

PROGRAM

AM-FPD 19

THE TWENTY-SIXTH INTERNATIONAL WORKSHOP ON
**ACTIVE-MATRIX
FLATPANEL DISPLAYS AND DEVICES**
-TFT TECHNOLOGIES AND FPD MATERIALS-

JULY 2-5, 2019
Ryukoku University Avanti Kyoto Hall
Kyoto, Japan

Sponsorship:

International Society of Functional Thin Film Materials & Devices

Co-Sponsorship:

The Japan Society of Applied Physics

Technical Sponsorship:

The Electrochemical Society - Electronics and Photonics Division -
The Electrochemical Society - Japan Section -
IEEE Electron Devices Society

In cooperation with:

The Institute of Electronics, Information and Communication Engineers
The Institute of Image Information and Television Engineers
The Institute of Electrical Engineers of Japan
The Chemical Society of Japan
The Laser Society of Japan
Japanese Liquid Crystal Society
Thin Film Materials & Devices Meeting
Society of Automotive Engineers of Japan, Inc.
Society for Information Display - Japan Chapter -

GENERAL INFORMATION

The 26th International Workshop on Active-Matrix Flatpanel Displays and Devices (AM-FPD '19) will be held at Ryukoku University Avanti Kyoto Hall, Kyoto, Japan from July 2 (Tuesday) to 5 (Friday), 2019. This international workshop was established in 1994 to present the latest research and development in Active Matrix Liquid Crystal Display technologies and their applications. In addition to AMLCDs and AMOLEDs, the scope has been widened to novel flat panel displays, materials for displays, flexible technologies, related physical phenomena and novel thin-film devices such as thin-film transistors(TFT), photovoltaics (PV) technologies, and other thin-film materials and devices (TFMD).

We hope that you will attend and enjoy our workshop.

SITE

Ryukoku University Avanti Kyoto Hall (Avanti 9th Floor)
31 Higashikujyo-nishisannoucho, Minami-ku, Kyoto 601-8003, Japan
(see the map on page 21, 22)

AM-FPD '19 Secretariat Tel: +81-475-23-1150

WORKSHOP THEME

AM-FPD '19 will prepare an attractive program focusing on “*Cutting Edge Applications Triggered by Thin-Film Devices*”.

SYMPOSIA

In addition to the regular sessions, we will prepare symposia which numerous speakers discuss for attractive and interesting themes.

Special Symposium on Vehicular Displays will focus on exciting developments paving the future of invehicle displays. The automotive industry is currently experiencing profound changes in its business environment, which will also have a strong impact on design and requirements of the human-vehicular interface, specifically displays.

On July 4, symposia, “*New Technology for Logic Circuits toward Future Electronics*”, “*Emerging Technologies for High-Efficiency PV*” and “*Recent Progress in Sensing Devices*” are scheduled. Invited speakers will talk about the latest topics from the viewpoints of functional materials, device structures, fabrication processes, driving schemes, circuit technologies, etc.

PRESENTATION TIMES FOR SPEAKERS

	Total	Presentation	Discussion
Keynote	30 min.	25 min.	5 min.
Special Symposium	40 min.	35 min.	5 min.
	30 min.	25 min.	5 min.
Invited	25 min.	20 min.	5 min.
Symposium	30 min.	25 min.	5 min.
Oral	20 min.	15 min.	5 min.
Poster	15:40-18:00, July 4		
Late News	15 min.	12 min.	3 min.

THE PROCEEDINGS OF AM-FPD '19

The Proceedings of AM-FPD '19 will be distributed from July 2 at the Registration Desk.

LANGUAGE

The official language of the workshop is English.

REGISTRATION

The Registration Desk will be open in front of Ryukoku University Avanti Kyoto Hall from Tuesday to Friday.

The registration hours are as follows:

Tuesday, July 2	9:15-17:00
Wednesday, July 3	9:15-17:00
Thursday, July 4	9:15-16:30
Friday, July 5	9:15-15:00* ¹

For Advance Registration, access our online registration page (<http://www.amfpd.jp>) and enroll your information and complete payment by June 5(JST). Registration and other fees should be paid in Japanese yen via bank transfer*² or credit cards. VISA, Master, DC, AMEX, Diners, Nicos and JCB are acceptable. After your payment has been confirmed, confirmation can be downloaded from our online registration page.

*¹ Only cash is acceptable as a means of payment on July 5, 2019.

*² Bank transfer for AM-FPD

A/C No.: 3106887 Mizuho Bank, Ltd. Jugogou Branch

A/C Name: Nippon Travel Agency Co., Ltd.

Registrants living in Japan can make payment via bank transfer or credit cards. Registrants living overseas can make payment by credit cards only.

Category		Advance Registration By June 5, 2019(JST)	On-Site Registration	[One day] Special Symposium Only* ⁴
WORKSHOP*³				
Member* ⁵		¥50,000	¥55,000	¥20,000
Non-Member		¥52,000	¥57,000	
Student* ⁶		¥20,000	¥22,000	
TUTORIAL				
Regular	Tutorial Only		¥7,000	
	Conference Attendee		¥5,000	
Student* ⁶			Free	

*³The registration fee of the workshop includes the admission to all sessions and USB memory of the proceedings. The banquet of AM-FPD '19 will be served without additional charge.

*⁴1 day pass of "Special Symposium Only" is available to attend Special Symposium and the banquet on Wednesday, July 3. No USB memory of the proceedings is included in the fee.

*⁵The member of the societies which sponsor and support AM-FPD '19 (see the front cover).

*⁶Students are required to show their ID card.

BANQUET

The banquet will be held on July 3, from 19:00 to 20:30 at Mariage Grande “Ambrosia” on the 8th floor of Avanti.

VISAS

Every foreign visitor entering Japan must have a valid passport. Visitors from countries whose citizens must have visas should apply to a Japanese consular office or diplomatic mission in their own country.

CANCELLATION POLICY

In case of cancellation, a written notification should be sent to NTA by e-mail (am_fpd@nta.co.jp) or by FAX (+81-43-225-2241) to avoid any trouble.

Cancel Charge

From June 6 to 24-----JPY 3,000

After June 25-----100% of the registration fee / NO REFUND

The Proceedings of the AM-FPD '19 (USB memory) will be sent to the attendees who have paid in 100% cancellation charge after the workshop.

