

Thursday, October 8

## Short Presentation

### Area 1:

#### P-1

8:45-10:09 Hirose <Nishi>

Chair: S. Tsujikawa (Sony Corp.)

H. Umeda (Renesas Tech. Corp.)

### Area 2:

#### P-2

8:45-9:30 Kaede

Chair: Y. Hayashi (NEC Electronics Corp.)

K. Ito (Kyoto Univ.)

### Area 3:

#### P-3

8:45-9:54 Heisei <Higashi>

Chair: A. Azuma (Toshiba Corp. )

M. Hane (NEC Electronics America)

### Area 4:

#### P-4

8:45-9:27 Sakura

Chair: M. Moniwa (Renesas Tech. Corp.)

T. Eshita (Fujitsu Microelectronics Ltd.)

### Area 5:

#### P-5

9:35-10:11 Sakura

Chair: T. Komuro (Kanagawa Inst. of Tech.)

S. Ishizuka (Toshiba Corp.)

### Area 6:

#### P-6

8:45-9:39 Hagi

Chair: T. Hashizume (Hokkaido Univ.)

M. Kuzuhara (Univ. of Fukui)

### Area 7:

#### P-7

8:45-9:48 Kiri

Chair: M. Sugawara (Fujitsu Labs. Ltd.)

J. Fujikata (NEC Corp.)

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**Area 8:**

**P-8**

9:40-10:22 Kaede

Chair: A. Yamada (Tokyo Tech)

H. Hibino (NTT Basic Res. Labs.)

**Area 9:**

**P-9**

8:45-9:39 Aoi

Chair: T. Fujisawa (Tokyo Tech)

K. Ono (RIKEN)

**Area 10:**

**P-10**

8:45-10:00 Hirose <Higashi>

Chair: M. Nakamura (Chiba Univ.)

**Area 11:**

**P-11**

9:45-10:21 Aoi

Chair: K. Ajito (NTT Corp.)

I. Yamashita (NAIST)

**Area 12:**

**P-12**

10:00-10:24 Heisei <Higashi>

Chair: K. Ito (Hitachi, Ltd.)

**Area 13:**

**P-13**

9:45-10:27 Hagi

Chair: J. Motohisa (Hokkaido Univ.)

S. Sato (Fujitsu Labs. Ltd.)

**Area 14:**

**P-14**

9:55-10:28 Kiri

Chair: M. Ishiko (Toyota Central R&D Labs., Inc.)

T. Ujihara (Nagoya Univ.)

Thursday, October 8

**POSTER SESSION**

(10:30-12:00, 2F Heisei<Naka & Nishi>)

**P1**

**Advanced Gate Stack/Si Processing Science**

(27 Papers)

**P-1-1**

Formation of Pr Oxide Films by Atomic Layer Deposition using Pr(EtCp)<sub>3</sub> Precursor

H. Kondo, H. Matsui, K. Furuta, M. Sakashita and S. Zaima, *Nagoya Univ. (Japan)*

**P-1-2**

Advanced High-k Materials and Electrical Analysis for Memories: the Role of SiO<sub>2</sub>-high-k Dielectric Intermixing  
L. Morassi<sup>1</sup>, L. Larcher<sup>1</sup>, L. Pantisano<sup>2</sup>, A. Padovani<sup>1</sup>, R. Degreave<sup>2</sup>, M. B. Zahid<sup>2</sup> and B. J. O'Sullivan<sup>2</sup>, <sup>1</sup>*Univ. di Modena e Reggio Emilia* and <sup>2</sup>*IMEC (Italy)*

**P-1-3**

Crystalline Structures and Electrical Properties of High Nitrogen-content Hf-Si-N Films

K. Miyamoto, H. Kondo and S. Zaima, *Nagoya Univ. (Japan)*

**P-1-4**

Study of La-doped GeO<sub>2</sub> Films from Defect Annihilation Viewpoint

T. Tabata<sup>1,2</sup>, K. Kita<sup>1,2</sup> and A. Toriumi<sup>1,2</sup>, <sup>1</sup>*Univ. of Tokyo* and <sup>2</sup>*CREST-JST (Japan)*

**P-1-5**

Characterization and Improvement of Charge Trapping in Gadolinium Incorporated Hf-based high-k/Metal gated n-MOSFETs

C. W. Chen<sup>1</sup>, H. C. Lai<sup>1</sup>, Y. L. Yeh<sup>1</sup>, W. K. Yeh<sup>2</sup>, S. H. Shu<sup>3</sup>, C. T. Lin<sup>3</sup>, C. H. Hsu<sup>3</sup>, L. W. Cheng<sup>3</sup> and M. Ma<sup>3</sup>, <sup>1</sup>*Ming Hsin Univ. of Sci and Tech.*, <sup>2</sup>*National Univ. of Kaohsiung* and <sup>3</sup>*UMC (Taiwan)*

**P-1-7**

Electronic Band Structures of Zirconium and Hafnium Oxides

T. Hamada<sup>1,3</sup> and T. Ohno<sup>2,3</sup>, <sup>1</sup>*Hitachi, Ltd.*, <sup>2</sup>*Inst. of Materials Res. and* <sup>3</sup>*Univ. of Tokyo (Japan)*

**P-1-8**

Threshold Voltage ( $V_{th}$ ) Tunability of pMOSFETs with Ternary  $Hf_xMo_yN_z$  Metal Gate and  $Gd_2O_3$  High-k Gate Dielectric

H. K. Peng, C. S. Lai and J. C. Wang, *Chang Gung Univ. (Taiwan)*

**P-1-9**

High Performance ZnO Thin-Film Transistors using High- $\kappa$  TiHfO Gate Dielectrics

N. C. Su<sup>1</sup>, C. C. Huang<sup>1</sup>, Y. H. Chen<sup>1</sup>, C. K. Chiang<sup>1</sup>, H. Y. Huang<sup>1</sup>, C. H. Wu<sup>2</sup>, A. Chin<sup>3</sup> and S. J. Wang<sup>1</sup>, <sup>1</sup>*National Cheng Kung Univ.*, <sup>2</sup>*National Chung Hua Univ. and* <sup>3</sup>*National Chiao Tung Univ. (Taiwan)*

**P-1-10**

Superiority of ALD TiN with TDMAT Precursor for Metal-Gate MOSFET

T. Hayashida<sup>1</sup>, K. Endo<sup>2</sup>, Y. X. Liu<sup>2</sup>, T. Matsukawa<sup>2</sup>, S. Ouchi<sup>2</sup>, K. Sakamoto<sup>2</sup>, J. Tsukada<sup>2</sup>, Y. Ishikawa<sup>2</sup>, H. Yamauchi<sup>2</sup>, A. Ogura<sup>1</sup> and M. Masahara<sup>1,2</sup>, <sup>1</sup>*Meiji Univ. and* <sup>2</sup>*AIST (Japan)*

**P-1-11**

Hole Tunnel Currents in TiN/HfSiO<sub>x</sub>N/SiO<sub>2</sub>/p-Si(100) MOS Capacitors

Khairurrijal<sup>1</sup>, F. A. Noor<sup>1</sup>, M. Abdullah<sup>1</sup>, Sukirno<sup>1</sup>, A. Ohta<sup>2</sup> and S. Miyazaki<sup>2</sup>, <sup>1</sup>*Institut Teknologi Bandung and* <sup>2</sup>*Hiroshima Univ. (Indonesia)*

**P-1-12**

Nanoscale Characterization of HfO<sub>2</sub>/SiO<sub>x</sub> Gate Stack Degradation by Scanning Tunneling Microscopy

K. S. Yew<sup>1</sup>, Y. C. Ong<sup>1</sup>, D. S. Ang<sup>1</sup>, K. L. Pey<sup>1</sup>, G. Bersuker<sup>2</sup>, P. S. Lysaght<sup>2</sup> and D. Heh<sup>2</sup>, <sup>1</sup>*Nanyang Tech.*

*Univ. and* <sup>2</sup>*SEMATECH (Singapore)*

**P-1-13**

Voltage Coefficient of Capacitance Modulation for Sm<sub>2</sub>O<sub>3</sub>/SiO<sub>2</sub> MIM Capacitors

J. J. Yang<sup>1</sup>, J. D. Chen<sup>1</sup>, R. Wise<sup>2</sup>, P. Steinmann<sup>2</sup>, M. B. Yu<sup>3</sup>, Y. C. Yeo<sup>1</sup> and C. Zhu<sup>1</sup>, <sup>1</sup>*National Univ. of Singapore*, <sup>2</sup>*Texas Instruments Inc. and* <sup>3</sup>*Inst. of Microelectronics (Singapore)*

**P-1-14**

Properties of LaAlO Film after Waterless Process using Organic Solvent containing Anhydrous HF

M. Honjo, N. Komatsu, T. Masuzumi, H. Aoki, D. Watanabe, C. Kimura and T. Sugino, *Osaka Univ. (Japan)*

**P-1-15**

Atomistic Modeling of GeO<sub>2</sub>/Ge and SiO<sub>2</sub>/Si Interface Structures

T. Onda, H. Yamamoto, R. Tosaka, I. Ohdomari and T. Watanabe, *Waseda Univ. (Japan)*

**P-1-16**

Highly Reliable Silicon Dioxide Formation Technique with Plasma and Thermal oxidation

Y. Kabe<sup>1</sup>, J. Kitagawa<sup>1</sup>, Y. Hirota<sup>1</sup>, S. Sato<sup>2</sup>, Z. Lu<sup>2</sup>, M. Sometani<sup>2</sup>, R. Hasunuma<sup>2</sup> and K. Yamabe<sup>2</sup>, <sup>1</sup>*Tokyo Electron AT Ltd. and* <sup>2</sup>*Univ. of Tsukuba (Japan)*

**P-1-17**

Enhancement of Carbon Diffusion Caused by Thermal Oxidation on Si<sub>1-x</sub>C<sub>x</sub> Alloy Layer / Si(001) Surfaces

H. Hozumi<sup>1</sup>, S. Ogawa<sup>1</sup>, A. Yoshigoe<sup>2</sup>, S. Ishidzuka<sup>3</sup>, J. Harries<sup>2</sup>, Y. Teraoka<sup>2</sup> and Y. Takakuwa<sup>1</sup>, <sup>1</sup>*Tohoku Univ.*, <sup>2</sup>*Japan Atomic Energy Agency and* <sup>3</sup>*Akita National College of Tech. (Japan)*

**P-1-18**

Infrared Semiconductor Laser Annealing Used for Activation of Silicon Implanted with Boron and

Phosphorus Atoms

N. Sano<sup>1</sup>, K. Ukawa<sup>2</sup>, T. Sameshima<sup>2</sup>, M. Naito<sup>3</sup> and N. Hamamoto<sup>3</sup>, <sup>1</sup>*Hightec Systems Corp.*, <sup>2</sup>*Tokyo Univ. of Agri. And Tech.* and <sup>3</sup>*Nissin Ion Equipment Co., Ltd. (Japan)*

**P-1-19**

Impact of Carbon Ion Implantation on the Thermal Stability of Nickel Silicide and Shallow Junction  
C. M. Lee and B. Y. Tsui, *National Chiao Tung Univ. (Taiwan)*

