

Preliminary Program
(March 16, 2023)

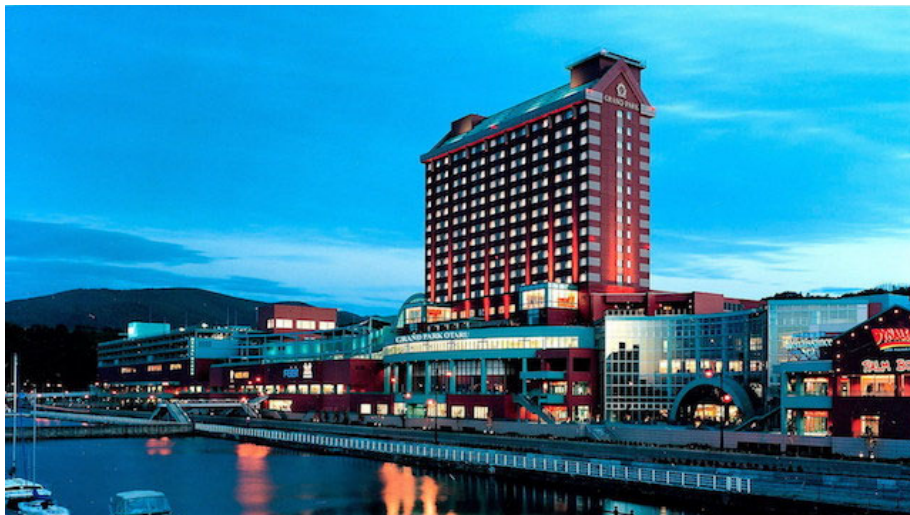
2023 International Conference on
Semiconductor Technology for Ultra Large
Scale Integrated Circuits and Thin Film
Transistors (ULSIC VS TFT 8)

May 14-18, 2023

Grand Park Hotel
Otaru (Sapporo), Japan

Conference Chairs

Yue Kuo
Texas A&M University, USA



Engineering Conferences International
369 Lexington Avenue, 3rd Floor #389 - New York, NY 10017, USA
www.engconfintl.org – info@engconfintl.org

Sunday, May 14, 2023

17:30 – 19:00	Conference Check-in
19:00 – 20:30	Welcome Reception and Dinner (Ryusei Room)
20:30 – 21:30	Free communication

Locations and Notes

- Technical Sessions will be in Jukai room

Monday, May 15, 2023

- 06:30 – 08:00 **Breakfast** (Terrace Brasserie Restaurant)
- 08:00 – 08:05 **Open remark**
Yue Kuo, Texas A&M University
- Session: General Topics**
Chair: Yue Kuo, Texas A&M University
- 08:05 – 08:30 **Invited**
Challenge to next-generation VLSI with VFET using oxide semiconductor and 3D structure
Shunpei Yamazaki, Semiconductor Energy Laboratory Co., Ltd
- 08:30 – 08:55 **Invited**
ULSI and TFT technologies joint forces to meet the future challenges of a pervasive digital society
Olivier Bonnaud, University of Rennes
- Session: Semiconductor Materials**
Chairs: Kenji Nomura, University of California San Diego
 Laurie E. Calvet, LPICM, CNRS-Ecole Polytechnique
 Shinji, Migita, AIST
- 08:55 – 09:20 **Invited**
Atomic-order surface reaction of reactant gas on group IV semiconductor (100) surface
Junichi Murota, Tohoku University
- 09:20 – 09:45 **Invited**
Formation and luminescence studies of Ge/Si core-shell quantum dots
Seiichi Miyazaki, Katsunori Makihara, Yuki Imai, Nagoya University
- 09:45 – 10:10 **Invited**
Epitaxy and heterostructure of germanium tin-related group-IV alloy semiconductors for future electronic and optoelectronic applications
Osamu Nakatsuka, Masashi Kurosawa, Shigehisa Shibayama, Mitsuo Sakashita, Nagoya University
- 10:10 – 10:40 Coffee Break
- 10:40 – 11:00 **Crystallinity of In-Ga-Zn-oxide (IGZO) in CAAC-IGZO vertical FET**
Tomonori Nakayama, Yukinori Shima, Toshikazu Ono, Nao Sorida, Naoki Okuno, Hitoshi Kunitake, Shunpei Yamazaki, Semiconductor Energy Laboratory Co., Ltd.

Monday, May 15, 2023 (continued)

- 11:00 – 11:20 **Spinel, an overlooked crystalline phase of Igzo**
Hendrik F.W. Dekkers, Akhilesh Kumar Mandal, Evangelos Aggiannis, Adrian Vaisman, Chasin Romain Delhougne, Attilio Belmonte, Gouri Sankar Kar, Interuniversity Microelectronics Centre (imec)
- Session: P-channel Oxide Materials for TFTs**
Chair: Olivier Bonnaud, University of Rennes
- 11:20 – 11:45 **Invited**
Progress of p-channel oxide-TFT development and how we improve the performances
Kenji Nomura, University of California San Diego
- 11:45 – 12:10 **Invited**
P-channel metal oxide thin film transistors for flexible CMOS logic: Challenges and opportunities
Andrew Flewitt, Kham Niang, Daisy Gomersall, Jake Meeth, Niels van Fraassen, Sanggil Han, University of Cambridge; James Parish, Andrew Johnson, University of Bath
- 12:10 – 12:35 **Invited**
Developing high-performance p-channel TFTs: From emerging semiconductors to amorphous
Ao Liu, Huihui Zhu, Northwestern University; Yong-Young Noh, POSTECH
- 12:35 – 14:00 Lunch (Ryusei Room)
- Session: Dielectrics**
Chairs: Cheol Seong Hwang, Seoul National University
 Junichi Murota, Tohoku University
- 14:00 – 14:25 **Invited**
What can we do with ferroelectric gate?
Eisuke Tokumitsu, Japan Advanced Institute of Science and Technology
- 14:25 – 14:50 **Invited**
Material challenges in HfO₂-based ferroelectric memory devices
Min Hyuk Park, Seoul National University
- 14:50 – 15:15 **Invited**
Ferroelectric phase transformation accelerated in nanolaminate HfO₂-ZrO₂ thin films
Shinji Migita, The National Institute of Advanced Industrial Science and Technology (AIST)
- 15:15 – 15:45 Coffee Break
- 15:45 – 16:10 **Invited**
Development of high-performance halide perovskite transistors
Yong-Young Noh, POSTECH

Monday, May 15, 2023 (continued)

- 16:10 – 16:35 **Invited**
Ternary amorphous oxide semiconductor material toward 3D-integrated ferroelectric devices
Takanori Takahashi, Mutsunori Uenuma, Nara Institute of Science and Technology; Masaharu Kobayashi, University of Tokyo; Yukiharu Uraoka, Nara Institute of Science and Technology
- 16:35 – 17:00 **Invited**
Microfabrication of BiTeSb thermoelectric devices for applications to IoT sensors
Takahito Ono, Nguyen Van Toan, Trung Thi Kim Tuoï, Tohoku University
- 17:00 – 18:30 Free Communication
- 18:30 – 20:30 Dinner (Ryusei Room)
- 20:30 – 21:30 Panel Discussion: Challenges in TFT Materials