Official Travel Agent

Nippon Travel Agency Co., Ltd. (NTA) has been appointed as the official travel agent for the workshop and will handle all related travel arrangements, including hotel accommodations. Inquiries and applications concerning arrangements should be addressed to:

Nippon Travel Agency Co., Ltd.(NTA)

Chiba Branch

Chiba Center Square Bldg. 4F, 2-3-16, Chuo, Chuo-ku, Chiba

260-0013, Japan

Fax: +81-43-225-2241 Tel: +81-43-227-2307

E-mail: am_fpd@nta.co.jp

Endorsement Letter

The endorsement letters to IEEE Journal Electron Device Society (J-EDS) or ECS Journal Solid State Science and Technology (JSS) will be issued for excellent papers, which are chosen at our internal rating processes by AMFPD program committees.

Please select which journal you wish getting the endorsement letter when you submit a paper to AM-FPD.

1. Endorsement letters will be issued to excellent papers from the AM-FPD committee after AM-FPD '19 workshop is held.
2. After you receive the endorsement letter,
 - Please attach your paper of AM-FPD '19 and the endorsement letter when submitting your manuscript to each journal,
 - You make sure to add in your reference list when you reuse the contents (figures / tables) used in your paper of AM-FPD '19.

Your ID and password are required to be registered before submitting your manuscript to each journal.

IEEE XPLORE DIGITAL LIBRARY

The Proceedings of AM-FPD '19 will be published in the IEEE Xplore digital library in around 2 months after the workshop.

TUTORIAL

These classes are widely aimed at many people from beginners to researchers who hope to review their knowledge. Presentations and documents of T-1 and T-2 will be in Japanese, and those of T-3 will be in English. Documents will be distributed to the attendees who have registered in advance. The attendees who make an entry on-site will be admitted into these classes, but no documents might be handed. These classes are available for an additional fee (see page 2.)

Tuesday, July 2 (9 : 30 ~ 12 : 20)

Chairperson : H. Okada, *Univ. of Toyama, Japan*

- | | |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9:30 (T-1) | Current and Future Prospects on Display Glass Substrate (<i>in Japanese</i>)
Taketsugu Itoh, <i>Corning Japan K.K., Japan</i> |
| 10:30 (T-2) | Fundamental Understanding of Photovoltaic Mechanisms and Technologies for High Efficiency (<i>in Japanese</i>)
Masao Isomura, <i>Tokai Univ., Japan</i> |
| 11:30 (T-3) | History of Vehicle Displays (<i>in English</i>)
Bernhard Straub, <i>Steinbeis-Consulting Ctr., Germany</i> |

AWARDS

Papers presented at this workshop will be considered for “AM-FPD Paper Awards”, “AMFPD-ECS Japan Section Young Researcher Award”. These winners will be presented at the award ceremony in AM-FPD '20 workshop.

AM-FPD Paper Awards

“Best Paper Award”, “Poster Award” and “Student Paper Award” will be presented. The winners of them are selected by AMFPD '19 award committee chaired by Professor Yukiharu Uraoka (*NAIST*).

AMFPD-ECS Japan Section Young Researcher Award

ECS Japan Section and AM-FPD Organizing Committee have jointly established “AMFPD-ECS Japan Section Young Researcher Award”. This award will be given to the author under the age of 35 that belongs to the university or the research institute in Japan.

AM-FPD '18 PAPER AWARD

Best Paper Award

- (3-2) High-Performance Solution-Processed Thin-Film Transistors Using Fluorine-Doped Aqueous Metal Oxides
Masashi Miyakawa, Mitsuru Nakata, Hiroshi Tsuji, Yoshihide Fujisaki, *NHK Sci. & Technol. Res. Labs., Japan*

Poster Award

- (P-16) Flexible Thin-Film Transistors with Vertical In-Ga-Zn-O Channel Using Atomic-Layer Deposition on Poly (Ethylene Naphthalate) Substrate
Hyeong Rae Kim¹, Ji-Hee Yang¹, Gi-Heon Kim², Sung-Min Yoon¹, ¹*Kyung Hee Univ., Korea*, ²*Electronics & Telecommunication Res. Inst., Korea*

Student Paper Award

So-Yeong Na, *Kyung Hee Univ., Korea*

- (5-3) Characterizations of Charge-Trap Memory Thin-Film Transistors Using HfO₂/ZnO Stack-Structured Charge-Trap Layer Controlled by Atomic Layer Deposition

AMFPD-ECS Japan Section Young Researcher Award

Taehwan Jun, *Tokyo Inst. of Technol., Japan*

- (L-1) Solution-Processable P-Type Transparent Amorphous Semiconductor for Flexible Electronics

ORGANIZING COMMITTEE

Chair: Hiroki Hamada (*Kinki Univ.*)
Vice-Chair: Hiroshi Tsutsu (*Japan Display*)
Members: Taketsugu Itoh (*Corning Japan*)
Junya Kiyota (*ULVAC*)
Yue Kuo (*Texas A&M Univ.*)
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Hidetada Tokioka (*Mitsubishi Electric*)
Advisor : Makoto Ohkura

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Shin-Ichiro Kuroki (*Hiroshima Univ.*)
Naoto Matsuo (*Univ. of Hyogo*)
Hiroyuki Okada (*Univ. of Toyama*)

PROGRAM COMMITTEE

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Ruud E. I. Schropp (*Univ. of the Western Cape*)
Isao Suzumura (*Japan Display*)
Kazushige Takechi (*Tianma Japan*)
Taishi Takenobu (*Nagoya Univ.*)
Yung-Hui Yeh (*ITRI*)
Atsushi Wakamiya (*Kyoto Univ.*)

PROGRAM

Tuesday, July 2

Opening Session (13 : 30 ~ 13 : 45)

Chairperson : Y. Uraoka, *NAIST, Japan*

Welcome Address

H. Hamada, *Kinki Univ., Japan*

Award Presentation

Session 1 : Keynote Address (13 : 45 ~ 15 : 15)