**P-1-20**

Ion-Implanted Boron Activation in a Preamorphized Si Layer by Microwave Annealing  
K. Hara, Y. Tanushi, S. Kuroki, K. Kotani and T. Ito, *Tohoku Univ. (Japan)*

**P-1-21**

Low Contact Resistance with Low Silicide/p<sup>+</sup>-Silicon Schottky Barrier for High Performance p-channel MOSFETs  
H. Tanaka, T. Isogai, T. Goto, A. Teramoto, S. Sugawa and T. Ohmi, *Tohoku Univ. (Japan)*

**P-1-22**

Mobility Behavior in Ge<sub>1-x</sub>Sn<sub>x</sub> Layers Grown on SOI Substrates  
N. Tsutsui<sup>1</sup>, Y. Shimura<sup>1</sup>, O. Nakatsuka<sup>1</sup>, A. Sakai<sup>2</sup> and S. Zaima<sup>1</sup>, <sup>1</sup>*Nagoya Univ.* and <sup>2</sup>*Osaka Univ. (Japan)*

**P-1-23**

Evaluation of anisotropic biaxial stress using an immersion lens by Raman analysis based on the polarization rules  
D. Kosemura<sup>1,3</sup>, M. Takei<sup>1</sup>, K. Nagata<sup>1</sup>, H. Akamatsu<sup>1</sup>, R. Shimidzu<sup>2</sup> and A. Ogura<sup>1</sup>, <sup>1</sup>*Meiji Univ.*, <sup>2</sup>*PHOTON Design Corp.* and <sup>3</sup>*JSPS (Japan)*

**P-1-24**

Comprehensive Modeling of Threshold Voltage Variability Induced by Plasma Damage in Advanced MOSFETs

K. Eriguchi, Y. Nakakubo, A. Matsuda, M. Kamei, Y. Takao and K. Ono, *Kyoto Univ. (Japan)*

**P-1-25**

Mechanism for Generation of Molecular-Level Line-Edge Roughness of ArF photoresist during Plasma Etching Processes  
K. Koyama<sup>1</sup>, B. Jinnai<sup>1</sup>, S. Maeda<sup>2</sup>, K. Kato<sup>2</sup>, A. Yasuda<sup>2</sup>, H. Momose<sup>2</sup> and S. Samukawa<sup>1</sup>, <sup>1</sup>*Tohoku Univ.* and <sup>2</sup>*Mitsubishi Rayon Co., Ltd. (Japan)*

**P-1-26**

Mechanism of Mask Distortion during Resist Trimming  
N. Kofuji<sup>1</sup> and H. Miura<sup>2</sup>, <sup>1</sup>*Hitachi, Ltd.* and <sup>2</sup>*Tohoku Univ. (Japan)*

**P-1-27**

Effect of UV irradiation in plasma on Photoresist LER  
A. Yabata, M. Takahashi and N. Kuriyama, *OKI Semiconductor Miyagi Co., Ltd. (Japan)*

**P-1-28**

Assessment of Ion-Bombardment Damage in Plasma-Exposed Si by Interface Layer Thickness and Charge-Trapping Defects  
A. Matsuda, Y. Nakakubo, M. Kamei, Y. Takao, K. Eriguchi and K. Ono, *Kyoto Univ. (Japan)*

**P2**

**Characterization and Materials Engineering for Interconnect Integration**

(13 Papers)

**P-2-1**

Self-Formation of Ti-Based Barrier Layers in Cu(Ti)/Porous-Low-k Samples  
K. Ito<sup>1</sup>, K. Kohama<sup>1</sup>, T. Tanaka<sup>1</sup>, K. Mori<sup>2</sup>, K. Maekawa<sup>2</sup>, Y. Shirai<sup>1</sup> and M. Murakami<sup>3</sup>, <sup>1</sup>*Kyoto Univ.*, <sup>2</sup>*Renesas Tech. Corp.* and <sup>3</sup>*The Ritsumeikan Trust (Japan)*

**P-2-2**

Improvement of Cu seedless Ru barrier by insertion of an amorphous WCoCN interlayer  
J. B. Yeh, D. C. Perng and K. C. Hsu, *National Cheng Kung Univ. (Taiwan)*

**P-2-3**

Suppression of Fluorine Diffusion into Low-k Material (Methyl-BCN) using Low Temperature Etching  
M. Hara, T. Masuzumi, L. Zhiming, C. Kimura, H. Aoki and T. Sugino, *Osaka Univ. (Japan)*

**P-2-4**

Novel Particle Reduction System in Chemical-Vapor-Deposition Process of Interlayer Dielectrics  
M. Sato, H. Ohtake and S. Samukawa, *Tohoku Univ. (Japan)*

**P-2-5**

Prediction of UV/VUV Irradiation Damage of Interlayer Dielectrics in Plasma Etching using on-wafer Monitoring Technique  
B. Jinnai<sup>1</sup>, S. Fukuda<sup>1</sup>, H. Ohtake<sup>1</sup>, S. Yasuhara<sup>2</sup>, E. A. Hudson<sup>3</sup> and S. Samukawa<sup>1</sup>, <sup>1</sup>*Tohoku Univ.*, <sup>2</sup>*Japan Advanced Chemicals* and <sup>3</sup>*Lam Res. Corp. (Japan)*

**P-2-6**

Low-Temperature Silicon Oxide Offset Spacer using Plasma Enhanced Atomic Layer Deposition for High-k/Metal Gate Transistor  
T. Murata, Y. Miyagawa, Y. Nishida, Y. Yamamoto, T. Yamashita, M. Matsuura and K. Asai, *Renesas Tech. Corp. (Japan)*

**P-2-7**

Impact of film structures on damage to low-k SiOCH film during plasma exposure  
S. Yasuhara<sup>1</sup>, T. Sasaki<sup>1</sup>, K. Tajima<sup>2</sup>, H. Yano<sup>2</sup>, S. Kadomura<sup>2</sup>, M. Yoshimaru<sup>2</sup>, N. Matsunaga<sup>2</sup> and S. Samukawa<sup>1</sup>, <sup>1</sup>*Tohoku Univ.* and <sup>2</sup>*STARC (Japan)*

**P-2-8**

Raman Spectroscopic Metrology for Stress measurement in Semiconductor Device Development and Process  
N. Naka<sup>1</sup>, S. Kashiwagi<sup>1</sup>, K. Ohtsuki<sup>1</sup>, J. H. Kim<sup>2</sup>, C. H. Lee<sup>2</sup>, S. T. Ahn<sup>2</sup>, K. H. Bae<sup>2</sup>, H. W. Yoo<sup>2</sup> and C. H. Kim<sup>2</sup>, <sup>1</sup>*HORIBA, Ltd.* and <sup>2</sup>*Hynix Semiconductor Inc. (Japan)*

**P-2-9**

Uniaxial Tensile Testing System for Quantitative Stress Analysis in Silicon Oxide Thin Films by Cathodoluminescence Spectroscopy  
N. Goami<sup>1</sup>, N. Yamashita<sup>1</sup>, N. Araki<sup>1</sup>, S. Kakinuma<sup>2</sup>, K. Nishikata<sup>2</sup>, N. Naka<sup>2</sup>, K. Matsumoto<sup>2</sup>, T. Namazu<sup>1</sup> and S. Inoue<sup>1</sup>, <sup>1</sup>*Univ. of Hyogo* and <sup>2</sup>*HORIBA Ltd. (Japan)*

**P-2-10**

Liquid Phase Bonding using Au Compliant Bumps for Fine-Pitch Solder Bump Interconnection  
L. J. Qiu, N. Watanabe and T. Asano, *Kyushu Univ. (Japan)*

**P-2-11**

Room-Temperature Large-Number Inter-Chip Connections using Mechanical Caulking Effect of Compliant Bump  
N. Watanabe and T. Asano, *Kyushu Univ. (Japan)*

**P-2-12**

Evaluation of Thin LSI Wafers by Capacitance-Time (C-t) Measurement for the Process Characterization of Three-Dimensional (3D) Integration  
J.C. Bea, M. Murugesan, Y. Ohara, A. Noriki, H. Kino, K. W. Lee, T. Fukushima, T. Tanaka and M. Koyanagi, *Tohoku Univ. (Japan)*

**P-2-15**

Influence of Magnetic Field on Permeability of Electroplating Permalloy for Micro Energy Harvesting Device  
E. Kubo, N. Ooi, H. Aoki, D. Watanabe, J. H. Jeong, C. Kimura and T. Sugino, *Osaka Univ. (Japan)*

**P3****CMOS Devices /Device Physics**

(21 Papers)

**P-3-1**

Suppression of  $V_{th}$  Variability for n-MOSFET in Dual Oxide Formation Process

Y. Kamata<sup>1</sup>, K. Shibusawa<sup>1</sup>, K. Abe<sup>2</sup>, S. Sugawa<sup>2</sup>, A. Teramoto<sup>2</sup> and T. Ohmi<sup>2</sup>, <sup>1</sup>OKI Semiconductor Miyagi Co., Ltd. and <sup>2</sup>Tohoku Univ. (Japan)

**P-3-2**

Rigorous Design of 20 nm Level SOI 4-T FinFETs for Low Standby Power by Extracting Parameters from the Pre-stage 50 nm Technology Node Devices

S. Cho<sup>1</sup>, S. W. Kim<sup>1</sup>, K. Endo<sup>2</sup>, S. O'uchi<sup>2</sup>, T. Matsukawa<sup>2</sup>, Y. Son<sup>1</sup>, J. P. Kim<sup>1</sup>, K. Sakamoto<sup>2</sup>, Y. Liu<sup>2</sup>, B. G. Park<sup>1</sup> and M. Masahara<sup>2</sup>, <sup>1</sup>Seoul National Univ. and <sup>2</sup>AIST (Korea)

**P-3-3**

Quantitative Analysis of Hump Effects of Multi-Gate MOSFETs for Low-Power Electronics

W. Lee and W. Y. Choi, *Sogang Univ. (Korea)*

**P-3-4**

Investigation of Novel Si/SiGe Hetero Structures and Gate Induced Source Tunneling for Improvement of P-channel Tunnel FETs

H. G. Virani, R. B. Rao and A. Kottantharayil, *Indian Inst. of Tech. Bombay (India)*

**P-3-5**

Mechanical stress evaluation of Si MOSFET structure using UV Raman spectroscopy measurements and calibrated TCAD simulation

A. Satoh<sup>1</sup>, T. Tada<sup>2</sup>, V. Poborchii<sup>2</sup>, T. Kanayama<sup>2</sup> and H. Arimoto<sup>1</sup>, <sup>1</sup>Fujitsu Microelectronics Ltd. and <sup>2</sup>AIST (Japan)

**P-3-6**

Recovery of CHC- and NBTI-induced Degradation on MOSFETs by using Different Annealing Treatments

C. H. Tu<sup>1</sup>, S. Y. Chen<sup>1</sup>, S. H. Chien<sup>1</sup>, H. S. Huang<sup>1</sup>, Z. W. Jhou<sup>2</sup>, S. Chou<sup>2</sup> and J. Ko<sup>2</sup>, <sup>1</sup>National Taipei Univ. of Tech. and <sup>2</sup>UMC (Taiwan)

