntak², T. Y. Tseng¹, ¹National Chiao Tung Univ. (Taiwan), ²National Dong Hwa Univ. (Taiwan)

PS-4-05

An Investigation of Light Triggering Effect on the Programming of Gate-less Anti-fuse Cells

Z. -H. Chen¹, °Y. Yeh¹, P. Cheng¹, C. J. Lin¹, Y. King¹, ¹National Tsing Hua Univ. (Taiwan)

PS-4-06

Error-Correction & Set/Reset Verify Strategy of Storage Class Memory (SCM) for SCM/NAND Flash Hybrid and All-SCM Storage

°C. Matsui¹, K. Takeuchi¹, ¹Chuo Univ. (Japan)

PS-4-07

Experimental Investigation of Localized Stress Induced Leakage Current Distribution in Gate Dielectrics Using Array Test Circuit

Thursday, September 21

°H. Park¹, T. Suwa¹, R. Kuroda¹, A. Teramoto¹, S. Sugawa¹,
¹Tohoku Univ. (Japan)

PS-4-08

Impact of Mechanical Stress to Cell Characteristics in Vertically Stacked NAND Flash Structure

°Y. Oh¹, T. Ono², Y. Song¹, ¹Hanyang Univ. (Korea),
²Tohoku Univ. (Japan)

PS-4-09

Impacts of Low Temperature formed SiO₂ Tunneling and Si₃N₄/HfO₂ Trapping Layers on Gate-All-Around Charge-Trapping Flash Memory Devices

°P. -Y. Lin¹, K. -S. Chang-Liao¹, H. -K. Fang¹, C. -H. Cheng¹, W. -H. Huang², C. -H. Shen², J. -M. Shieh²,
¹National Tsing Hua Univ. (Taiwan), ²National Nano Device Labs. (Taiwan)

PS-4-10

New Tunnel FET Charge-Trapping Memory with Large Memory Window for Ultra Low Power Operation

°H. Kino¹, T. Fukushima¹, T. Tanaka¹, ¹Tohoku Univ. (Japan)

PS-4-11

V_{th} variation of string SONOS NAND Flash depending on single grain boundary and stored electron charges in an adjacent cell

°H. Oh¹, J. Kim¹, R. -H. Baek¹, J. -S. Lee¹, ¹POSTECH (Korea)

PS-4-12

Poly-Ge Tri-gate Nanowire Junctionless Charge-Trapping Flash Devices Formed with Low-Temperature Processes for 3D Memory Applications

°Y. -C. Lu¹, K. -S. Chang-Liao¹, H. -K. Fang¹, K. -Y. Li¹, W. -H. Huang², C. -H. Shen², J. -M. Shieh², ¹National Tsing Hua Univ. (Taiwan), ²National Nano Device Labs. (Taiwan)

PS-4-13

Spin orbit torque magnetization switching of a tungsten

based three terminal perpendicular magnetic tunnel junction for low power Spin Orbit Torque MRAM application

°Y. Guerfi¹, T. Brächer², O. Boule², J. Langer³, B. Ocker³, P. Gambardella⁴, M. -C. Cyrille¹, G. Gaudin², ¹CEA-Leti (France), ²Univ. Grenoble Alpes, CNRS, CEA, Grenoble INP, INAC, SPINTEC (France), ³Singulus Tech. (Germany), ⁴ETH Zurich (Switzerland)

PS-4-14

Investigation of bias polarity dependence on set operation in phase change memory using GeCu₂Te₃

°J. An¹, K. Kim¹, C. Choi¹, S. Shindo², Y. Sutou², Y. Song¹, ¹Hanyang Univ. (Korea), ²Tohoku Univ. (Japan)

PS-4-15 (Late News)

Strain-Enhanced Ferroelectric Aluminum-Doped Hafnium Oxides for Volatile and Nonvolatile Memories Applications

°C. Liu¹, C. -C. Fan¹, Y. -R. Chen¹, G. -L. Liou², Y. -C. Chiu¹, C. -Y. Chang², C. -H. Cheng¹, H. -H. Hsu³, ¹National Chiao Tung Univ. (Taiwan), ²National Taiwan Normal Univ. (Taiwan), ³National Taipei Univ. of Tech. (Taiwan)

05: Advanced Circuits and Systems

(10 Papers)

PS-5-01

Octagonal MOSFET for Simultaneous Sensing of Temperature and Magnetic Field

°T. Harada¹, K. Kaiwa¹, ¹Yamagata Univ. (Japan)

PS-5-02

Sensor assembly method using Si-interposer with trenches for 3-D binocular range sensors

°K. Nakajima¹, ¹Kyushu Inst. of Tech. (Japan)

PS-5-03

Temperature Sensors with Negative and Positive Temperature Coefficients by Using Cascoded Diode-connected Sub-threshold NMOSFETs and PMOSFETs

Thursday, September 21

R. -L. Wang¹, °K. -B. Lee¹, C. -S. Tsai¹, L. -W. Wang¹, Y. -Y. Lin¹, H. -Y. Chen¹, Y. -T. Chuang², H. -H. Liao², H. -H. Tsai², Y. -Z. Juang², ¹National Kaohsiung Normal Univ. (Taiwan), ²National Applied Research Lab., National Chip Implementation Center (Taiwan)

PS-5-04

Analysis of Dynamic Characteristics of SiC SBD at High Switching Frequency Based on Junction Capacitance

°R. Maeda¹, T. Okuda¹, T. Hikihara¹, ¹Kyoto Univ. (Japan)

PS-5-05

A Cyclic Switched-Capacitor Step-Down DC-DC Regulator with Enhanced Output Current

W. -L. Wang¹, °H. Lin¹, C. -L. Yu¹, ¹National Chung Hsing Univ. (Taiwan)

PS-5-06

A 2.4 – 3.2 GHz Robust Self-Injecting Injection-Locked PLL

°J. Yang¹, Z. Zhang¹, L. Liu¹, J. Liu¹, N. Wu¹, ¹State Key Laboratory of Super Lattice and Microstructures Institute of Semiconductors, Chinese Academy of Sciences, Univ. of Chinese Academy of Sciences (China)

PS-5-07

A 0.45-to-1.8 GHz Fully Synthesized Injection Locked Bang-Bang PLL with OFDAC to Enhance DCO resolution

°J. Yang¹, Z. Zhang¹, L. Liu¹, J. Liu¹, N. Wu¹, ¹State Key Laboratory of Super Lattice and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences, Univ. of Chinese Academy of Sciences (China)

PS-5-08

Low Power UWB CMOS LNA using Resistive Feedback and Current-Reused Techniques

°J. -C. Guo¹, C. -S. Lin¹, ¹National Chiao Tung Univ. (Taiwan)

PS-5-09

Reconfigurable Block-based Normalization Circuit for

On-chip Object Detection

°A. Luo¹, F. An¹, X. Zhang¹, L. Chen, H. J. Mattausch¹,
¹Hiroshima Univ. (Japan)

PS-5-10 (Late News)

A High-Efficiency Wide-Input-Voltage-Range CMOS
Voltage Doubler Rectifier for RF Wireless Power Transfer
Systems

T. -H. Tsai¹, °W. -M. Cheng¹, Y. -L. Lo¹, W. -B. Yang²,
¹National Kaohsiung Normal Univ. (Taiwan), ²Tamkang
Univ. (Taiwan)

**06: Compound Semiconductor Electron Devices &
Related Technologies**

(14 Papers)

PS-6-01

Impact of Substrate off-angle on the *m*-plane GaN Schottky
Diodes

°H. Yamada¹, H. Chonan¹, T. Takahashi¹, M. Shimizu¹,
¹AIST (Japan)

PS-6-02

RF Power Characteristics of the AlGaIn/GaN HEMTs with
Molecular Beam Deposition CeO₂ as Gate Insulator

Y. -S. Chiu¹, °Y. Lin¹, Y. C. Lin¹, J. C. Huang¹, H. Iwai², K.
Kakushima², E. Y. Chang¹, ¹National Chiao Tung Univ.
(Taiwan), ²Tokyo Tech (Japan)

PS-6-03

Electron Mobility of Two-dimensional Electron Gas in
InGaIn Heterostructures: Effects of Alloy Disorder and
Random Dipole Scatterings

°T. Hoshino¹, N. Mori¹, ¹Osaka Univ. (Japan)

PS-6-04

Electrical Characteristics of n-GaN Schottky Contacts on
Cleaved Surfaces of Free-Standing Substrates -- Metal
Work-Function Dependence of Schottky Barrier Height --

°H. Imadate¹, T. Mishima², K. Shiojima¹, ¹Univ. of Fukui
(Japan), ²Hosei Univ. (Japan)

PS-6-05

Investigation of the Interface Stability of the Metal/HfO₂/AlN/InGaAs MOS Devices

H. Binh Do¹, Q. H. Luc¹, M. T. H. Ha¹, S. H. Huynh¹, T. A. Nguyen¹, J. W. Lin¹, K. S. Yang¹, °C. -C. F. Chiang¹, Y. -D. Jin¹, Y. C. Lin¹, E. Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan)

PS-6-06

AlGa_n/Ga_nN Schottky Gate Fin-HEMT Fabricated on 8-inch Silicon (111) Substrate with Thin Buffer Layer

°L. -C. Chang¹, C. -J. Dai¹, M. Yang¹, Y. -H. Jiang¹, C. -H. Wu¹, ¹National Taiwan Univ. (Taiwan)

PS-6-07

Effects of Channel Profile and Source/Drain Resistance on P-type SnO TFTs

°M. -H. Wu¹, H. -C. Lin¹, P. -W. Li¹, ¹National Chiao Tung Univ. (Taiwan)

PS-6-08

Improved Electrical Stability of Thin-Film Transistors with Co-sputtered Ti-IGZO Channel and Zr_{0.85}Si_{0.15}O₂ Gate Dielectric

H. -P. Yan¹, °Z. -K. Zhuang¹, ¹National Cheng Kung Univ. (Taiwan)

PS-6-09

An improved normally-off Al₂O₃/Ga_nN MOSFET based on self-terminating gate-recess etching technique

°H. Wang¹, J. Wang¹, J. Liu¹, M. Yu¹, B. Xie¹, W. Wu¹, ¹Peking Univ. (China)

PS-6-10

Fabrication of a Pt/Mg_xZn_{1-x}O/ZnO Schottky barrier photodiode utilizing a field plate structure

°H. Endo¹, K. Takahashi¹, Y. Kashiwaba², ¹Iwate Indus. Res. Inst. (Japan), ²Iwate Univ. (Japan)

PS-6-11

Electrical Performances of 1T-DRAM based on PNP

Tunneling FET with asymmetric Double-Gate Structure

°Y. J. Yoon¹, J. H. Seo¹, M. S. Cho¹, B. G. Kim¹, I. M. Kang¹, ¹Kyungpook National Univ. (Korea)

PS-6-12

Transient-mode Simulation of MOS C-V Characteristics for GaN

°K. Fukuda¹, H. Asai¹, J. Hattori¹, M. Shimizu¹, T. Hashizume², ¹AIST (Japan), ²Hokkaido Univ. (Japan)

PS-6-13

Defect Observations of Ni/AlGaIn/GaN Schottky Contacts on Si Substrates Using Scanning Internal Photoemission Microscopy

°K. Shiojima¹, H. Konishi¹, H. Imadate¹, Y. Yamaoka^{2,3}, K. Matsumoto², T. Egawa³, ¹Univ. of Fukui (Japan), ²Taiyo Nippon Sanso Corp. (Japan), ³Nagoya Inst. of Tech. (Japan)

PS-6-14

In-Situ Mapping of Degradation of AlGaIn/GaN MIS-HEMTs Using Video-Mode Scanning Internal Photoemission Microscopy

°K. Shiojima¹, S. Murase¹, Y. Watamura², T. Suemitsu², ¹Univ. of Fukui (Japan), ²Tohoku Univ. (Japan)

07: Photonic Devices and Related Technologies

(11 Papers)

PS-7-01

Dewetting-Induced Formation and Optical Properties of Arrays of Low-Ge-Content SiGe Mie-Resonators on Si (100) Surface

°V. Poborchii¹, A. Shklyaev², L. Bolotov¹, N. Uchida¹, T. Tada¹, ¹AIST (Japan), ²A.V. Rzhanov Inst. of Semiconductor Physics, SB RAS, (Russia)

PS-7-02

Low-Crosstalk Optical Switch with InGaAsP/Si Hybrid MOS Optical Phase Shifter

°Q. Li¹, S. Takagi¹, M. Takenaka¹, ¹Univ. of Tokyo (Japan)

PS-7-03

Low-optical-loss graphene-based phase modulator operating at mid-infrared wavelength

°*Y. Yamaguchi¹, S. Takagi¹, M. Takenaka¹, ¹Univ. of Tokyo (Japan)*

PS-7-04

Withdrawn

PS-7-05

Design THz Quantum Cascade Lasers Toward High Output Power Near Liquid Nitrogen Temperature Operation

°*T. -T. Lin¹, H. Hirayama¹, ¹RIKEN (Japan)*

PS-7-06

InGaN/GaN μ LEDS for display applications Optical and electrical characteristics spread comprehension

°*A. Daami^{1,2}, F. Olivier^{1,2}, D. Sarrasin^{1,2}, L. Dupré^{1,2}, F. Templier^{1,2}, ¹Univ. Grenoble Alpes (France), ²CEA-Leti, MINATEC Campus (France)*

PS-7-07

EQE Enhancement Dependency on Reflective p-type Electrode of Ni/Mg and Rh in AlGaIn UVC LED with Transparent p-AlGaIn Contact Layer.

