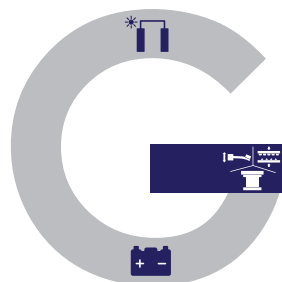
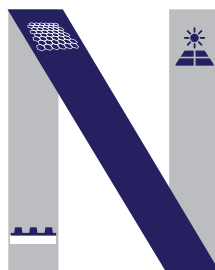


Program Book

The 6th International Conference on Electronic Materials and Nanotechnology for Green Environment

November 1-4, 2020

Ramada Plaza Jeju Hotel, Jeju, Korea



KIM THE KOREAN INSTITUTE OF
METALS AND MATERIALS

IBS

IBS CMM

IBS CMM

4단계 BK21사업 서울대학교 창의인재 재료교육연구단
SNU Materials Education/Research Division for Creative Global Leaders

Jeju CVB
JEJU CONVENTION & VISITOR BUREAU

**KOREA
TOURISM
ORGANIZATION**

KOPST
Korea Foundation of Science &
Technology Societies

NRF National Research
Foundation of Korea

NANO
CONVERGENCE

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- 016 Keynote Speakers / Tutorial Speaker
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029 Presentation Schedule

- 030 01. High performance semiconductor
- 041 02. Extreme low power semiconductor
- 047 03. Wearable electronics
- 054 04. Materials for frontier displays and optoelectronics
- 075 05. Two-dimensional (2D) van der Waals materials
- 086 06. Emerging bottom-up nanofabrication
- 094 07. Emerging photovoltaic materials
- 103 08. Hydrogen energy conversion and storage
- 114 09. High-capacity, low-cost, and safe energy storage
- 124 10. Energy harvesting materials
- 137 11. Biomaterials
- 143 12. Computational materials science
- 150 13. Advanced nanocharacterization and microscopic modelling

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Euijoon Yoon
ENGE 2020 Chair
Founding President
Korea Institute of Energy Technology

WELCOME MESSAGE

We were thrilled to announce that we not only talk about flexible, but we go flexible and hold ENGE 2020 as a hybrid event. In addition to our well-known on-site event in Jeju on November 1st-4th, we have put in place a virtual layer for everyone who prefers to join this year’s edition online event. Our goal is to bring the atmosphere, content and inspiration of ENGE to your homes and offices.

Together with our online conference platform, we will be able to offer our attendees the virtual opportunity to be involved in the exchange of information and to enjoy the benefits of being part of a network.

We firmly believe that the experience of attending a conference in person can never be fully replicated by any of the digital alternatives. But, due to the current situation, we think it

is necessary to offer the possibility to virtually attend the conference for those who cannot attend in person due to personal or logistical reasons. For us, this is an important step towards opening our doors to a more diverse audience preference from all over the world.

The ENGE 2020 Steering Committee is fully aware of the concerns about the hybrid event and will exert its utmost efforts to ensure attendees’ safety during the conference. Please help make this conference a safe and successful one by familiarizing yourself with these instructions.

It is an honor for us to have you join us at ENGE 2020 and we thank you again for your commitment to ENGE 2020 and its community, particularly during these difficult times.

OVERVIEW

TITLE
The 6th International Conference on Electronic Materials and Nanotechnology for Green Environment

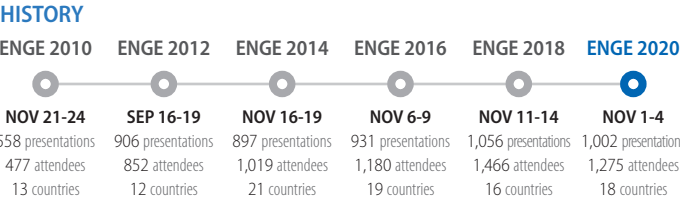
DATE
November 1-4, 2020

LOCATION
Ramada Plaza Jeju Hotel, Jeju, Korea

HOSTED BY
The Korean Institute of Metals and Materials

ORGANIZED BY
IBS–Center for Artificial Low D Electronic Systems
IBS–Center for Multidimensional Carbon Materials
SNU Materials Education/Research Division for Creative Global Leaders

SPONSORED BY
Jeju Convention & Visitors Bureau
Korea Tourism Organization
Korean Federation of Science and Technology Societies
National Research Foundation of Korea
Nano Convergence



“ We welcome you and sincerely hope that you will be amazed and inspired at ENGE 2020.

COMMITTEE

STEERING COMMITTEE

Chair	Euijoon Yoon	Korea Institute of Energy Technology
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	Young Keun Kim	Korea University
	Jong-Lam Lee	Pohang University of Science and Technology
	Hyuck Mo Lee	Korea Advanced Institute of Science and Technology
	Kyung-Ho Shin	Korea Institute of Science and Technology
	Ji-Beom Yoo	Sungkyunkwan University

PROGRAM COMMITTEE

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Bong Hoon Kim	Soongsil University
Jin Young Kim	Ulsan National Institute of Science and Technology
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Yun Jung Lee	Hanyang University
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Si-Young Choi	Pohang University of Science and Technology

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Hua Zhang	City University of Hong Kong

PROGRAM AT A GLANCE

Your Week in Jeju

SUNDAY NOVEMBER

01

Welcome Reception

17:00-18:30 | Ballroom 1

Dinner Box will be provided.
Take-out is available.