**P-3-7**

Ultra thin Ni-silicides with low contact resistance on SOI and strained-SOI

L. Knoll<sup>1</sup>, Q. T. Zhao<sup>1</sup>, S. Habicht<sup>1</sup>, C. Urban<sup>1</sup>, B. Ghyselen<sup>2</sup> and S. Mantl<sup>1</sup>, <sup>1</sup>Forschungszentrum Juelich and <sup>2</sup>SOITEC (Germany)

**P-3-9**

Experimental Analysis of Anisotropic Impact Ionization in (110) Surface pMOSFETs

T. K. Kang<sup>1</sup>, C. M. Kuo<sup>1</sup>, C. L. Huang<sup>1</sup>, H. L. Liu<sup>1</sup>, C. Y. Wu<sup>1</sup>, S. L. Wu<sup>1</sup>, Y. T. Huang<sup>2</sup> and S. J. Chang<sup>2</sup>, <sup>1</sup>Cheng Shiu Univ. and <sup>2</sup>National Cheng Kung Univ (Taiwan)

**P-3-10**

Defect-Induced Deep Levels in SiGe-on-Insulator Substrate Fabricated using Ge Condensation Technique

H. Yang, D. Wang and H. Nakashima, *Kyushu Univ. (Japan)*

**P-3-11**

New Observations of FN Stress Induced Performance Degradation of RF MOSFETs

B. Xiao, L. Zhang, R. Huang, D. Wu, L. Zhang, F. Song and Y. Y. Wang, *Peking Univ. (China)*

**P-3-12**

Effects of Negative Bias Temperature Stress-induced Degradation and Mismatch on pMOSFETs in 90 nm Technology

C. H. Tu<sup>1</sup>, S. Y. Chen<sup>1</sup>, A. E. Chuang<sup>1</sup>, H. S. Huang<sup>1</sup>, Z. W. Jhou<sup>2</sup>, S. Chou<sup>2</sup> and J. Ko<sup>2</sup>, <sup>1</sup>National Taipei Univ. of Tech. and <sup>2</sup>UMC (Taiwan)

**P-3-13**

Subcircuit Compact Model for Dopant-Segregated Schottky Silicon-Nanowire MOSFETs  
G. Zhu<sup>1</sup>, X. Zhou<sup>1</sup>, Y. K. Chin<sup>1</sup>, K. L. Pey<sup>1</sup>, G. H. See<sup>2</sup>, S. Lin<sup>1</sup>, J. Zhang<sup>1</sup> and Z. Chen<sup>1</sup>, <sup>1</sup>*Nanyang Technological Univ. and* <sup>2</sup>*Chartered Semiconductor Manufacturing Ltd. (Singapore)*

**P-3-14**

Intrinsic-Parameter-Fluctuated Power-Delay Characteristics in 16-nm-Metal-Gate CMOS Devices and Circuits  
M. H. Han<sup>1</sup>, C. H. Hwang<sup>1</sup> and Y. Li<sup>1,2</sup>, <sup>1</sup>*National Chiao Tung Univ. and* <sup>2</sup>*National Nano Device Labs. (Taiwan)*

**P-3-16**

High-Temperature Dependent Data Extraction and Modeling of Effective Channel Mobility in MOSFETs using Measured S-Parameters  
B. Ko, D. Jung and S. Lee, *Hankuk Univ. of Foreign Studies (Korea)*

**P-3-17**

The Structure and Power-level Dependences of CMOS RF Power Cell Degradation by Hot-carrier Stress with Load Pull System  
C. H. Liu<sup>1</sup>, Y. K. Su<sup>1</sup>, R. L. Wang<sup>2</sup>, C. H. Tu<sup>3</sup> and Y. Z. Juang<sup>3</sup>, <sup>1</sup>*National Cheng Kung Univ.*, <sup>2</sup>*National Kaohsiung Normal Univ. and* <sup>3</sup>*CIC (Taiwan)*

**P-3-18**

Anomalous Hot-Carrier-Induced Saturation Drain Current Degradation in DEMOS Transistors  
J. F. Chen<sup>1</sup>, K. W. Lin<sup>1</sup>, S. Y. Chen<sup>1</sup>, K. M. Wu<sup>2</sup>, J. R. Shih<sup>2</sup> and K. Wu<sup>2</sup>, <sup>1</sup>*National Cheng Kung Univ. and* <sup>2</sup>*TSMC (Taiwan)*

**P-3-19**

Subthreshold SRAM with Enhanced Stability using Ultra-Thin-Body and BOX SOI  
V. P. H. Hu, M. L. Fan, P. Su and C. T. Chuang, *National*

*Chiao Tung Univ. (Taiwan)*

**P-3-20**

Novel Dynamic Threshold Voltage Contact Etching Stop Layer (DT-CESL) Strained HfO<sub>2</sub> nMOSFET for Very Low Voltage Operation (0.7V)  
W. C. Wu<sup>1</sup>, T. S. Chao<sup>1</sup>, K. T. Wang<sup>1</sup>, S. C. Lee<sup>1</sup>, T. H. Chiu<sup>1</sup>, T. Y. Lu<sup>1</sup>, C. S. Lai<sup>2</sup>, J. C. Wang<sup>2</sup>, M. W. Ma<sup>1</sup>, K. H. Kao<sup>1</sup> and W. C. Lo<sup>1</sup>, <sup>1</sup>*National Chiao Tung Univ. and* <sup>2</sup>*Chang Gung Univ. (Taiwan)*

**P-3-21**

Low Frequency Noise (1/f) Improvements on CMOS Transistors with a Single n<sup>+</sup> Doped Poly Si-SiGe Gate Stack  
H. G. Jiménez<sup>1</sup>, L. T. Manera<sup>1,2</sup>, R. Wada<sup>2</sup>, J. A. Diniz<sup>1,2</sup>, I. Doi<sup>1,2</sup>, P. J. Tatsch<sup>1,2</sup>, H. E. Figueroa<sup>1,2</sup> and J. W. Swart<sup>1,2</sup>, <sup>1</sup>*CCS-UNICAMP and* <sup>2</sup>*Univ. of Campinas (Brazil)*

**P-3-22**

Bi-Directional SCR Device with Dual-Triggered Mechanism for ESD Protection in Extended-Voltage-Swing I/O Application  
Z. W. Jiang<sup>1</sup>, S. H. Chen<sup>1</sup> and M. D. Ker<sup>2</sup>, <sup>1</sup>*Indus. Tech. Res. Inst. and* <sup>2</sup>*National Chiao Tung Univ. (Taiwan)*

**P-3-23**

Trap Profile and Bias Temperature Instability of ALD-HfSiON Gate Stacks in Advanced MOSFETs  
C. K. Chiang<sup>1</sup>, Y. H. Chen<sup>1</sup>, N. C. Su<sup>1</sup>, S. J. Wang<sup>1</sup>, C. C. Huang<sup>1</sup>, H. Y. Huang<sup>1</sup> and C. H. Wu<sup>2</sup>, <sup>1</sup>*National Cheng Kung Univ. and* <sup>2</sup>*Chung Hua Univ. (Taiwan)*

**P4**

**Advanced Memory Technology**

(12 Papers)

**P-4-1**

HAX-PES Study of SiN Film for Charge Storage Layer in High Performance SONOS Type Flash Memory Cell

D. Kosemura<sup>1,4</sup>, M. Takei<sup>1</sup>, K. Nagata<sup>1</sup>, H. Akamatsu<sup>1</sup>, M. Hattori<sup>1</sup>, D. Katayama<sup>1</sup>, T. Nishita<sup>2</sup>, T. Nakanishi<sup>2</sup>, Y. Hirota<sup>2</sup>, M. Machida<sup>3</sup>, J. Y. Son<sup>3</sup>, T. Koganezawa<sup>3</sup>, I. Hirose<sup>3</sup> and A. Ogura<sup>1</sup>, <sup>1</sup>Meiji Univ., <sup>2</sup>Tokyo Electron td., <sup>3</sup>JASRI and <sup>4</sup>JSPS (Japan)

**P-4-2**

Electrical Characteristics of Engineered ZrO<sub>2</sub>/SiO<sub>2</sub> Tunnel Barrier with a High-k HfO<sub>2</sub> Trapping Layer for Non-Volatile Memory

H. W. You<sup>1</sup>, G. H. Park<sup>1</sup>, J. W. Jung<sup>2</sup> and W. J. Cho<sup>1</sup>, <sup>1</sup>Kwangwoon Univ. and <sup>2</sup>Sejong Univ. (Korea)

**P-4-3**

Explanation of anomalous erase behaviour and the associated device instability in TANOS Flash using a new trap characterization technique

R. Degraeve<sup>1</sup>, M. Zahid<sup>1</sup>, G. Van den bosch<sup>1</sup>, P. Blomme<sup>1</sup>, L. Breuil<sup>1</sup>, B. Kaczer<sup>1</sup>, M. Mercuri<sup>1</sup>, A. Rothschild<sup>1</sup>, A. Cacciato<sup>1</sup>, M. Jurczak<sup>1</sup>, G. Groeseneken<sup>2</sup> and J. Van Houdt<sup>1</sup>, <sup>1</sup>IMEC and <sup>2</sup>Catholic Univ. Leuven (Belgium)

**P-4-4**

Precision Programming Power Control in Embedded P-channel SONOS Flash using Transient-IV Method

Y. J. Chen, Y. J. Ting, C. J. Liu, W. T. Sun and R. Shen, *eMemory Tech. Inc. (Taiwan)*

**P-4-6**

Source-Side Injection Programmed P-channel Self-Aligned-Nitride OTP Cell for 90nm Logic Nonvolatile Memory Applications

H. OuYang, Y. J. Chen, C. E. Huang and C. J. Lin, *National Tsing Hua Univ. (Taiwan)*

**P-4-7**

Optimized Silicon Nitride MONOS Memory for Superior Endurance of 10M Cycles

K. Yamabe, S. Yoshida, Y. Taniguchi and S. Kamohara, *Renesas Tech. Corp. (Japan)*

**P-4-8**

Programming Current Enhancement by Ge Incorporation into Tunnel Oxide Film

T. Ito, Y. Mitani, Y. Nakasaki, M. Koike, T. Konno, H. Matsuba, W. Kaneko, T. Kai and Y. Ozawa, *Toshiba Corp. (Japan)*

**P-4-9**

Improved Switching Uniformity of a Carbon-based ReRAM device by Controlling Size of Conducting Filament

J. Park, H. Choi, M. Jo, J. Lee, T. W. Kim, J. Yoon, D. J. Seong, W. Lee, M. Chang, J. Shin, T. Lee and H. Hwang, *Gwangju Inst. of Sci. and Tech. (Korea)*

**P-4-10**

Formation free resistive switching memory device using Ge<sub>0.4</sub>Se<sub>0.6</sub> solid electrolyte

S. Z. Rahaman<sup>1</sup>, S. Maikap<sup>1</sup>, C. H. Lin<sup>2</sup>, T. Y. Wu<sup>2</sup>, Y. S. Chen<sup>2</sup>, P. J. Tzeng<sup>2</sup>, F. Chen<sup>2</sup>, M. J. Kao<sup>2</sup> and M. J. Tsai<sup>2</sup>, <sup>1</sup>Chang Gung Univ. and <sup>2</sup>Industrial Tech. Res. Inst. (Taiwan)