°*N. Maeda¹, J. Yun¹, M. Jo¹, H. Hirayama¹, ¹RIKEN (Japan)*

PS-7-08

Size Expansion of PbS Quantum Dots by Silica Coating for Position Control with Si Template Fabricated by SPM Lithography

°*I. Okumura¹, Y. Nishizaki¹, S. Yamashita¹, K. Niwa¹, K. Mukai¹, ¹Yokohama National Univ. (Japan)*

PS-7-09

Transversal Symmetry Breaking in Novel Photonic Crystal Waveguide: Innovative Manner to Master Defect Band Dispersion Relation

°*M. Sotto¹, K. Debnath¹, M. K. Hussain¹, Z. Li¹, F. Liu¹, A. Z. Khokar¹, S. Saito¹, ¹Univ. of Southampton (UK)*

PS-7-10

Controlling Circular Polarized Localized Surface Plasmon Resonance in Nanorod Based Metasurface

°H. -T. Lin¹, C. -Y. Chang¹, P. -J. Cheng¹, M. -S. Lai^{1,2}, Y. -Y. Hsu^{1,2}, S. -W. Chang^{1,2}, P. -K. Wei¹, M. -H. Shih^{1,2,3},
¹RCAS, Academia Sinica (Taiwan), ²National Chiao Tung Univ. (Taiwan), ³National Sun Yat-sen Univ. (Taiwan)

PS-7-11

The Resonant Phenomenon in the PL Spectra Measured in the Tensile-Strained Ge Microbridges

°P. Zhou¹, X. Xu¹, Y. Kanda¹, S. Matsushita¹, K. Sawano¹, T. Maruizumi¹, ¹Tokyo City Univ. (Japan)

08: Advanced Material Synthesis and Crystal Growth Technology

(15 Papers)

PS-8-01

High-Quality InSb Nanostructures Grown by Molecular-Beam Epitaxy

°D. Pan¹, X. Yu¹, J. Zhao¹, ¹Ins. of Semiconductors, Chinese Academy of Sciences (China)

PS-8-02

Magnetic Domain Characterizations of MnAs Nanoclusters on Si (111) Substrate

°M. Iida¹, R. Horiguchi¹, K. Morita¹, S. Hara¹, ¹Hokkaido Univ. (Japan)

PS-8-03

Low-Temperature Sb-Induced Layer Exchange Crystallization for Slef-Limiting Formation of n-Type Ge/Insulator

°H. Gao¹, R. Aoki¹, M. Miyao¹, T. Sadoh¹, ¹Kyushu Univ. (Japan)

PS-8-04

In situ investigation of self-catalyzed purity Copper nanowire growth through seed-mediated synthesis

°T. -Y. Lin¹, Y. -L. Chen¹, C. -W. Huang¹, C. -F. Chang¹, C.

Thursday, September 21

-H. Chiu¹, G. -M. Huang¹, Y. -C. Lo¹, W. -W. Wu¹, ¹National Chiao Tung Univ. (Taiwan)

PS-8-05

Self-catalyst growth of InAs and InAs/GaSb
Heterostructure Nanowires on Si substrate by MOCVD

°R. K. Kakkerla¹, H. W. Yu¹, D. Anandan¹, C. J. Hsiao², S. K. Singh¹, E. Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan), ²National Cheng Kung Univ. (Taiwan)

PS-8-06

Boron Nitride Thin Films Grown on (0001) Sapphire
Substrates by Molecular Beam Epitaxy

°Y. Kobayashi¹, T. Kimura¹, H. Nakazawa¹, H. Okamoto¹, M. Hiroki², K. Kumakura², ¹Hirosaki Univ. (Japan), ²NTT Basic Res. Lab. (Japan)

PS-8-07

Compositional Pulling Effect in Epitaxial Growth of
GaInN by RF-MBE

°T. Yamaguchi¹, T. Sasaki², M. Takahashi², T. Araki³, T. Onuma¹, T. Honda¹, Y. Nanishi³, ¹Kogakuin Univ. (Japan), ²QST (Japan), ³Ritsumeikan Univ. (Japan)

PS-8-08

Epitaxial Growth of Non-polar ZnS on Sapphire Substrate
by Mist Chemical Vapor Deposition

°K. Okita¹, T. Goto¹, Y. Tanaka¹, M. Takenouchi¹, Z. Yatabe², Y. Nakamura^{1,3}, ¹Kumamoto Univ. GSST (Japan), ²Kumamoto Univ. POIE (Japan), ³Phoenics (Japan)

PS-8-09

Study on Fabrication of Yttrium Oxide Thin Films Using
Mist CVD

°L. Liu¹, M. Nishi¹, S. Sato¹, P. Rutthongjan¹, M. Sakamoto¹, Y. Kobayashi¹, G. T. Dang¹, E. K. C. Pradeep¹, T. Kawaharamura¹, ¹Kochi Univ. of Tech. (Japan)

PS-8-10

Study on the Influence Factors of Antimony Doped Tin
Oxide Thin Films With High Conductivity Deposited *via*

Mist CVD

°L. Liu¹, T. Kawaharamura¹, T. Uchida², S. Fujita², H. Orita³, H. Kobayashi³, ¹Kochi Univ. of Tech. (Japan), ²Kyoto Univ. (Japan), ³TMEIC (Japan)

PS-8-11

Electronic states in the neutral-beam-formed Ta₂O₅ film measured by thermally stimulated current method

°T. Ohno^{1,2}, H. Shima³, H. Akinaga³, S. Samukawa¹, ¹Tohoku Univ. (Japan), ²PRESTO-JST (Japan), ³AIST (Japan)

PS-8-12

Thermal solid-phase crystallization of amorphous V-doped ZnO film stacked on highly oriented ZnO

°K. Shito¹, H. Chiba^{1,2}, T. Kawashima¹, K. Washio¹, ¹Tohoku Univ. (Japan), ²Japan Society for the Promotion of Sci. Res. Fellowships for Young Scientists (Japan)

PS-8-13

Thermal stability of high-pressure phase of SrO:Ce phosphor

°K. Komatsu¹, A. Nakamura^{1,2}, H. Saitoh¹, ¹Nagaoka Univ. of Tech. (Japan), ²Chubu Chelest Co.Ltd. (Japan)

PS-8-14

Single crystal growth of Mg, Ce co-doped Lu₂Gd₁(Ga,Al)₅O₁₂ by micro-pulling down method and their luminescence properties

°K. Kamada^{1,2}, H. Yamaguchi¹, S. Kurosawa¹, Y. Shoji^{1,2}, Y. Yokota¹, Y. Ohashi¹, A. Yoshikawa^{1,2}, ¹Tohoku Univ. (Japan), ²C&A Corp. (Japan)

PS-8-15 (Late News)

Study of Sn and Mg Doping Effects on TiO₂/Ge Stack Structure by Combinatorial Synthesis

Y. Suzuki^{1,2}, °T. Nagata^{2,3}, Y. Yamashita², A. Ogura¹, T. Chikyow², ¹Meiji Univ. (Japan), ²NIMS (Japan), ³PRESTO-JST (Japan)

09: Physics and Applications of Novel Functional Devices and Materials

(11 Papers)

PS-9-01

Observation of current-injected Landau-level emission in graphene using a quantum-well based infrared phototransistor

°K. Takizawa¹, A. Nishimura¹, H. Murano¹, D. Nakagawa¹, K. Ikushima¹, S. Kim², M. Patrashin³, I. Hosako³, S. Komiyama², ¹Tokyo Univ. of Agri. & Tech. (Japan), ²Univ. of Tokyo (Japan), ³NICT (Japan)

PS-9-02

Boron-doped Diamond Superconducting Quantum Interference Devices with Two Step-Edge Josephson Junctions

°I. Tsuyuzaki¹, T. Kageura¹, M. Hideko¹, Y. Sasama², T. Yamaguchi², Y. Takano², M. Tachiki², K. Hirata², S. Ooi², S. Arisawa², H. Kawarada¹, ¹Waseda Univ. (Japan), ²MANA NIMS (Japan)

PS-9-03

Electroluminescence of Super-atom-like Si-Ge based Quantum Dots Floating Gate

°K. Makihara¹, M. Ikeda¹, N. Fujimura¹, A. Ohta¹, Seiichi Miyazaki¹, ¹Nagoya Univ. (Japan)

PS-9-04

Charge Stability of Shallow Nitrogen Vacancy Center in Diamond with Radical Exposure Nitridation Surface for DNA Detection

°S. Kawai¹, H. Yamano¹, M. Kajiyama¹, K. Kato¹, J. J. Buendia¹, T. Kageura¹, M. Inaba^{1,6}, R. Fukuda¹, T. Okada¹, I. Higashimata¹, M. Haruyama^{2,3}, T. Tani¹, S. Onoda², W. Kada³, O. Hanaizumi³, T. Teraji⁴, S. Kono¹, J. Isoya⁵, H. Kawarada¹, ¹Waseda Univ. (Japan), ²National Inst. for Quantum and Radiological Sci. and Tech. (Japan), ³Gunma Univ. (Japan), ⁴NIMS (Japan), ⁵Univ. of Tsukuba (Japan), ⁶Nagoya Univ. (Japan), ⁷Waseda Univ. (Japan)

PS-9-05

A Simple Efficient Method of Nanofilm-on-Bulk-Substrate Thermal Conductivity Measurement Using Raman Thermometry

°V. Poborchii¹, N. Uchida¹, Y. Miyazaki¹, T. Tada¹, P. Geshev², ¹AIST (Japan), ²Inst. of Thermophysics of the Russian Academy of Sciences, Novosibirsk (Russia)

PS-9-06

A Vertical Ge Tunneling FET With Tapered Source/Drain Structures

K. Wu¹, °G. -L. Luo¹, C. -L. Chu¹, S. -H. Chen¹, B. -Y. Chen¹, W. -F. Wu¹, W. -K. Yeh^{1,2}, C. -H. Chien³, ¹National Nano Device Labs. (Taiwan), ²National Univ. of Kaohsiung (Taiwan), ³National Chiao Tung Univ. (Taiwan)

PS-9-07

Device Performance and Characteristics of Nano Scale n-type Junctionless FET (nJLFET) with Raised Source and Drain Structure

C. -L. Lin¹, Y. -J. Lu¹, J. -D. Lee¹, °W. -T. Hong¹, K. -P. Chen¹, S. -H. Ong¹, W. -C. Chen¹, J. -S. Wu¹, Y. -S. Jhu¹, P. -C. Juan², T. -K. Kang¹, P. -C. Yang¹, ¹Feng Chia Univ. (Taiwan), ²Mingchi Univ. of Tech. (Taiwan)

PS-9-08

Low-power, Forming-free and Analog-type Resistive Switching in Pt/SiO_x/ZnO/Pt Oxide Heterostructures as an Electronic Synapse

°A. S. Sokolov¹, D. Lim¹, H. Han¹, Y. Jeon¹, Y. Abbas¹, S. Son, C. Choi¹, ¹Hanyang Univ. (Korea)

PS-9-9 (Late News)

Fabrication and characterization of p-type heavily doped silicon quantum dots

°S. Mizoguchi¹, N. Shimatani¹, T. Makino¹, Y. Yamaoka¹, T. Koderu¹, ¹Tokyo Tech (Japan)

PS-9-10 (Late News)

Effect of PMN-PT Morphology on the Energy Harvesting Properties of PMN-PT/P[VDF-TrFE] Piezoelectric

Nanogenerator

°C. G. Wu¹, ¹Univ. of Electronic Science and Technology of China (China)

PS-9-11 (Late News)

Fabrication of Y128-cut and Y36-cut lithium niobate single crystalline thin films by crystal-ion-slicing technique

°Y. Shuai¹, C. Gong¹, X. Bai¹, C. Wu¹, W. Luo¹, R. Böttger², S. Zhou², W. Zhang¹, ¹Univ. of Electronic Sci. and Tech. of China (China), ²Inst. of Ion Beam Physics and Materials Research (Germany)

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

(10 Papers)

PS-10-01

Fabrication of Single-Crystalline Thin-Film Utilizing Liquid-Crystalline Alkyl-Substituted Phthalocyanine

°A. Fujii¹, T. Kitagawa¹, Y. Anzai¹, M. Nakatani¹, M. Ohmori¹, H. Kajii¹, M. Ozaki¹, ¹Osaka Univ. (Japan)

PS-10-02

Growth of Alkyl-Monosubstituted Thiophene/Phenylene Co-Oligomer Crystals and Their Device Application

°K. Sugahara¹, T. Nakagawa¹, R. Hirase², T. Katagiri³, Y. Inada¹, T. Yamao¹, S. Hotta¹, ¹Kyoto Inst. of Tech. (Japan), ²Hyogo Prefectural Inst. of Tech. (Japan), ³Sumitomo Seika Chemicals Co., Ltd. (Japan)

PS-10-03

Oxygen plasma treatment for wettability improvement of alkyl terminal self-assembled monolayer as gate dielectrics

°K. Kuribara¹, Y. Tanaka², T. Nobeshima¹, T. Kazasa¹, M. Yoshida¹, ¹AIST (Japan), ²Ube Industries, Ltd. (Japan)