Tuesday, May 16, 2023

- 06:30 – 08:00 **Breakfast** (Terrace Brasserie Restaurant)
- Session: Devices and Circuits I**
Chairs: Shunpei Yamazaki, Semiconductor Energy Laboratory
Min Hyuk Park, Seoul National University
Peter Mascher, McMaster University
- 08:00 – 08:25 **Invited**
HfZrO-based ferroelectric capacitors and FETs for ultralow-power signal processing
Shinichi Takagi, Kasidit Toprasertpong, Eishin Nako, Xuan Luo, Mitsuru Takenaka, Ryosho Nakane, The University of Tokyo
- 08:25 – 08:50 **Invited**
Contact effects towards mainstream thin-film transistor applications
Radu A. Sporea, University of Surrey
- 08:50 – 09:15 **Invited**
Latch-up issue between high-voltage circuit domain and low-voltage circuit domain in TFT LCD driver IC fabricated with BCD process
Ming-Dou Ker, Zi-Hong Jiang, National Yang Ming Chiao Tung University
- 09:15 – 09:35 **Invited**
Spiking neuron circuits in ULSIC vs TFT technologies
Laurie E. Calvet, LPICM, CNRS-Ecole Polytechnique; Zonglong Li, Centre de Nanosciences et Nanotechnologies; Benjamin Iniguez, University Rovira i Virgili; Kruno Romanjek, CEA-LITEN
- 09:35 – 10:00 **Electric field thermopower modulation analysis of oxide thin film transistors**
Prashant Ghediya, Hui Yang, Hokkaido University; Yuqiao Zhan, Jiangsu University; Yasutaka Matsuo, Yusaku Magari, Hiromichi Ohta, Hokkaido University
- 10:00 – 10:30 Coffee Break
- 10:30 – 10:55 **Invited**
Sub 10-nm ferroelectric gadolinium-doped HfO₂ capacitors for non-volatile FeRAM
Ahmad Bsiesy, Liliane Alrifai, Evgenii Skopin, Patrice Gonon, Université Grenoble Alpes
- 10:55 – 11:20 **Invited**
TFT circuits for driving sensors and actuators on flat panels
Florian De Roose, Nikolas Papadopoulos, Raf Appeltans, Paul Heremans, Interuniversity Microelectronics Centre (imec)
- 11:20 – 11:45 **Invited**
CMOS inverters and circuits based on oxide thin-film transistors
I-Chun Cheng, Shu-Ming Hsu, Yun-Shiuan Li, Wei-Chen Li, Feng-Yu Tsai, Jian-Zhang Chen, National Taiwan University

Tuesday, May 16, 2023 (continued)

- 11:45 – 12:10 **Device layout dependence of PBTI in back-gated IGZO TFTs**
Pietro Rinaudo, Adrian Chasin, Jacopo Franco, Ben Kaczer, Ingrid de Wolf, Gouri Kar, imec and Katholieke Universiteit Leuven
- 12:10 – 13:10 Lunch (Ryusei Room)
- Session: Devices and Circuits II**
Chairs: Ahmad Bsiesy, Université GrenobleAlpes
 Radu A. Sporea, University of Surrey
 Po-Tsun Liu, National Yang Ming Chiao Tung University
- 13:10 – 13:35 **Invited**
Vertical channel-all-around IGZO FET for low latency, high-density 2T0C 3D DRAM application
Di Geng, Chuanke Chen, Xinlv Duan, Ling Li, Institute of Microelectronics of the Chinese Academy of Sciences
- 13:35 – 14:00 **Invited**
Circuit architecture and pixel array driving methods for AMOLED and Mini/Micro-LED displays
Chih-Lung Lin, National Cheng Kung University
- 14:00 – 14:25 **Invited**
Strategy for threshold voltage reduction of molybdenum disulfide (MoS₂)-based field effect transistor by substitutional tungsten doping
Hwi Yoon, Inkyu Sohn, Yonsei University; Yunyong Nam, Jun Hyung Lim, Samsung Display Co., Ltd.; Seung-min Chung, Hyungjun Kim, Yonsei University
- 14:25 – 14:50 **Invited**
Threshold voltage reduction of MoS₂-based thin film transistor by H₂O-added chemical vapor deposition
Jisang Yoo, Hwi Yoon, Jaehyeok Kim, Yonsei University; Yunyong Nam, Jun Hyung Lim, Samsung Display Co., Ltd.; Seung-min Chung, Jaehyeok. Hyungjun Kim, Yonsei University
- 14:50 – 15:20 Coffee Break
- 15:20 – 15:45 **Invited**
An atomistic understanding of the oxygen vacancies in Pt/TiO₂/Ti resistive random access memory: *Ab initio* study
Jung-Hae Choi, Taeyoung Jeong, Korea Institute of Science and Technology; Cheol Seong Hwang, Seoul National University
- 15:45 – 16:10 **Invited**
Characteristics of oxide TFT using atomic-layer deposited InO_x-based metal oxide channel
Toshihide Nabatame, Riku Kobayashi, Kazuhito Tsukagoshi, National Institute for Materials Science
- 16:10 – 16:30 **Tri-layer self-aligned structure indium gallium zinc oxide thin film transistor with optical synaptic plasticity**
Tsung-Che Chiang, Zhen-Hao Li, Jing-Zhong Deng, Po-Tsun Liu, National Yang Ming Chiao Tung University; Yue Kuo, Texas A&M University