Tutorial Session

19:00-21:00

- 1) Ballroom 2-4
- 2) ZOOM



HOW TO JOIN THE VIRTUAL PAGE

- 1) Visit www.enge2020.org
- 2) Click "Virtual Page Button" on the main page by logging in with your registered email address and password.
- 3) View "Program Button" to join sessions virtually.

MONDAY NOVEMBER

02

Oral Session

09:00-12:00 | Session Rooms & ZOOM

Poster Session

08:00-11:00 | Put-up

11:00-16:00 | Screening

17:00-18:00 | Take-down

Lunch

12:00-13:20 | 1F Restaurant

Lunch Box will be provided.
Take-out is available.

Oral Session

13:20-15:50 | Session Rooms & ZOOM

Coffee Break

15:50-16:10

Oral Session

16:10-18:10 | Session Rooms & ZOOM

TUESDAY NOVEMBER

03

Plenary Session 1 & 2

08:30-09:50

- 1) Ballroom 1
- 2) Broadcasting to Other Session Rooms
- 3) ZOOM

Poster Session

08:00-11:00 | Put-up

11:00-16:00 | Screening

17:00-18:00 | Take-down

Coffee Break

09:50-10:10

Lunch

12:40-14:00 | 1F Restaurant

Lunch Box will be provided.
Take-out is available.

Oral Session

14:00-17:00 | Session Rooms & ZOOM

Coffee Break

17:00-17:20

Plenary Session 3

17:20-18:00

- 1) Ballroom 1
- 2) Broadcasting to Other Session Rooms
- 3) ZOOM

Oral Session

18:00-19:00

Banquet

19:00-21:00 | Ramada Ballroom

Dinner Box will be provided.

WEDNESDAY NOVEMBER

04

Oral Session

09:00-12:00 | Session Rooms & ZOOM

Poster Session

08:00-11:00 | Put-up

11:00-16:00 | Screening

17:00-18:00 | Take-down

Lunch

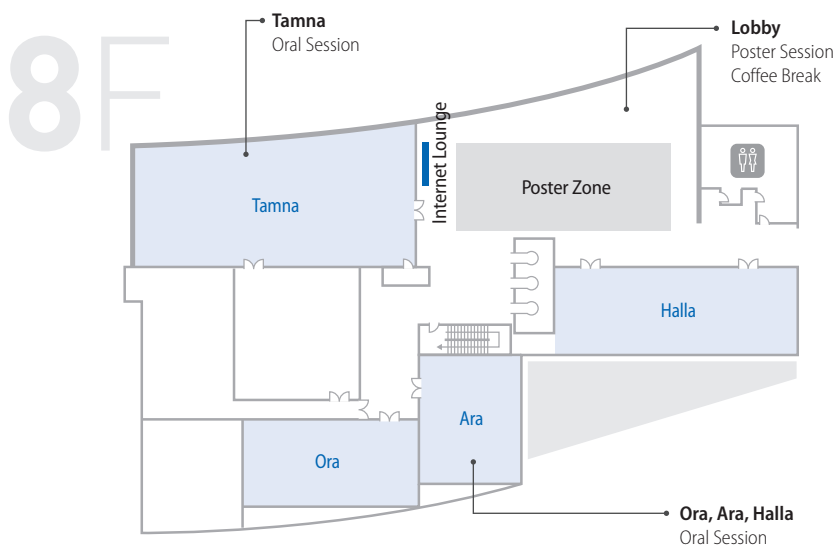
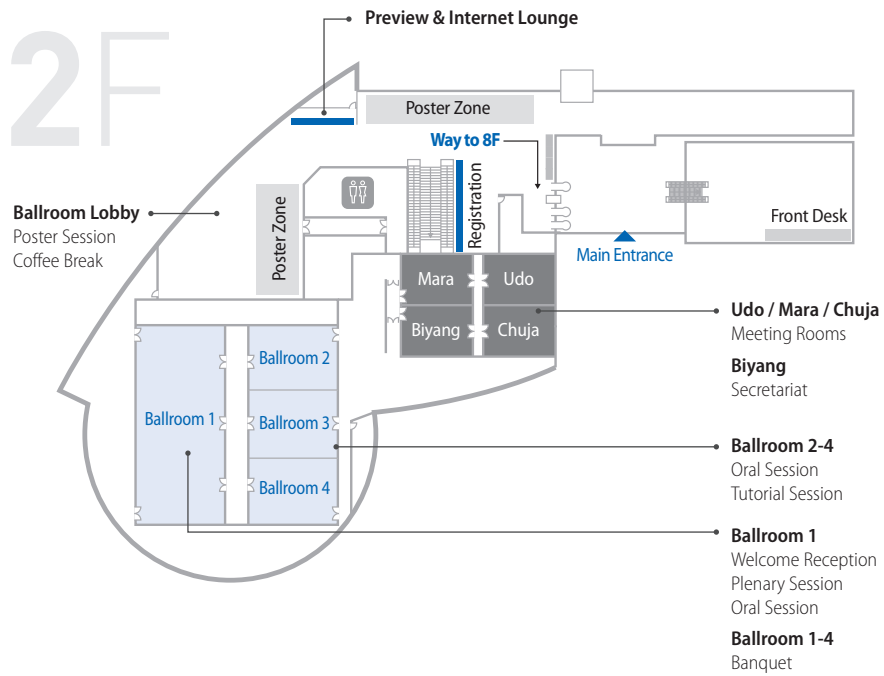
12:00-13:20 | 1F Restaurant

Lunch Box will be provided.
Take-out is available.