PS-10-04

Polymer light-emitting diodes operating in ultraviolet region containing carrier-transporting materials in active layers

M. Takahashi¹, °N. Ohtani¹, ¹Doshisha Univ. (Japan)

PS-10-05

Photoelectronic Properties of Thiophene-Vinylene Derivatives with Phthalimide Groups in Both Terminals

°*H. Mochizuki¹, H. Tachibana¹, ¹AIST (Japan)*

PS-10-06

Detection of Cu (I) in Copper Sulfate Plating Solution Using BCS Fluorescence

°*T. Koga¹, C. Hirakawa¹, M. Takeshita², N. Terasaki¹, ¹AIST (Japan), ²Saga Univ. (Japan)*

PS-10-07 (Late News)

Characterization of optical and photoelectric properties of a new boron-based organic semiconductor in the near-infrared regions

°*R. Fujioka¹, T. Fukushima¹, Y. Koshiba¹, K. Ishida¹, ¹Kobe Univ. (Japan)*

PS-10-08 (Late News)

Structural and Piezoelectric Characterization of P (VDF-TrFE)/Ionic Liquid Gels

°*M. Fukagawa¹, Y. Koshiba¹, M. Morimoto², T. Fukushima¹, K. Ishida¹, ¹Kobe Univ. (Japan), ²Univ. of Toyama (Japan)*

PS-10-09 (Late News)

High Voltage Sensitivity of Organic Pyroelectric Sensors with Polarization Treatment during Evaporation Process

°*Y. Sutani¹, S. Horike¹, T. Fukushima¹, Y. Koshiba¹, M. Morimoto^{1,2}, T. Kodani³, T. Kanemura³, K. Ishida¹, ¹Kobe Univ. (Japan), ²Univ. of Toyama (Japan), ³Daikin Indus. Ltd. (Japan)*

PS-10-10 (Late News)

The influence of optical absorbing layer thickness on measurement accuracy in inverted structure organic position-sensitive detectors

°*T. Morimune¹, H. Kajii², A. Kida¹, M. Miyoshi¹, K. Fukuda¹, K. Tanaka³, H. Fujita⁴, ¹National Inst. of Tech. Kagawa College (Japan), ²Osaka Univ. (Japan), ³Nagaoka Univ. of Tech. (Japan), ⁴National Inst. of Tech. Kochi College (Japan)*

11: Sensors and Materials for Biology, Chemistry and Medicine

(13 Papers)

PS-11-01

Enhancing Nitric Oxide Gas Sensitivity of p-Si NWs FETs with Antioxidant Surface Modification

°P. -W. Chiu¹, H. -M. P. Chen¹, ¹National Chiao Tung Univ. (Taiwan)

PS-11-02

High Resolution Multiplexing for DNA Arrays using a Multi-Electrode Chip

°K. Levrie^{1,2}, K. Jans¹, G. Schepers², R. Vos¹, P. Van Dorpe^{1,2}, L. Lagae^{1,2}, C. Van Hoof^{1,2}, A. Van Aerschoot², T. Stakenborg¹, ¹IMEC (Belgium), ²KU Leuven (Belgium)

PS-11-03

Valve-less Microfluidic Device for Sequential Exchange of Solutions for Fluorescence Immunoassay

°S. K. Pramanik¹, H. Suzuki¹, ¹Univ. of Tsukuba (Japan)

PS-11-04

Molecular Dynamics Investigation of the Field-Effect at the Technologically Relevant Silica-Electrolyte Interface

°B. M. Lowe¹, Y. Maekawa¹, C. -K. Skylaris², N. Green², Y. Shibuta¹, T. Sakata¹, ¹Univ. of Tokyo (Japan), ²Univ. of Southampton (UK)

PS-11-05

CMOS Readout Circuit with an On-chip Offset Voltage for Temperature Compensation of pH-ISFET Sensor

R. -L. Wang¹, °C. -S. Tsai¹, K. -B. Lee¹, H. -Y. Chen¹, Y. -Y. Lin¹, J. -Y. Chen¹, Y. -T. Chuang², H. -H. Liao², H. -H. Tsai², Y. -Z. Juang², ¹National Kaohsiung Normal Univ. (Taiwan), ²National Applied Research Labs., National Chip Implementation Center (Taiwan)

PS-11-06

Formation of Lipid bilayer on Ion Image Sensor and Measurement of Ion Concentration Change

°K. Imai¹, T. Horio¹, T. Hattori¹, K. Sawada¹, R. Tero¹,

¹*Toyohashi Univ. of Tech. (Japan)*

PS-11-07

Processing design using mechanoluminescence on epiphysis plates

°*T. Toyomasu¹, M. Sonohata², N. Terasaki¹, ¹AIST (Japan), ²Saga Univ. (Japan)*

PS-11-08

Wafer-Scale Development of 0.36 mm² 228mV Open-Circuit-Voltage Solid-State CMOS-Compatible Glucose Fuel Cell for Healthcare IoT Application

°*S. Arata¹, K. Hayashi¹, Y. Nishio¹, A. Kobayashi¹, K. Nakazato¹, K. Niitsu¹, ¹Nagoya Univ. (Japan)*

PS-11-09

Using Aligned P3HT/PMMA Fibers to Detect Volatile Organic Compounds

°*S. -H. Chan¹, M. -C. Wu¹, S. -H. Chen¹, W. -F. Su², C. -S. Lai¹, ¹Chang Gung Univ. (Taiwan), ²National Taiwan Univ. (Taiwan)*

PS-11-10

A finger-powered microfluidic device for agglutination study

°*C. -H. Lu¹, G. Pendharkar¹, C. -Y. Chow¹, C. -H. Liu¹, ¹National Tsing Hua Univ. (Taiwan)*

PS-11-11

Improvement of spatial resolution for 2D chemical images in thin-Si substrate

°*Y. -P. Chen¹, W. -Y. Zeng¹, T. -C. Chen¹, C. -M. Yang^{1,2}, C. -S. Lai¹, ¹Chang Gung Univ. (Taiwan), ²Chang Gung Memorial Hospital (Taiwan)*

PS-11-12

Common-Gate Boron-Doped Diamond (BDD) Solution Gate FET Application for PH Sensor

°*S. F. Mohd Sukri¹, Y. Shintani², H. Kawarada^{1,3}, ¹Waseda Univ. (Japan), ²Yokogawa Corp. (Japan), ³Kagami Memorial Lab. (Japan)*

PS-11-13 (Late News)

Paper-based Potentiometric pH Sensor using Carbon Electrode Drawn by Pencil

^oR. Kawahara¹, P. Sahatiya², S. Badhulika², S. Uno¹,
¹Ritsumeikan Univ. (Japan), ²Indian Inst. of Tech. Hyderabad (India)

12: Spintronics Materials and Devices

(19 Papers)

PS-12-01

Spin-orbit Interaction Investigated by Weak Anti-Localization Analysis in III-VI Layered Semiconductor GaSe Thin Film

S. Takasuna¹, J. Shiogai¹, M. Kohda¹, Y. Oyama¹, ^oJ. Nitta¹,
¹Tohoku Univ. (Japan)

PS-12-02

Superconducting proximity effect on a magnetic domain wall

^oM. Ishitaki¹, K. Ohnishi¹, T. Kimura¹, ¹Kyushu Univ. (Japan)

PS-12-03

High Electronegativity Element Compounds as Way of Increasing Ferromagnetic Interface PMA and its Voltage Control

^oM. Pankiev¹, K. Kita¹, ¹Univ. of Tokyo (Japan)

PS-12-04

Optimization of Figure of Merit in Magneto-Plasmonic Waveguides with Fe / Au Multilayer and Nonreciprocal Coupling on SOI substrate

^oT. Shimodaira¹, H. Shimizu¹, ¹Tokyo Univ. of Agri. & Tech. (Japan)

PS-12-05

Energy-Efficient High-Performance Nonvolatile VLSI Processor with a Temporary-Data Reuse Technique

^oM. Natsui¹, T. Hanyu¹, ¹Tohoku Univ. (Japan)

PS-12-06

Ultrafast switching in elliptical pMTJ via Voltage Control of Magnetic Anisotropy

°J. Deng¹, G. Liang¹, G. Gupta², ¹National Univ. of Singapore (Singapore), ²Spin Devices (India)

PS-12-07

Structural ordering and magnetism in equiatomic CoFeMnSi epitaxial films

°L. Bainsla¹, R. Yilgin¹, J. Okabayashi¹, A. Ono¹, K. Suzuki¹, S. Mizukami¹, ¹Tohoku Univ. (Japan)

PS-12-08

Inverse spin-valve effect in MBE-grown nanoscale Si spin-valve devices

°D. H. Duong¹, M. Tanaka², N. H. Pham^{1,2}, ¹Tokyo Tech (Japan), ²Univ. of Tokyo (Japan)

PS-12-09

Spin-Dependent Transport of Ferromagnetic-Semiconductor GaMnAs-Based Lateral Spin-Valve Devices

°H. Asahara¹, T. Kanaki¹, S. Ohya¹, M. Tanaka¹, ¹Univ. of Tokyo (Japan)

PS-12-10

Fabrication of Magnetic Tunnel Junctions with a Single-Crystalline LiF Tunnel Barrier

°S. K. Narayananellor¹, N. Doko², N. Matsuo², H. Saito¹, S. Yuasa¹, ¹AIST (Japan), ²Chiba Inst. of Tech. (Japan)

PS-12-11

Influence of Mn composition in Co₂MnSi films on magnetoresistance characteristics of Co₂MnSi-based current-perpendicular-to-plane spin valves

°M. Inoue¹, B. Hu¹, K. Moges¹, K. Inubushi², K. Nakada², M. Yamamoto¹, T. Uemura¹, ¹Hokkaido Univ. (Japan), ²TDK Corp. (Japan)

PS-12-12

Anomalous Nernst Effect of Ni-Al Alloys and Application

to Spin Seebeck Devices

^oT. Ono¹, S. Hirata¹, Y. Amemiya¹, T. Tabei¹, S. Yokoyama¹,
¹Hiroshima Univ. (Japan)

PS-12-13

Reliability Characteristics for Magnetic Tunnel Junctions
with MgO Tunnel Barrier in Low Voltage

B. So¹, ^oC. Choi¹, H. Sukegawa², S. Mitani², Y. Song¹,
¹Hanyang Univ. (Korea), ²NIMS (Japan)

PS-12-14

Fabrication of Fe_{1-x}Sn_x epitaxial films on MgO (001)
substrates

^oY. Goto¹, M. Araki¹, T. Yanase¹, T. Shimada¹, T.
Nagahama¹, ¹Hokkaido Univ. (Japan)

PS-12-15

Electric Field Effect on Exchange Interaction in Pt/Co Thin
Film

^oM. Ishibashi¹, K. T. Yamada¹, F. Ando¹, T. Koyama², H.
Kakizakai¹, H. Mizuno¹, K. Miwa³, S. Ono³, T. Moriyama¹,
D. Chiba², T. Ono¹, ¹Kyoto Univ. (Japan), ²Univ. of Tokyo
(Japan), ³Central Research Inst. of Electric Power
Industry (Japan)

PS-12-16

Spin Seebeck Devices Using Ce_xY_{3-x}Fe₅O₁₂ Deposited by
Metal Organic Decomposition -Influence of Composition
and Long Time Annealing-

^oT. Ono¹, S. Hirata¹, Y. Amemiya¹, T. Tabei¹, S. Yokoyama¹,
¹Hiroshima Univ. (Japan)

PS-12-17

Magnetic Properties of (Ga,Mn)As (110) Epitaxial Films

J. L. Ma¹, ^oH. Wang¹, Z. F. Yu¹, X. L. Wang¹, J. H. Zhao¹,
¹Inst. Semicond., Chinese Acad. Sci. (China)

PS-12-18

Electrical and Magnetic Properties of Neodymium
Monoxide Thin Film

^oD. Saito¹, K. Kaminaga^{1,2}, D. Oka¹, T. Hasegawa², T.