Tuesday, May 16, 2023 (continued)

- 16:30 – 16:55 **Invited**
Ultrathin organic transistors toward next-generation skin electronics
Sunghoon Lee, Tomoyuki Yokota, Takao Someya, The University of Tokyo
- 16:55 – 17:15 **GAP-type low-temperature polycrystalline silicon thin film transistors for light sensing photo-transistor application**
Jo-Lin Chen, Tsung-Che Chiang, Zhen-Hao Li, Yu-Ting Tsai, Po-Tsun Liu, National Yang Ming Chiao Tung University; Yue Kuo, Texas A&M University
- 17:15 – 17:40 **Invited**
ALD of robust amorphous oxide TFTS with turn on at the Boltzmann limit
Rebecca L. Peterson, Christopher R. Allemang, Tonglin L. Newsom, Tae H. Cho, Neil P. Dasgupta, University of Michigan
- 17:40 – 18:10 Free Communication
- 18:10 – 20:10 Dinner (Ryusei Room)
- 20:10 – 21:10 **Poster session**
- 21:10 – 22:10 Panel Discussion: Challenges in TFT Materials

Wednesday, May 17, 2023

- 06:30 – 08:00 **Breakfast** (Terrace Brasserie Restaurant)
- Session: Processes**
 Chairs: Rebecca L. Peterson, University of Michigan
 Chih-Lung Lin, National Cheng Kung University
- 08:00 – 08:25 **Invited**
New development on plasma-based copper etch at room temperature
Yue Kuo, Texas A&M University
- 08:25 – 08:50 **Invited**
Solid-phase crystallization of hydrogen-doped indium oxide for low-temperature processed TFTs
Mamoru Furuta, Kochi University of Technology
- 08:50 – 09:10 **Base pressure controlled fabrication of high-mobility In₂O₃ thin film transistors**
Yusaku Magari, Prashant Ghediya, Hui Yang, Hokkaido University; Yuqiao Zhang, Jiangsu University; Yasutaka Matsuo, Hiromichi Ohta, Hokkaido University
- 09:10 – 09:35 **Invited**
Conquering key issues of solution processed organic thin-film transistor for large scale active-matrix array integration
Xiaojun Guo, Lei Han, Yukun Huang, Xiaokuan Yin, Shanghai Jiao Tong University
- 09:35 – 09:55 **Solution processed ultrawide bandgap insulator to semiconductor conversion of amorphous gallium oxide via fermi level control**
Juan Paolo Bermundo, Nara Institute of Science and Technology; Diki Purnawati, Universitas Gadjah Mada; Paul Rossener Regonia, University of the Philippines Diliman; Kazushi Ikeda, Yukiharu Uraoka, Nara Institute of Science and Technology
- 09:55 – 10:20 **Invited**
Developing low-temperature defect passivation technology with supercritical fluid technology
Po-Hsun Chen, R.O.C. Naval Academy; Ting-Chang Chang, Pei-Yu Wu, Jian-Jie Chen, Chuan-Wei Kuo, Sheng-Yao Chou, Yu-Bo Wang, Hung-Ming Kuo, National Sun Yat-Sen University
- 10:20 – 10:50 Coffee Break
- Session: Novel TFT Applications**
 Chairs: Jin Jang, Kyung Hee University
 Mamoru Furuta, Kochi University of Technology
- 10:50 – 11:15 **Invited**
Optical and mechanical properties of Si-based thin films for photonic applications
Peter Mascher, Brahim Ahammou, Fahmida Azmi, McMaster University; Jean-Pierre Landesman, Christophe Levallois, INSA Rennes