**P-4-11**

Improved resistive switching of HfO<sub>x</sub>/TiN stack with a reactive metal layer and annealing

P. S. Chen<sup>1</sup>, H. Y. Lee<sup>2,3</sup>, Y. S. Chen<sup>2</sup>, F. Chen<sup>2</sup> and M. J. Tsai<sup>2</sup>, <sup>1</sup>MingShin Univ. of Sci. and Tech., <sup>2</sup>Industrial Tech. Res. Inst. and <sup>3</sup>National Tsing Hua Univ. (Taiwan)

**P-4-12**

A Novel Capacitor-less 1T-DRAM on Partially Depleted SOI pMOSFET based on Direct-tunneling Current in the Partial n+ Poly Gate

G. Guegan<sup>1</sup>, P. Touret<sup>1</sup>, G. Molas<sup>1</sup>, C. Raynaud<sup>1</sup> and J. Pretet<sup>2</sup>, <sup>1</sup>CEA - LETI/MINATEC and <sup>2</sup>STMicroelectronics (France)

**P-4-14**

Ferroelectric P(VDF-TeFE) Gate FET Memory

T. Watanabe, H. Miyashita, T. Kanashima and



M. Okuyama, *Osaka Univ. (Japan)*

**P5**

**Advanced Circuits and Systems**

(12 Papers)

**P-5-1**

Highly-Accurate Ladder Model of Inductors on a Glass Substrate

K. Haruyama, K. Kotani and T. Ito, *Tohoku Univ. (Japan)*

**P-5-2**

A Study of Packaging-induced Stress Distribution for Small-scale Silicon Chips

N. Ueda, E. Nishiyama and H. Watanabe, *Ricoh Corp. (Japan)*

**P-5-3**

A Binary-Tree Hierarchical Multiple-Chip Architecture for Real-Time Large-Scale Learning Processor Systems

Y. Ma and T. Shibata, *Univ. of Tokyo (Japan)*

**P-5-4**

31.25 ps Differential Equivalent Time Sampling Circuit using 65nm CMOS Technology

A. Toya, N. Sasaki, S. Kubota and T. Kikkawa, *Hiroshima Univ. (Japan)*

**P-5-5**

4 ch × 10 Gb/s Parallel Phase-synchronization Architecture and a Phase-adjuster Circuit using a Common Clock Signal

H. Katsurai, J. Terada and Y. Ohtomo, *NTT Microsystem Integration Labs. (Japan)*

**P-5-6**

An Optimal Design Method for CMOS Even-Stage Ring Oscillators Containing Plural Latches

Y. Kohara<sup>1</sup>, Y. Kawakami<sup>1</sup>, Y. Uchida<sup>1</sup>, H. Koike<sup>2</sup> and K. Nakamura<sup>1</sup>, <sup>1</sup>*Kyushu Inst. of Tech. and* <sup>2</sup>*Fukuoka*

*Industry, Sci. and Tech. Foundation (Japan)*

**P-5-7**

Design of an 8-nsec-search 72-bit-word Content-Addressable Memory using Phase-Change Devices, S. Hanzawa and T. Hanyu, *Tohoku Univ. (Japan)*

**P-5-8**

High-Speed Face Detection in Images with Massive-Parallel Bit-Serial SIMD Processor using Haar-Like Features

Y. Imai, T. Kumaki, T. Koide and H. J. Mattausch, *Hiroshima Univ. (Japan)*

**P-5-9**

RF Signal Generator based on Time-to-Analog Converter in 0.18μm CMOS

K. Nakano, S. Amakawa, N. Ishihara and K. Masu, *Tokyo Tech (Japan)*

**P-5-10**

Symmetrical Planar IPD Balun for WLAN and Wimax Application

S. M. Wu, W. Y. Lin, S. W. Guan and Y. H. Chen, *National Univ. of Kaohsiung (Taiwan)*

**P-5-11**

A 3-D Binocular Range Sensor LSI with an Enhanced Correlation Signal

M. Kawano<sup>1</sup>, N. Kawaguchi<sup>2</sup>, T. Yoshida<sup>2</sup> and Y. Arima<sup>2</sup>, <sup>1</sup>*Fukuoka Industry, Sci. and Tech. Foundation and* <sup>2</sup>*Kyushu Inst. of Tech. (Japan)*

**P-5-12**

3-D Binocular Range Sensor LSI with A High-Speed Data Output Method

N. Kawaguchi<sup>1</sup>, M. Kawano<sup>2</sup> and Y. Arima<sup>1</sup>, <sup>1</sup>*Kyushu Inst. of Tech. and* <sup>2</sup>*Fukuoka Industry, Sci. and Tech. Foundation (Japan)*

**P6**

**Compound Semiconductor Circuits, Electron  
Devices and Device Physics**

(17 Papers)

**P-6-1**

A Micromachined Air-Cavity Oscillator for 94 GHz  
Applications

Y. Koh, U. Son, S. Song and K. S. Seo, *Seoul National  
Univ. (Korea)*

**P-6-2**

Fabrication Low-voltage Amorphous Indium Zinc  
Oxide(a-IZO) Thin Film Transistors using High Dielectric  
HfO<sub>2</sub> as Gate Insulator at Room Temperature

W. K. Lin<sup>1</sup>, C. S. Li<sup>2</sup>, K. C. Liu<sup>2</sup> and S. T. Chang<sup>1</sup>, *<sup>1</sup>National  
Chung Hsing Univ. and <sup>2</sup>Chang Gung Univ. (Taiwan)*

**P-6-3**

Self-cleaning Effects on Atomic Layer Deposition (ALD)  
of Al<sub>2</sub>O<sub>3</sub> on InGaAs with Several Surface Treatments

H. D. Trinh<sup>1,2</sup>, E. Y. Chang<sup>1</sup>, Y. Y. Wong<sup>1</sup>, C. Y. Chang<sup>1</sup> and  
C. C. Yu<sup>3</sup>, *<sup>1</sup>National Chiao Tung Univ., <sup>2</sup>Hanoi National  
Univ. of Edu. and <sup>3</sup>National Applied Res. Labs. (Taiwan)*

**P-6-4**

Enhanced Photovoltaic Effects of InGaN-based Materials  
for Future Full-Solar-Spectrum Solar Cells

C. C. Yang<sup>1</sup>, J. K. Sheu<sup>1</sup>, S. J. Tu<sup>1</sup>, C. K. Tseng<sup>1</sup>,  
M. S. Huang<sup>1</sup>, K. H. Chang<sup>1</sup>, T. H. Hsueh<sup>1</sup>, M. L. Lee<sup>2</sup>,  
L. C. Peng<sup>1</sup> and W. C. Lai<sup>1</sup>, *<sup>1</sup>National Cheng Kung Univ.  
and <sup>2</sup>Southern Taiwan Univ. (Taiwan)*

**P-6-5**

Low Leakage AlGaIn/GaN HEMTs with a High On/Off  
Current Ratio

Y. S. Lin<sup>1</sup>, Y. W. Lian<sup>1</sup>, S. S. H. Hsu<sup>1</sup> and T. C. Lee<sup>2</sup>,  
*<sup>1</sup>National Tsing Hua Univ. and <sup>2</sup>National Chiao Tung Univ.  
(Taiwan)*

**P-6-6**

High Breakdown GaN Schottky Diodes with Buried  
P-layer Structure

Y. W. Lian, Y. S. Lin and S. S. H. Hsu, *National Tsing Hua  
Univ. (Taiwan)*

**P-6-7**

High Mobility In-Ga-Zn-oxide Thin-film Transistor with  
Sb<sub>2</sub>TeO<sub>x</sub> Gate Insulator Fabricated by Reactive Sputtering

W. S. Cheong, S. M. Yoon, S. Yang and C. S. Hwang,  
*ETRI (Korea)*

**P-6-9**

Temperature Dependence of the Resistance of AlGaIn/GaN  
Heterostructures and their Applications as Temperature  
Sensors

A. H. Zahmani<sup>1</sup>, A. Nishijima<sup>1</sup>, Y. Morimoto<sup>1</sup>, H. Wang<sup>1,2</sup>,  
J. F. Li<sup>2</sup> and A. Sandhu<sup>1</sup>, *<sup>1</sup>Tokyo Tech and <sup>2</sup>Tsinghua Univ.  
(Japan)*

**P-6-10**

Stress Analysis in GaN Epilayer after Chemical  
Mechanical Polishing (CMP) from Sapphire Substrates

Y. K. Su<sup>1,2</sup>, C. C. Kao<sup>1</sup>, C. L. Lin<sup>2</sup> and J. J. Chen<sup>1</sup>, *<sup>1</sup>National  
Cheng Kung Univ. and <sup>2</sup>Kun-Shan Univ. (Taiwan)*

**P-6-11**

Investigation of Electrostatic Integrity for Ultra-Thin-  
Body GeON MOSFET

V. P. H. Hu, Y. S. Wu and P. Su, *National Chiao Tung  
Univ. (Taiwan)*

**P-6-12**

The Effect of Distribute Bragg Reflector in Device  
Temperature of AlGaInP Light-emitting Diode

Y. K. Yang<sup>1</sup>, W. C. Lien<sup>1</sup>, Y. S. Wang<sup>2</sup>, L. H. Zen<sup>1</sup>,  
J. F. Chen<sup>1</sup> and N. C. Chen<sup>1</sup>, *<sup>1</sup>Chang Gung Univ. and  
<sup>2</sup>National Chiao Tung Univ. (Taiwan)*

**P-6-13**

Improved Characteristics of InAlAs/InGaAs MOS-

MHEMTs by using Ozone Water Oxidation Method  
A. Y. Kao<sup>1</sup>, C. S. Ho<sup>2</sup>, W. C. Hsu<sup>2</sup>, Y. N. Lai<sup>2</sup> and  
C. S. Lee<sup>1</sup>, <sup>1</sup>Feng Chia Univ. and <sup>2</sup>National Cheng Kung  
Univ. (Taiwan)

**P-6-14**

Width Dependent Electrically Stress Degradation of  
Bottom Gate Amorphous Indium Gallium Zinc Oxide Thin  
Film Transistors  
D. H. Nam, K. I. Chai, S. S. Park, J. G. Park, H. J. Yun,  
W. H. Choi, H. D. Lee and G. W. Lee, *Chungnam National  
Univ. (Korea)*

**P-6-15**

Transparent AZO-Gated Double  $\delta$ -Doped AlGaAs/InGaAs  
HEMTs  
B. Y. Chou<sup>1</sup>, C. S. Lee<sup>1</sup>, W. C. Hsu<sup>2</sup>, S. Y. Chu<sup>2</sup>, Y. N. Lai<sup>2</sup>,  
C. S. Ho<sup>2</sup>, Z. L. Tseng<sup>2</sup> and M. F. Shih<sup>2</sup>, <sup>1</sup>Feng Chia Univ.  
and <sup>2</sup>National Cheng Kung Univ. (Taiwan)

**P-6-16**

Effect of Two-Step E-Beam SiO<sub>2</sub> Passivation on AlGaIn/  
GaIn HEMT Performance  
H. L. Yu, H. K. Lin and Y. J. Chan, *National Central Univ.  
(Taiwan)*