Fukumura¹, ¹Tohoku Univ. (Japan), ²Univ. of Tokyo (Japan)

PS-12-19 (Late News)

X-ray magnetic circular dichroism and hard x-ray photoelectron spectroscopy of a perpendicularly magnetized D0₂₂-type Mn₇₂Ge₂₈ thin film

°J. Kim¹, M. Mizuguchi¹, N. Inami², T. Ueno³, S. Ueda³, K. Takanashi¹, ¹Tohoku Univ. (Japan), ²High Energy Accelerator Research Organization (Japan), ³NIMS (Japan)

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

(25 Papers)

PS-13-01

Possibility of Thermoelectric Property Improvement by Non-uniformly Doped Si

°K. Shima¹, M. Tomita^{1,2}, Y. Kamakura³, T. Watanabe¹, ¹Waseda Univ. (Japan), ²JSPS Res. Fellow PD (Japan), ³Osaka Univ. (Japan)

PS-13-02

Fabrication of a Si Nanowire MOS Capacitor for the Application to Energy Storage Devices

°R. Nezasa¹, Y. Kurokawa¹, N. Usami¹, ¹Nagoya Univ. (Japan)

PS-13-03

Fabrication of Gate-All-Around Poly-Si Tube-channel Junctionless Field-Effect Transistors

°Y. -T. Chang¹, K. -P. Peng¹, P. -W. Li¹, H. -C. Lin¹, ¹National Chiao Tung Univ. (Taiwan)

PS-13-04

Impact of Crystallinity of AlN Thermal Conductive Film on Thermoelectric Power of Silicon Nanowire Micro Thermoelectric Generator

°R. Yamato¹, S. Hashimoto¹, T. Zhan¹, S. Oba¹, Y. Himeda¹, T. Matsukawa², T. Watanabe¹, ¹Waseda Univ. (Japan),

²AIST (Japan)

PS-13-05

Highly Sensitive Double-Gate Thin-Film Transistor pH Sensors with Solution-Processed Carbon-Nanotube Networks Channel and AlO_x Gate Insulator

°J. -Y. Pyo¹, W. -J. Cho¹, ¹Kwangwoon Univ. (Korea)

PS-13-06

Adsorption of cesium from aqueous solution using graphene oxide grown on a porous substrate

°S. Entani¹, M. Honda², I. Shimoyama², S. Li¹, H. Naramoto¹, T. Yaita², S. Sakai¹, ¹QST (Japan), ²JAEA (Japan)

PS-13-07

Adsorption and Diffusion of Li Atom on Graphene Sheet with V₆ Vacancy: First Principles Calculations

°K. Shiota¹, T. Kawai^{1,2}, ¹Univ. of Tsukuba (Japan), ²NEC Corp. (Japan)

PS-13-08

Dynamic Observation of Reversible Lithium Storage Phenomenon in Co₃O₄/CNTs Hybrid Devices

°G. -M. Huang¹, T. -C. Tsai¹, C. -W. Huang¹, W. -W. Wu¹, ¹National Chiao Tung Univ. (Taiwan)

PS-13-09

Time Dependent Structural Analysis of CVD Grown MoS₂ Flakes with Different Configurations

°A. Ozden¹, H. Sar¹, C. Odaci¹, C. Sevik¹, F. Ay¹, N. K. Perkgoz¹, ¹Anadolu Univ. (Turkey)

PS-13-10

Theoretical Study of Supporting Effect on Vacancies in MoS₂

°H. Kageshima¹, S. Urasaki¹, ¹Shimane Univ. (Japan)

PS-13-11

Investigation Of Long Term Electrical Transport Stability Of Mos₂ Flakes

°H. Sar¹, A. Ozden¹, C. Odaci¹, C. Sevik¹, N. Kosku

Pergozl, F. Ay¹, ¹Anadolu Univ. (Turkey)

PS-13-12

Optical and Electrical Properties of Large-area MoS₂ Thin Film Photodetectors

°Y. J. Huang¹, D. -Y. Lin¹, T. -S. Ko¹, C. -F. Lin², B. -S. Hong², H. -Z. Chen³, ¹National Changhua Univ. of Edu. (Taiwan), ²National Chung Hsing Univ. (Taiwan), ³Hsiuping Univ. of Sci. and Tech. (Taiwan)

PS-13-13

Simulation Investigation of Strained Black Phosphorus p-n Photodetector for Middle Infrared Range

°S. Zhang¹, Y. Liu¹, ¹Xidian Univ. (China)

PS-13-14

Electronic structure of 2D InSe

Y. Guo¹, °J. Robertson¹, ¹Cambridge Univ. (UK)

PS-13-15

Fabrication of high performance solar cells with few-layered WSe₂

°Y. Yamaguchi¹, W. Okita¹, T. Akama¹, C. Li¹, T. Kaneko¹, T. Kato¹, ¹Tohoku Univ. (Japan)

PS-13-16

Optical and electric transport properties of undoped and niobium doped tungsten diselenide

°J. J. Jheng^{1,2}, D. -Y. Lin¹, T. -S. Ko¹, H. -P. Hsu², Y. Ye³, ¹National Changhua Univ. of Edu. (Taiwan), ²Ming Chi Univ. of Tech. (Taiwan), ³Peking Univ. (China)

PS-13-17

Two-dimensional titanium oxide-based electron transport layer for high performance perovskite solar cells

°T. -P. Chen^{1,2}, ¹National Taiwan Univ. (Taiwan), ²Nano Sci. and Tech. Program, Taiwan International Graduate Program, Academia Sinica and National Taiwan Univ. (Taiwan)

PS-13-18 (Late News)

Paramagnetic Property in Two-Dimensional Titanium

Carbides *via* Surface Modifications

°Y. Yoon¹, ¹KAIST (Korea)

PS-13-19 (Late News)

Graphene oxide/graphene layered electrode for electrochemical biosensor applications

°P. -Y. Chien¹, C. -H. Huang¹, Y. Li¹, C. -H. Chiang¹, ¹Ming Chi Uni. of Tech. (Taiwan)

PS-13-20 (Late News)

Experimental Investigation of the Contact Resistance of Graphene/MoS₂ Interface Treated with O₂ Plasma

°Q. Lu¹, Y. Liu¹, G. Han¹, C. Fang¹, Y. Shao², J. Zhang¹, Y. Hao¹, ¹Xi dian Univ. (China), ²Res. Inst. of China Electric Power (China)

PS-13-21 (Late News)

First-principles study on domain boundary of MoS₂: Origin of band bending

°T. Kaneko¹, R. Saito¹, ¹Tohoku Univ. (Japan)

PS-13-22 (Late News)

Detection of electron trapping/detrapping in MoS₂ FET by high time-resolved I-V measurement

°K. Taniguchi¹, K. Nagashio^{1,2}, ¹Univ. of Tokyo (Japan), ²PRESTO-JST (Japan)

PS-13-23 (Late News)

Graphene and Poly (Methyl Methacrylate) Composite Laminates on Flexible Substrates for Volatile Organic Compounds Detection

°C. Rattanabut¹, W. Muangrat², W. Bungjongpru³, M. Phonyiem¹, W. J. Wongwiryapan¹, Y. J. Song⁴, ¹King Mongkut's Inst. Tech. Ladkrabang (Thailand), ²Shinshu Univ. (Japan), ³Thai Microelectronics Center (Thailand), ⁴Sungkyunkwan Univ. (Korea)

PS-13-24 (Late News)

Sodium Dodecyl Sulfate-Functionalized Carbon Nanotube / Polydimethylsiloxane Composites for High Performance Triboelectric Nanogenerator

^oN. Ketama¹, W. Wongwiryapan^{1,2}, A. Klamchuen², S. Rattanamai¹, ¹King Mongkut's Inst. Tech. Ladkrabang (Thailand), ²National NanoTech. Center (Thailand)

PS-13-25 (Late News)

Contact Properties of SWNT TCEs via the Microwave Treatment

K. H. Kim^{1,2}, ^oM. Yun¹, H. -D. Kim¹, ¹Sejong Univ. (Korea), ²Univ. of Michigan (USA)

14: Power Devices and Materials

(11 Papers)

PS-14-01

Observations of Inhomogeneity of 3C-SiC Layers Grown on 6H-SiC Substrates Using Scanning Internal Photoemission Microscopy

^oK. Shiojima¹, N. Mishina¹, N. Ichikawa², M. Kato², ¹Univ. of Fukui (Japan), ²Nagoya Inst. of Tech. (Japan)

PS-14-02

Reaction mechanisms at 4H-SiC/SiO₂ interface during wet SiC oxidation

^oT. Akiyama¹, S. Hori¹, K. Nakamura¹, T. Ito¹, H. Kageshima², M. Uematsu³, K. Shiraishi⁴, ¹Mie Univ. (Japan), ²Shimane Univ. (Japan), ³Keio Univ. (Japan), ⁴Nagoya Univ. (Japan)

PS-14-03

Compact Modeling of SiC Schottky Barrier Diode (SBD) and Its Extension to Junction Barrier Schottky Diode (JBS)

^oD. Navarro¹, M. Miura-Mattausch¹, H. J. Mattausch¹, M. Takusagawa², J. Kobayashi², M. Hara², ¹Hiroshima Univ. (Japan), ²Toyota Motor Corp. (Japan)

PS-14-04

Determination of Temperature-Dependent Stress in SiC MOSFETs by Raman Spectroscopy

^oR. Sugie¹, T. Uchida¹, ¹Toray Research Center Inc. (Japan)

PS-14-05

Interface Properties of Diamond MOS Diodes Studied by Capacitance-Voltage and Conductance Methods - NO₂ Hole Doping Effect -

°N. C. Saha¹, M. Kasu¹, ¹Saga Univ. (Japan)

PS-14-06

AC Hot carrier effect and PBTI of a thin-film SOI Power n-MOSFET at high temperature

°M. Nomura¹, A. Watanabe¹, S. Matsumoto¹, ¹Kyushu Inst. of Tech. (Japan)

PS-14-07

Highly Efficient and Compact CMOS DC-DC Converter with Novel Transistor Layout of 60 nm Multi-pillar Type Vertical Body Channel MOSFET

°K. Itoh^{1,2,3}, T. Endoh^{1,2,3}, ¹Tohoku Univ. (Japan), ²ACCEL, JST (Japan), ³OPERA, JST (Japan)

PS-14-08

High Temperature SiC Power Module Enhanced with Transient Thermal Characteristic by Al-bump Technology

°H. Tanisawa^{1,2}, F. Kato¹, K. Kouji^{1,3}, S. Sato¹, K. Watanabe¹, H. Takahashi^{1,4}, Y. Murakami^{1,5}, H. Sato¹, ¹AIST (Japan), ²Sanken electric Corp., Ltd. (Japan), ³Calsonic Kansei Corp. (Japan), ⁴Fuji Electric Co., Ltd. (Japan), ⁵NISSAN MOTOR Corp., Ltd. (Japan)

PS-14-09 (Late News)

Evaluation of Hall Effect Mobility for SiC MOSFETs with Increasing Nitrogen Implantation into Channel Region

°M. Noguchi¹, T. Iwamatsu¹, H. Amishiro¹, H. Watanabe¹, K. Kita², S. Yamakawa¹, ¹Mitsubishi Electric Corp. (Japan), ²Univ. of Tokyo (Japan)

PS-14-10 (Late News)

Normally-off MOSFET Properties Fabricated on Mg Implanted GaN Layers

°S. Takashima¹, K. Ueno¹, R. Tanaka¹, H. Matsuyama¹, M. Edo¹, K. Nakagawa², ¹Fuji Electric Co., Ltd. (Japan), ²Univ. of Yamanashi (Japan)

PS-14-11 (Late News)

A first principles study on the C=C defects near SiC/SiO₂ interface: Defect passivation by double bond saturation
°N. Tajima¹, T. Kaneko¹, T. Yamasaki¹, J. Nara¹, T. Schimizu², K. Kato³, T. Ohno¹, ¹NIMS (Japan), ²Toshiba Corp. (Japan), ³Univ. of Tokyo (Japan)

15: Photovoltaic Materials and Devices

(11 Papers)

PS-15-01

Contact Adhesion of Plated Ni/Cu Metallization for Si Solar Cells

°W. J. Chen¹, J. Y. Wu¹, S. H. Hsieh², ¹National Yunlin Univ. of Sci. and Tech. (Taiwan), ²National Formosa Univ. (Taiwan)

PS-15-02

Formation of Perfect Superlattice with Aligned Plane Orientation of Colloidal PbS Quantum Dots

°S. Fujimoto¹, F. Suetsugu¹, K. Mukai¹, ¹Yokohama National Univ. (Japan)

PS-15-03

Reactive Deposition Epitaxy of SrGe₂ Thin Films on Ge (111) and (001) Substrates

°T. Imajo¹, K. Toko¹, R. Takabe¹, T. Suemasu¹, ¹Univ. of Tsukuba (Japan)

PS-15-04

Characterization of Sputtered CdSe_xTe_{1-x} Films and Its Application in CdTe Solar Cells

°C. Li¹, L. Wu¹, F. Wang¹, Y. Chen¹, L. Feng¹, ¹Sichuan Univ. (China)

PS-15-05

Femtosecond Laser Crystallization for Boosting the Conversion Efficiency of Flexible Ink-Printing Cu (In,Ga) Se₂ Thin Film Solar Cells

°K. H. Wu¹, S. C. Chen¹, N. Z. She¹, J. X. Li¹, F. I. Lai², H. C. Kuo¹, ¹National Chiao Tung Univ. (Taiwan), ²Yuan Ze

Univ. (Taiwan)

PS-15-06

Investigation of Thermal Treatment Effects of PbI_2 Film Yielded Two-step Type Perovskite Solar Cells

°K. Yamamoto¹, K. Hamada², M. Shahiduzzaman¹, K. Yonezawa¹, M. Karakawa¹, T. Kuwabara¹, K. Takahashi¹, T. Taima¹, ¹Kanazawa Univ. (Japan), ²JAIST (Japan)

PS-15-07

High-performance and high-durability perovskite photovoltaic devices prepared using ethylammonium iodide as an additive

°C. -L. Chung¹, H. -L. Hsu¹, C. -C. Chang¹, C. -P. Chen¹, ¹Ming Chi Univ. of Tech. (Taiwan)

PS-15-08

New Electron Extraction Layer for Perovskite Solar Cells

°P. Karuppuswamy^{1,2,3}, C. Hanmandlu³, K. M. Boopathi³, C. -W. Chu³, ¹National Tsing Hua Univ., Hsinchu (Taiwan), ²Nano Sci. and Tech. Program Taiwan Int'l. Graduate Program, Academia Sinica and National Tsing Hua Univ. (Taiwan), ³RCAS, Academia Sinica (Taiwan)

PS-15-09

Antimony based Perovskite Materials for Photovoltaic Applications

°K. M. Boopathi¹, A. Singh¹, P. Karuppuswamy¹, C. -W. Chu¹, ¹RCAS, Academia Sinica (Taiwan)

PS-15-10

$\text{Cs}_3\text{Sb}_2\text{I}_9$ - All Inorganic Lead Free Perovskite Like Material for Solar Cell Application

°A. Singh^{1,2,3}, K. Mooorthy Boopathi³, C. -W. Chu³, ¹National Taiwan Univ., (Taiwan), ²Nano Sci. and Tech. Program Taiwan Int'l. Graduate Program Academia Sinica and National Taiwan Univ. (Taiwan), ³RCAS, Academia Sinica (Taiwan)

PS-15-11

Ultrafast Carrier Dynamics in Perovskite Solar Cells under

Thursday, September 21

Light Irradiation

°*J. X. Li¹, A. P. Thilakan¹, C. W. Luo¹, A. Yabushita¹, Ka. H. Wu¹, T. P. Chen², S. S. Li², C. W. Chen², ¹National Chiao Tung Univ. (Taiwan), ²National Taiwan Univ. (Taiwan)*

Joint Session (Area 4&12)

A-5: Nonvolatile Memory and Storage Devices

9:30-11:10 Meeting Room 1

Session Chair: T. Kondo (Toshiba Corp.)

H. Sato (Tohoku Univ.)

9:30 A-5-01 (Invited)

Accumulative Magnetic Switching of Ultrahigh-Density Recording Media by Circularly Polarized Light

°Y. K. Takahashi¹, R. Medapalli², S. Kasai¹, J. Wang¹, K. Ishioka¹, S. H. Wee³, O. Hellwig⁴, K. Hono¹, E. E. Fullerton², ¹NIMS (Japan), ²UCSD (USA), ³HGST (USA), ⁴Institut für Ionenstrahlphysik und Materialforschung (Germany)

10:00 A-5-02

Switching Mechanism Design for High-speed Voltage-Control Spintronics Memory (VoCSM) Considering the Operation Window

°K. Koi¹, H. Yoda¹, N. Shimomura¹, T. Inokuchi¹, Y. Kato¹, B. Altansargai¹, S. Shirotori¹, Y. Kamiguchi¹, K. Ikegami¹, S. Oikawa¹, H. Sugiyama¹, M. Shimizu¹, M. Ishikawa¹, T. Ajay¹, Y. Ohsawa¹, Y. Saito¹, A. Kurobe¹, ¹Toshiba Corp. (Japan)

10:20 A-5-03

Cross Point Type 1T-1MTJ STT-MRAM Cell with 60 nm Multi-pillar Vertical Body Channel MOSFET under 55 nm p-MTJ and Its Beyond for High Density STT-MRAM

°T. Sasaki^{1,2,3}, T. Endoh^{1,2,3}, ¹Tohoku Univ. (Japan), ²ACCEL, JST (Japan), ³OPERA, JST (Japan)

10:40 A-5-04 (Invited)

Key advanced technology for eMRAM development

°J. Lee¹, H. Jung¹, K. Lee¹, Y. Song¹, G. -H. Koh¹, G. -T. Jeong, ¹Samsung Electronics Co., Ltd. (Korea)

11:10-11:15

Coffee Break

Friday, September 22

A-6: Novel Memory

11:15-12:15 Meeting Room 1

Session Chair: T. Ono (Kyoto Univ.)

K. Kinoshita (Tokyo Univ. of Science)

11:15 A-6-01

Voltage-Control Spintronics Memory (VoCSM) having a potential of high write-efficiency

^oM. Shimizu¹, H. Yoda¹, S. Shirotori¹, N. Shimomura¹, Y. Ohsawa¹, T. Inokuchi¹, K. Koui¹, Y. Kato¹, S. Oikawa¹, H. Sugiyama¹, A. Buyandalai¹, M. Ishikawa¹, K. Ikegami¹, Y. Kamiguchi¹, Y. Saito¹, A. Kurobe¹, ¹Toshiba Corp. (Japan)

11:35 A-6-02

Sub 1 V 60 nm Vertical Body Channel MOSFET Based 6T SRAM Array with Wide Noise Margin and Excellent Power Delay Product

^oR. Ogasawara^{1,2,3}, T. Endoh^{1,2,3}, ¹Tohoku Univ. (Japan),
²ACCEL, JST (Japan), ³OPERA, JST (Japan)

11:55 A-6-03

In-situ Observation of Cu Residuals in Resistance Switching Failure of MoO_x/Al₂O₃ CBRAM

^oM. Arita¹, R. Ishikawa¹, S. Hirata¹, A. Turumaki-Fukuchi¹, Y. Takahashi¹, ¹Hokkaido Univ. (Japan)

12:15-13:40

Lunch

04: Advanced Memory Technology

A-7: ReRAM Applications

13:40-15:00 Meeting Room 1

Session Chair: Y. Jono (Micron Memory Japan Inc.)

Y. Hikosaka (Fujitsu Semiconductor Ltd.)

13:40 A-7-01

The Experimental Observations of a New Dielectric-fuse Breakdown in a Bilayer-RRAM to Realize the OTP Functionality

^oE. R. Hsieh¹, H. W. Cheng¹, Z. H. Huang¹, C. H. Chuang¹, C. H. Chen¹, S. Chung¹, ¹National Chiao Tung Univ. (Taiwan)

Friday, September 22

14:00 A-7-02

A Novel Ternary Content Addressable Memory Design Based on RRAM with High Intensity and Low Search Energy

°R. Han¹, W. Shen¹, P. Huang¹, Z. Zhou¹, L. Liu¹, X. Liu¹, J. Kang¹, ¹Peking Univ. (China)

14:20 A-7-03

Error Free Physically Unclonable Function (PUF) with Programmed ReRAM using Reliable Resistance States by Novel ID-Generation Method

°P. H. Tseng¹, ¹Macronix International Co., Ltd. (Taiwan)

14:40 A-7-04

Highly Reliable Logic-Compatible MTP Memory for Automotive Applications

°C. Y. Lo¹, S. C. Wang¹, ¹eMemory Technology Inc. (Taiwan)

15:00-15:10

Coffee Break

A-8: PCRAM

15:10-16:55 Meeting Room 1

Session Chair: S. Jeon (Korea Univ.)

Y. Hikosaka (Fujitsu Semiconductor Ltd.)

15:10 A-8-01 (Invited)

Transition Metal-Ge-Te Chalcogenides for PCRAM Material

°Y. Sutou¹, S. Shindo¹, S. Hatayama¹, Y. Saito², J. Koike¹, ¹Tohoku Univ. (Japan), ²AIST (Japan)

15:40 A-8-02

Origin of the difference between high resistive and low resistive structures for interfacial phase change memories based on GeTe/Sb₂Te₃ superlattice

°H. Shirakawa¹, M. Araidai¹, K. Shiraishi¹, ¹Nagoya Univ. (Japan)

16:00 A-8-03

Thermal Stability and Switching Performance of iPCM at Elevated Temperature

Friday, September 22

°K. V. Mitrofanov¹, Y. Saito¹, N. Miyata¹, P. Fons¹, A. V. Kolobov¹, J. Tominaga¹, ¹AIST (Japan)

16:20 A-8-04

Continuous Multilevel Compact Model of Subthreshold Conduction and Threshold Switching in Phase-Change Memory

°C. Pigot^{1,2,3}, F. Gilibert¹, M. Reyboz², M. Bocquet³, P. Zuliani⁴, J. -M. Portal³, ¹STMicroelectronics, Crolles (France), ²CEA-Leti (France), ³IM2NP, Aix-Marseille Univ. (France), ⁴STMicroelectronics, Agrate (Italy)

16:40 A-8-05 (Late News)

Programming Current Reduction in GeS₂+Sb₂Te₃ Based Phase-Change Memory

°J. Kluge^{1,2,3}, A. Verdy², G. Navarro², S. Blonkowski¹, V. Sousa², P. Kowalczyk², M. Bernard², N. Bernier², G. Bourgeois², N. Castellani², P. Noé², E. Nowak², L. Perniola², ¹STMicroelectronics (France), ²CEA-Leti (France), ³IMEP-LAHC (France)

Joint Session (Area 10&15)

B-5: Quantum Dot/Organic Solar Cells

9:30-10:45 Meeting Room 2

Session Chair: M. Ikegami (Toin Univ. of Yokohama)
T. Kaji (Tokyo Univ. of Agri. & Tech.)

9:30 B-5-01 (Invited)

Solution-processed solar cells with nanostructured hybrid materials

°T. Kubo¹, H. Wang¹, H. Segawa¹, ¹Univ. of Tokyo (Japan)

10:00 B-5-02

0-dimensional Carbon Dot as Efficient Cathode Interfacial Layers for Organic Photovoltaics Providing Power Conversion Efficiencies up to 9.5%

°J. -C. Kao¹, C. -P. Chen¹, ¹Ming Chi Univ. of Tech. (Taiwan)

Friday, September 22

10:15 B-5-03

The research on the principle of high V_{oc} in Schottky type organic photovoltaic cells with low concentrated donors
°F. Enokido¹, M. Yogo¹, M. Katayama¹, T. Kaji¹, ¹Tokyo Univ. of Agri. & Tech. (Japan)

10:30 B-5-04

Highly stable organic-inorganic perovskite solar cells
C. Qin^{1,2}, °T. Matsushima^{1,2}, T. Fujihara³, C. Adachi^{1,2},
¹Kyushu Univ. (Japan), ²JST, ERATO (Japan), ³ISIT (Japan)

10:45-11:15

Coffee Break

15: Photovoltaic Materials and Devices

B-6: Perovskite Solar Cells

11:15-12:30 Meeting Room 2

Session Chair: M. Chikamatsu (AIST)

T. Taima (Kanazawa Univ.)

11:15 B-6-01

The Influence of O₂ Plasma Treatment to NiO_x Layer for Perovskite Solar Cells

°Y. Nishihara^{1,2}, M. Chikamatsu¹, S. Kazaoui¹, T. Miyadera¹, Y. Yoshida^{1,2}, ¹AIST (Japan), ²Univ. of Tsukuba (Japan)

11:30 B-6-02

Low Temperature Processed Atomically Thin Perovskite Oxide as Electron Transporting Layer in Perovskite Solar Cells

°Y. -H. Tsai¹, S. -S. Li¹, K. Tsukagoshi², T. Sasaki², M. Osada², C. -W. Chen¹, ¹National Taiwan Univ. (Taiwan), ²NIMS (Japan)

11:45 B-6-03

High Mobility Fullerene Derivative as Interface Engineering of Amorphous Compact-TiO_x for Planar Perovskite Solar Cells

°M. Shahiduzzaman¹, M. Karakawa¹, K. Yamamoto¹, K. Yonezawa¹, T. Kuwabara¹, K. Takahashi¹, T. Taima¹,

Friday, September 22

¹*Kanazawa Univ. (Japan)*

12:00 B-6-04

Semitransparent Perovskite Solar Cells With Thin Metal Electrodes

°*H. Chintam*^{1,2}, *K. M. Boopathi*¹, *C. S. Lai*², *C. W. Chu*¹,
¹*Academia Sinica (Taiwan)*, ²*Chang Gung Univ. (Taiwan)*

12:15 B-6-05

Simple Structured Polyetheramines, as Electron Transporting Modified Layers for Efficient Organic Photovoltaics

°*Y. -Y. Tsai*¹, *B. -H. Jiang*¹, *C. -P. Chen*¹, ¹*Ming Chi Univ. of Tech. (Taiwan)*

07: Photonic Devices and Related Technologies

C-5: Silicon Photonics I

9:30-10:45 Meeting Room 3

Session Chair: *M. Shirao* (Mitsubishi Electric Corp.)
S. Sekiguchi (Fujitsu Labs.)