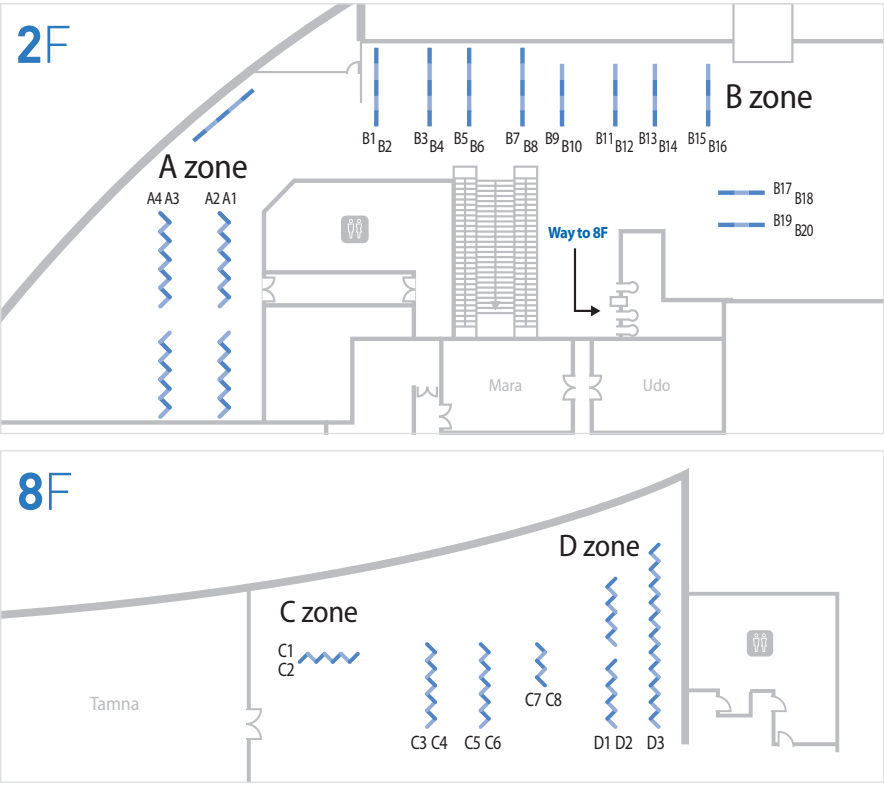
Oral Session

13:20-15:50 | Session Rooms & ZOOM

VENUE LAYOUT



POSTER SESSION LAYOUT



Program	MONDAY, Nov 2	TUESDAY, Nov 3	WEDNESDAY, Nov 4
01	2F A1-A2	2F A1	
02			2F B1-B5
03	2F A3-A4		
04	2F B1-B4	2F A2-A4, B1-B15	
05		8F C1-C5	8F C2-4
06	8F C2-C6		
07	2F B4-B17		
08			8F C4-C8, D1
09	8F C6-C8, D1-D3		
10		8F C5-C8, D1-D3	
11			2F B5-B11
12		2F B15-B20	
13			2F B11-B13

CONFERENCE TOPICS

1-1

Brain-inspired device and architecture

Kyung-min Kim | Korea Advanced Institute of Science and Technology

1-2

Materials and devices for embedded memory technology

Chun-Yeol You | Daegu Gyeongbuk Institute of Science and Technology

1-3

FEOL process and materials for scaled CMOS technology

Tae Joo Park | Hanyang University

1-4

Advanced interconnect process and materials

Sarah Eunkyung Kim | Seoul National University of Science and Technology

2-1

Materials and devices for multi-valued logic technology

Jin-Hong Park | Sungkyunkwan University

2-2

Ferroelectric-based materials, devices and architectures

Sanghun Jeon | Korea Advanced Institute of Science and Technology

2-3

Materials and processes for monolithic 3D integration

Hyun-Yong Yu | Korea University

2-4

Extreme low voltage technology or beyond Boltzman devices and architectures

Kyung Rok Kim | Ulsan National Institute of Science and Technology



01

High performance semiconductor

Kyeong-Sik Min

Kookmin University

Jianhua Yang

University of Massachusetts Amherst



02

Extreme low power semiconductor

Changhwan Choi

Hanyang University



03

Wearable electronics

Jang-ung Park

Yonsei University



04

Materials for frontier displays and optoelectronics

Sang-Hee Ko Park

Korea Advanced Institute of Science and Technology



05

Two-dimensional (2D) van der Waals materials

Gwan-Hyoung Lee

Seoul National University

3-1

Materials for wearable optoelectronics

Keon Jae Lee | Korea Advanced Institute of Science and Technology

3-2

Novel processes and nano-bio interfaces

Woo Soo Kim | Simon Fraser University

3-3

Devices for bio-integrated electronics

Ki Jun Yu | Yonsei University

4-1

Organic and organic-inorganic hybrid light-emitting materials and devices

Tae-Woo Lee | Seoul National University

4-2

Composites, organic, inorganic, and polymeric materials

Jonghee Lee | Hanbat National University

4-3

Thin film transistors

Mamoru Furuta | Kochi University of Technology

4-4

Light emitting diode

Young Wook Ko | GLVISION CO., LTD

5-1

Large-area growth and integration of 2D materials

Feng Ding | Ulsan National Institute of Science and Technology

5-2

Structure, electronic and optical properties of 2D materials and vdW heterostructures