Chairpersons : Y. Uraoka, *NAIST, Japan*

H. Okada, *Univ. of Toyama, Japan*

13 : 45 (1-1) OLED, Change Your Lifestyle : Its Technologies (Invited)
J. U. Bae, *LG Display, Korea*

14 : 15 (1-2) The CASE is Building for Automotive Displays (Tentative)(Invited)
D. S. Hermann, *Volvo, Sweden*

14 : 45 (1-3) Towards the Record Efficiency of Si Based Solar Cells (Invited)
K. Yamamoto, *KANEKA Corp, Japan*

— Coffee Break —

Session 2 : Advance in Photovoltaics Technologies (15 : 35 ~ 16 : 40)

Chairpersons : A. Wakamiya, *Kyoto Univ., Japan*

Y. Ishikawa, *NAIST, Japan*

15 : 35 (2-1) Challenges and Prospects of Very Thin (<50 μm) Crystalline Silicon Solar
Cells (Invited)
H. Sai, T. Matsui, *Nat'l Inst. of Advanced Industrial Sci. and Technol.
(AIST), Japan*

16 : 00 (2-2) Influence of Molybdenum Oxide Thickness, Electronic Structure, and
Work Function on the Performance of Hole Selective Silicon
Heterojunction Solar Cells
K. Mallem, S. Kim, S. Chowdary, S. Kim, J. Park, J. Kim, S. Dutta, M. Ju,
Y. Kim, Y. H. Cho, E. -C. Cho, J. Yi, *Sungkyunkwan Univ., Korea*

16 : 20 (2-3) Influences of Spiro-MeOTAD Hole Transport Layer on the Long-Term
Stabilities of Perovskite-Based Solar Cells
L. K. Ono, Y. Qi, *Okinawa Inst. of Sci. and Technol. Graduate Univ.
(OIST), Japan*

Special Session 1 : Advanced FPDs (16 : 40 ~ 17 : 55)

Chairpersons : T. Mori, *Aichi Inst. of Technol., Japan*
M. Mitani, *Sharp, Japan*

- 16 : 40 (SP1-1) Mass Production Technology of Flexible AMOLED Displays and the Improvement of OLED Device Characteristics (Invited)
Y. Tsukamoto, T. Umeda, M. Mizusaki, M. Shibasaki, N. Uetake,
S. Kawato, S. Shimada, *Sharp Corp., Japan*
- 17 : 05 (SP1-2) The Advanced Thin Film Micro LED Array (Invited)
C. -C. Lin^{1,2}, S. -M. Yang¹, W. -H. Kuo¹, K. -L. Liang¹, Y. -H. Fang¹,
C. -I Wu^{1,3}, ¹*Industrial Tech. Res. Ctr. (ITRI), Taiwan*, ²*Nat'l Chiao Tung Univ., Taiwan*, ³*Nat'l Taiwan Univ., Taiwan*
- 17 : 30 (SP1-3) Anion Exchange Perovskite Quantum-Dots for Highly Efficient Light-Emitting-Devices (Invited)
T. Chiba, Y. Hayashi, K. Hoshi, H. Ebe, J. Kido, *Yamagata Univ., Japan*

Wednesday, July 3

Special Symposium : The Future Vehicle Displays (9 : 15 ~ 18 : 50)

Introduction (9 : 15 ~ 9 : 25)

Chairpersons : N. Fruehauf, *Univ. of Stuttgart, Germany*
B. Straub, *Steinbeis-Consulting Ctr., Germany*

Special Symposium 1 : OEM Perspective - Design Concepts and Trends for Future Vehicular Displays (9 : 25 ~ 10 : 45)

Chairpersons : N. Fruehauf, *Univ. of Stuttgart, Germany*
B. Straub, *Steinbeis-Consulting Ctr., Germany*

9 : 25 (SS1-1) Active Matrix Display Technologies for Automotive Use (Tentative)
(Invited)
D. S. Hermann, *Volvo Car Corp. AB, Sweden*

10 : 05 (SS1-2) Future Display Technologies for Automotive Application (Invited)
¹M. Zobl, ¹A. Wagner-Gentner, ¹S. Danner, ²S. Lutz, ¹*BMW AG, Germany*,
²*BMW of Japan, Japan*

— Coffee Break —

Special Symposium 2 : Vehicular Display Market Overview(10 : 55 ~ 11 : 55)

Chairpersons : D. S. Hermann, *Car Corp. AB, Sweden*
S. Lutz, *BMW of Japan, Japan*

10 : 55 (SS2-1) Automotive Display Market Outlook (Invited)
S. Wu, *IHS Markit, Taiwan*

11 : 25 (SS2-2) Technology Trends (Invited)
B. Straub, *Steinbeis-Consulting Ctr., Germany*

Special Symposium 3 : Tire 1 Perspective - Implementation Aspects for Vehicular Displays (11 : 55 ~ 12 : 25)

Chairpersons : D. S. Hermann, *Car Corp. AB, Sweden*
S. Lutz, *BMW of Japan, Japan*

11 : 55 (SS3-1) Automotive Display Requirements and Development (Invited)
V. F. Paz, E. Persidis, *Robert Bosch GmbH, Germany*

— Lunch —

**Special Symposium 4 : Component Manufacturers - Innovations in
Vehicular Display Components (13 : 50 ~ 14 : 20)**

Chairpersons : V. F. Paz, *Robert Bosch GmbH, Germany*
S. Wu, *IHS Markit, Taiwan*

13 : 50 (SS4-1) Automotive Display Trend and Tianma's Directions (Invited)
J. Q. Liu, S. J. Yang, Z. Ye, *Tianma Micro-Electronics Group, China*

**Special Symposium 5 : Material Suppliers - Materials for Vehicular Display
Applications (14 : 20 ~ 16 : 30)**

Chairpersons : V. F. Paz, *Robert Bosch GmbH, Germany*
S. Wu, *IHS Markit, Taiwan*

14 : 20 (SS5-1) Latest Development of Soluble-OLED Material and Its Application to Mid-
to Large-Sized Panel Production (Invited)
T. Yamada, *Sumitomo Chemical Co., Ltd., Japan*

14 : 50 (SS5-2) Technology Trend of Cover Glass for Automotive Displays (Invited)
M. Tamada, H. Mishiro, S. Kobune, *AGC Inc., Japan*

