

# The Conference Theme

*Electron Devices and Intellectualization of Everything*

## Advanced Program

6/29 .....

### Tutorials (in Japanese)

Chair: Hirobumi Watanabe

**9:30-10:30 H/W Technology for Cognitive Computing**

Koji Hosokawa  
(IBM Japan)

**Short Break (10:30-10:40)**

**10:40-11:40 Development of Spintronics and Device Application**

Yasuo Ando  
(Tohoku University)

### Opening

**13:00-13:10 Opening Remarks by Yasuhisa Omura (Kansai University)**

### Keynote Speeches

Chair: Mutsumi Kimura

**13:10-13:50**

**K-1 (p.18) Silicon Neuronal Networks**

- another approach to intelligent systems -  
Takashi Kohno  
(University of Tokyo)

**Short Break (13:50-14:00)**

# Session A (Silicon Devices)

Chairs: Naoto Matsuo / Yukiharu Uraoka

14:00-14:40 - Invited -

**A-1 (p.22) Silicon-based Micro Thermoelectric Generator Fabricated by CMOS Compatible Process**

Takanobu Watanabe  
(Waseda University)

14:40-15:00

**A-2 (p.24) An 800-MHz 8-bit High Speed SAR ADC in 16nm FinFET Process**

Keisuke Okuno, Koji Obata, Takumi Kato and Koji Sushihara  
(Panasonic Corporation)

**Short Break (15:00-15:10)**

15:10-15:30

**A-3 (p.26) Image Sensor with New Trench-gated Phototransistor**

Katsuyuki Sakurano, Takaaki Negoro, Kazuhiro Yoneda, Yasukazu Nakatani, Katsuhiko Aisu, Yoshinori Ueda and Hirobumi Watanabe  
(Ricoh)

15:30-15:50

**A-4 (p.28) Low-Power CMOS LNA for 900-MHz LoRa Application Through Parallel-RC Feedback**

Cheng-Shian Shiau and Jeng-Rern Yang  
(Yuan Ze University, Taiwan)

**Short Break (15:50-16:00)**

## Poster Session

### Short Presentation – 2min. each (6/29, 16:00-17:40)

Chairs: A: Akira Hiroki, B: Takatoshi Kato, C: Yuichi Ando

- PA-01 (p.32) Study of the inverter circuit with DNA/Si-MOSFET**  
Hibiki Nakano<sup>1</sup>, Naoto Matsuo<sup>1</sup>, Tadao Takada<sup>1</sup>, Kazushige Yamana<sup>1</sup>, Akira Heya<sup>1</sup>, Tadashi Sato<sup>2</sup> and Shin Yokoyama<sup>2</sup>  
(<sup>1</sup>University of Hyogo, <sup>2</sup>Hiroshima University)
- PA-02 (p.34) Physical Mechanisms of Short-Channel Effects of Lateral Double-Gate Tunnel FET**  
Yoshiaki Mori<sup>1</sup>, Shingo Sato<sup>1</sup>, Yasuhisa Omura<sup>1</sup> and Abhijit Mallik<sup>2</sup>  
(<sup>1</sup>Kansai University, <sup>2</sup>University of Calcutta)
- PA-03 (p.36) Study on Underwater Wireless Power Transfer via Electric Coupling with a submerged electrode**  
Mitsuhiro Urano, Kazuki Ata and Akira Takahashi  
(National Institute of Technology, Nara College)
- PA-04 (p.38) Wireless Power Transmission to Thin-Film Devices**  
Keigo Misawa, Yuki Yamamoto and Mutsumi Kimura  
(Ryukoku University)
- PA-05 (p.40) Evaluation of Thin-Film Biostimulating Device using Thin-Film Transistors**  
Kohei Miyake, Keisuke Tomioka, and Mutsumi Kimura  
(Ryukoku University)
- PA-06 (p.42) Angular dependence of nonparabolicity factor of silicon band structure**  
Fujimoto Nobuya, Akira Hiroki and Shin Hiratoko  
(Kyoto Institute of Technology)
- PA-07 (p.44) Evaluation platform for the security of in-vehicle systems**  
Yoshiya Ikezaki, Yusuke Nozaki and Masaya Yoshikawa  
(Meijo University)

- PA-08 (p.46) Evaluation of PLFSR PUF with Several Implementation Methods for FPGA**  
Yusuke Nozaki, Yoshiya Ikezaki and Masaya Yoshikawa  
(Meijo University)
- PB-01 (p.48) Heteroepitaxial growth of  $\epsilon$ -Ga<sub>2</sub>O<sub>3</sub> thin films on cubic (111) GGG substrates by mist chemical vapor deposition**  
Daisuke Tahara, Hiroyuki Nishinaka, Shota Morimoto and Masahiro Yoshimoto  
(Kyoto Institute of Technology)
- PB-02 (p.50) Junction-Barrier Schottky Diodes Fabricated with Very Thin Highly Mg-Doped p+-GaN(20nm)/n-GaN Layers Grown on GaN Substrates**  
Kentarou Hayashi, Hiroshi Ohta, Tohru Nakamura and Tomoyoshi Mishima (Hosei University)
- PB-03 (p.52) Optical absorption properties of Ni<sub>1-x</sub>Mg<sub>x</sub>O thin films**  
Kazutoshi Kinoshita, Tomohiko Nishida, Shoso Shingubara, Mitsuru Inada and Tadashi Saitoh (Kansai University)
- PB-04 (p.54) High Breakdown Voltage Vertical GaN p-n Junction Diodes Using Guard Ring Structures**  
Hiroshi Ohta, Kentaro Hayashi, Tohru Nakamura and Tomoyoshi Mishima  
(Hosei University)
- PB-05 (p.56) Thermal Analysis of Pulsed LED Lighting in Plant Factory**  
Kazuki Ata, Mitsuhiro Urano and Akira Takahashi  
(National Institute of Technology, Nara College)
- PB-06 (p.58) Protonation-Induced Change on Optical, Electrical, and Structural Properties of Epitaxial WO<sub>3</sub> Films**  
Wataru Kuwagata<sup>1</sup>, Hiroki Mito<sup>1</sup>, Satoshi Murakami<sup>1</sup>, Kazuto Koike<sup>1</sup>, Yoshiyuki Harada<sup>1</sup>, Shigehiko Sasa<sup>1</sup>, Mitsuaki Yano<sup>1</sup>, Shintaro Kobayashi<sup>2</sup> and Katsuhiko Inaba<sup>2</sup>  
(<sup>1</sup>Osaka Institute of Technology, <sup>2</sup>Rigaku Corporation)

**PC-01 (p.60) Nanostructure Fabrication through a Microwire of Local Anodization**

Takahiro Fukumoto, Yasuo Kimura, Masataka Moriya, Yoshinao Mizugaki, Toshiro Ogino, Daisuke Tadaki, Ma Teng, Ayumi Hirano-Iwata and Michio Niwano  
(CREST)

**PC-02 (p.62) Cross-Point Device using In-Ga-Zn-O Semiconductor for Synapse Element in Neural Network**

Ryo Tanaka, Yuki Koga, Keisuke Ikushima, Kenta Umeda, Toshimasa Hori, Tomoharu Yokoyama, Koki Watada, Daiki Yamakawa, Mutsumi Kimura and Tokiyoshi Matsuda  
(Ryukoku University)

**PC-03 (p.64) Creation and study of memristors based on  $\text{CuCl}_2$**

Roman Rozanov, Konstantin Tsarik, Anna Volkova and Vladimir Nevolin  
(National Research University of Electronic Technology, Russia)

**PC-04 (p.66) Effects of He plasma treatment on zinc oxide thin film transistors**

Shotaro Shinya, Toyokazu Kaneko, Masatoshi Koyama, Toshihiko Maemoto and Shigehiko Sasa  
(Osaka Institute of Technology)

**PC-05 (p.68) Room-Temperature Forming of Ga-Sn-O Film for Thin-Film Transistors**

Ryo Takagi, Kenta Umeda, Mutsumi Kimura and Tokiyoshi Matsuda  
(Ryukoku University)

**PC-06 (p.70) Multilevel resistance switching phenomena observed in the Cu (Ti)/ $\text{HfO}_2$ /Au device**

Hayato Yoshida, Tomohiro Shimizu, Takeshi Ito, and Shoso Shingubara  
(Kansai University)

**PC-07 (p.72) Planar Device using In-Ga-Zn-O Semiconductor for Synapse Element in Neural Network**

Daiki Yamakawa, Yuki Koga, Keisuke Ikushima, Kenta Umeda, Toshimasa Hori, Tomoharu Yokoyama, Koki Watada, Ryo Tanaka, Mutsumi Kimura and Tokiyoshi Matsuda  
(Ryukoku University)

**PC-08 (p.74) Characteristic Evaluation of Ga-Sn-O Films deposited using Mist Chemical Vapor Deposition**

Ryugo Okamoto, Hiroki Fukushima, Mutsumi Kimura and Tokiyoshi Matsuda  
(Ryukoku University)

**PC-09 (p.76) Magnetoresistance Effect of Ga-Sn-O Film deposited using Mist Chemical Vapor Deposition**

Ryuki Nomura, Asuka Fukawa, Kota Imanishi, Hiroki Fukushima, Ryugo Okamoto, Mutsumi Kimura and Tokiyoshi Matsuda  
(Ryukoku University)

**PC-10 (p.78) A Fast Microwave Correlated Imaging Method Based on Strip Division in Large Scenes**

Yuanyue Guo, Jie Deng and Dongjin Wang  
(USTC, China)

6/30 .....