**P-6-17**

GZO/GaN Schottky Barrier Ultraviolet Band-pass  
Photodetector with a Low-temperature-grown GaN Cap  
Layer  
K. H. Chang<sup>1</sup>, J. K. Sheu<sup>1</sup>, M. L. Lee<sup>2</sup>, T. H. Hsueh<sup>1</sup>,  
C. C. Yang<sup>1</sup>, K. S. Kang<sup>1</sup>, J. F. Huang<sup>1</sup>, L. C. Peng<sup>1</sup> and  
W. C. Lai<sup>1</sup>, <sup>1</sup>National Cheng Kung Univ. and <sup>2</sup>Southern  
Taiwan Univ. (Taiwan)

**P-6-18**

Effects of Pre-treatment on Passivation of AlGaIn/GaN on  
Silicon HEMTs  
J. H. Kim<sup>1,2</sup>, H. G. Choi<sup>1</sup>, H. J. Song<sup>1</sup>, C. H. Roh<sup>1</sup>,  
J. H. Lee<sup>1</sup>, J. H. Park<sup>2</sup> and C. K. Hahn<sup>1</sup>, <sup>1</sup>Korea Electronics  
Tech. Inst. and <sup>2</sup>Korea Univ. (Korea)

**P7**

**Photonic Devices and Device Physics**

(18 Papers)

**P-7-1**

Silicon Lateral Avalanche Photodiodes Fabricated  
by Standard 0.18  $\mu$ m Complementary Metal-Oxide-  
Semiconductor Process  
K. Iiyama, H. Takamatsu and T. Maruyama, *Kanazawa  
Univ. (Japan)*

**P-7-3**

Nitride-based MSM Photodetectors with InN/GaN  
Multiple Nucleation Layers  
C. H. Chen, H. J. Chien, K. R. Wang, S. Y. Tsai and  
S. L. Wu, *Cheng Shiu Univ. (Taiwan)*

**P-7-4**

Investigation of AlGaIn MSM Photodetectors with Low-  
Temperature AlN Cap and Recess Etched Layers  
C. H. Chen<sup>1</sup>, S. J. Chang<sup>2</sup>, M. H. Wu<sup>2</sup>, S. Y. Tsai<sup>1</sup> and  
H. J. Chien<sup>1</sup>, <sup>1</sup>Cheng Shiu Univ. and <sup>2</sup>National Cheng Kung  
Univ. (Taiwan)

**P-7-5**

Photoresponse of Phase Separated Hafnium Silicate in  
Metal-Insulator-Semiconductor Structure  
C. F. Shih, C. Y. Hsiao, C. B. Shu, K. T. Hung and  
W. M. Li, *National Cheng Kung Univ. (Taiwan)*

**P-7-6**

Fabrication and Evaluation of an Er<sub>2</sub>SiO<sub>5</sub> Waveguide  
with a Buried Si Guide Layer for Optical Amplifier in Si  
Photonics  
T. Nakajima, K. Honma, T. Kimura and H. Isshiki, *Univ.  
of Electro- Communications (Japan)*

**P-7-7**

Amorphous Polyethylene Terephthalate Optical Channel  
Waveguide

K. Iiyama, Y. Ono, T. Maruyama and T. Yamagishi,  
*Kanazawa Univ. (Japan)*

**P-7-8**

Separate Control of Interband and Intersubband Transition Wavelengths of  $\text{In}_{0.8}\text{Ga}_{0.2}\text{As}/\text{AlGaAs}/\text{AlAs}_{0.56}\text{Sb}_{0.44}$  Coupled Double Quantum Wells by Only Changing Al Composition  
S. Gozu, T. Mozume, R. Akimoto, K. Akita, G. Cong and H. Ishikawa, *AIST (Japan)*

**P-7-9**

Influence of Heterointerface Abruptness on Electrorefractive Effect in InGaAs/InAlAs Five-Layer Asymmetric Coupled Quantum Well (FACQW)  
Y. Iseri<sup>1</sup>, T. Arakawa<sup>1</sup>, K. Tada<sup>2</sup> and N. Haneji<sup>1</sup>, <sup>1</sup>*Yokohama National Univ. and* <sup>2</sup>*Kanazawa Inst. of Tech. (Japan)*

**P-7-10**

Ridge-Type Semiconductor Lasers with Antiguiding Cladding Layers for Horizontal Transverse Modes  
H. Takada and T. Numai, *Ritsumeikan Univ. (Japan)*

**P-7-11**

Ridge-Type Semiconductor Lasers with Optical Antiguiding Layers for Horizontal Transverse Modes: Dependence on Step Positions  
N. Shomura and T. Numai, *Ritsumeikan Univ. (Japan)*

**P-7-12**

Electrorefractive Effect in Asymmetric Triple Coupled Quantum Well  
K. Ema<sup>1</sup>, W. Endo<sup>1</sup>, T. Arakawa<sup>1</sup> and K. Tada<sup>2</sup>, <sup>1</sup>*Yokohama National Univ. and* <sup>2</sup>*Kanazawa Inst. of Tech. (Japan)*

**P-7-13**

Indium-doped  $\text{Mg}_{1-x}\text{Zn}_x\text{O}$  films for ZnO-based Heterojunction Diodes  
T. Tsuboi, K. Yamamoto, A. Nakamura and J. Temmyo, *Shizuoka Univ. (Japan)*

**P-7-15**

Improved Light Output Power of GaN-Based Light Emitting Diodes using Double Photonic Quasi-Crystal Patterned  
J. K. Huang<sup>1</sup>, H. W. Huang<sup>1,2</sup>, C. H. Lin<sup>2</sup>, K. Y. Lee<sup>2</sup>, C. C. Yu<sup>2</sup>, H. C. Kuo<sup>1</sup>, T. C. Lu<sup>1</sup> and S. C. Wang<sup>1</sup>, <sup>1</sup>*National Chiao Tung Univ. and* <sup>2</sup>*Luxtaltek Corp. (Taiwan)*

**P-7-16**

III-Nitride Light Emitting Diodes with GaN Micro-Pillars around Mesa and Patterned Substrate  
L. C. Peng<sup>1</sup>, W. C. Lai<sup>1</sup>, M. N. Chang<sup>1</sup>, C. Y. Yeh<sup>1</sup>, Y. Y. Yang<sup>1</sup>, S. C. Shei<sup>2</sup>, T. H. Hsueh<sup>1</sup>, K. H. Chang<sup>1</sup>, C. C. Yang<sup>1</sup> and J. K. Sheu<sup>1</sup>, <sup>1</sup>*National Cheng Kung Univ. and* <sup>2</sup>*National Univ. of Tainan (Taiwan)*

**P-7-18**

Thermal Characteristics of InGaN/GaN MQW Blue LEDs  
H. K. Lee and J. S. Yu, *Kyung Hee Univ. (Korea)*

**P-7-19**

Emission Intensity and Fabry-Pérot-Type Surface Plasmons in Tri-Layer Ag/SiO<sub>2</sub>/Ag Plasmonic Thermal Emitter with Different SiO<sub>2</sub> Thickness  
Y. T. Chang, H. H. Chen, J. H. Lee, Y. T. Wu, H. F. Huang and S. C. Lee, *National Taiwan Univ. (Taiwan)*

**P-7-20**

The Influence of the Hole Size on the Peak Emission Wavelength of a Plasmonic Thermal Emitter  
H. H. Chen, Y. W. Jiang, Y. T. Wu, Y. T. Chang, P. E. Chang, H. F. Huang and S. C. Lee, *National Taiwan Univ. (Taiwan)*

**P-7-21**

Enhanced Thermal Radiation Observed in Metal-dielectric-metal Thermal Emitter by Surface Plasmon Resonance  
Y. W. Jiang, D. C. Tzuang, Y. T. Wu, M. W. Tsai and S. C. Lee, *National Taiwan Univ. (Taiwan)*

**P8**

**Advanced Material Synthesis and Crystal Growth Technology**

(13 Papers)

**P-8-2**

Fabrication of In<sub>0.15</sub>Ga<sub>0.85</sub> As Nanohole Templates on GaAs (001) for Quantum Dot Molecules

P. Boonpeng, W. Jevasuwan, S. Panyakeow and S. Ratanathamphan, *Chulalongkorn Univ. (Thailand)*

**P-8-3**

Hydrophilic Property of titanium oxide film crystallization induced by an oxidation nickel seed Layer

T. W. Lin<sup>1</sup>, B. S. Chiang<sup>1</sup>, S. Chang<sup>2</sup> and D. S. Liu<sup>1</sup>, <sup>1</sup>*National Formosa Univ. and* <sup>2</sup>*Far East Univ. (Taiwan)*

**P-8-4**

Raman Spectroscopy, TEM and Bulk-sensitive XPS Study of Multi-layer Graphene Grown on SiO<sub>2</sub>(350 nm)/Si

S. Ogawa<sup>1,2</sup>, H. Sumi<sup>1</sup>, A. Saikubo<sup>2,3</sup>, E. Ikenaga<sup>2,3</sup>, M. Sato<sup>2,4</sup>, M. Nihei<sup>2,4</sup> and Y. Takakuwa<sup>1,2</sup>, <sup>1</sup>*Tohoku Univ.*, <sup>2</sup>*CREST-JST*, <sup>3</sup>*JASRI/Spring-8 and* <sup>4</sup>*Fujitsu Ltd. (Japan)*

**P-8-5**

Investigation on direct-growth Of a-GaN on r-sapphire by MOCVD

H. C. Hsu, Y. K. Su and S. J. Huang, *National Cheng Kung Univ. (Taiwan)*

**P-8-6**

Microwave Dielectric Properties of MgTiO<sub>3</sub> by Sintering MgO and TiO<sub>2</sub> Nanostructures

C. F. Shih, W. M. Li, K. S. Tung, C. Y. Hsiao and K. T. Hung, *National Cheng Kung Univ. (Taiwan)*

**P-8-7**

High quality of a-plane (11-20) GaN using a high pressure buffer layer

J. H. Choi<sup>1</sup>, L. W. Jang<sup>1</sup>, J. W. Ju<sup>1</sup>, S. M. Hwang<sup>2</sup> and

I. H. Lee<sup>1</sup>, <sup>1</sup>*Chonbuk National Univ. and* <sup>2</sup>*Korea Electronics Tech. Inst. (Korea)*

**P-8-8**

Generation Mechanism of Photoemission-assisted Plasma on SiO<sub>2</sub>(350 nm)/Si Substrate

T. Kaga<sup>1</sup>, S. Ogawa<sup>1,2</sup>, H. Hozumi<sup>1</sup>, H. Sumi<sup>1</sup>, M. Sato<sup>2,3</sup>, M. Nihei<sup>2,3</sup> and Y. Takakuwa<sup>1,2</sup>, <sup>1</sup>*Tohoku Univ.*, <sup>2</sup>*CREST-JST and* <sup>3</sup>*Fujitsu Ltd. (Japan)*

**P-8-9**

Annealing a Ge layer embedded between the SiO<sub>2</sub> and patterned Si substrate into crystalline

C. W. Chiu, H. J. Huang, T. W. Liao, J. H. Lin and C. H. Kuan, *National Taiwan Univ. (Taiwan)*

**P-8-10**

In situ X-ray diffraction study of lateral and vertical structures of InAs/GaAs(001) quantum dots

M. Takahashi, *Japan Atomic Energy Agency (Japan)*

**P-8-11**

Advanced transparent conductive ZnO/ITO/ZnO multilayer thin films

K. J. Chen, F. Y. Hung, S. J. Chang, S. J. Young and Z. S. Hu, *National Cheng Kung Univ. (Taiwan)*

**P-8-12**

Laser-Induced Backward Transfer Technique for Maskless Patterning of Poly-Si Thin Films

H. Ikenoue and M. Tani, *Kochi National Colledge of Tech. (Japan)*

**P-8-13**

Development of Experiment Integrated Computational Chemistry and Its Application to Advanced Materials

A. Endou, K. Nishitani, I. Yamashita, T. Onodera, M. Ise, Y. Obara, A. Suzuki, H. Tsuboi, N. Hatakeyama, H. Takaba, M. Kubo and A. Miyamoto, *Tohoku Univ. (Japan)*

**P-8-14**

High Quality Ultraviolet Photodetector based on Ternary ZnSe<sub>1-x</sub>Te<sub>x</sub> Nanotips Grown by MBE  
S. H. Chih<sup>1</sup>, C. H. Hsiao<sup>1</sup>, B. W. Lan<sup>1</sup>, S. J. Chang<sup>1</sup>, S. B. Wang<sup>1</sup>, S. P. Chang<sup>1</sup>, Y. C. Cheng<sup>2</sup>, T. C. Li<sup>2</sup> and W. J. Lin<sup>2</sup>, <sup>1</sup>National Cheng Kung Univ. and <sup>2</sup>Chung Shan Inst. of Sci. and Tech. (Taiwan)

**P9**

**Physics and Applications of Novel Functional Materials and Devices**

(14 Papers)

**P-9-1**

The Drivability Enhancement of Poly-Si TFTs by use of Nanograting Substrate  
S. Kuroki, X. Zhu, K. Kotani and T. Ito, *Tohoku Univ. (Japan)*

**P-9-2**

Characterization of Polycrystalline Silicon Thin-Film Transistors with Nickel-Titanium Oxide Gate Dielectric Coating by Sol-Gel Method  
S. C. Wu<sup>1</sup>, R. C. Yen<sup>1</sup>, C. K. Deng<sup>1</sup>, T. S. Chao<sup>1</sup>, S. H. Chuang<sup>2</sup> and T. F. Lei<sup>1</sup>, <sup>1</sup>National Chiao Tung Univ. and <sup>2</sup>National Univ. of Kaohsiung (Taiwan)

**P-9-3**

Metal-oxide Thin Film Transistors with Co-sputtering Novel Aluminum Zinc Oxide Yttrium Channel Layer  
S. F. Chen, Y. L. Lee, S. Cho, K. M. Huang, Y. H. Chu and M. C. Wu, *National Tsing Hua Univ. (Taiwan)*

**P-9-5**

A Large Scale Quantum Chemistry Study for the High  $\gamma$ MgO Protecting Layer of Plasma Display Panels  
K. Serizawa<sup>1</sup>, H. Onuma<sup>1</sup>, H. Kikuchi<sup>2</sup>, K. Suesada<sup>2</sup>, M. Kitagaki<sup>2</sup>, I. Yamashita<sup>1</sup>, A. Suzuki<sup>1</sup>, H. Tsuboi<sup>1</sup>, N. Hatakeyama<sup>1</sup>, A. Endou<sup>1</sup>, H. Takaba<sup>1</sup>, M. Kubo<sup>1</sup>, H. Kajiyama<sup>2</sup> and A. Miyamoto<sup>1</sup>, <sup>1</sup>Tohoku Univ. and

<sup>2</sup>Hiroshima Univ. (Japan)

**P-9-7**

Transient Current Study on Pt/TiO<sub>2-x</sub>/Pt Capacitor  
N. Zhong<sup>1,2</sup>, H. Shima<sup>1,2</sup> and H. Akinaga<sup>1,2</sup>, <sup>1</sup>AIST and <sup>2</sup>CREST-JST (Japan)

**P-9-8**

Nanoscale Fabrication of Planar-type Structures on thin Graphite Flake using Focused Ion Beam System  
G. Venugopal and S. J. Kim, *Jeju National Univ. (Korea)*

**P-9-9**

Capacitances in Tunneling Field-Effect Transistors  
Y. Yang, X. Tong, L. T. Yang, P. F. Guo, L. Fan, G. S. Samudra and Y. C. Yeo, *National Univ. of Singapore (Singapore)*

**P-9-10**

Comparative Study of Tunnel FETs and MOSFETs for Low-Power Consumption  
W. Y. Choi, *Sogang Univ. (Korea)*

**P-9-11**

A Non-local Algorithm for Simulation of Band-to-Band Tunneling in a Heterostructure Tunnel Field-Effect Transistor (TFET)  
L. Fan, L. T. Yang, Y. Yang, P. F. Guo, G. Samudra and Y. C. Yeo, *National Univ. of Singapore (Singapore)*

**P-9-14**

New Type Oxygen Sensing Device using Oxygen Intercalation of Layered Semiconductor TiS<sub>2</sub>  
T. Imamura, T. Nugroho, Y. Ikawa, K. Kishiro and H. Kuriyaki, *Kyushu Univ. (Japan)*

**P-9-15**

Electrical Interface Structure of Schottky Junctions by  $\pi$ -conjugated Polymer/III-nitride Hetero Structure  
N. Matsuki<sup>1</sup>, Y. Nakano<sup>2</sup>, Y. Irokawa<sup>1</sup> and M. Sumiya<sup>1</sup>, <sup>1</sup>NIMS and <sup>2</sup>Chubu Univ. (Japan)

**P-9-16**

Suppression of Critical Current in Submicron Intrinsic Josephson Junction Fabricated in a  $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10+\delta}$  (Bi-2223) Single Crystal Whisker  
S. Saini and S. J. Kim, *Jeju National Univ. (Korea)*

**P-9-17**

First-principles Study of Rectifying Properties of Pt/TiO<sub>2</sub> Interface  
T. Tamura<sup>1,3</sup>, S. Ishibashi<sup>1,3</sup>, K. Terakura<sup>1,2,3</sup> and H. Weng<sup>2,3</sup>,  
<sup>1</sup>AIST, <sup>2</sup>JAIST and <sup>3</sup>CREST-JST (Japan)

**P-9-18**

Anisotropic Transport in Epitaxial Graphene Transistor on Vicinal SiC Substrate  
S. Odaka<sup>1,2,3</sup>, H. Miyazaki<sup>1,3</sup>, A. Kanda<sup>3,4</sup>, K. Morita<sup>5</sup>, S. Tanaka<sup>5</sup>, Y. Miyata<sup>6</sup>, H. Kataura<sup>6</sup>, K. Tsukagoshi<sup>1,3,6</sup> and Y. Aoyagi<sup>3,7</sup>, <sup>1</sup>NIMS, <sup>2</sup>Tokyo Tech, <sup>3</sup>CREST-JST, <sup>4</sup>Univ. of Tsukuba, <sup>5</sup>Kyushu Univ., <sup>6</sup>AIST and <sup>7</sup>Ritsumeikan Univ. (Japan)

**P10**

**Organic Materials Science, Device Physics, and Applications**

(24 Papers)

**P-10-1**

Device Characteristics of Short-Channel Organic Field-Effect Transistors  
T. Hirose<sup>1</sup>, T. Nagase<sup>1</sup>, T. Kobayashi<sup>1</sup>, R. Ueda<sup>2</sup>, A. Otomo<sup>2</sup> and H. Naito<sup>1</sup>, <sup>1</sup>Osaka Prefecture Univ. and <sup>2</sup>NICT (Japan)

**P-10-2**

Interface Characterization and Charge Storage Effect of a Polystyrene Gate Dielectric Organic Thin-Film Transistor  
K. Kim<sup>1</sup>, J. Jeong<sup>2</sup>, T. Lim<sup>2</sup> and Y. Kim<sup>2</sup>, <sup>1</sup>Samsung Electronics Co., Ltd. and <sup>2</sup>Hongik Univ. (Korea)

**P-10-3**

Instability of Amorphous-Indium Gallium Zinc Oxide

(a-IGZO) Thin Film Transistors under DC and AC Bias Stress  
K. I. Choi, D. H. Nam, J. G. Park, S. S. Park and G. W. Lee, *Chungnam National Univ. (Korea)*

**P-10-4**

Phase Transition Induced by a Gate Electric Field in (BEDT-TTF)(TCNQ) Single Crystalline Field Effect Transistor  
M. Sakai, Y. Ito, T. Takahara, M. Nakamura and K. Kudo, *Chiba Univ. (Japan)*

**P-10-5**

Enhanced Performance of Organic Base-modulation Triodes by Nanoscale Interfacial Modification  
S. S. Cheng<sup>1</sup>, G. Y. Chen<sup>1</sup>, J. H. Chen<sup>1</sup>, M. C. Wu<sup>1</sup>, D. Kekuda<sup>2</sup> and C. W. Chu<sup>2,3</sup>, <sup>1</sup>National Tsing Hua Univ., <sup>2</sup>Academia Sinica and <sup>3</sup>National Chiao Tung Univ. (Taiwan)

**P-10-6**

Bulk Heterojunction Ambipolar Thin Film Transistors  
L. F. Chu<sup>1</sup>, C. F. Sung<sup>2,3</sup>, Y. Z. Lee<sup>3</sup>, F. C. Chen<sup>2</sup>, M. C. Wu<sup>1</sup> and C. W. Chu<sup>2,4</sup>, <sup>1</sup>National Tsing Hua Univ., <sup>2</sup>National Chiao Tung Univ., <sup>3</sup>Indus. Tech. Res. Inst. and <sup>4</sup>Academia Sinica (Taiwan)

**P-10-7**

Molecular Orientation of Poly(3-hexylthiophene)/Fullerene Composite Thin Films  
K. A. Mohamad, N. Komatsu, K. Uesugi and H. Fukuda, *Muroran Inst. of Tech. (Japan)*

**P-10-8**

Geometrical and Electrical Characteristics of Gate Electrodes for OTFT Fabricated by Screen Printing and Wet Etching  
M. Y. Lee and C. K. Song, *Dong-A Univ. (Korea)*

**P-10-9**

Front-Light Source using Inverted Organic Light-Emitting

Diodes with Micro Cathode Arrays

K. Urata, S. Naka and H. Okada, *Univ. of Toyama (Japan)*

**P-10-11**

Characterization of the Anomalous Temperature-dependent Carrier Transports in the Disordered ITO/PEDOT/PF/Ca/Al Polymer Light-emitting Diodes

Y. T. Chen, J. W. Teng, J. C. Wang, T. E. Nee and

G. M. Wu, *Chang Gung Univ. (Taiwan)*

**P-10-12**

High Efficiency White Organic Light-Emitting Diodes with Tandem Structure

C. C. Hou, C. T. Wu, L. C. Kao, S. H. Su and

M. Yokoyama, *I-Shou Univ. (Taiwan)*

**P-10-13**

Luminescent Characteristics of OLED using Zn(PQ)<sub>2</sub> as Electron Transporting Layer and Hole Blocking Layer