— Coffee Break —

Chairpersons : L. Liu, *Tianma Micro-Electronics, China*
H. Okada, *Univ. of Toyama, Japan*

15 : 30 (SS5-3) Ultra-Low CTE Polyimide Film for Flexible Substrates (Invited)
T. Tsuchiya, T. Okuyama, *TOYOBO Co., Ltd., Japan*

16 : 00 (SS5-4) Application of OLED for Automotive Lighting (Invited)
D. Q. Chawdhury, S. M. Garner, S. C. Lewis, *Corning Incorporated, USA*

**Special Symposium 6 : Academia - Foundations of Future Vehicular Display
Applications (16 : 30 ~ 17 : 00)**

Chairpersons : L. Liu, *Tianma Micro-Electronics, China*
H. Okada, *Univ. of Toyama, Japan*

16 : 30 (SS6-1) Organic Light Emitting Diodes for Lighting Applications (Tentative)
(Invited)
T. Sano, *Yamagata Univ., Japan*

— Coffee Break —

Panel Discussion (17 : 10 ~ 18 : 40)

Coordinator : N. Fruehauf, *Univ. of Stuttgart, Germany*

Panelists : All invited speakers in Special Symposium on “The Future Vehicle Display”

Closing (18 : 40 ~ 18 : 50)

Chairperson : N. Fruehauf, *Univ. of Stuttgart, Germany*

Banquet (19 : 00 ~ 20 : 30)

Thursday, July 4

Symposium 1 : New Technology for Logic Circuits toward Future

Electronics (9 : 15 ~ 10 : 45)

Chairpersons : S. -M. Yoon, *Kyung Hee Univ., Korea*
M. Kitamura, *Kobe Univ., Japan*

- 9 : 15 (S1-1) High Performance In-Zn-O FET with High On-Current and Ultralow ($<10^{-20}$ A/ μm) Off-State Leakage Current for Si CMOS BEOL Application (Invited)
N. Saito, T. Sawabe, J. Kataoka, T. Ueda, T. Tezuka, K. Ikeda, *Toshiba Memory Corp., Japan*
- 9 : 45 (S1-2) Development of New P-Type Metal Oxide Semiconductor with High Hall Mobility over 50 cm^2/Vs Based on Solution Process (Invited)
S. H. Cho, S. Nam, S. -J. Lee, *Electronics and Telecommunications Res. Inst. (ETRI), Korea*
- 10 : 15 (S1-3) Flash-Lamp Annealing for Manufacturing of Reduced Thermal Budget Self-Aligned LTPS TFTs (Invited)
G. M. Packard¹, R. G. Manley², K. D. Hirschman¹, ¹*Rochester Inst. of Technol., USA*, ²*CORNING Thin Films & Surfaces, USA*

— Coffee Break —

Symposium 2 : Emerging Technologies for High-Efficiency PV

(11 : 05 ~ 12 : 35)

Chairpersons : N. Matsuki, *Kanagawa Univ., Japan*
T. Kaneko, *Tokai Univ., Japan*

- 11 : 05 (S2-1) CdTe Thin Film PV: How Has the Technology Evolved and What Challenges Lie Ahead (Invited)
C. S. Ferekides, C. -A. Hsu, *Univ. of South Florida, USA*
- 11 : 35 (S2-2) Development Strategy of Thin Film Solar Cells: Low-Cost & High-Efficiency (Invited)
T. -W. Kim, *Korea Inst. of Industrial Technol. (KITECH), Korea*
- 12 : 05 (S2-3) Perovskite Material and Solar Cell Research by Surface Science and Advanced Characterization (Invited)
Y. Qi, *Okinawa Inst. of Sci. and Technol. (OIST), Japan*

Late News (12 : 35 ~ 12 : 50)

12 : 35 (L-1) How to Use Synchrotron Soft X-Ray for Analysis of Perovskite Solar Cell
S. Ito, *Univ. of Hyogo, Japan*

— Lunch —

Symposium 3 : Recent Progress in Sensing Devices (13 : 55 ~ 15 : 25)

Chairpersons : H. Kajii, *Osaka Univ, Japan*
A. Heya, *Univ. of Hyogo, Japan*

13 : 55 (S3-1) Flexible Information and Sensing Devices Fabricated by Printing Process
(Invited)
K. Kudo, M. Sakai, *Chiba Univ., Japan*

14 : 25 (S3-2) Electronic Skin for Healthcare Monitoring (Invited)
T. Yokota, T. Someya, *The Univ. of Tokyo, Japan*

14 : 55 (S3-3) Fabrication of a Quartz-Crystal Microbalance/Surface-Plasmon-Resonance
Hybrid Sensor and Taking Advantage of Their Responses for Evaluation of
Thin Films and Liquids (Invited)
K. Shinbo, C. Lertvachirapaiboon, Y. Ohdaira, A. Baba, K. Kato, *Niigata
Univ., Japan*

Poster Session (15 : 40 ~ 18 : 00)

Chairpersons : H. Okada, *Univ. of Toyama, Japan*
T. Mori, *Aichi Inst. of Technol., Japan*
M. Kitamura, *Kobe Univ., Japan*
H. Kajii, *Osaka Univ., Japan*
A. Wakamiya, *Kyoto Univ., Japan*

FPDp

- (P-1) Correlation between Roll-Off Phenomena and Carrier Injections for OLEDs
T. Mori, S. Aoyama, Y. Seike, *Aichi Inst. of Technol., Japan*
- (P-2) New External Compensated Circuit to Achieve Uniform OLED Luminance for High-Resolution AMOLED Displays
W. -S. Liao, P. -S. Chen, C. -L. Tsai, C. -L. Lin, *Nat'l Cheng Kung Univ., Taiwan*
- (P-3) Gate Driver with Multiple Pulse Width Gate-Control Method for Narrow-Bezel Application
G. -T. Zheng, P. -T. Liu, *Nat'l Chiao-Tung Univ., Taiwan*