Kwanpyo Kim | Yonsei University

5-3

Advanced electronics based on 2D materials and vdW heterostructures

HeeJun Yang | Sungkyunkwan University



06

Emerging bottom-up nanofabrication

Bong Hoon Kim
Soongsil University

Sheng Li
Korea Advanced Institute of Science and Technology

6-1

Directed self-assembly of block copolymers

Sung Woo Hong | Korea Institute of Industrial Technology

6-2

Nanomaterial assembly for material discovery

Tae Hee Han | Hanyang University

6-3

Bottom-up nanofabrication for device applications

Bong Hoon Kim | Soongsil University



07

Emerging photovoltaic materials

Jin Young Kim
Ulsan National Institute of Science and Technology

Wallace C.H. Choy
The University of Hong Kong

7-1

Photovoltaic halide perovskite materials and devices

Hyun Suk Jung | Sungkyunkwan University

7-2

Inorganic thin film solar energy materials and devices

Byungha Shin | Korea Advanced Institute of Science and Technology

7-3

New materials and device physics in organic & hybrid solar cells

BongSoo Kim | Ulsan National Institute of Science and Technology



08

Hydrogen energy conversion and storage

Caroline Sunyong Lee
Hanyang University

Oi Lun Li
Pusan National University

8-1

Water splitting and CO₂ reduction

Yun Jeong Hwang | Korea Institute of Science and Technology

8-2

Fuel cell: materials for electrodes and electrolytes

EunAe Cho | Korea Advanced Institute of Science and Technology

8-3

Next generation hydrogen energy storage

Hyangsoo Jeong | Korea Institute of Science and Technology

9-1

Lithium and sodium ion batteries

Byoungwoo Kang | Pohang University of Science and Technology

9-2

All-solid-state battery

Yong Joon Park | Kyonggi University

9-3

Next generation energy storage

Taeseup Song | Hanyang University

10-1

Piezoelectric and ferroelectric energy harvesting materials

Sangtae Kim | Hanyang University

10-2

Triboelectric energy harvesting materials

Ju-hyuck Lee | Daegu Gyeongbuk Institute of Science and Technology

10-3

Hybrid and emerging energy harvesting materials

Jungho Ryu | Yeungnam University

11-1

Biomaterials for tissue engineering and regenerative medicine

Nam-Joon Cho | Nanyang Technological University

11-2

Nanomaterials as therapeutic platforms for biomedical applications

Suk Ho Bhang | Sungkyunkwan University

11-3

Biomaterials and biointerfaces for smart biosensors

Seung Soo Oh | Pohang University of Science and Technology



09

High-capacity, low-cost, and safe energy storage

Yun Jung Lee
Hanyang University



10

Energy harvesting materials

Miso Kim
Korea Research Institute of Standards and Science

Haixia (Alice) Zhang
Peking University



11

Biomaterials

Junsang Doh
Seoul National University

12-1

Data-driven material design

Sang Soo Han | Korea Institute of Science and Technology

12-2

Low dimensional materials: from surfaces to clusters

Aloysius Soon | Yonsei University

12-3

Computational design of solar fuel materials

Hyungjun Kim | Korea Advanced Institute of Science and Technology

12-4

Computational approaches for materials characterization

Donghwa Lee | Pohang University of Science and Technology



12

Computational materials science

Sang Soo Han

Korea Institute of Science and Technology

13-1

Imaging and spectroscopic characterization of ultrafast phenomena

Oh-Hoon Kwon | Ulsan National Institute of Science and Technology

13-2

3D imaging using APT and TEM tomography

Pyuck-Pa Choi | Korea Advanced Institute of Science and Technology

13-3

Quantitative local analysis using TEM/SPM

Yunseok Kim | Sungkyunkwan University



13

Advanced nanocharacterization and microscopic modelling

Si-Young Choi

Pohang University of Science and Technology

Teruyasu Mizoguchi

The University of Tokyo

PLENARY SPEAKERS

Peidong Yang

University of California, Berkeley, USA

TUESDAY, November 3

08:30-09:10, Ballroom 1 (2F)

The Chemistry of Making Semiconductor Nanowires for Artificial Photosynthesis



Geoffrey W. Burr

IBM Research – Almaden, USA

TUESDAY, November 3

09:10-09:50, Ballroom 1 (2F)

Accelerating Deep Neural Networks with Analog Memory Devices



Matthias Scheffler

Fritz Haber Institute of the Max Planck Society, Germany

TUESDAY, November 3

17:20-18:00, Ballroom 1 (2F)

FAIR Data Infrastructure and Artificial Intelligence in Materials Science



KEYNOTE SPEAKERS



Kaushik Roy

Purdue University, USA



MONDAY, Nov 2 09:00-09:30, Ballroom 1 (2F)

**In-Memory Computing based
Machine Learning Accelerators:
Opportunities and Challenges**



Qihua Xiong

Nanyang Technological University,
Singapore



MONDAY, Nov 2 11:15-11:45, Tamna (8F)