Wednesday, May 17, 2023 (continued)

- 11:15 – 11:40 **Invited**
An overview of the three-dimensionally stacked dynamic random access memory
Cheol Seong Hwang, Seoul National University
- 11:40 – 12:00 **Solid-state electrochemical thermal transistors**
Hiromichi Ohta, Qian Yang, Hai Jun Cho, Zhiping Bian, Mitsuki Yoshimura, Hokkaido University; Joonhyuk Lee, Hyoungjeen Jeon, Pusan National University; Jinghuang Lin, Jiake Wei, Bin Feng, Yuichi Ikuhara, Hokkaido University
- 12:00 – 12:20 **Super stretchable polymer-metal hybrid electrodes fabricated by co-sputtering for high-performance stretchable electronics and sensors**
Han-Ki Kim, SungKyunKwan University
- 12:20 – 13:20 Lunch (Ryusei Room)
- 13:20 – 18:30 Excursion
- 18:30 – 21:00 **Banquet and Poster Award Announcement** (Ryusei Room)
- 21:00 – 22:00 Panel Discussion: Challenges in TFT Materials

Thursday, May 18, 2023

- 06:30 – 08:00 **Breakfast** (Terrace Brasserie Restaurant)
- Session: Novel TFT Applications**
 Chairs: Yukiharu Uraoka, NAIST
 Xiaojun Guo, Shanghai Jiao Tong University
 Florian De Roose, imec
- 08:00 – 08:25 **Invited**
 Poly-oxide Tft for flexible electronics
 Jin Jang, Kyung Hee University
- 08:25 – 08:50 **Invited**
 TFT-based active sensors and sensor interfaces
 Kai Wang, Sun Yat-sen University
- 08:50 – 09:15 **Invited**
 Temporal information processing for in-sensor computing based on amorphous IGZO phototransistor
 Jen-Sue Chen, Ching-Hsiang Yang, Li-Chung Shih, National Cheng Kung University
- 09:15 – 09:40 **Metal-oxide thin-film transistor: An enabling technology for smart sensor construction and 3-D monolithic integration**
 Zhihe Xia, Yushen Hu, Tengting Lei, Man Wong, The Hong Kong University of Science and Technology
- 09:40 – 10:10 Coffee Break
- 10:10 – 10:35 **Invited**
 Organic electrochemical transistors for sensing applications
 Feng Yan, The Hong Kong Polytechnic University
- 10:35 – 10:55 **Self-adhesive organic thin film transistors on elastomeric nanofilms**
 Chika Okuda, Sunghoon Lee, Takao Someya, Tomoyuki Yokota, The University of Tokyo
- 10:55 – 11:20 **Invited**
 Droplets driving and sensing pixel circuits for thin film transistor-based digital microfluidics
 Dongping Wang, Chunyu Chang, Chinese Academy of Sciences; Yingbo Wei, Jun Yu, Arokia Nathan, Shandong University; Hanbin Ma, Chinese Academy of Sciences
- 11:20 – 11:45 **Invited**
 Mesoporous titania based synaptic device characteristics
 Hyun Ho Lee, Myongji University
- 11:45 – 11:50 End of Meeting Remark
- 11:50 Lunch (Ryusei Room)