TFTp

- (P-4) Low-Temperature Process Compatibility for the Oxide Thin Film Transistors Using In-Ga-Zn-O Active Channels Prepared by Atomic-Layer Deposition at 150°C
S. -J. Yoon¹, S. -B. Ko¹, N. -J. Seong², K. Choi², W. -C. Shin², S. -M. Yoon¹, ¹*Kyung Hee Univ., Korea*, ²*NCD Co., Ltd., Korea*
- (P-5) Threshold Voltage and Mobility Improvement by Optimized Oxygen Plasma Treatment on Gate Dielectric in ZnO Based Thin-Film Transistor
U. Chand, H. Veluri, S. Samanta, D. Singh, E. Zamburg, M. Sivan, L. J. Feng, Y. Li, A. V. -Y. Thean, *Nat'l Univ. of Singapore, Singapore*
- (P-6) Proposals on Lower Thermal Budget Process for In-Ga-Zn-O Thin Film Transistor Using HfO₂ Gate Insulators Prepared by Atomic-Layer Deposition at a Temperature of 150°C
S. -N. Choi, S. -Y. Na, S. -M. Yoon, *Kyung Hee Univ., Korea*
- (P-7) Fabrication and Characterization of P-Type SnO Thin-Film Transistors by Reactive DC Magnetron Sputtering
C. -Y. Tsay¹, M. -C. Lin¹, F. -Y. Chang¹, Y. -W. Wang², ¹*Feng Chia Univ., Taiwan*, ²*Nat'l Changhua Univ. of Education, Taiwan*
- (P-8) A Study on Improvement of Electrical and Retention Characteristics of Non-Volatile Memory with Al₂O₃ Insulator
G. Yoon¹, J. Kim¹, D. Shin¹, K. Malle¹, J. Park¹, J. Kim¹, J. Cho¹, S. Bae², J. -S. Kim², H.-H. Kim³, J. Yi¹, ¹*Sungkyunkwan Univ., Korea*, ²*Samsung Electronics Co., LTD., Korea*, ³*Doowon Technical Univ., Korea*

- (P-9) Atomic Hydrogen Annealing of AlO_x/GeO_x/a-Ge Stack Structure Fabricated in Oxygen Atmosphere
T. Onuki, A. Heya, N. Matsuo, *Univ. of Hyogo, Japan*
- (P-10) Phosphorus Followed by Hydrogen Two-Step Ion Implantation Used for Forming Low Resistivity Doped Silicon at 300°C
T. Nagao¹, Y. Inouchi¹, J. Tatemichi¹, T. Sugawara², M. Hasumi², T. Sameshima², ¹*NISSIN ION EQUIPMENT CO., LTD., Japan*, ²*Tokyo Univ. of Agriculture and Technol., Japan*
- (P-L1) Four-Terminal Cu-MIC Poly-Ge_{1-x}Sn_x TFT with a High-K Bottom-Gate Dielectric
R. Miyazaki, A. Hara, *Tohoku Gakuin Univ., Japan*
- (P-L2) Low Temperature High-K Solution Processed Hybrid Gate Insulator for High Performance Amorphous In-Ga-Zn-O Thin-Film Transistors
P. Kesorn¹, J. P. Bermundo¹, N. Yoshida², T. Nonaka², M. N. Fujii¹, Y. Ishikawa¹, Y. Uraoka¹, ¹*Nara Inst. of Sci. and Technol. (NAIST), Japan*, ²*Merck Performance Material Ltd., Japan*

PVp

- (P-11) A Colorful Organic Photovoltaic Devices with a 5.48% Power Conversion Efficiency
Y. -D. Li¹, P. Thatiboyana², S. Biring², C. -C. Lee¹, S. -W. Liu², ¹*Nat'l Taiwan Univ. of Sci. and Technol., Taiwan*, ²*Ming Chi Univ. of Technol., Taiwan*
- (P-12) Partially Green Small Molecule Solar Cells
M. -Y. Lin¹, V. -C. Su¹, S. -L. Chen², ¹*Nat'l United Univ., Taiwan*, ²*Chung Yuan Christian Univ., Taiwan*
- (P-13) PEDOT:PSS Transparent Electrode for ITO-Free Polymer: Fullerene Bulk-Heterojunction Organic Solar Cells
R. -J. Wu, F. -C. Wu, L. -Y. Huang, B. -R. Lin, W. -Y. Chou, H. -L. Cheng, *Nat'l Cheng Kung Univ., Taiwan*
- (P-14) Efficient Planar Perovskite Solar Cells with Entire Low-Temperature Processes via Brookite TiO₂ Nanoparticle Electron Transport Layer
S. Visal¹, M. Shahiduzzaman^{1,2}, M. Kuniyoshi¹, T. Kaneko¹, T. Katsumata¹, S. Iwamori¹, K. Tomita¹, M. Isomura¹, ¹*Tokai Univ., Japan*, ²*Kanazawa Univ., Japan*
- (P-15) Identification of Edge Recombination from CIGS Solar Cells
S. -H. Lin¹, Y. -C. Lu², C. -C. Tai², T. -H. Cheng³, ¹*Tunghai Univ., Taiwan*, ²*Nat'l Cheng Kung Univ., Taiwan*, ³*LiveStrong Optoelectronics Co., Ltd., Taiwan*

- (P-16) Carbon Heating Tube Rapid Heating System for Fabricating Silicon Solar Cells
T. Miyazaki^{1,3}, G. Kobayashi², I. Serizawa², T. Kikuchi³, T. Uehara³,
T. Arima³, M. Hasumi³, T. Sameshima³, ¹*Techno Res., Ltd., Japan*, ²*Orc Manufacturing Co., Ltd., Japan*, ³*Tokyo Univ. of Agriculture and Technol., Japan*
- (P-17) Photovoltaic Characteristics of Passivated Emitter and Rear Contact Silicon Solar Cells with Chemical and Molybdenum Oxides Stacked Films
C. -L. Cheng, C. -C. Liu, K. -H. Liao, *Nat'l Formosa Univ., Taiwan*
- (P-18) Field Effect Passivation of Plasma Oxidized SiO_x layer on Boron Emitter Surface by PECVD
S. Kim, K. Mallem, S. Park, S. Chowdary, S. Kim, J. Park, J. Kim, M. Ju, Y. Kim, E. -C. Cho, Y. H. Cho, J. Yi, ¹*Sungkyunkwan Univ., Korea*
- (P-L3) Solution-Processed Conductive Interconnecting Layer for Highly-Efficient and Long-Term Stable Monolithic Perovskite Tandem Solar Cells
C. -Y. Chang, S. -H. Chen, *Taipei Medical Univ., Taiwan*
- (P-L4) Novel Measurement Method of Ion Impurity in OPV Materials
M. Inoue¹, N. Oyabu², Y. Kumoda³, Y. Suenaga³, T. Ishii³, H. Naito³,
¹*TOYOTech LLC, USA*, ²*TOYO Corp., Japan*, ³*Osaka Prefecture Univ., Japan*
- (P-L5) ZnO Nanorods Fabricated by Chemical Bath Deposition for Dye-Sensitized Solar Cell Application
Q. Zhang, C. Li, T. Nakamura, M. Morimoto, *Kochi Univ. of Technol., Japan*

TFMDp

- (P-19) Evaluation of Perovskite Photo-Sensors with Electron-Beam Evaporated Titanium Dioxide Films
M. F. Hossain^{1,2}, I. Hirano¹, S. Naka¹, H. Okada¹, ¹*Univ. of Toyama, Japan*, ²*Rajshahi Univ. of Engineering & Technol., Bangladesh*
- (P-20) Effect of Device Structure on the Narrow-Band Light Detection of Bulk Heterostructure Organic Photodetectors Based on Poly(3-Hexylthiophene) and Fullerene Derivative
H. Okui, H. Kajii, M. Kondow, *Osaka Univ., Japan*
- (P-21) Multicolor Quantum Well and Superlattice Infrared Photodetector with Grating Structure Optimization
S. H. Lin¹, B. -W. Liang², C. -H. Kuan², R. -S. Yu^{3,4}, ¹*Tunghai Univ., Taiwan*, ²*Nat'l Taiwan Univ., Taiwan*, ³*Asia Univ., Taiwan*, ⁴*China Medical Univ., Taiwan*

- (P-22) Evaluation of IGZO Synapses for Neuromorphic Systems
D. Yamakawa¹, Y. Shibayama¹, H. Yamane², Y. Nakashima²,
M. Kimura^{1,2}, ¹Ryukoku Univ., Japan, ²Nara Inst. of Sci. and Technol.
(NAIST), Japan
- (P-23) Reduction and Etching of Si-Rich SiO_x Film by Atomic Hydrogen
Annealing
Akira Heya, Univ. of Hyogo, Japan
- (P-24) Structural, Optical and Electrical Properties of Sputtered Nb Doped TiO₂
Transparent Conductive Films
L. Zhang, H. Zuo, Q. Ma, S. Zhang, Peking Univ., China
- (P-25) Development of Two-Layered ReRAM Using Ga-Sn-O Thin Film
A. Kurasaki¹, S. Sugiski¹, R. Tanaka¹, T. Matsuda¹, M. Kimura^{1,2},
¹Ryukoku Univ., Japan, ²Nara Inst. of Sci. and Technol. (NAIST), Japan
- (P-26) Ga-Sn-O Thin Film Thermoelectric Conversion Device Fabricated by Mist
CVD Method
T. Aramaki¹, T. Matsuda¹, K. Umeda², M. Uenuma², M. Kimura¹,
¹Ryukoku Univ., Japan, ²Nara Inst. of Sci. and Technol. (NAIST), Japan
- (P-27) Drop Impact Analysis of AMOLED Display with Buffer Designs by Using
Dynamic Finite Element Simulation
C. -C. Lee¹, C. -W. Wang², ¹Nat'l Tsing Hua Univ., Taiwan, ²Nat'l Chung
Hsing Univ., Taiwan
- (P-28) Influence of Thermal Treatment of Sol-Gel Derived (Ca_{0.8}Sr_{0.2})ZrO₃
Dielectric Thin Films
C. -H. Hsu, P. -Y. Chou, C. -F. Tseng, Nat'l United Univ., Taiwan
- (P-29) Plasma Mode Influences on the Surface Hydrophobization of Polyimide
L. Zhang^{1,2}, H. Zuo¹, Q. Ma^{1,2}, S. Zhang^{1,3}, L. Zhang², X. Zhang²,
Y. J. Hsu² ¹Peking Univ., China, ²China Star Optoelectronics Semicond.
Display Technol. Co., Ltd., China, ³Active Matrix Display Beijing
Engineering Res. Ctr., China,
- (P-30) Modulation of Interfacial Properties for Low Voltage-Driven Organic Thin-
Film Transistors
S. -K. Peng, P. -H. Fang, P. -L. Kuo, H. -L. Cheng, F. -C. Tang,
W. -Y. Chou, Nat'l Cheng Kung Univ., Taiwan
- (P-L6) Improved Carrier Mobility of Thin Ge Films on Insulator by Solid-Phase
Crystallization Combined with Interface-Modulation
X. Gong, C. Xu, T. Sadoh, Kyushu Univ., Japan

Friday, July 5

Special Session 2 : Advanced Materials and Technology (9 : 15 ~ 10 : 20)

Chairpersons : R. Hattori, *Kyushu Univ., Japan*
H. Nakamura, *IDEMITSU KOSAN, Japan*

- 9 : 15 (SP2-1) Recent Progress in Inverted OLEDs: Mechanism of Electron Injection without Use of Alkali Metals (Invited)
H. Fukagawa, T. Sasaki, T. Oono, T. Shimizu, *Japan Broadcasting Corp. (NHK), Japan*
- 9 : 40 (SP2-2) Single-Layer Cu Gate Electrode for Large Display Devices
H. Kim, B. Zhu, R. Vaddi, M. -H. Huang, R. Manley, *Corning Res. and Development Corp., USA*
- 10 : 00 (SP2-3) Simplified Compensation Pixel Circuit Based on LTPS TFTs for High-Quality Images of High-Resolution AMOLED Displays
P. -C. Lai¹, M. -H. Cheng², L. -W. Shih², C. -L. Lin¹, ¹*Nat'l Cheng Kung Univ., Taiwan*, ²*AU Optronics, Taiwan*

— Coffee Break —

Session 3 : Novel Fabrication Processing and Applications (10 : 40 ~ 11 : 45)

