



RIEC

Research Institute of Electrical Communication
Tohoku University

**The Joint Symposium of
7th International Symposium
on Medical, Bio- and Nano-Electronics,
4th International Workshop
on Nanostructures & Nanoelectronics,
and
JSPS Core-to-Core Program Joint Seminar
"Atomically Controlled Processing for
Ultralarge Scale Integration"**

March 7-8, 2013

**Research Institute of Electrical Communication
Tohoku University**

Co-sponsored by

**Grant for Excellent Graduate Schools, MEXT, Japan,
and JSPS Core-to-Core Program**

**The Joint Symposium of
7th International Symposium on Medical, Bio- and Nano-Electronics,
4th International Workshop on Nanostructures & Nanoelectronics,
and
JSPS Core-to-Core Program Joint Seminar "Atomically Controlled
Processing for Ultralarge Scale Integration"**

March 7-8, 2013

**Site: Laboratory for Nanoelectronics and Spintronics,
Research Institute of Electrical Communication,
Tohoku University**

Organizer:

Symposium Co-Chairs

Michio Niwano, Tohoku Univ.

Masashi Sahashi, Tohoku Univ.

Program Committee

Tatsuo Yoshinobu, Tohoku Univ.,

Yasuo Kimura, Tohoku Univ.,

Masao Sakuraba, Tohoku Univ.

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Organizing Committee

Yasuo Kimura, Tohoku Univ.,

Masao Sakuraba, Tohoku Univ.,

Junichi Murota, Tohoku Univ.

Program

March 7 (Thursday)

Room: 4F, Room A401, *Laboratory for Nanoelectronics and Spintronics*

- 13:00~13:05 Opening Remarks
Michio Niwano (Tohoku University, Japan)
- (Chair: Yasuo Kimura)
- 13:05 ~13:50 TiO₂ nanotubes (and similar): An overview and update on recent advancements and applications
Patrik Schmuki (University of Erlangen Nuremberg, Germany)
- 13:50~14:10 Diverse Applications of Nanostructured Silicon
Nobuyoshi Koshida (Tokyo University of Agriculture and Technology, Japan)
- 14:10~14:30 In situ observation of N719 dye on TiO₂ in dye-sensitized solar cells
Fumihiko Hirose (Yamagata University, Japan)
- 14:30~14:45 Coffee break
- (Chair: Masashi Sahashi)
- 14:45~15:05 Biomedical Application of Phase-Change Nano-Droplets
Kenichi Kawabata (Central Research Laboratory, Hitachi, Ltd., Japan)
- 15:05~15:35 Magnetic “Lab-on-a-chip”
B. Sinha, J.I. Lim, S.J. Oh, S.Y. Yoo, K.W. Kim, A. Mohamed, and CheolGi Kim
(Center for NanoBio Engineering & SpinTronics, Chungnam National University, Korea)
- 15:35~15:55 Study on medical-bio application of spin torque oscillator
Masashi Sahashi¹, Kousaku Miyake¹, Yohei Shiokawa¹, Yoshihito Okutomi¹, Yuki Kozono¹, Tetsuya Nakamura¹, Hiroshi Tsukahara², and Hiroshi Imamura²
(¹Tohoku University, Japan, ²National Institute of Advanced Industrial Science and Technology (AIST), Japan)
- 15:55~16:25 Magnetic thin films with perpendicular magnetic anisotropy for magnetic tunnel junctions
Young Keun Kim, Do Kyun Kim, Ki Ha Kim (Department of Materials Science and Engineering, Korea University, Korea)
- 16:25~16:40 Coffee break

(Chair: Masao Sakuraba)

- 16:40~17:10 Nanotechnology Research and Innovation at Albany NanoTech Complex - On
Worldwide Collaboration for Research and Fabrication -
Makoto Hirayama (College of Nanoscale Science and Engineering, State
University of New York, USA)
- 17:10~17:30 DLTS Evaluation of GeNX/Ge Structures Fabricated by ECR-Plasma Techniques
H. Okamoto¹, H. Narita¹, T. Iwasaki¹, T. Ono¹, Y. Fukuda², Y. Otani², H. Toyota³,
M. Sakuraba⁴, J. Murota⁴ and M. Niwano⁴ (¹Hirosaki University, Japan, ²Tokyo
University of Science, Suwa, Japan, ³Hiroshima Institute of Technology, Japan,
⁴Tohoku University, Japan)