**Perovskite Semiconductor Optics
and Photonics**



Hyunsang Hwang

Pohang University of Science and
Technology, Korea



MONDAY, Nov 2 09:30-10:00, Ballroom 1 (2F)

**RRAM-Based Synapse and I&F
Neuron Device for Neuromorphic
Pattern Recognition System**



Ji-Seon Kim

Imperial College London, UK



MONDAY, Nov 2 15:20-15:50, Tamna (8F)

**Key Molecular Parameters of
Non-Fullerene Acceptors for High
Performance Organic Solar Cells**



Kazu Suenaga

National Institute of Advanced Industrial
Science and Technology, Japan



TUESDAY, Nov 3 10:10-10:40, Ora (8F)

**Nanoscale Investigation of Local
Optical Properties from Low-
Dimensional Materials Using
Electron Energy-Loss Spectroscopy**



Jeewan Kim

Massachusetts Institute of Technology, USA



WEDNESDAY, Nov 4 11:00-11:30, Ora (8F)

**Mixed-Dimensional Stackable
Electronics Enabled by
Freestanding 2D/3D Materials**

FEATURED
SPEAKERS

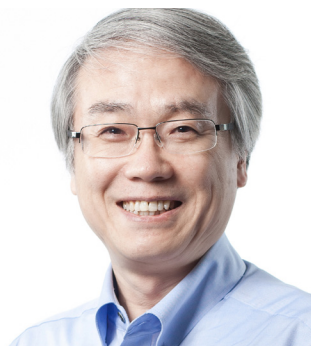
OF

ENGE 2020



Mansoo Choi

Seoul National University, Korea



MONDAY, Nov 2 09:00-09:30, Ora (8F)

**Three Dimensional Nonprinting
via Charged Aerosols**



Jangwon Seo

Korea Research Institute of Chemical
Technology, Korea



MONDAY, Nov 2 15:05-15:35, Ballroom 3 (2F)

**Efficient, Stable and Scalable
Perovskite Solar Cells**



Christoph J. Brabec

Friedrich-Alexander University
Erlangen-Nürnberg, Germany



MONDAY, Nov 2 15:35-16:05, Ballroom 3 (2F)

**Material Strategies to Accelerate
Printed Photovoltaics Towards a
GW Technology**



Kisuk Kang

Seoul National University, Korea



MONDAY, Nov 2 09:00-09:30, Ara (8F)

**The Interlayer Chemistry in
Li-Metal Growth through a Solid
Electrolyte**



Yan Li

Peking University, China



MONDAY, Nov 2 09:30-10:00, Ora (8F)

**Chirality-Specific Synthesis of
Single-Walled Carbon Nanotubes
by Catalyzed Chemical Vapor
Deposition**



Shad Roundy

University of Utah, USA



MONDAY, Nov 2 13:20-13:50, Halla (8F)

**Low Frequency Wireless Power
Transfer for Biomedical Implants**

FEATURED
SPEAKERS

OF
ENGE 2020



H. Tom Soh
Stanford University, USA



WEDNESDAY, Nov 4 09:00-09:30, Ballroom 2 (2F)

**Real-Time Biosensors for
Continuous Measurements of
Biomolecules in Live Subjects**



Karsten Reuter
Fritz Haber Institute of the Max Planck
Society, Germany



TUESDAY, Nov 3 16:30-17:00, Ballroom 2 (2F)

**Knowledge-Based Approaches in
Catalysis and Energy Modeling**

TUTORIAL SPEAKER



Seyoung Kim
Pohang University of Science and Technology, Korea

SUNDAY, Nov 1 19:00-21:00 Ballroom 2-4 (2F)

**Devices and Materials for Deep Learning and
Artificial Intelligence**

SESSION TIMETABLE

MONDAY, November 2									
	Ballroom 1 (2F)	Ballroom 2 (2F)	Ballroom 3 (2F)	Ballroom 4 (2F)	Ara (8F)	Halla (8F)	Tanna (8F)		
09:00-12:00	1-1 Brain-inspired device and architecture p. 030	12-1 Data-driven material design p. 143	7-3 New materials and device physics in organic & hybrid solar cells p. 094	3-3 Devices for bio-integrated electronics p. 047	6-1 Directed self-assembly of block copolymers p. 086	10-1 Piezoelectric and ferroelectric energy harvesting materials p. 124	4-1 Organic and inorganic hybrid light-emitting materials and devices p. 054		
12:00-13:20				Lunch					
13:20-15:50	1-4 Advanced interconnect process and materials p. 031	12-4 Computational approaches for materials characterization p. 144	7-1 Photovoltaic halide perovskite materials and devices p. 095	3-1 Materials for wearable optoelectronics p. 048	6-2 Nanomaterial assembly for material discovery p. 087	10-1 Piezoelectric and ferroelectric energy harvesting materials p. 124	4-2 Composites, organic, inorganic, and polymeric materials p. 054		
15:50-16:10				Coffee Break					
16:10-18:10	1-3 FEOL process and materials for scaled CMOS technology p. 031	12-4 Computational approaches for materials characterization p. 144	7-2 Inorganic thin film solar energy materials and devices p. 095	3-2 Novel processes and nano-bio interfaces p. 048	6-3 Bottom-up nanofabrication for device applications p. 087	10-2 Triboelectric energy harvesting materials p. 125	4-2 Composites, organic, inorganic, and polymeric materials p. 055		
11:00-16:00	2F Lobby 1-1 Brain-inspired device and architecture 1-4 Advanced interconnect process and materials 3-1 Materials for wearable optoelectronics 3-2 Novel processes and nano-bio interfaces 3-3 Devices for bio-integrated electronics 4-1 Organic and inorganic hybrid light-emitting materials and devices 7-1 Photovoltaic halide perovskite materials and devices 7-2 Inorganic thin film solar energy materials and devices 7-3 New materials and device physics in organic & hybrid solar cells 8F Lobby 6-1 Directed self-assembly of block copolymers p. 089 6-2 Nanomaterial assembly for material discovery p. 089 6-3 Bottom-up nanofabrication for device applications p. 091 9-1 Lithium and sodium ion batteries p. 117 9-2 All-solid-state battery p. 119 9-3 Next generation energy storage p. 120								