Chairpersons : H. Kajii, *Osaka Univ., Japan*
A. Heya, *Univ. of Hyogo, Japan*

- 10 : 40 (3-1) Interactive Skin Display with Epidermal Stimuli Electrode (Invited)
C. Park, *Yonsei Univ., Korea*
- 11 : 05 (3-2) Mechanically Flexible Vertical Thin-Film Transistor with Sub-Micrometer Channel Length Using ZnO Channel and Zeocoat™ Spacer on Ultra-Thin Polyimide Substrate
H. -R. Kim¹, S. -M. Kwak¹, M. Furutua², S. -M. Yoon¹, ¹*Kyung Hee Univ., Korea*, ²*Kochi Univ. of Technol., Japan*
- 11 : 25 (3-3) Effects of Sputtering Gas on Crystal Growth Orientations and Durability of Al-Doped ZnO Transparent Electrodes in Harsh Environment
F. Machda, T. Ogawa, H. Okumura, K. N. Ishihara, *Kyoto Univ., Japan*

— Lunch —

Session 4 : Advance in Oxide TFTs (13 : 15 ~ 14 : 20)

Chairpersons : J. W. Borchert, *Max Planck Inst. for Solid State Res., Germany*,
S. H. Cho, *ETRI, Korea*

- 13 : 15 (4-1) Inorganic-Based Flexible Transistors for Circuits and Sensors (Invited)
K. Takei^{1,2}, ¹*Osaka Prefecture Univ., Japan*, ²*JST PRESTO, Japan*
- 13 : 40 (4-2) Analysis on Mechanical-Strain Induced Bias-Stress Instabilities for the Flexible InGaZnO Thin Film Transistors with Different Channel Geometries
H. -W. Jang¹, K. -H. Kim², S. Oh², S. -M. Yoon¹, ¹*Kyung Hee Univ., Korea*, ²*Hanyang Univ., Korea*
- 14 : 00 (4-3) Gate Insulator Influences on the Electrical Performance of Back-Channel-Etch Amorphous Zinc Tin Oxide (a-ZTO) Thin Film Transistors
H. Zuo¹, L. Zhang¹, Y. Yang¹, C. Fan¹, S. Zhang^{1,2}, ¹*Peking Univ., China*, ²*Active Matrix Display Beijing Engineering Res. Ctr., China*

— Coffee Break —

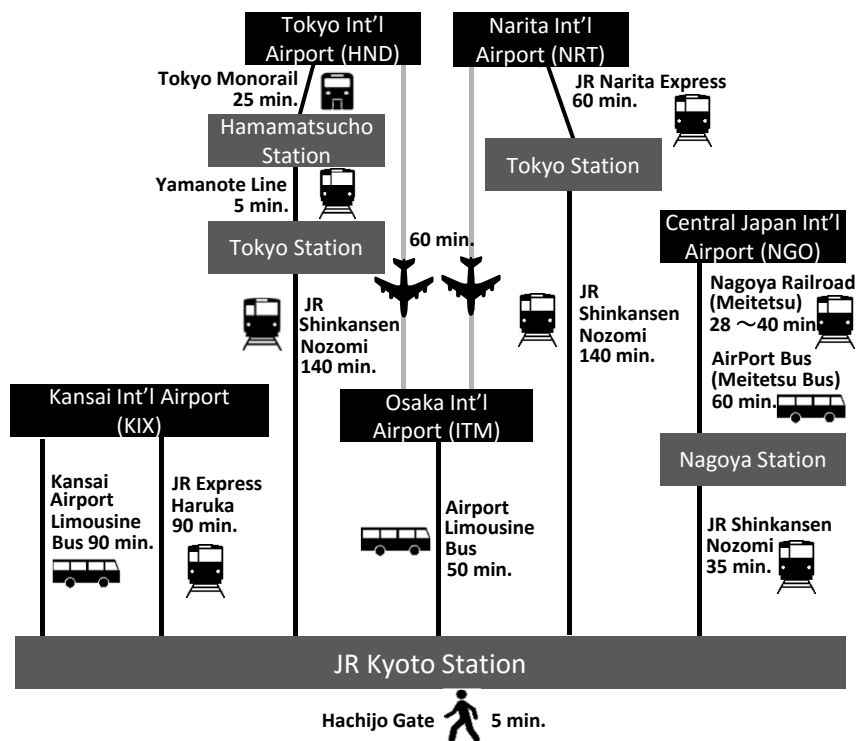
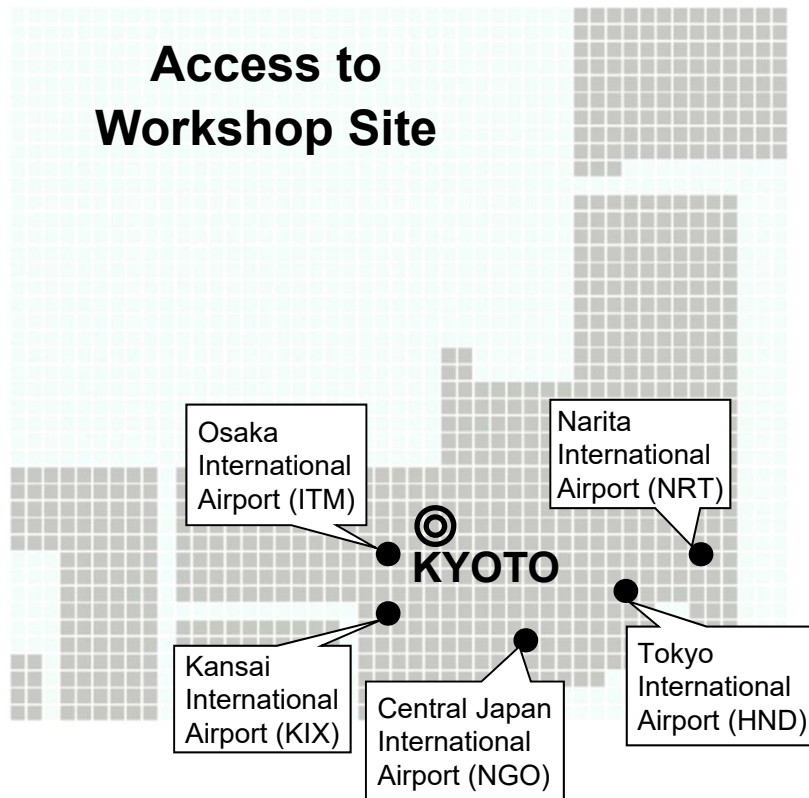
Session 5 : High-Performance TFT Technologies (14 : 40 ~ 15 : 45)