## Session B (Compound Devices)

Chairs: Masaaki Kuzuhara / Hiroyuki Sakai

**9:30-10:10 – Invited –**

**C-1 (p.82) MEMS Mirrors for automotive applications**

Toshiyuki Tsuchiya  
(Kyoto University)

**Short Break (10:10-10:20)**

**10:20-11:00 – Invited –**

**B-1 (p.84) Recent Topics of Vertical GaN Power Devices**

Tohru Oka  
(TOYODA GOSEI)

**11:00-11:40 – Invited –**

**B-2 (p.86) Characterization of lightly-doped n- and p-type homoepitaxial GaN on free-standing substrates**

Masahiro Horita<sup>1</sup> and Jun Suda<sup>2</sup>  
(<sup>1</sup>Kyoto University, <sup>2</sup>Nagoya University)

**11:40-12:00**

**B-3 (p.88) Effect of Reverse Bias Annealing on the Properties of AlGaIn/GaN MIS-HEMTs with Recessed-gate Structure**

Wataru Gamachi, Koutarou Ishii, Joel Asubar, Hirokuni Tokuda and  
Masaaki Kuzuhara  
(University of Fukui)

**Lunch (12:00-13:00)**

**13:00-13:20**

**B-4 (p.90) Investigation of Thermal Runaway of Reverse-Biased Silicon Carbide Schottky Barrier Diode**

Minoru Nakagawa, Seigo Mori, Yuichiro Nanen, Masatoshi Aketa,  
Hirokazu Asahara and Takashi Nakamura  
(ROHM)

**13:20-13:40**

**B-5 (p.92) Reduced Current Collapse in Multi-Fingered AlGaIn/GaN MOS-HEMTs with Dual Field Plate**

Ryota Yamaguchi, Yudai Suzuki, Joel Asubar, Hirokuni Tokuda and  
Masaaki Kuzuhara  
(University of Fukui)

**13:40-14:00**

**B-6 (p.94) Characterization of AlGaIn/GaN HEMTs with Directly Regrown AlGaIn Barrier Layer**

Keito Kanatani, Satoshi Yoshida, Akio Yamamoto and Masaaki  
Kuzuhara  
(University of Fukui)

**14:00-14:20**

**B-7 (p.96) Comparison of Ni/Au and Pd/Au Ohmic Contacts to p-GaN**

Masataka Sasada, Aki Sasakura, Norifumi Takashima, Hirokuni  
Tokuda and Masaaki Kuzuhara  
(University of Fukui)

**Short Break (14:20-14:30)**



## Session C (Emerging Devices)

Chairs: Minoru Noda / Mutsumi Kimura

**14:30-15:10 – Invited –**

**C-2 (p.100) Wearable, Healthcare Sensor Sheets**

Kuniharu Takei  
(Osaka Prefecture University)

**15:10-15:30**

**C-3 (p.102) A Novel SAW Resonator with Incredible High-Performances**

Hideki Iwamoto, Tsutomu Takai, Yuichi Takamine, Masahiro Hiramoto and Masayoshi Koshino  
(Murata)

**Short Break (15:30-15:40)**

**15:40-16:00**

**C-4 (p.104) Hall Effect in Thin-Film Transistor - Sensitivity Dependence on Applied Voltage -**

Takaaki Matsumoto<sup>1</sup>, Akito Yoshikawa<sup>1</sup>, Tokiyoshi Matsuda<sup>1</sup>,  
Mutsumi Kimura<sup>1</sup>, Tokuro Ozawa<sup>2</sup>, Koji Aoki<sup>2</sup> and Chih-Che Kuo<sup>2</sup>  
(<sup>1</sup>Ryukoku University, <sup>2</sup>AU Optronics Corporation )

**16:00-16:20**

**C-5 (p.106) MEMS based fabrication of conformal electrode pairs for thermotunneling cooling**

Amit Banerjee, Yoshikazu Hirai, Toshiyuki Tsuchiya and Osamu Tabata  
(Kyoto University)

**16:20-16:40**

**C-6 (p.108) Sensitivity of piezoelectric MEMS ultrasonic sensors using sol-gel PZT films prepared through various pyrolysis temperatures**

Shota Nakajima, Jo Shiomi, Kaoru Yamashita and Minoru Noda  
(Kyoto Institute of Technology)

**Short Break (16:40-16:50)**

## **Poster Viewing Session**

**16:50-18:00** at Poster Room

## **Closing**

**18:00-18:20** Award and Closing: Mutsumi Kimura (Ryukoku University)