TUESDAY, November 3								
	Ballroom 1 (2F)	Ballroom 2 (2F)	Ballroom 3 (2F)	Ballroom 4 (2F)	Ora (8F)	Ara (8F)	Halla (8F)	Tamna (8F)
08:30-09:10	Plenary Speech 1 (Peidong Yang) Ballroom 1							
09:10-09:50	Plenary Speech 2 (Geoffrey W. Burr) Ballroom 1							
09:50-10:10	Coffee Break							
10:10-12:40	1-3 FEOL process and materials for scaled CMOS technology p. 032	12-2 Low dimensional materials: from surfaces to clusters p. 145	13-3 Quantitative local analysis using TEM/SPM p. 150	11-1 Biomaterials for tissue engineering and regenerative medicine p. 137	5-2 Structure, electronic properties of 2D materials and vdW heterostructures p. 075	8-2 Fuel cell: materials for electrodes and electrolytes p. 103	10-2 Triboelectric energy harvesting materials p. 126	4-3 Thin film transistors p. 056
12:40-14:00	Lunch							
14:00-17:00	1-2 Materials and devices for embedded memory technology p. 033	12-3 Computational design of solar fuel materials p. 146	13-3 Quantitative local analysis using TEM/SPM p. 151	2-2 Ferroelectric-based materials, devices and architectures p. 041	5-1 Large-area growth and integration of 2D materials p. 076	8-1 Water splitting and CO ₂ reduction p. 103	10-3 Hybrid and emerging energy harvesting materials p. 127	4-3 Thin film transistors 4-4 Light emitting diode p. 057
17:00-17:20	Coffee Break							
17:20-18:00	Plenary Speech 3 (Matthias Scheffler) Ballroom 1							
18:00-19:00	Banquet Preparation						10-3 Hybrid and emerging energy harvesting materials p. 128	Banquet Preparation
	Poster Session 2F Lobby 1-2 Materials and devices for embedded memory technology p. 038 1-3 FEOL process and materials for scaled CMOS technology p. 039 4-2 Composites, organic, inorganic, and polymeric materials p. 061 4-3 Thin film transistors p. 069 4-4 Light emitting diode p. 072 12-1 Data-driven material design p. 147 12-2 Low dimensional materials: from surfaces to clusters p. 147 12-3 Computational design of solar fuel materials p. 147 12-4 Computational approaches for materials characterization p. 148 8F Lobby 5-1 Large-area growth and integration of 2D materials p. 079 5-2 Structure, electronic and optical properties of 2D materials and vdW heterostructures p. 081 10-1 Piezoelectric and ferroelectric energy harvesting materials p. 129 10-2 Triboelectric energy harvesting materials p. 131 10-3 Hybrid and emerging energy harvesting materials p. 134							
19:00-21:00	Banquet Ramada Ballroom							

WEDNESDAY, November 4								
	Ballroom 1 (2F)	Ballroom 2 (2F)	Ballroom 3 (2F)	Ballroom 4 (2F)	Ora (8F)	Ara (8F)	Halla (8F)	Tamna (8F)
09:00-12:00		11-3 Biomaterials and biointerfaces for smart biosensors p. 137	13-1 Imaging and spectroscopic characterization of ultrafast phenomena p. 152	2-1 Materials and devices for multi-valued logic technology p. 042 2-3 Materials and processes for monolithic 3D integration p. 042	5-3 Advanced electronics based on 2D materials and vdW heterostructures p. 077	8-1 Water splitting and CO ₂ reduction p. 104	IBS Atomic 2D Materials science forum p. 028	
12:00-13:20	Lunch							
13:20-15:50		11-2 Nanomaterials as therapeutic platforms for biomedical applications p. 138	13-2 3D imaging using APT and TEM tomography p. 152	2-4 Extreme low voltage technology or beyond Boltzman devices and architectures p. 042	5-3 Advanced electronics based on 2D materials and vdW heterostructures p. 078	8-3 Next generation hydrogen energy storage p. 106	IBS Atomic 2D Materials science forum p. 028	
11:00-16:00	2F Lobby 2-1 Materials and devices for multi-valued logic technology 2-2 Ferroelectric-based materials, devices and architectures 2-3 Materials and processes for monolithic 3D integration 2-4 Extreme low Vdd technology or beyond Boltzman devices and architectures 11-1 Biomaterials for tissue engineering and regenerative medicine 11-2 Nanomaterials as therapeutic platforms for biomedical applications 11-3 Biomaterials and bionterfaces for smart biosensors 13-1 Imaging and spectroscopic characterization of ultrafast phenomena 13-2 3D imaging using APT and TEM tomography 13-3 Quantitative local analysis using TEM/SPM Poster Session 8F Lobby 5-3 Advanced electronics based on 2D materials and vdW heterostructures 8-1 Water splitting and CO₂ reduction 8-2 Fuel cell: materials for electrodes and electrolytes 8-3 Next generation hydrogen energy storage							