Chairpersons : M. Kimura, *Ryukoku Univ., Japan*
H. Kajii, *Osaka Univ., Japan*

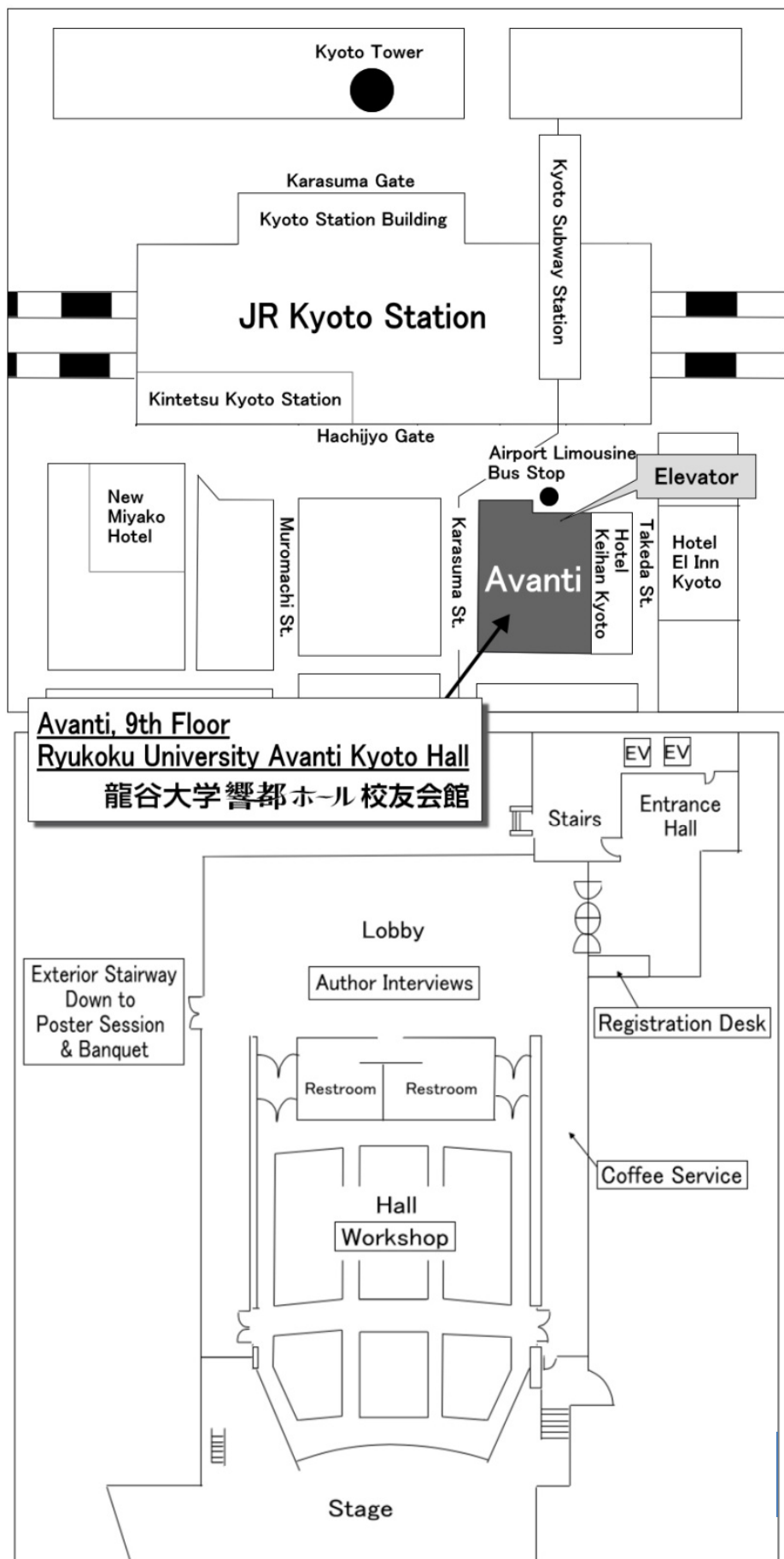
- 14 : 40 (5-1) Flexible Low-Voltage Organic Thin-Film Transistors with Low Contact Resistance and High Transit Frequencies (Invited)
J. W. Borchert^{1,2}, U. Zschieschang¹, F. Letzkus³, M. Giorgio^{4,5}, M. Caironi⁴, J. N. Burghartz³, S. Ludwigs², H. Klauk¹, ¹*Max Planck Inst. for Solid State Res., Germany*, ²*Univ. of Stuttgart, Germany*, ³*Inst. for Microelectronics Stuttgart (IMS CHIPS), Germany*, ⁴*Italian Inst. of Technol. (IIT), Italy*, ⁵*Politecnico Milano, Italy*
- 15 : 05 (5-2) The Indium-Gallium-Tin-Oxide Thin Film Transistor with Better Performance Based on the Solution Procession
Y. Wang¹, Z. Wang¹, C. Liu^{1,2}, ¹*Sun Yat-Sen Univ., China*, ²*Zhejiang Univ., China*
- 15 : 25 (5-3) Robust Mobility and Variability Improvement of Indium-Gallium-Zinc-Oxide (IGZO) Thin-Film Transistor with E-Beam Deposited SiO₂ Passivation Layer
S. Samanta, Z. Panpan, U. Chand, G. Xiao, K. Han, S. Xu, Y. Li, A. V. -Y. Thean, X. Fong, *Nat'l Univ. of Singapore, Singapore*

Closing Remarks (15 : 45 ~ 15 : 50)

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**THE TWENTY-SIXTH INTERNATIONAL WORKSHOP ON
ACTIVE-MATRIX FLATPANEL DISPLAYS AND DEVICES
— TFT TECHNOLOGIES AND FPD MATERIALS —
(AM-FPD '19)**

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