Poster Presentations

- 1. New approach for bottom-up synthesis of 2D MoS₂ and patterning using electrohydrodynamic jet printer for thin-film transistors**
Young-Jin Kwack, Thi Thu Thuy Can, Woon-Seop Choi, Hoseo University
- 2. Extract coefficients of thermal expansion of TaN thin film by tuning the N₂ gas flow in the PVD process**
Yao-Zih Lai, Weileun Fang, National Tsing Hua University
- 3. Highly sensitive broadband phototransistors based on gradient tin/lead mixed thin film perovskites**
Hok-Leung Loi, Feng Yan, The Hong Kong Polytechnic University
- 4. Ultra-sensitive and portable organic electrochemical transistors for noninvasive saliva glucose monitoring**
Zeyu Zhao, Feng Yan, The Hong Kong Polytechnic University
- 5. Flexible Ion-selective biosensors for sweat analysis**
Zhiyuan Tian, Feng Yan, The Hong Kong Polytechnic University
- 6. Vertical oxide semiconductor field-effect transistor with extremely low off-state current**
Takeya Hirose, Tomonori Nakayama, Masataka Nakada, Manabu Sato, Tomoaki Atsumi, Masahiro Takahashi, Satoru Saito, Hitoshi Kunitake, Hideaki Shishido, Takanori Matsuzaki, Shunpei Yamazaki, Semiconductor Energy Laboratory Co., Ltd.
- 7. Analysis of carrier injection under high temperature AC operation in top gate IGZO TFTs**
Kuan-Ju Zhou, Ting-Chang Chang, National Sun Yat-Sen University. Po-Hsun Chen, Military Academy. Bo-Shen Huang, National Sun Yat-Sen University. Simon M. Sze, National Yang Ming Chiao Tung University
- 8. Clean dry etching of Cu and Ni alloy metal thin film by reactive proton assisted etching**
MunPyo Hong, Donghoon Kim, Sangheon Lee, Minyoung Kim, Sungyoun Lee, Jin Nyoung Jang, Jong Hwa Lee, Chiwoo Kim, Sang-Gab Kim, Korea University
- 9. Room temperature gas sensing with a hybrid poly-Si/ZnO TFT cell**
Horng-Chih Lin, Jen-Chi Liao, Ping-Che Liu, Pei-Wen Li, National Yang Ming Chiao Tung University
- 10. Donor activation in boron and phosphorus implanted self-aligned bottom-gate Igzo Tfts**
Eli Powell, Muhammad Kabir, Rahnuma Chowdhury, Karl Hirschman, Rochester Institute of Technology. Robert Manley, Bin Zhu, Corning Incorporated
- 11. Ambipolar oxide thin-film transistor-based artificial synapses**
Chihsin Huang, Kenji Nomura, University of California San Diego
- 12. Hafnium oxide-based ferroelectric thin-film transistor with a-InGaZnO channel fabricated at temperatures <= 350°C**
Che-Chuan Lee, Chun-Wei Chang, Min-Hung Lee, I-Chun Cheng, National Taiwan University

13. **P-type tin monoxide thin-film transistors on cellulose nanopaper substrates**
You-Hong Zhang, Pu-Yuan Lin, Feng-Cheng Chang, I-Chun Cheng, National Taiwan University
14. **Electrical performance of amorphous IGZO thin-film transistor on cellulose nanopaper substrate**
Zi-Fan Cao, Chih-Han Tseng, Feng-Cheng Chang, I-Chun Cheng, National Taiwan University
15. **Optimization of transparent PTFE/oxide multilayered antireflective coating**
Ye-Ju Lim, Jung-Min Park, Han-Ki Kim, SungKyunKwan University
16. **Deposition angle effect of Ga, Ti co-doped In₂O₃ top cathodes in semi-transparent perovskite solar cells**
Jin-Won Yang, Seo-Yun Choi, Hyeon Uk Ha, Ji-Young Heo, Dong-Won Kang, Saemon Yoon, Han-Ki Kim, Sungkyunkwan Universty
17. **High-quality ITO electrode on quartz substrate for ultra-large scaled integrated circuits and thin film transistors**
Seo-Yun Choi, Ji-Young Heo, Jin-Won Yang, Hae-Jun Seok, SungKyunKwan University; JuYoung Jang, JeongWoo Ha, SEMES; Han-Ki Kim, SungKyunKwan University
18. **High-quality Sn-doped In₂O₃ top cathodes for semi-transparent perovskite solar cells prepared by using isolated plasma soft deposition at room temperature**
Jung-Min Park, Ji-Young Heo, Ye-Ju Lim, Han-Ki Kim, Sungkyunkwan University
19. **Metal–semiconductor transition of hydrogen-doped In₂O₃ for thin-film transistor application**
Xiaoqian Wang, Mamoru Furuta, Kochi University of Technology