9:30 C-5-01 (Invited)

Integration of Photonics with Digital Processing Units

°*L. Alloatti*¹, ¹*ETH Zürich (Switzerland)*

10:00 C-5-02

High-Performance Surface Illumination-type Ge Photodetector for Optical Interconnection on 300mm-diameter of SOI substrate

°*J. Fujikata*¹, *K. Kinoshita*¹, *S. Takahashi*¹, *T. Horikawa*^{1,2},
*M. Noguchi*¹, *K. Takemura*¹, *D. Okamoto*¹, *Y. Suzuki*¹, *M. Kurihara*¹,
*Y. Hagihara*¹, *T. Nakamura*¹, *K. Kurata*¹, *T. Mogami*¹, ¹*PETRA (Japan)*, ²*AIST (Japan)*

10:15 C-5-03

O-Band CWDM Echelle Grating Demultiplexers on SiNOI Exhibiting Quasi-Absolute Thermal Insensitiveness

°*C. Sciancalepore*¹, *Q. Wilmart*¹, *D. Robin-Brosse*¹, *L. Adelmini*¹,
*S. Malhouitre*¹, *S. Olivier*¹, ¹*CEA-Leti (France)*

Friday, September 22

10:30 C-5-04

CMOS Compatible 200mm Silicon Photonic Platform
Suitable For High Bandwidth Applications

°*B. Szlag¹, B. Charbonnier¹, S. Brision¹, B. Karakus¹, D. Fowler¹, O. Lemonnier¹, J. -M. Hartmann¹, P. Brianceau¹, D. Marris-Morini², E. Cassan², L. Vivien², S. Menezo¹, C. Kopp¹, ¹CEA-Leti (France), ²C2N-Univ. Paris Sud (France)*

10:45-11:15

Coffee Break

09: Physics and Applications of Novel Functional Devices and Materials

C-6: Quantum Transport

11:15-12:30 Meeting Room 3

Session Chair: R. Moriya (Univ. of Tokyo)

T. Koderu (Tokyo Tech)

11:15 C-6-01 (Invited)

1D van der Waals Materials in 2D Form

°*P. Ye¹, ¹Purdue Univ. (USA)*

11:45 C-6-02

Interplay between Kondo effect and superconductivity in a
carbon nanotube quantum dot

°*T. Hata¹, M. Ferrier², S. Lee¹, T. Arakawa¹, R. Delagrangé², R. Deblock², H. Bouchiat², K. Kobayashi¹, ¹Osaka Univ. (Japan), ²Univ. Paris Sud (France)*

12:00 C-6-03

Dissipative Landau-Zener transition in capacitance
measurement on a double quantum dot

°*T. Ota¹, K. Hitachi¹, K. Muraki¹, T. Fujisawa², ¹NTT Basic Res. Labs. (Japan), ²Tokyo Tech (Japan)*

12:15 C-6-04 (Late News)

Micro Channel Based Heat Sink with Integrated Thin-Film
Temperature Sensors

°*J. Wang¹, T. Wang¹, J. He¹, Y. Yang¹, Y. Li¹, H. Jiao¹, C. Wu¹, W. Luo¹, Y. Shuai¹, W. Zhang¹, ¹Univ. of Electronic Sci. and Tech. of China (China)*

12:30-13:40

Lunch

C-7: Quantum Optoelectronics

13:40-14:55 Meeting Room 3

Session Chair: T. Miyazawa (Fujitsu Labs. Ltd.)
T. Ota (NTT Basic Res. Labs.)

13:40 C-7-01

Telecom-Wavelength Quantum Relay using a
Semiconductor Entangled Light Source

J. Huwer¹, M. Felle^{1,2}, ^oM. Stevenson¹, J. Skiba-Szymanska¹, M. Ward¹, I. Farrer², R. Penty², D. Ritchie², A. Shields¹, ¹Toshiba Research Europe Ltd. (UK), ²Univ. of Cambridge (UK)

13:55 C-7-02

Generation and Detection of Edge Magnetoplasmons in a
Quantum Hall Edge Channel Using a Photoconductive
Switch

^oC. Lin¹, K. Morita¹, K. Muraki², T. Fujisawa¹, ¹Tokyo Tech (Japan), ²NTT Basic Res. Labs. (Japan)

14:10 C-7-03

Electrically Tunable Coupling of a Ge/Si Core/Shell
Nanowire Double Quantum to a Superconducting
Transmission Line Cavity

^oR. Wang¹, R. S. Deacon^{1,2}, J. Yao³, C. M. Lieber³, K. Ishibashi^{1,2}, ¹RIKEN (Japan), ²CEMS, RIKEN (Japan), ³Harvard Univ. (USA)

14:25 C-7-04

Terahertz response in the quantum Hall effect regime of a
quantum-well based charge sensitive phototransistor

D. Nakagawa¹, K. Takizawa¹, ^oK. Ikushima¹, S. Kim², M. Patrashin³, I. Hosako³, S. Komiyama², ¹Tokyo Univ. of Agri. & Tech. (Japan), ²Univ. of Tokyo (Japan), ³NICT (Japan)

14:40 C-7-05

Acoustic characteristics of a surface-acoustic-wave
resonator made of two Bragg reflectors with periodic
metallization of GaAs

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°R. Takasu¹, Y. Sato¹, T. Fujisawa¹, ¹Tokyo Tech (Japan)

03: CMOS Devices / Device Physics

E-5: Steep Slope Transistor and Device Physics

9:30-10:50 Tachibana Conference Room

Session Chair: K. Maekawa (Renesas Electronics Corp.)

R. Huang (Peking Univ.)

9:30 E-5-01 (Invited)

Improvement of Device and Circuit Performance of Si-based Tunnel Field-Effect Transistors by Utilizing Isoelectronic Trap Technology

°T. Mori¹, H. Asai¹, T. Matsukawa¹, ¹AIST (Japan)

10:00 E-5-02

Investigation of Thermal Effects on FinFETs in the Quasi-Ballistic Regime

°L. Yin¹, L. Shen¹, S. Y. Di¹, G. Du¹, X. Y. Liu¹, ¹Peking Univ. (China)

10:20 E-5-03 (Late News)

Optimizing MOS-Gated Thyristor using Voltage-based Equivalent Circuit Model for Designing Steep Subthreshold Slope PN-Body Tied SOI FET

°D. Ueda¹, K. Takeuchi¹, M. Kobayashi¹, T. Hiramoto¹, ¹Univ. of Tokyo (Japan)

10:35 E-5-04 (Late News)

Lowering Minimum Operation Voltage (V_{\min}) in SRAM Array by Post-Fabrication Self-Improvement of Cell Stability by Multiple Stress Application

°T. Mizutani¹, K. Takeuchi¹, T. Saraya¹, M. Kobayashi¹, T. Hiramoto¹, ¹Univ. of Tokyo (Japan)

10:50-11:15

Coffee Break

E-6: 3D Technology

11:15-12:25 Tachibana Conference Room

Session Chair: K. Sukegawa (Socionext Inc.)

F. L. Yang (Academia Sinica)

11:15 E-6-01 (Invited)

Achieving BEOL Footprint-Efficient and Low Cost Monolithic 3D⁺ IoT Chip Using Low Thermal Budget Laser Technology

°C. -C. Yang¹, T. -Y. Hsieh¹, W. -H. Huang¹, J. -M. Shieh¹, H. -H. Wang¹, C. -H. Shen¹, F. -K. Hsueh¹, W. -K. Yeh¹,
¹National Nano Device Labs. (Taiwan)

11:45 E-6-02

Analysis of Inter-and Intra-Grain Defects in Electrically Characterized Poly-Si Nanowire TFTs by Multicomponent DF Imaging Based on NBD-2DI

°T. Asano¹, R. Takaishi¹, M. Oda¹, K. Sakuma¹, M. Saitoh¹, H. Tanaka¹, ¹Toshiba Corp. (Japan)

12:05 E-6-03

Investigation of the Optimum Stacking Number of Stacked Nanowires for Logic Applications

°W. -C. Huang¹, P. Su¹, ¹National Chiao Tung Univ. (Taiwan)

11: Sensors and Materials for Biology, Chemistry and Medicine
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F-5: Nano Devices for Chemical & Biosensing

9:30-10:30 Meeting Room 4

Session Chair: M. Sasaki (Toyota Technological Inst.)
T. Sakata (Univ. of Tokyo)

9:30 F-5-01

The Super-Nernstian pH-sensitivity of CeY_xO_y Sensing Membrane Electrolyte-Insulator-Semiconductor Sensors

T. -M. Pan¹, C. -L. Chan¹, °Y. -H. Huang¹, C. -W. Wang¹,
¹Chang Gung Univ. (Taiwan)

9:45 F-5-02

A Super-Nernstian pH Sensor using WO₃ Nanosheets Sensing Electrode

°C. -Y. Kuo¹, R. -M. Ko¹, H. -H. Tseng¹, S. -J. Wang¹,
¹National Cheng Kung Univ. (Taiwan)

Friday, September 22

10:00 F-5-03

Ag/SiO₂ surface-enhanced Raman scattering substrate detection in plasticizer

°T. -H. Lin¹, M. -P. Lin², W. -F. Su², M. -C. Wu¹, ¹Chang Gung Univ. (Taiwan), ²National Taiwan Univ. (Taiwan)

10:15 F-5-04 (Late News)

From single phase to multiphase: single cell encapsulation in a droplet

°G. Pendharkar¹, D. Mukherjee², C. -M. Chang³, Y. -T. Lu³, S. Chakraborty², C. -H. Liu¹, ¹National Tsing Hua Univ. (Taiwan), ²Indian Inst. of Tech. (India), ³Mackay Memorial Hospital (Taiwan)

10:30-11:15

Coffee Break

Joint Session (Area 10&11)

F-6: Organic and Bio Devices

11:15-12:30 Meeting Room 4

Session Chair: S. Nakajima (Japan Aviation Electronics Ind., Ltd.)
R. Tero (Toyohashi Tech)

11:15 F-6-01 (Invited)

Bioorganic Hybrid Nanomaterials in Optics, Electronics and Sensing

I. Mames¹, J. W. Wood¹, J. P. Pursey¹, L. L. Sargisson¹, °E. Stulz¹, ¹Univ. of Southampton (UK)

11:45 F-6-02

Performance Analysis of Multi-metallic Sensor Chip for the Real-time Quantification of EV 71 Virus with SPR Biosensor

°A. Alom¹, B. A. Prabowo¹, P. Pal¹, M. K. Secario¹, P. -T. Ou¹, J. -J. Liu¹, R. Y. L. Wang^{1,2}, K. C. Liu^{1,2}, ¹Chang Gung Univ. (Taiwan), ²Chang Gung Memorial Hospital (Taiwan)

12:00 F-6-03

Adhesive Conductive Polymer for Wearable Electrocardiogram Monitoring

°D. Yamamoto¹, Y. Yamamoto¹, M. Takada¹, H. Naito¹, T. Arie¹, S. Akita¹, K. Takei¹, ¹Osaka Pref. Univ. (Japan)

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12:15 F-6-04 (Late News)

Highly efficient deep-blue OLED with a novel carbazole based florescent emitter

°S. Sahoo¹, M. Singh¹, V. Joseph², K. R. J. Thomas², J. H. Jou¹, ¹National Tsing Hua Univ. (Taiwan), ²Indian Inst. of Tech. Roorkee (India)

05: Advanced Circuits and Systems

G-5: Advanced Imager and Characterization

9:30-10:40 Meeting Room 5

Session Chair: R. Kuroda (Tohoku Univ.)

H. Majima (Toshiba Corp.)

9:30 G-5-01 (Invited)

Advanced Stacked CMOS Image Sensor Technology

°Y. Nitta¹, ¹Sony Semiconductor Solutions Corp. (Japan)

10:00 G-5-02

Impact of Drain Current to Appearance Probability and Amplitude of Random Telegraph Noise in Low Noise CMOS Image Sensors

°S. Ichino¹, T. Mawaki¹, A. Teramoto¹, R. Kuroda¹, H. Park¹, T. Maeda¹, S. Wakashima¹, T. Goto¹, T. Suwa¹, S. Sugawa¹, ¹Tohoku Univ. (Japan)

10:20 G-5-03

Analysis of Random Telegraph Noise Behaviors of nMOS and pMOS toward Back Bias Voltage Changing

°T. Mawaki¹, A. Teramoto¹, R. Kuroda¹, S. Ichino¹, S. Sugawa¹, ¹Tohoku Univ. (Japan)

10:40-11:15 Coffee Break

G-6: Advanced Computing and Memories for Smart Data Processing

11:15-12:25 Meeting Room 5

Session Chair: I. Akita (Toyohashi Tech)

K. Johguchi (Shinshu Univ.)

Friday, September 22

11:15 G-6-01 (Invited)

HPP: A Novel Architecture for High Performance Processing

D. Wang¹, °Z. Zhang¹, Z. Liu¹, X. Du¹, S. Xie¹, H. Ma¹, G. Ding¹, W. Ren¹, F. Zhou¹, W. Sun¹, H. Wang¹, ¹Inst. of Automation, Chinese Academy of Sci. (China)

11:45 G-6-02

A 28nm High-*k*/Metal-gate Symmetric 10T 2RW Dual-port SRAM bitcell design

T. Y. Lu¹, C. H. Huang¹, S. S. Chen¹, Y. T. Kuo¹, C. C. Lung¹, O. Cheng¹, Y. Ishii², M. Tanaka², M. Yabuuchi², Y. Sawada², S. Tanaka², °K. Nii², ¹United Microelectronics Corp. (Taiwan), ²Renesas Electronics Corp. (Japan)

12:05 G-6-03

Fully Digital Ternary Content Addressable Memory using Ratio-less SRAM Cells and Hierarchical-AND Matching Comparator for Ultra-low-voltage Operation

°D. Nishikata¹, M. A. Bin Mohd Ali¹, K. Hosoda¹, H. Matsumoto¹, K. Nakamura¹, ¹Kyushu Inst. of Tech. (Japan)

12:25-13:40

Lunch

G-7: Advanced Sensing and Connectivity

13:40-14:50 Meeting Room 5

Session Chair: H. Majima (Toshiba Corp.)