J. W. Park<sup>1</sup>, G. C. Choi<sup>1</sup>, B. S. Kim<sup>1</sup> T. D. Hoanh<sup>2</sup>,

B. J. Lee<sup>2</sup> and Y. S. Kwon<sup>1</sup>, <sup>1</sup>*Dong-A Univ. and* <sup>2</sup>*Inje Univ. (Korea)*

**P-10-14**

Evaluation of Seebeck Coefficients of Organic Thin Films toward Flexible Thermoelectric Power Generators

A. Hoshi, M. Sakai, K. Kudo and M. Nakamura, *Chiba Univ. (Japan)*

**P-10-15**

Study on Electronic Structure of Au, Ag, and Ca-doped Bathocuproine Layers

H. Kitazume<sup>1</sup>, S. Toyoshima<sup>1</sup>, T. Sakurai<sup>1</sup>, M. Aoki<sup>2</sup>,

S. Masuda<sup>2</sup> and K. Akimoto<sup>1</sup>, <sup>1</sup>*Univ. of Tsukuba and* <sup>2</sup>*Univ. of Tokyo (Japan)*

**P-10-16**

Growth and Electric Properties of C<sub>60</sub> Nano-Crystals Directly Grown between Electrodes from Solution by Dipping Technique

K. Kurihara, Y. Iio, N. Iwata and H. Yamamoto, *Nihon*

*Univ. (Japan)*

**P-10-17**

Morphology Observation of Langmuir-Blodgett Thin Film based on Silsesquioxane Dendrimer

G. C. Sung, J. Y. Lee, D. S. Shin, C. Kim and Y. S. Kwon, *Dong-A Univ. (Korea)*

**P-10-18**

Fine Pattern Preparation for Various Metals by using Selective Deposition based on Photochromic Surfaces

Y. Sesumi<sup>1</sup>, S. Yokojima<sup>2</sup>, S. Nakamura<sup>2</sup>, K. Uchida<sup>3</sup> and T. Tsujioka<sup>1</sup>, <sup>1</sup>*Osaka Kyoiku Univ.*, <sup>2</sup>*Mitsubishi Chemical Group Sci. and Tech. Res. Center Inc. and* <sup>3</sup>*Ryukoku Univ. (Japan)*

**P-10-19**

Surface Modification of Organic Thin Films by Neutral Beam Irradiation

M. Hirade<sup>1,2</sup>, T. Kubota<sup>2,3</sup>, Y. Tsuru<sup>2,4</sup>, M. Yahiro<sup>1,2,6</sup>, K. Miyazaki<sup>2,4</sup>, S. Samukawa<sup>2,5</sup> and C. Adachi<sup>1,2</sup>, <sup>1</sup>*Kyushu Univ.*, <sup>2</sup>*Beans Lab.*, <sup>3</sup>*Univ. of Tokyo*, <sup>4</sup>*Kyushu Inst. of Tech.*, <sup>5</sup>*Tohoku Univ. and* <sup>6</sup>*ISIT (Japan)*

**P-10-20**

Gas Adsorption Properties of Fluorocarbon Polymer Thin Films Prepared by Three Different Types of r.f. Magnetron Sputtering Systems

N. Hasegawa<sup>1</sup>, S. Yano<sup>1</sup>, S. Iwamori<sup>1</sup> and K. Noda<sup>2</sup>, *<sup>1</sup>Kanazawa Univ. and* *<sup>2</sup>AIST (Japan)*

**P-10-21**

Adsorption Properties of Polymer Thin Films Prepared by r.f. Sputtering with a BPDA-PDA Polyimide Target

S. Yano<sup>1</sup>, A. Uemura<sup>1,2</sup>, S. Iwamori<sup>1</sup> and K. Noda<sup>3</sup>, *<sup>1</sup>Kanazawa Univ.*, *<sup>2</sup>Indus. Res. Inst. of Ishikawa and* *<sup>3</sup>AIST (Japan)*

**P-10-22**

Evaluation of 5CB Liquid Crystal Molecules on SiO<sub>2</sub> Alignment Layer by Simultaneous Surface Plasmon



Resonance and Optical Waveguide Spectroscopy  
A. Ikarashi, A. Baba, K. Shinbo, K. Kato and F. Kaneko,  
*Niigata Univ. (Japan)*

**P-10-23**

Enhancing the Fill Factor in Polymer Photovoltaic Cell by  
using a Hole Transporting Layer  
W. T. Chiang, S. H. Su, Y. C. Liu and M. Yokoyama,  
*I-Shou Univ. (Taiwan)*

**P-10-24**

Study of Opto-electronic and Physical Properties of Novel  
Flexible Substrate Material  
W. G. Sie, W. Y. Huang, C. C. Lee and W. T. Liu, *National  
Sun Yat-sen Univ. (Taiwan)*

**P-10-25**

Donor - Acceptor Type Conjugated Polymers Containing  
Carbazole and Fluorene for Organic Photovoltaic  
Applications  
W. J. Lee, J. R. Haw and D. K. Moon, *Konkuk Univ.  
(Korea)*

**P11**

**Micro/Nano Electromechanical and Bio-Systems  
(Devices)**

(12 Papers)

**P-11-1**

Terahertz Spectroscopic Technology for Safety and  
Security  
T. Uno and H. Tabata, *Univ. of Tokyo (Japan)*

**P-11-2**

Discharge Current Controlled Atmospheric Microplasma  
Generation  
H. Park<sup>1</sup>, J. Kim<sup>1</sup> and Y. Kim<sup>1</sup>, *Hongik Univ. (Korea)*

**P-11-3**

Continuous Manipulation of Micro Particles by Use of

Asymmetric Electrodes Array  
M. Midorikawa, S. Kuroki, D. Obara, K. Kotani and  
T. Ito, *Tohoku Univ. (Japan)*

**P-11-4**

Actuation of Magnetic Beads on a CMOS Chip for  
Biological Applications  
T. Ishikawa, K. Johguchi and F. Kaneko, *Hiroshima Univ.  
(Japan)*

**P-11-5**

A Novel Differential LAPS with PVC and HfO<sub>2</sub> Sensing  
Membranes for pH Sensors  
C. S. Lai<sup>1</sup>, C. M. Wu<sup>1</sup>, C. E. Lue<sup>1</sup>, T. F. Lu<sup>1</sup>, C. M. Yang<sup>2</sup>  
and H. Y. Chen<sup>1</sup>, <sup>1</sup>*Chang Gung Univ. and* <sup>2</sup>*Inotera  
memories Inc. (Taiwan)*

**P-11-6**

Ultra-Conformal Metal Coating on High-aspect-ratio  
3D Structures using Supercritical Fluid: Controlled  
Selectivity/Non-Selectivity  
T. Momose<sup>1,2</sup>, T. Uejima<sup>1</sup>, H. Yamada<sup>2</sup>, M. Sugiyama<sup>1,2</sup>  
and Y. Shimogaki<sup>1,2</sup>, <sup>1</sup>*Univ. of Tokyo and* <sup>2</sup>*BEANS Project,  
METI (Japan)*

**P-11-7**

Fabrication of Electrostatic Actuated Rotary for Micro  
Interferometer  
Y. M. Lee, M. Toda, T. Ono and M. Esashi, *Tohoku Univ.  
(Japan)*

**P-11-8**

Thermopile IR Detector Integrated with Wavelength  
Selective Filter Stable against Temperature and Incident  
Angle Change  
K. Masuno, S. Kumagai, M. Sasaki and K. Tashiro, *Toyota  
Technological Inst. (Japan)*

**P-11-9**

Silane-coupling Silicon Substrate that Fixes Protein  
without Adsorption of Protein Buffer Components for

Device Fabrication

M. Fukuta<sup>1</sup> and I. Yamashita<sup>1,2</sup>, <sup>1</sup>NAIST and <sup>2</sup>Panasonic Corp. (Japan)

**P-11-10**

Multi-channel Bio Sensing and Stimulation LSI Chip using 0.18  $\mu\text{m}$  CMOS Process

M. Yamaguchi<sup>1</sup>, A. Shimada<sup>2</sup>, K. Torimitsu<sup>2</sup> and N. Nakano<sup>1</sup>, <sup>1</sup>Keio Univ. and <sup>2</sup>NTT Corp. (Japan)

**P-11-11**

Fabrication of Smart Electrochemical Sensor with CMOS Integrated Circuits

T. Yamazaki<sup>1,2</sup>, T. Ikeda<sup>1</sup>, Y. Kano<sup>1</sup>, H. Takao<sup>1,3</sup>, M. Ishida<sup>1,3</sup> and K. Sawada<sup>1,3</sup>, <sup>1</sup>Toyohashi Univ. of Tech., <sup>2</sup>HIOKI E. E. Corp. and <sup>3</sup>CREST-JST (Japan)

**P-11-12**

In vivo Neural Signal Recording using Double-sided Si Neural Probe

S. Lee, R. Kobayashi, S. Kanno, K. Lee, T. Fukushima, K. Sakamoto, Y. Matsuzaka, N. Katayama, H. Mushiake, M. Koyanagi and T. Tanaka, *Tohoku Univ. (Japan)*

**P12**

**Spintronic Materials and Devices**

(7 Papers)

**P-12-1**

Dielectric Breakdown in MgO-barrier Magnetic Tunnel Junctions with a CoFeB based Synthetic Ferrimagnetic Recording Layer

M. Yamanouchi<sup>1</sup>, Y. Mori<sup>1</sup>, J. Hayakawa<sup>1</sup>, H. Yamamoto<sup>1</sup>, K. Miura<sup>1</sup>, H. Hasegawa<sup>1</sup>, K. Ito<sup>1</sup>, K. Takeda<sup>1</sup>, K. Meguro<sup>1</sup>, H. Takahashi<sup>1</sup>, H. Matsuoka<sup>1</sup>, S. Ikeda<sup>2</sup> and H. Ohno<sup>2</sup>, <sup>1</sup>Hitachi, Ltd. and <sup>2</sup>Tohoku Univ. (Japan)

**P-12-2**

SpinFET on Epitaxial Graphene

T. Shen<sup>1</sup>, Y. Q. Wu<sup>1</sup>, A. Chernyshov<sup>1</sup>, L. P. Rokhinson<sup>1</sup>,

M. L. Bolen<sup>1</sup>, M. A. Capano<sup>1</sup>, A. R. Pirkle<sup>2</sup>, J. Kim<sup>2</sup>, R. M. Wallace<sup>2</sup>, J. J. Gu<sup>1</sup>, K. Xu<sup>1</sup>, L. W. Engel<sup>3</sup> and P. D. Ye<sup>1</sup>, <sup>1</sup>Purdue Univ., <sup>2</sup>Univ. of Texas at Dallas and <sup>3</sup>National High Magnetic Field Lab. (USA)

**P-12-3**

Growth and Magnetic Properties of Mn<sub>2</sub>SGa Films for Spintronic Devices

F. Wu, S. Mizukami, D. Watanabe, H. Naganuma, M. Oogane, Y. Ando and T. Miyazaki, *Tohoku Univ. (Japan)*

**P-12-4**

Formation of Cr-rich Columnal Regions in Magnetic Semiconductor (Zn,Cr)Te

Y. Nishio<sup>1</sup>, K. Ishikawa<sup>1</sup>, S. Kuroda<sup>1</sup>, M. Mitome<sup>2</sup> and Y. Bando<sup>2</sup>, <sup>1</sup>Univ. of Tsukuba and <sup>2</sup>NIMS (Japan)