March 8 (Friday)

Room: 4F, Conference Room, *Laboratory for Nanoelectronics and Spintronics*

(Chair: Ko-ichiro Miyamoto)

- 9:00~ 9:20 Fabrication and structure modulation of high-aspect-ratio porous GaAs through anisotropic chemical etching, anodic etching, and anodic oxidation
Sachiko Ono, Shunsuke Kotaka, and Hidetaka Asoh (Kogakuin University, Japan)
- 9:20~9:40 Graphene on Sapphire and its Application to Biosubstrates
Toshio Ogino and Kenji Yamazaki (Yokohama National University, Japan)
- 9:40~10:00 Plasmonic Metal Nanostructures for Photoelectrochemical Applications
Tetsu Tatsuma (University of Tokyo, Japan)
- 10:00~10:20 Electrochemical deposition of gold nanoparticles on TiO₂ surfaces
Yasuo Kimura (Tohoku University, Japan)
- 10:20~10:35 Coffee break

(Chair: Tatsuo Yoshinobu)

- 10:35~10:55 Micropatterned neuronal network in culture as a model system of CNS local circuit
Hideaki Yamamoto¹, Takashi Tani², Shun Nakamura¹ (¹Tokyo University of Agriculture and Technology, Japan, ²Waseda University, Japan)
- 10:55~11:25 Chip-based (bio-)chemical sensors for biopolymer testing and bioprocess monitoring
M. Bäcker^{1,2}, S. Schusser^{1,2}, M. Leinhos^{1,2}, A. Poghossian^{1,2}, P. Wagner³, M. J. Schöning^{1,2} (¹Institute of Nano- and Biotechnologies (INB), FH Aachen, Germany, ²Peter Grünberg Institute (PGI-8), Forschungszentrum Jülich GmbH, Germany, ³Institute for Materials Research (IMO), Hasselt University, Belgium)
- 11:25~13:00 Lunch
- 13:00~14:30 Poster session

(Chair: Toshiro Kaneko)

- 14:30~14:50 Gas-Liquid Interfacial Plasmas for Gene Transfer System
Toshiro Kaneko, Shota Sasaki, Hideaki Konishi, Makoto Kanzaki, and Toshiaki Kato (Tohoku University, Japan)
- 14:50~15:20 Optical Fiber Based Plasma Endoscopes for Bio-Medical Applications
Sung-O Kim (Center for Optical Materials Science and Engineering Technologies (COMSET), Clemson University, USA)

- 15:20~15:50 Cold atmospheric plasma for biomedical applications
Tetsuji Shimizu¹, Georg Isbary², Julia L. Zimmermann¹, Wilhelm Stolz², Gregor E. Morfill¹ (¹Max-Planck Institute for extraterrestrial physics, Germany, ²Department of Dermatology, Allergology and Environmental Medicine, Hospital Munich Schwabing, Germany)
- 15:50~16:10 Bubble Cloud Generation in Tissue Mimicking Gel by Second-harmonic Superimposed Ultrasound
S. Yoshizawa¹, J. Yasuda¹, A. Asai¹ and S. Umemura² (¹Department of Electrical and Communication Engineering, Tohoku University, Japan, ²Department of Biomedical Engineering, Tohoku University, Japan)
- 16:10~16:25 Coffee break
- (Chair: Masao Sakuraba)
- 16:25~16:55 Silicon-Germanium-Tin buffer layers through Pulsed Laser Induced Epitaxy
Stefano Chiussi, Stefan Stefanov, Jorge Carlos Conde, Julia Serra and Pío González (Dpto. Física Aplicada, E.E.I., Univ. de Vigo, Spain)
- 16:55~17:25 Group-IV-based molecular beam heteroepitaxy for optoelectronic device applications
Joerg Schulze, Inga Fischer, Martin Gollhofer, Daniel Haehnel, Mathias Kaschel, Michael Oehme, Filipe Oliveira and Marc Schmid (Institute for Semiconductor Engineering (IHT), University of Stuttgart, Germany)
- 17:25~17:30 Closing remarks
Masashi Sahashi (Tohoku University, Japan)

Poster Presentations

- [P1] The role of correlated inhibitory firing
I. Sakurai, S. Kubota, and M. Niwano
- [P2] Development of Organic Hydrogen Gas Sensor with Piezoelectric Poly(vinylidene fluoride) Film
Y. Imai, D. Tadaki, S. Iino, T. Nakayama, Y. Kimura, M. Niwano
- [P3] Effect of Slow Cooling on Characteristics of OFETs using P3HT
S. Iino, D. Tadaki, T. Ma, J. Zhang, Y. Kimura, M. Niwano
- [P4] Self-Organized Anodic Nanochannel Oxide Architectures: Growth in Glycerol/Phosphate Electrolyte and Example of Applications
K. Lee and P. Schmuki
- [P5] Effect of Hydrogen Treatment on Characteristics of Titanium Oxide Nanotube Micro Hydrogen Gas Sensor
T. Tobe, R. Kojima, Y. Kimura and M. Niwano
- [P6] Bilayer Reconstitution of Human *ether-a-go-go* Related Gene Channels using a Microfabricated Silicon Chip
A. Oshima, A. Hirano-Iwata, Y. Ishinari, Y. Kimura and M. Niwano
- [P7] Viscoelastic Properties of Artificial Skin Estimated from Micro-displacement Induced by Acoustic Radiation Force
R. Nagaoka, K. Kobayashi, Y. Saijo
- [P8] Development of Two-dimensional Blood Velocity Estimation Method and its Validation by Phase Contrast Magnetic Resonance Angiography
T. Kojima, A. Ohmori, H. Nakajima, T. Kameyama and Y. Saijo
- [P9] Measurement and Analysis of Propagation of Myocardial Contraction Caused by Electrical Stimulation Using Myocardium of Rat
Y. Fujita, H. Tagashira, H. Hasegawa, K. Fukunaga, H. Kanai
- [P10] Measurement of Shear Modules of Phantom Mimicking Soft Tissue Using Acoustic Radiation Pressure Generated by Continuous Wave Ultrasound
K. Tachi, H. Hasegawa, H. Kanai
- [P11] Cavitation Generation Region Subjected to Nonlinear Pressure Field by Second-harmonic Superimposed Ultrasound
J. Yasuda, A. Asai, S. Yoshizawa and S. Umemura
- [P12] In-plane Angular Dependence of Magnetic Property Originated from (1-102) Plane of Cr₂O₃
Y. Sato, N. Shimomura, T. Ashida, T. Nozaki, and M. Sahashi
- [P13] Electron Conduction Scheme at Nano-Sized Contact in NCMR Device with Conductive-AFM
Y. Shiokawa, K. Kishi, H. Watanabe, M. Sahashi

- [P14] Deposition of Wurtzite ZnO Thin Films on Co₃ Pt Buffer Layers by MBE Method toward Realization of ZnO based MTJs
M. Belmoubarik, T. Nozaki, H. Endo and M. Sahashi
- [P15] Investigation of Pt/Co Nano-Contacts with AlO_x Nano-Oxide Layer
M. Al-Mahdawi, M. Sahashi
- [P16] Interface Effect on Perpendicular Magnetic Anisotropy of Co₃Pt
M. Oida, T. Ashida, T. Nozaki, and M. Sahashi
- [P17] Composition Dependence of Low-Temperature Excess Heat Capacity in Oxide Glass
K. Nakamura, Y. Takahashi, R. Ihara, T. Fujiwara
- [P18] Thermoelectric Properties of B and Sb co-doped Mg₂Si
M. Kubouchi, K. Hayashi, Y. Miyazaki
- [P19] High-frame-rate pH Imaging of Liquid Flow in a Microchannel
A. Itabashi, K. Miyamoto, T. Wagner and T. Yoshinobu
- [P20] Measurement of Small pH Changes by a Semiconductor-based Chemical Sensor
A. Sakamoto, K. Miyamoto, T. Wagner and T. Yoshinobu
- [P21] Modeling and Simulation of the Light-Addressable Potentiometric Sensor for High-Resolution and High-Speed Chemical Imaging
Y. Guo, T. Wagner, K. Miyamoto and T. Yoshinobu