T. Minotani (NTT Device Technology Lab.)

13:40 G-7-01 (Invited)

QZSS Short Message Synchronized SS-CDMA Communication

°S. Kameda¹, K. Ohya¹, H. Oguma², N. Suematsu¹, ¹Tohoku Univ. (Japan), ²National Inst. of Tech., Toyama College (Japan)

14:10 G-7-02

High Volume Testing and Calibration Technique of CMOS Analog Circuits for System-on-Chips and Microprocessors

°T. Oshita¹, J. Douglas¹, A. Krishnamoorthy¹, ¹Intel Corp. (USA)

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14:30 G-7-03

A Temperature Monitor Circuit with Small Voltage Sensitivity using a Topology Reconfigurable Ring Oscillator

°T. Kishimoto¹, T. Ishihara¹, H. Onodera¹, ¹Kyoto Univ. (Japan)

14:50-15:10

Coffee Break

G-8: Advanced MEMS Sensors and Analog Front End

15:10-16:20 Meeting Room 5

Session Chair: K. Johguchi (Shinshu Univ.)
J. C. Guo (NCTU)

15:10 G-8-01 (Invited)

Open Innovation of CMOS-MEMS Integrated Devices by Open Facility

°Y. Mita¹, ¹Univ. of Tokyo (Japan)

15:40 G-8-02

A Capacitive Sensor Circuit Based on Relaxation Oscillator for Sub-1mG MEMS Inertial Sensors

°M. Takayasu¹, S. Doshō¹, H. Ito¹, D. Yamane¹, T. Konishi^{1,2}, K. Machida¹, N. Ishihara¹, K. Masu¹, ¹Tokyo Tech (Japan), ²NTT Adv. Tech. Corp. (Japan)

16:00 G-8-03

A 120dBΩ 16MHz Pseudo Differential CMOS Analog Front End Circuit for Optical Probe Current Sensor

°T. Uekura¹, K. Oyanagi, M. Sonehara¹, T. Sato¹, K. Miyaji¹, ¹Shinshu Univ. (Japan)

02: Interconnect Technologies, MEMS, and Reliability

H-5: TSV & 3D Integration

9:30-11:00 Meeting Room 6

Session Chair: M. Mariappan (Tohoku Univ.)
S. Ogawa (AIST)

9:30 H-5-01 (Invited)

Advanced Packaging Technology to Address Micro-bump

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Solder Bonding and Warpage in Large-die 3D IC using
22nm ULK Dielectrics

°K. Sakuma¹, J. Knickerbocker¹, ¹IBM T. J. Watson
Research Center (USA)

10:00 H-5-02

Evaluation of Substrate Noise Suppression Method to
Mitigate Crosstalk among TSVs

°Y. Araga¹, K. Kikuchi¹, M. Aoyagi¹, ¹AIST (Japan)

10:20 H-5-03

The large-area backside etching method by changing
backside layout using loading effect and ARDE for
foundry-based fabrication

°Y. Okamoto¹, Y. Tohyama¹, N. Usami¹, Y. Mita¹, ¹Univ. of
Tokyo (Japan)

10:40 H-5-04

Characterization of Cu-TSVs Fabricated by a New All-Wet
Process

°M. Xiong^{1,2}, Y. Yan², Y. Ding², H. Kino¹, T. Fukushima¹, T.
Tanaka¹, ¹Tohoku Univ. (Japan), ²Beijing Inst. of Tech.
(China)

11:00-11:15

Coffee Break

Joint Session (Area 2&7)

H-6: Optical Interconnects and Sensors

11:15-12:30 Meeting Room 6

Session Chair: M. Fujino (Univ. of Tokyo)

F. Boeuf (STMicroelectronics)

11:15 H-6-01 (Invited)

Heterogeneous Integration Based on Low-Temperature
Bonding for Advanced Optoelectronic Devices

°E. Higurashi^{1,2}, ¹AIST (Japan), ²Univ. of Tokyo (Japan)

11:45 H-6-02

Membrane-based GaInAs/InP waveguide-type p-i-n
photodetector fabricated on Si substrate using
Benzocyclobutene bonding

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^oZ. Gu¹, T. Uryu¹, D. Inoue¹, T. Amemiya¹, N. Nishiyama¹,
S. Arai¹, ¹Tokyo Tech (Japan)

12:00 H-6-03

Fabrication of VTPC-TG Pixels for 3D Structure CMOS
Image Sensor Applications

S.-K. Park¹, ^oD. Woo¹, M.-K. Na¹, P.-S. Kwag¹, H.-R. Lee¹,
K.-W. Ro¹, K.-H. Kim¹, D.-K. Lee¹, C. Hong¹, I.-W. Cho¹,
J.-H. Park², K.-D. Yoo², ¹SK Hynix (Korea), ²Hanyang
Univ. (Korea)

12:15 H-6-04 (Late News)

Influence of different plasma treatments on low-
temperature Au-Au bonding and its application to hermetic
packaging

^oM. Yamamoto¹, E. Higurashi^{1,2}, T. Suga¹, R. Sawada³, T.
Itoh¹, ¹Univ. of Tokyo (Japan), ²AIST (Japan), ³Kyushu
Univ. (Japan)

12:30-13:40

Lunch

07: Photonic Devices and Related Technologies

H-7: Silicon Photonics II

13:40-14:55 Meeting Room 6

Session Chair: T. Shimizu (PETRA)

T. Amano (AIST)

13:40 H-7-01 (Invited)

High power Silicon laser based on the dressed photon
technology

^oT. Kawazoe¹, ¹Tokyo Denki Univ. (Japan)

14:10 H-7-02

1.7 μm Wavelength Tunable Laser Diode Using Silicon
External Cavity

^oS. Takei¹, T. Kita¹, H. Yamada¹, ¹Tohoku Univ. (Japan)

14:25 H-7-03

Demonstration of Distributed Feedback Silicon Evanescent
Quantum Dot Laser

^oB. Jang¹, T. Tsuchizawa^{2,3}, H. Nishi^{2,3}, T. Nakamura³, S.

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Iwamoto¹, Y. Arakawa¹, ¹Univ. of Tokyo (Japan), ²NTT Device Tech. Labs. (Japan), ³Photonics Electronics Tech. Res. Association (Japan)

14:40 H-7-04 (Late News)

Silicon on Insulator Nanowire Photodiode with Nanoscale Bow-Tie Surface Plasmon Antenna for Light Detection Applications

°Y. Sharma¹, H. Satoh¹, H. Inokawa¹, ¹Shizuoka Univ. (Japan)

14:55-15:10

Coffee Break

H-8: Silicon Photonics III

15:10-16:25 Meeting Room 6

Session Chair: S. Saito (Univ. of Southampton)

K. Ohira (Toshiba Corp.)

15:10 H-8-01

High Speed and Low Power Consumption Silicon Thermo-optical Phase Shifter

°Y. Chiba¹, T. Kita¹, H. Yamada¹, ¹Tohoku Univ. (Japan)

15:25 H-8-02

Performance Benchmarking of InGaAsP, Si_{0.8}Ge_{0.2} and Si-based Photonics Homojunction and Heterojunction PN Modulators

°F. Boeuf^{1,2}, N. Sekine², S. Takagi², M. Takenaka², ¹STMicroelectronics (France), ²Univ. of Tokyo (Japan)

15:40 H-8-03

Mid-Infrared Si-photonic Devices Based on 340 nm SOI Platform

°H. Wang¹, ¹Nanyang Technological Univ. (Singapore)

15:55 H-8-04 (Invited)

Line Beam Scanner using Slow-Light Waveguides in Si Photonics

°T. Baba¹, K. Kondo², ¹Yokohama National Univ. (Japan), ²Tokyo Tech (Japan)

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

J-5: Advanced Functional Nanowire Devices

9:30-10:45 Meeting Room 7

Session Chair: M. Arita (Univ. of Tokyo)

S. Hara (Hokkaido Univ.)

9:30 J-5-01 (Invited)

Flexible Optoelectronic Devices Based on Nitride Nanowires Embedded in Polymer Films

°M. Tchernycheva¹, N. Guan¹, X. Dai¹, H. Zhang¹, V. Piazza¹, A. Kapoor^{2,3}, C. Bougerol^{2,4}, L. Mancini¹, F. H. Julien¹, L. Lu¹, M. Morassi¹, N. Gogneau¹, J. -C. Harmand¹, L. Largeau¹, M. Foldyna⁵, J. Eymery^{2,3}, C. Durand^{2,3}, ¹CNRS, Univ. Paris Saclay (France), ²Univ. Grenoble Alpes (France), ³CEA-CNRS “Nanophysique et Semiconducteurs” group, CEA-INAC-PHELIQS (France), ⁴CEA-CNRS “Nanophysique et Semiconducteurs” group, CNRS, Institut Néel (France), ⁵LPICM-CNRS, Ecole Polytechnique (France)

10:00 J-5-02

Efficient Coupling of Lateral Force in GaN Nanorod Piezoelectric Nanogenerators by Vertically Integrated Pyramided Si Substrate

°C. -L. Wu¹, S. -J. Tsai¹, C. -Y. Lin¹, C. -L. Wang¹, J. -W. Chen¹, C. -H. Chen², ¹National Cheng Kung Univ. (Taiwan), ²National Synchrotron Radiation Research Center (Taiwan)

10:15 J-5-03

Highly Stable Heavily-Doped Oxide Contacts on Oxide Nanowires: Reliable Low Contact Resistance and Enhancement of Long-term Sensor Response

H. Zeng¹, °T. Takahashi¹, K. Nagashima¹, T. Yanagida¹, ¹Kyushu Univ. (Japan)

10:30 J-5-04

Al-catalyzed Silicon Nanowire Formation and its Application for Photovoltaic Device

Friday, September 22

°W. Jevasuwan¹, T. Subramani¹, C. Junyi¹, K. C. Pradel¹, T. Takei¹, N. Fukata¹, ¹NIMS (Japan)

10:45-11:15 **Coffee Break**

J-6: Characterization & Properties of Nanowires

11:15-12:30 Meeting Room 7

Session Chair: K. Kawaguchi (Fujitsu Labs. Ltd.)
S. Hara (Hokkaido Univ.)

11:15 J-6-01 (Invited)

Synchrotron-based Characterization of Nanowires and Nanowire Devices

°A. Mikkelsen¹, ¹Lund Univ. (Sweden)

11:45 J-6-02

Analysis of Bending Mechanism in MnAs/InAs Heterojunction Nanowires

°T. Kadowaki¹, R. Kodaira¹, S. Hara¹, ¹Hokkaido Univ. (Japan)

12:00 J-6-03

Enhancement of Thermoelectric Performance of p-type Short Silicon Nanowires

°Y. Himeda¹, S. Hashimoto¹, S. Ohba¹, R. Yamato¹, T. Matsukawa², T. Watanabe¹, ¹Waseda Univ. (Japan), ²AIST (Japan)

12:15 J-6-04 (Late News)

InAs Nanotube FETs with Atomic-Layer-Deposited Al₂O₃/ZnO Gate-Stack

°S. Sasaki¹, K. Tateno¹, G. Zhang¹, ¹NTT Basic Res. Labs. (Japan)

12:30-13:40 **Lunch**

02: Interconnect Technologies, MEMS, and Reliability

J-7: Latest Research for Interconnect Technologies, MEMS, and Reliability

13:40-14:40 Meeting Room 7

Session Chair: M. Fujino (Univ. of Tokyo)

S. Ogawa (AIST)

13:40 J-7-01 (Late News)

New Characterization Technique for Detection of Atomic-sized Crystalline Defects and Strain Using Moiré Method

°M. Kodera¹, Q. Wang², S. Ri², H. Tsuda², A. Yoshioka¹, T. Sugiyama¹, T. Hamamoto¹, N. Miyashita¹, ¹Toshiba Electronic Devices & Storage Corp. (Japan), ²AIST (Japan)

13:55 J-7-02 (Late News)

Enlarging the Nanocylinder Size for Through-Si-Via Applications

°M. Mariappan¹, T. Fukushima¹, K. Mori¹, J. Bea¹, H. Hashimoto¹, M. Koyanagi¹, ¹Tohoku Univ. (Japan)

14:10 J-7-03 (Late News)

Al-foil-based low-loss coplanar waveguides directly bonded to sapphire substrates

°K. Matsuura¹, J. Liang¹, K. Maezawa², N. Shigekawa¹, ¹Osaka City Univ. (Japan), ²Univ. of Toyama (Japan)

14:25 J-7-04 (Late News)

A Tri-axis MEMS Accelerometer with a Gold Electroplated Single-proof-mass and Segmented Electrodes

°S. Otake¹, D. Yamane¹, T. Konishi^{1,2}, T. Saito², H. Ito¹, S. Doshio¹, N. Ishihara¹, K. Machida¹, K. Masu¹, ¹Tokyo Tech (Japan), ²NTT Advanced Tech. Corp. (Japan)

01: Advanced LSI Processing & Materials Science

K-5: Ferroelectric Material

9:30-10:55 Meeting Room 8

Session Chair: K. Kakushima (Tokyo Tech)

O. Nakatsuka (Nagoya Univ.)

Friday, September 22

9:30 K-5-01 (Invited)

CMOS Compatible Ferroelectric Devices for Beyond 1X nm Technology Nodes

°S. Müller¹, ¹Ferroelectric Memory GmbH (Germany)

10:00 K-5-02

Polarization Switching Behavior of HfO₂-based Ferroelectric Ultrathin Films Studied through Coercive Field Characteristics

°S. Migita¹, H. Ota¹, H. Yamada¹, K. Shibuya¹, A. Sawa¹, A. Toriumi², ¹AIST (Japan), ²Univ. of Tokyo (Japan)

10:20 K-5-03

Thickness-dependent ferroelectric phase evolution in doped HfO₂

°L. Xu¹, T. Nishimura¹, S. Shibayama¹, T. Yajima¹, S. Migita², A. Toriumi¹, ¹Univ. of Tokyo (Japan), ²AIST (Japan)

10:40 K-5-04 (Late News)

Direct Evidence of 3-nm-thick Ferroelectric HfO₂

°X. Tian¹, S. Shibayama¹, T. Nishimura¹, T. Yajima¹, S. Migita², A. Toriumi¹, ¹Univ. of Tokyo (Japan), ²AIST (Japan)

10:55-11:15 Coffee Break

K-6: Theory and Modeling

11:15-12:15 Meeting Room 8

Session Chair: T. Nakayama (Chiba Univ.)