**P-12-6**

Effects of Hole Doping in the Ferromagnetic Semiconductor Mn-doped ZnO Thin Film Studied by X-ray Magnetic Circular Dichroism

T. Kataoka<sup>1</sup>, Y. Sakamoto<sup>1</sup>, M. Kobayashi<sup>1</sup>, V. R. Singh<sup>1</sup>, Y. Yamazaki<sup>1</sup>, A. Fujimori<sup>1,2</sup>, F. H. Chang<sup>3</sup>, H. J. Lin<sup>3</sup>, D. J. Huang<sup>3</sup>, C. T. Chen<sup>3</sup>, Y. Takeda<sup>2</sup>, T. Ohkochi<sup>2</sup>, T. Okane<sup>2</sup>, Y. Saitoh<sup>2</sup>, H. Yamagami<sup>2,4</sup>, M. Kapilashrami<sup>2</sup>, L. Belova<sup>5</sup> and K. V. Rao<sup>5</sup>, <sup>1</sup>Univ. of Tokyo, <sup>2</sup>JAEA/SPRING-8, <sup>3</sup>NSRRC, <sup>4</sup>Kyoto Sangyo Univ. and <sup>5</sup>Royal Inst. of Tech. (Japan)

**P-12-7**

Advanced Macro-Model with Pulse-Width Dependent Switching Characteristic for Spin-Transfer-Torque based Magnetic-Tunnel-Junction Elements

S. Kim, S. Lee and H. Shin, *Ewha Womans Univ. (Korea)*

**P-12-8**

Local Probing of Magnetization Reversal in a Ni-Fe Nanowire with a Notch Measured with Magnetic Field Sweeping(MFS)-Magnetic Force Microscopy(MFM)

Y. Endo, Y. Mitsuzuka, M. Watanabe and M. Yamaguchi,

Tohoku Univ. (Japan)

**P13**

**Applications of Nanotubes and Nanowires**

(14 Papers)

**P-13-1**

High thermo-acoustic property of Carbon-nanotube speaker

K. Suzuki, S. Sakakibara, S. Shimizu, M. Okada, Y. Neo, H. Mimura, Y. Suzuki, Y. Minami, A. Murakami, J. Muramatsu and Y. Inoue, *Shizuoka Univ. (Japan)*

**P-13-2**

Fabrication of Quantum Dots in Twin-Free GaAs Nanopillars on Si

K. Tateno, G. Zhang, H. Gotoh and H. Nakano, *NTT Basic Res. Labs. (Japan)*

**P-13-3**

Gate induced Cross-over between Fabry Perot and Quantum Dot Behavior in a Single-Walled Carbon Nanotube Hole-Transistor with Double Gate Structure

T. Kamimura<sup>1,2,3</sup> and K. Matsumoto<sup>1,3,4</sup>, <sup>1</sup>AIST, <sup>2</sup>JSPS, <sup>3</sup>CREST-JST and <sup>4</sup>Osaka Univ. (Japan)

**P-13-4**

Enhanced Visible Light and Electron Field Emission of Porous Silicon Nanowires

W. I. Hsu, S. J. Wang, W. C. Tsai, W. C. Hsu, F. S. Tsai and H. Y. Huang, *National Cheng Kung Univ. (Taiwan)*

**P-13-5**

First Principles Study of Metals Coating on Single Wall Carbon Nanotube

Y. He, J. Zhang, Y. Wang and Z. Yu, *Tsinghua Univ. (China)*

**P-13-6**

The Preparation of SiO<sub>2</sub> Nanotubes with Controllable

inner/outer Diameter and Length using Hydrothermally Grown ZnO Nanowires

D. M. Kuo<sup>1</sup>, S. J. Wang<sup>1</sup>, K. M. Uang<sup>2</sup>, W. C. Tsai<sup>1</sup>, W. I. Hsu<sup>1</sup>, W. C. Lee<sup>1</sup>, P. R. Wang<sup>1</sup> and C. R. Tseng<sup>1</sup>, <sup>1</sup>National Cheng Kung Univ. and <sup>2</sup>WuFeng Inst. of Tech. (Taiwan)

**P-13-7**

Diameter dependence of hole current in silicon and germanium nanowire FETs

H. Minari and N. Mori, *Osaka Univ. (Japan)*

**P-13-8**

Shape Effects on the Performance of Si and Ge Nanowire FETs based on Size De-pendent Bandstructure

C. S. Koong, G. Samudra and G. Liang, *National Univ. of Singapore (Singapore)*

**P-13-9**

Experimental Investigation of Electron-Phonon Scattering Effect in Strained Si Nanowire FETs at Low Temperature

I. Tsuchida<sup>1</sup>, A. Seike<sup>1</sup>, H. Takai<sup>1</sup>, J. Masuda<sup>2</sup>, D. Kosemura<sup>2</sup>, A. Ogura<sup>2</sup>, T. Watanabe<sup>1</sup> and I. Ohdomari<sup>1</sup>, <sup>1</sup>Waseda Univ. and <sup>2</sup>Meiji Univ. (Japan)

**P-13-10**

Simulation on the Heat Transport in a Silicon Nano-Structure Covered with Oxide Films

T. Zushi<sup>1</sup>, K. Kukita<sup>2</sup>, Y. Kamakura<sup>2</sup>, K. Taniguchi<sup>2</sup>, I. Ohdomari<sup>1</sup> and T. Watanabe<sup>1</sup>, <sup>1</sup>Waseda Univ. and <sup>2</sup>Osaka Univ. (Japan)

**P-13-11**

Interface and Passivation Effect on Subthreshold Transport of Carbon Nanotube Network Transistor by Plasma

Enhanced Chemical Vapor Deposition  
S. G. Jung<sup>1</sup>, U. J. Kim<sup>2</sup> and Wanjun Park<sup>1</sup>, <sup>1</sup>Hanyang Univ. and <sup>2</sup>Samsung Advanced Inst. of Tech. (Korea)

**P-13-12**

Selectivity Lateral Grown ZnO Nanowire UV

Photodetectors on Glass Substrate

W. Y. Weng<sup>1</sup>, T. J. Hsueh<sup>2</sup>, S. J. Chang<sup>1</sup> and C. L. Hsu<sup>3</sup>,  
<sup>1</sup>National Cheng Kung Univ, <sup>2</sup>National Nano Device  
 Laboratories and <sup>3</sup>National Univ of Tainan (Taiwan)

**P-13-13**

Post-Annealing Effect on the Electrical Properties of Top-  
 gated SWNT Network Transistors

S. C. Min<sup>1,2</sup>, W. J. Park<sup>1</sup> and U. J. Kim<sup>2</sup>, <sup>1</sup>Hanyang Univ.  
 and <sup>2</sup>Samsung Advanced inst. of tech (Korea)

**P-13-14**

Electronic Transport Properties in Irradiated C<sub>60</sub> FNW

T. Doi<sup>1</sup>, Y. Chiba<sup>1</sup>, H. Tsuji<sup>1</sup>, M. Ueno<sup>1</sup>, S. R. Chen<sup>1,2</sup>,  
 N. Aoki<sup>1</sup> and Y. Ochiai<sup>1</sup>, <sup>1</sup>Chiba Univ. and <sup>2</sup>Southern  
 Taiwan Univ. of Tech. (Japan)

**P14**  
**Power Electronics**

(11 Papers)

**P-14-1**

Reducing the Gate Charge of Dual Gate Power  
 VDMOSFET by Pseudo-Gate

C. N. Liao<sup>1</sup>, F. T. Chien<sup>2</sup>, C. M. Lin<sup>3</sup>, C. H. Ho<sup>1</sup> and  
 Y. T. Tsai<sup>1</sup>, <sup>1</sup>National Central Univ., <sup>2</sup>Feng Chia Univ. and  
<sup>3</sup>Southern Taiwan Univ. (Taiwan)

**P-14-2**

The Cryogenic behaviour of High Power Si and GaAs  
 Schottky Diodes

K. Leong, A. Bryant and P. Mawby, *Univ. of Warwick,*  
 (UK)

**P-14-3**

Cathodoluminescence Microcharacterization of  
 Recombination Centers in Lifetime-Controlled IGBTs

R. Sugie<sup>1</sup>, T. Mitani<sup>1</sup>, M. Yoshikawa<sup>1</sup>, Y. Iwata<sup>2</sup> and  
 R. Satoh<sup>2</sup>, <sup>1</sup>Toray Res. Center Inc. and <sup>2</sup>Osaka Univ.  
 (Japan)

**P-14-4**

Improvement in Quantitative Analysis of Defects and  
 Microstructures in Si Multicrystals using X-ray Diffraction

K. Kutsukake, N. Usami, K. Fujiwara and K. Nakajima,  
*Tohoku Univ. (Japan)*

**P-14-5**

Selection of Material for the Back Electrodes of Thin-Film  
 Solar Cells using Polycrystalline Silicon Films Formed by  
 Flash Lamp Annealing

K. Ohdaira, T. Fujiwara, K. Shiba and H. Matsumura,  
*JAIST (Japan)*

**P-14-6**

Defect Passivation of Solar Cells by High Pressure H<sub>2</sub>O  
 Vapor Treatment

M. Hasumi, M. Shimokawa, K. Ukawa, T. Haba,  
 Y. Mizutani and T. Sameshima, *Tokyo Univ. of Agri. and*  
*Tech. (Japan)*

**P-14-7**

Development of an Ultra-Accelerated Quantum Chemical  
 Molecular Dynamics Method and its Application to Ion  
 Transport in Li-ion Battery

Y. Suzuki, T. Ogawa, H. Tsuboi, N. Hatakeyama,  
 A. Endou, A. Suzuki, H. Takaba, M. Kubo and  
 A. Miyamoto, *Tohoku Univ. (Japan)*

**P-14-8**

Surface Modification of SnO<sub>2</sub> Electrodes for Highly  
 Efficient Dye Sensitized Solar Cells

F. Hirose, H. Yoshida, M. Shikaku, T. Suzuki and  
 Y. Narita, *Yamagata Univ. (Japan)*

**P-14-9**

High Performance Transparent Conducting Ga-doped  
 ZnO film Deposited by RF-magnetron Sputter Deposition  
 Technique

J. K. Kim<sup>1,2</sup>, J. M. Lee<sup>1,2</sup>, J. W. Lim<sup>1,2</sup>, J. H. Kim<sup>2</sup> and  
 S. J. Yun<sup>1,2</sup>, <sup>1</sup>Univ. of Sci. and Tech. and <sup>2</sup>Electronics and  
 Telecommunications Res. Inst. (Korea)

**Thursday, October 8**

**P-14-10**

Improvement of Opt-Electrical Properties in GaAsN by Controlling Step Density During Chemical Beam Epitaxy Growth

H. Suzuki, M. Inagaki, T. Honda, Y. Ohshita, N. Kojima and M. Yamaguchi, *Toyota Technological Inst. (Japan)*

**P-14-11**

First Principles Calculations on  $\Sigma$  3 Grain Boundary Impurities in Polycrystalline Silicon

A. Suvitha, N. S. Venkataramanan, R. Sahara, H. Mizuseki and Y. Kawazoe, *Tohoku Univ. (Japan)*

**12:00-13:15 Lunch**