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2012 Silicon Nanoelectronics Workshop

June 9-10, 2013
Rihga Royal Hotel Kyoto, Kyoto, Japan

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Sunday, June 9, 2013

10:50 Break

Session 2: Ge Channel MOSFET

11:15 2-1 Effectiveness of Quasi-Confinement Technology for Improving P-Channel Si and Ge MOSFET Performance, Nuo Xu[1], Marek Hytha[2], Hideki Takeuchi[2], Xiangyang Huang[2], Robert J. Stephenson[2], Nattapol Damrongplasit[1], Nyles Cody[2], Robert J. Mears[2], Tsu-Jae King Liu[1] ([1]UC Berkeley, [2]2Mears Technologies)

11:35 2-2 Ultrathin EOT and High Mobility Ge pMOSFETs by in-situ H_2O Plasma Grown GeO_2 and HfON Gate Dielectric, Li-Jung Liu, Kuei-Shu Chang-Liao, Chung-Hao Fu, Ting-Ching Chen, Chen-Chien Li, Jen-Wei Cheng, Chun-Chang Lu, Tzu-Min Lee, Li-Ting Chen, Shih-Han Yi, Sheng-Kai Chen, Tien-Ko Wang (National Tsing Hua University)

11:55 2-3 Ultra-thin GeO2 Formation by Oxygen Radicals (O*) for Advanced Ge Gate Stacks - Reaction kinetics, film quality and MIS characteristics -, W. J. Song, W. F. Zhang, C. H. Lee, T. Nishimura, and A. Toriumi (University of Tokyo)

12:05 Lunch

Session 3: Nanoscale FETs: Small & Low Power

13:30 3-1 (Invited) MOSFET Scaling to 3-nm-Long and 1-nm-Thick Channel, Shinji Migita, Yukinori Morita, Meishoku Masahara, and Hiroyuki Ota (AIST)

14:00 3-2 Experimental Determination of the Ballistic Transport Parameters in Nanoscale Trigate CMOS Devices, T. C. Lin[1], E. R. Hsieh[1], Steve S. Chung[1], C. H. Tsai[2], R. M. Huang[2], and C. T. Tsai[2] ([1]National Chiao Tung University, [2]United Microelectronics Corporation)

14:20 3-3 Impact of Drain-Induced Barrier Lowering on Ultra-Low Supply Voltage CMOS Circuits Operating in Subthreshold Region, Seung-Min Jung, Tomoko Mizutani, and Toshiro Hiramoto (University of Tokyo)

14:40 3-4 Evaluation of Interface State Density of Strained-Si MOS Interfaces by Conductance Method, W.-L. Cai, M. Takenaka and S. Takagi (University of Tokyo)

15:00 Break

Session 4: Nanoscale FETs: Device Model & Valiability

15:15 4-1 (Invited) Graphene and Beyond-Graphene 2D-Crystals for Green Electronics, Kaustav Banerjee (UCSB)

15:45 4-2 Reduced Cell Current Variability in Fully Depleted Silicon-on-Thin-BOX (SOTB) SRAM Cells at Supply Voltage of 0.4V, T. Mizutani[1], Y. Yamamoto[2], H. Makiyama[2], H. Shinohara[2], T. Iwamatsu[2], H. Oda[2], N. Sugii[2], and T Hiramoto[1] ([1]University of Tokyo, [2]LEAP)

16:05 4-3 SRAM Cell Stability Parameter: Noise Margin or Vmin?, Anil Kumar[1], Takuya Saraya[1], Shinji Miyano[2], and Toshiro Hiramoto[1] ([1]University of Tokyo, [2]STARC)

16:25 4-2 Variability and Recovery Behaviors of |Vth| Shift of pFETs by High-Voltage OFF-State and ON-State Stress for Post-Fabrication SRAM Cell Stability Self-Improvement, Nurul Ezaila Alias[1], Anil Kumar[1], Takuya Saraya[1], Shinji Miyano[2], and Toshiro Hiramoto[1] ([1]University of Tokyo, [2]STARC)

Session 5: Posters

16:45-18:30 Starting with Short Oral Presentation

5-1 Exploring the Size Limit of RRAM Cross Point Array: Optimization of Device Characteristics and Bias Schemes, Yexin Deng, Peng Huang, Bing Chen, Bin Gao, Xiaoyan Liu, Jinfeng Kang (Peking University)

5-2 Improved uniformity of HfOx based resistive switching device by inserting AlOx near TiN top electrode, Y. Hou, B. Chen, B. Gao, L. F. Liu, D. D. Han*, Y. Wang, X. Y. Liu, J. F. Kang, X. Zhang (Peking University)

5-3 Modeling of Unipolar Resistive Switching of Pt/TiO2/Pt Capacitor, Yusuke Kondo and Yasuhisa Omura (Kansai University)

5-4 Investigation of Three Dimensional NAND Flash Memory Based on Gate Stacked ARray (GSTAR), Do-Bin Kim, Yoon Kim, Se Hwan Park, Wandong Kim, Joo Yun Seo, Seung-Hyun Kim, and Byung-Gook Park (Seoul National University)

5-5 High Speed and Good Retention of Ω-Gate P-channel Twin Poly-Si Thin Film Transistors EEPROM, Mu-Shih Yeh*, Kuan-Cheng Liu, Min-Feng Hung, and Yung-Chun Wu (National Tsing Hua University)

5-6 Comparison of High-Temperature Performance between Junctionless and Conventional Poly-Si Thin-Film Transistors, Nan-Heng Lu[1], Yung-Chun Wu[1], Hung-Bin Chen[2], Ya-Chi Cheng[1], Jun-Ji Su[1] and Ming-Hung Han[2] ([1]National Tsing Hua University, [2]National Chiao-Tung University)