PRESENTATION GUIDELINES



ORAL SESSION

Presentation Time

- Keynote / Invited Presentation: 25 min. speech + 5 min. Q&A
- Oral Presentation: 12 min. speech + 3 min. Q&A
- To keep the sessions running to the set schedule and to allow possible questions from the audience, it is very important to keep presentation within the allocated time.
- **Considering being broadcast on ZOOM, please arrive at session room 15 minutes prior to session.**

Presentation Preparation

- Presentation file should be prepared in MS PowerPoint format in English.
- Aspect ratio of the screen is 16:9.
- To avoid software compatibility problems (MS PowerPoint), speakers are advised to save their PowerPoint presentation on a USB memory stick.

No Camera & No Record



Please note that photo taking and video recording are strictly prohibited in the presentation room.



POSTER SESSION

Presentation Day	Set-up Time	Presentation Time	Tear-Down Time
MON-WED November 2-4	Before 11:00 AM	11:00 AM - 4:00 PM	5:00 PM - 6:00 PM

※ Under the social distance policy, direct face-to-face presentation of posters will be omitted.



POSTER AWARDS

ENGE 2020 Best Poster Awards will be given to outstanding contribution to the field of electronic materials and nanotechnology for green environment among the posters presented at the conference.

- This award consists of a KRW 100,000 cash award and a certificate.
- The winners will be announced after the conference via ENGE 2020 website.

LET'S MEET ON ZOOM

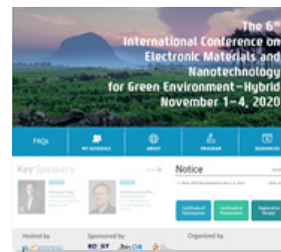
ENGE 2020 offers an alternative option for those who cannot make the trip to Jeju to participate through the online platform. We hope that this new platform will be an active venue to exchange our experience and knowledge!

HOW TO ACCESS THE VIRTUAL PAGE

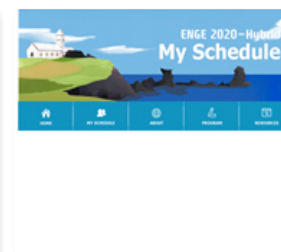


- Participants who have completed registration can only access the virtual page with the registered login information.
- Click "Virtual Conference" on the main page of the website (www.enge2020.org) to access the virtual page.

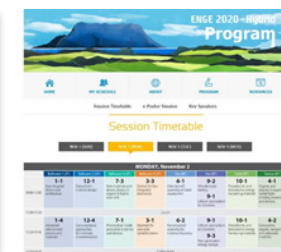
HOW TO MAKE THE MOST OF ENGE 2020 VIRTUAL PAGE



- Ongoing sessions will be displayed on the main page. You can join a session with a single click. Certificate of Attendance and Registration Receipt also can be downloaded.



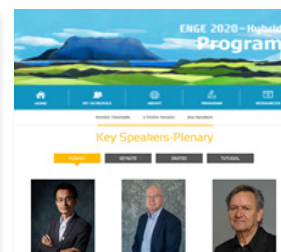
- Create your own timetable!



- You can see the entire sessions at a glance. Click on each session to see a list of presentations and access ZOOM as well.



- Listed below can be downloaded from the resources: Abstracts, Statistics Reports and Program Book



You can easily find the program schedules and access the ongoing ZOOM sessions. You are able to participate in Q&A using the features in ZOOM as well.

Click  ZOOM to join a session!

USEFUL INFORMATION

REGISTRATION DESK | LOBBY (2F)

SUN November 1, 14:00-19:00 MON-WED November 2-4, 08:00-18:00

ON-SITE REGISTRATION FEE

Regular USD 700 | KRW 840,000
Student USD 350 | KRW 420,000 (Banquet USD 50 | KRW 60,000)

★ On-site banquet tickets may be purchased at the registration desk subject to availability and will be provided on a first-come, first-served basis.

NAME BADGE

Name badge is required for admission to all sessions and social events.
Do not miss your coupons in your name badge. (Lunches, Banquet/applicants only)

HEALTH KIT

Hand sanitizer, KF94 mask and mask necklace are provided.

DOWNLOAD YOUR MATERIALS

Abstract, certificate of attendance and registration payment receipt are available to download from the website.

WELCOME RECEPTION

SUN November 1, 17:00-18:30 | Ballroom 1 (2F)
Come and join this entertaining icebreaker of ENGE 2020.

BANQUET

TUE November 3, 19:00-21:00 | Ramada Ballroom (2F)
Enjoy the climax of ENGE 2020 with an excellent dinner.



Parking

Parking is available at no cost during the conference.



Mobile Charge

Mobile device charging is available at the registration desk (2F).



Wi-Fi Access

ENGE2020

Please DO NOT USE 'RAMADA/RAMADA-PAD' Wi-Fi during the conference days.