H. Arimura (IMEC)

11:15 K-6-01

Acceleration of Metal-atom Diffusion under Electric Field at Metal/Insulator Interfaces; First-principles Study

°R. Nagasawa¹, Y. Asayama¹, T. Nakayama¹, ¹Chiba Univ. (Japan)

11:35 K-6-02

Guiding principles for the fabrication of V-MOSFETs based on a Si emission model

°T. Nagura¹, K. Chokawa¹, H. Shirakawa¹, M. Araidai^{1,4}, H.

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Kageshima^{2,4}, *T. Endoh*^{3,4}, *K. Shiraishi*^{1,4}, ¹*Nagoya Univ. (Japan)*, ²*Shimane Univ. (Japan)*, ³*Tohoku Univ. (Japan)*, ⁴*JST-ACCEL (Japan)*

11:55 K-6-03

Development of Interatomic Potential of $\text{Ge}_{(1-x-y)}\text{Si}_x\text{Sn}_y$
Ternary Alloy Semiconductors for Classical Lattice
Dynamics Simulation

[○]*M. Tomita*^{1,2}, *T. Watanabe*¹, ¹*Waseda Univ. (Japan)*, ²*JSPS Res. Fellow PD (Japan)*

12:15-13:40

Lunch

12: Spintronics Materials and Devices

K-7: Magnetic Tunnel Junctions

13:40-14:55 Meeting Room 8

Session Chair: *T. Fukumura* (Tohoku Univ.)
S. Ohya (Univ. of Tokyo)

13:40 K-7-01

Magnetic phase transition induced tunneling anisotropic
magnetoresistance in FeRh-based junctions

[○]*C. Song*¹, *X. Chen*¹, *F. Pan*¹, ¹*Tsinghua Univ. (China)*

13:55 K-7-02

Epitaxy and Magneto-Transport Properties in Fully
Epitaxial Fe/GaO_x/Fe Magnetic Tunnel Junctions

[○]*S. K. Narayananellor*¹, *N. Doko*^{1,2}, *N. Matsuo*^{1,2}, *H. Saito*¹, *S. Yuasa*¹, ¹*AIST (Japan)*, ²*Chiba Inst. of Tech. (Japan)*

14:10 K-7-03

Evaluation of energy barrier of CoFeB/MgO magnetic
tunnel junctions with perpendicular easy axis using
retention time measurement

*E. C. I. Enobio*¹, [○]*H. Sato*¹, *S. Fukami*¹, *H. Ohno*¹, ¹*Tohoku Univ. (Japan)*

14:25 K-7-04

Magnetic tunnel junctions with poly-crystalline Heusler
alloy films

Friday, September 22

^oM. Oogane¹, A. Ono¹, Y. Ando¹, ¹Tohoku Univ. (Japan)

14:40 K-7-05

*L*₁₀-MnGa based magnetic tunnel junction for high magnetic field sensor

X. P. Zhao¹, ^oJ. Lu¹, S. W. Mao¹, J. H. Zhao¹, ¹Chinese Academy of Sciences (China)

14:55-15:10

Coffee Break

K-8: Spintronics Devices

15:10-16:25 Meeting Room 8

Session Chair: C. Song (Tsinghua Univ.)

T. Uemura (Hokkaido Univ.)

15:10 K-8-01

Integration of Interconnected Magnetic Tunnel Junctions for Spin Torque Majority Gates

^oD. Wan¹, M. Manfrini¹, L. Souriau¹, S. Sayan¹, J. Jussot¹, J. Swerts¹, N. Rassoul¹, K. B. Gavan¹, L. Wouters¹, K. Paredis¹, C. Huyghebaert¹, A. Vaysset¹, A. Thiam¹, M. Ercken¹, C. J. Wilson¹, D. Mocuta¹, I. P. Radu¹, ¹IMEC (Belgium)

15:25 K-8-02

Asymmetric behavior of the planar Hall effect of perpendicularly magnetized Co on Pt epitaxial film

^oJ. R. Ryu¹, C. O. Avci², M. Mann², M. Kohda¹, G. Beach², J. Nitta¹, ¹Tohoku Univ. (Japan), ²Massachusetts Inst. of Tech. (USA)

15:40 K-8-03

Current-induced switching in paramagnetic-CoGa buffer / *L*₁₀ MnGa / MgO structure with a perpendicular magnetic anisotropy

^oM. Takikawa¹, K. Suzuki¹, R. Ranjbar¹, S. Mizukami¹, ¹Tohoku Univ. (Japan)

15:55 K-8-04

Ambipolar transport and modulation of electronic properties of Mn₂CoAl films by ionic liquid gating

^oK. Ueda¹, S. Hirose¹, M. Mori¹, H. Asano¹, ¹Nagoya Univ.

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(Japan)

16:10 K-8-05 (Late News)

Voltage Controlled Magnetic Anisotropy at Fe_{1-x}Co_xPd/
MgO Interface

°A. K. Shukla¹, M. Goto¹, K. Nawaoka¹, J. Suwardy¹, S.
Miwa¹, Y. Suzuki¹, ¹Osaka Univ. (Japan)

**08: Advanced Material Synthesis and Crystal Growth
Technology**

M-5: Nanostructures: Synthesis and Properties

9:30-10:45 Meeting Room 2

Session Chair: T. Iwai (Fujitsu Labs. Ltd.)

T. Hoshi (NTT Device Tech. Labs.)

9:30 M-5-01 (Invited)

Nanospectroscopic investigation of individual free-
standing semiconductor nanowires using nanoprobe-
cathodoluminescence techniques

°K. Watanabe^{1,2}, ¹Osaka Univ. (Japan), ²NIMS (Japan)

10:00 M-5-02

Improved optical properties of low density InAs/GaAs
quantum dots by controlling partial capping process

°M. Kakuda¹, Y. Ota¹, K. Kuruma¹, K. Watanabe¹, S.
Iwamoto¹, Y. Arakawa¹, ¹Univ. of Tokyo (Japan)

10:15 M-5-03

MOCVD Selective Growth of InAs Nanowires on
Patterned Silicon Substrate by Optimizing Gas Flow Rate
and Annealing Temperature

°D. Anandan¹, H. W. Yu¹, H. L. Ko¹, R. K. Kakkerla¹, V.
Nagarajan¹, S. K. Singh¹, E. Y. Chang¹, ¹National Chiao
Tung Univ. (Taiwan)

10:30 M-5-04

Materials growth and band offset parameters of the Al₂O₃/
In_{0.28}Ga_{0.72}Sb/AlSb/GaSb/GaAs heterostructure

°S. H. Huynh¹, M. T. H. Ha¹, H. B. Do¹, T. A. Nguyen¹, Y. D.
Jin¹, J. W. Lin¹, K. S. Yang¹, C. -C. F. Chang¹, Q. H. Luc¹, E.

Friday, September 22

Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan)

Joint Session (Area 6&14)

N-5: Advanced Power Device Technologies I

9:30-10:45 Meeting Room 3

Session Chair: T. Tanaka (Panasonic Corp.)

K. Kobayashi (Toshiba Electronic Devices & Storage Corp.)

9:30 N-5-01 (Invited)

Recent achievements and pending challenges in Gallium Nitride vertical device development

°S. Chowdhury¹, ¹Univ. of California, Davis (USA)

10:00 N-5-02

Suppression of Positive Bias Temperature Instability in GaN-MOSFETs

°Y. Kajiwara¹, T. Yonehara¹, D. Kato¹, H. Saito¹, K. Uesugi¹, A. Shindome¹, M. Kuraguchi¹, A. Yoshioka¹, S. Nunoue¹, ¹Toshiba Corp. (Japan)

10:15 N-5-03

650 Volt GaN Quality and Reliability- Readiness for Automotive Applications

°K. Shono¹, T. Hosoda¹, Y. Asai¹, R. Barr², K. Smith², Y. Wu², P. Parikh², ¹Transphorm Japan, Inc. (Japan), ²Transphorm, Inc. (USA)

10:30 N-5-04

Investigations on Electrical Characteristics of 1-kV pnp SiC BJTs Compared with npn SiC BJT

°T. Okuda¹, T. Kimoto¹, J. Suda^{1,2}, ¹Kyoto Univ. (Japan), ²Nagoya Univ. (Japan)

10:45-11:15

Coffee Break

N-6: Advanced Power Device Technologies II

11:15-12:30 Meeting Room 3

Session Chair: K. Tsuda (Toshiba Infrastructure Systems & Solutions Corp.)

D. Hisamoto (Hitachi, Ltd.)

Friday, September 22

11:15 N-6-01 (Invited)

Demonstration of Reduction in V_{ce} (sat) of IGBT based on a 3D Scaling Principle

°K. Kakushima¹, T. Hoshii¹, K. Tsutsui¹, A. Nakajima², S. Nishizawa³, H. Wakabayashi¹, I. Muneta¹, K. Sato⁴, T. Matsudai⁵, W. Saito⁵, T. Saraya⁶, K. Itou⁶, M. Fukui⁶, S. Suzuki⁶, M. Kobayashi⁶, T. Takakura⁶, T. Hiramoto⁶, A. Ogura⁷, Y. Numasawa⁷, I. Omura⁸, H. Ohashi¹, H. Iwai¹,
¹Tokyo Tech (Japan), ²AIST (Japan), ³Kyushu Univ. (Japan), ⁴Mitsubishi Electric Corp. (Japan), ⁵Toshiba Electronic Devices & Storage Corp. (Japan), ⁶Univ. of Tokyo (Japan), ⁷Meiji Univ. (Japan), ⁸Kyushu Inst. of Tech. (Japan)

11:45 N-6-02

5.0 kV Breakdown-Voltage Vertical GaN p-n Junction Diodes

°H. Ohta¹, K. Hayashi¹, F. Horikiri², T. Nakamura¹, T. Mishima¹,
¹Hosei Univ. (Japan), ²Sciocs Company Ltd. (Japan)

12:00 N-6-03

Potential of the 0.35 μm CMOS gate driver technology for the GaN power devices

°S. Miyano¹, T. Akagi¹, S. Abe¹, S. Matsumoto¹,
¹Kyushu Inst. of Tech. (Japan)

12:15 N-6-04

Vertical-type 2DHG Diamond MOSFETs

°N. Oi¹, T. Kudo¹, T. Muta¹, S. Okubo¹, I. Tsuyuzaki¹, T. Kageura¹, M. Inaba^{1,2}, S. Onoda³, A. Hiraiwa¹, H. Kawarada¹,
¹Waseda Univ. (Japan), ²Nagoya Univ. (Japan), ³National Inst for Quantum and Radiological Sci. and Tech. (Japan)

12:30-13:40

Lunch

06: Compound Semiconductor Electron Devices & Related Technologies

N-7: Compound Semiconductor Device & Process

13:40-14:55 Meeting Room 3

Session Chair: A. Wakejima (Nagoya Inst. of Tech.)

T. Suzuki (JAIST)

13:40 N-7-01

Removal of reactive-ion-etching damage from n-GaN surface using a photoelectrochemical process

°S. Matsumoto¹, M. Toguchi¹, T. Sato¹, ¹Hokkaido Univ. (Japan)

13:55 N-7-02

High Thermal Stability of Abrupt SiO₂/GaN Interface with Low Interface State Density

°T. X. Nguyen^{1,2}, N. Taoka², A. Ohta¹, K. Makihara¹, H. Yamada², T. Takahashi², M. Ikeda¹, M. Shimizu², S. Miyazaki¹, ¹Nagoya Univ. (Japan), ²AIST-NU GaN Advance Device Open Innovation Lab. (Japan)

14:10 N-7-03

High-performance E-mode recessed GaN Power MIS-HEMT with La-silicate gate insulator

°C. C. Hsu¹, J. H. Lee¹, Y. C. Lin¹, J. C. Lin¹, C. H. Wu¹, J. N. Yao¹, H. T. Hsu¹, K. Kakushima², H. Iwai², E. Y. Chang¹, ¹National Chiao Yung Univ. (Taiwan), ²Tokyo Tech (Japan)

14:25 N-7-04 (Late News)

Cryogenic DC and RF Characteristics of InGaAs/InAs/InGaAs Channel HEMTs

°A. Endoh¹, I. Watanabe¹, A. Kasamatsu¹, T. Mimura^{1,2}, ¹NICT (Japan), ²Fujitsu Labs. Ltd. (Japan)

14:40 N-7-05 (Late News)

Enhancing the Performance of Ni-In_{0.53}Ga_{0.47}As MOSFETs Using Post Silicon Dopant Process

°H. Q. Luc¹, W. J. Lin¹, S. K. Yang¹, C. C. Chang¹, C. -C. C. Fan¹, B. H. Do¹, M. T. H. Ha¹, H. S. Huynh¹, D. Y. Jin¹, A. T. Nguyen¹, C. Y. Lin¹, E. Y. Chang¹, ¹National Chiao Tung Univ. (Taiwan)