5-7 Performance of p-Type Junctionless Poly-Si Thin-Film Transistors with Raised S/D, Jun-Ji Su[1], Ya-Chi Cheng[1], Nan-Heng Lu[1], Yung-Chun Wu[1], and Hung-Bin Chen[2] ([1]National Tsing Hua University, [2]National Chiao-Tung University)

Monday, June 10, 2013

Session 6: Nano Wire FETs & Formation

8:30 6-1 (Invited) III-V nanowire channels on Si: vertical FET applications, Katsuhiro Tomioka and Takashi Fukui (Hokkaido University)

9:00 6-2 Vertically grown germanium nanowire diodes on silicon and germanium substrates, Nishant Chandra[1], Clarence J. Tracy[1], Stephen M. Goodnick[1], Jeong-Hyun Cho[2], S. Tom Picraux[3] ([1]Arizona State University, [2]University of Minnesota, [3]Los Alamos National Laboratory)

9:20 6-3 Anisotropy in Surface Self-Diffusion on Si Nanowires and Its Impact on Wire Instability in Hydrogen Annealing, Naoya Moriokaa, Jun Suda, and Tsunenobu Kimoto (Kyoto University)

9:40 6-4 Modeling Surface-Roughness-Induced Scattering in Non-Planar Silicon Nanostructures, Z. Stanojevi´c and H. Kosina (TU Wien)

10:00 Break

Session 7: Single-Electron & Dopant Phenomena

10:15 7-1 The coupled atom transistor: a first realization with shallow donors implanted in a trigate silicon nanowire, B. Voisin[1], B. Roche[1], E. Dupont-Ferrier[1], B. Sklénard[2,3], M. Cobian[4], X. Jehl[1], O. Cueto[2], R. Wacquez[2], M. Vinet[2], Y-M. Niquet[4], S. De Franceschi[1] and M. Sanquer[1] ([1]CEA-INAC-SPSMS, [2]CEA-LETI Minatec, [3]STMicroelectronics, and [4]CEA-INAC-SP2M)

10:35 7-2 Fabrication and characterisation of down-scaled multi-configuration Silicon quantum dot devices, Y. P. Lin[1], J. I. Perez-Barraza[2], M. K. Husain[1], F. M. Alkhalil[1], Y. Tsuchiya[1], N. Lambert[2], D. A. Williams[3], A. J. Ferguson[2], H. M. H. Chong[1] and H. Mizuta[1,4] ([1]University of Southampton, [2]Cavendish Laboratory, [3]Hitachi Cambridge Laboratory, [4]JAIST)

10:55 7-3 Double-dot Si single-electron transistor with tunable coupling capacitive by the number of electrons in the dot, Takafumi Uchida[1], Hiroto Takenaka[1], Isamu Yoshioka[1], Masashi Arita[1], Akira Fujiwara[2], and Yasuo Takahashi[1] ([1]Hokkaido University, [2]NTT Basic Research Laboratories)

11:15 7-4 Electrical characteristics of donor-induced quantum dots formed in nanoscale selectively-doped SOI-FETs, D. Moraru, A. Samanta, Y. Kuzuya, T. Nagasaka, T. Mizuno, and M. Tabe (Shizuoka University)

11:35 7-5 Dopant-Induced Random Telegraph Signal in Nanoscale pn and pin Junctions, Sri Purwiyanti[1,2], Roland Nowak[1,3], Daniel Moraru[1], Takeshi Mizuno[1], Ryszard Jablonski[3], Djoko Hartanto[3], and Michiharu Tabe[1] ([1]Shizuoka University, [3]Universitas Indonesia, [3]Warsaw Univ. of Technology)

11:55 Lunch

Session 8: Emerging Devices

13:30 8-1 (Invited): H. Sunamura, K. Kaneko, N. Inoue, N. Furutake, S. Saito, M. Narihiro, N. Ikarashi, J. Kawahara, M. Hane, and Y. Hayashi (Renesas Electronics)

14:00 8-2 Shape-Engineered Antenna-Coupled Thermocouples for Infrared Detection, Gergo P. Szakmany[1], Clemens Preiss[2], Alexei O. Orlov[1], Gary H. Bernstein[1], and Wolfgang Porod[1] ([1]University of Notre Dame, [2]University of the German Federal Armed Forces Munich.)

14:20 8-3 Refractive Index Measurement by SOI Photodiode with Gold Surface Plasmon, Antenna, Hiroaki Satoh, Shohei Iwata, Ken Kawakubo, Atsushi Ono, and Hiroshi Inokawa (Shizuoka University)

14:40 8-4 Direct helium ion milling technology: towards the fabrication of extremely down-scaled graphene nanodevices, Shuojin Hang[1], Zakaria Moktadir[1], Nima Khalor[1], Shinichi Saito[1] and Hiroshi Mizuta[1,2] ([1]University of Southampton, [2]JAIST)

15:00 8-5 Integrate-and-Fire Neuron CMOS Circuit with a Multi-input Floating body MOSFET, Min-Woo Kwon, Hyungjin Kim, Jungjin Park, Jong-Ho Lee, Hyungcheol Shin, and Byung-Gook Park (Seoul National University)

15:20 8-6 Sustained Nano-Mechanical Oscillation of a Resonant-Body Transistor by Frequency-Modulated Heterodyne Phase-Locked-Loop, S.T. Bartsch, A. Rusu, A.M. Ionescu (Swiss Federal Institute of Technology EPFL)

15:40 Break

Session 9: Rump Session

15:55-17:00

Subject: BEOL Devices and New Applications

Moderator: Toshitsugu Sakamoto (LEAP)

Panelists: