Preliminary Program
(March 21, 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  Invited
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.
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 Tuoi, 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  
I-Chun Cheng, National Taiwan 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 – 14:20  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, Hyunjun Kim, Yonsei University

14:20 – 14:40  Threshold volatge 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. Hyunjun
Kim, Yonsei University

14:40 – 15:10  Coffee Break

15:10 – 15:35  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

15:35 – 16:00  Invited
Characteristics of oxide TFT using atomic-layer deposited InOx-based metal
oxide channel
Toshihide Nabatame, Riku Kobayashi, Kazuhito Tsukagoshi, National Institute
for Materials Science

16:00 – 16:20  Tri-layer self-aligned structure indium gallium zinc oxide thin film transistor
with otical 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)

16:20 – 16:45  Invited
   Ultrathin organic transistors toward next-generation skin electronics
   Sunghoon Lee, Tomoyuki Yokota, Takao Someya, The University of Tokyo

16:45 – 17:05  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

17:05 – 17:30  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

17:30 – 18:00  Free Communication

18:00 – 20:00  Dinner (Ryusei Room)

20:00 – 21:30  Poster session (remove poster at 21:30)
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 Jeen, 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 Optional 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, Tengteng 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 MoS$_2$ 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 N$_2$ 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

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 $\leq 350^\circ$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 In$_2$O$_3$ 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 University

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 In$_2$O$_3$ 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 In$_2$O$_3$ for thin-film transistor application**  
   Xiaoqian Wang, Mamoru Furuta, Kochi University of Technology