Secretariat

ENGE 2020 participants can use the secretariat office as lost & found and cloakroom during the conference.

SUN	11/1	14:00-18:00
MON	11/2	08:00-18:00
TUE	11/3	08:00-18:00
WED	11/4	08:00-18:00

Biyang (2F)

SATELLITE SESSION

Atomic 2D Materials Science Forum

2020. 11. 4. (Wed), Ramada Plaza Jeju Hotel, Jeju. Korea

Time	Titles	Speakers
09:30 - 10:00	The routes toward wafer-scale 2D single crystals	Feng Ding (IBS/UNIST)
10:00 - 10:30	Epitaxial Van der Waals semiconductor superlattices	Moon-Ho Jo (IBS/POSTECH)
10:30 - 11:00	Coffee Break	
11:00 - 11:30	TBA	Boris I. Yakobson (Rice Univ.)
11:30 - 12:00	Artificial Van der Waals crystals	Cheol-Joo Kim (POSTECH)
12:00 - 13:30	Lunch	
13:30 - 14:00	Bilayer graphene and its conversion to a new 2D material: F-diamane	Rodney Ruoff (IBS/UNIST)
14:00 - 14:30	TEM imaging of molecular structures and dynamics enabled by graphene membrane	Kwanpyo Kim (Yonsei Univ.)
14:30 - 15:00	Pilot-scale technology & equipment for CVD graphene	Zhongfan Liu (Peking Univ.)
15:00 - 15:30	Surface/phase/interface engineering in 2D materials	Gwan-Hyoung Lee (Seoul Nat'l Univ.)
15:30 - 15:45	Tea Break	
15:45 - 16:15	Atomic and electronic reconstruction at van der Waals interface in twisted 2D materials	Hyobin Yoo (Sogang Univ.)
16:15 - 16:45	Growing high-quality 2D TMDCs by controlling source feeding	Bilu Liu (Tsinghua Univ.)
16:45 - 17:15	Optical studies of atomically thin black phosphorus	Jonghwan Kim (POSTECH)
17:15 - 17:45	Progress of graphene and h-BN at SIMIT	Zengfeng Di (Shanghai Inst of Microsystems)
17:45 - 18:00	Wrap Up	

Organizers: Moon-Ho Jo (IBS-CALDES, POSTECH, mhjo@postech.ac.kr)
Feng Ding (IBS-CMCM, UNIST, f.ding@unist.ac.kr)

PROGRAM





1. High performance semiconductor

ORAL PRESENTATION

1-1. Brain-inspired device and architecture

MONDAY, November 2

Ballroom 1 (2F)

Chair Kyeong-Sik Min (Kookmin University, Korea)

In-Memory Computing based Machine Learning Accelerators: Opportunities and Challenges

09:00-09:30 [Kaushik Roy](#)

KEYNOTE *Purdue University, USA*

09:30-10:00 **RRAM-Based Synapse and I&F Neuron Device for Neuromorphic Pattern Recognition System**

KEYNOTE [Hyunsang Hwang](#)

Pohang University of Science and Technology, Korea

1-0689 **Memristor Devices with Novel Functionality for Neural Computing**

10:00-10:30 [Hongsik Jeong](#)

INVITED *Ulsan National Institute of Science and Technology, Korea*

1-0364 **Computing with Memristive Devices and Arrays**

10:30-11:00 [J. Joshua Yang](#)

INVITED *University of Southern California, USA*

1-0128 **Non-Volatile Memory for Neuromorphic Computing**

11:00-11:30 [Sangbum Kim](#)

INVITED *Seoul National University, Korea*

1-3274 **Bio-Mimetic Tactile Sensor with Intrinsic Intelligence by Synaptic Functions**

11:30-11:45 [Yu Rim Lee](#), Nae-Eung Lee

Sungkyunkwan University, Korea

1-0714 **Control of Tantalum Nanocluster Deposition in Pt/Ta₂O₅/Ti Device Improving Synaptic Properties of Analog Resistive Switching**

11:45-12:00 [Soeun Jin](#)¹, Yonghun Kim², Jung-Dae Kwon²

¹University of Science and Technology, Korea, ²Korea Institute of Materials Science, Korea

1-4. Advanced interconnect process and materials

MONDAY, November 2

Ballroom 1 (2F)

Chair Sarah Eunkyung Kim (Seoul National University of Science and Technology, Korea)

1-1013 **Ligament-Size-Dependent Indentation Size Effect with Two Indenter Types of Nanostructured Materials**

13:20-13:50

INVITED

[Young-Cheon Kim](#)

Andong National University, Korea

1-0679 **Development of Embedded Flexible Hybrid Package Using Robust Soft Bumps**

13:50-14:20

INVITED

[Ah-Young Park](#), Jae Hak Lee, Seungman Kim, Seongheum Han, Jun-Yeob Song

Korea Institute of Machinery and Materials, Korea

1-2865 **Electrical Properties of Co and CoW Nanowires for Interconnect Applications**

14:20-14:35

Eunmin Yoo¹, [Jun Hwan Moon](#)¹, Yoo Sang Jeon¹, Yanghee Kim², Jae-Pyoung Ahn², Seunghyun Kim¹, Young Keun Kim¹

¹Korea University, Korea, ²Korea Institute of Science and Technology, Korea

1-2653 **Atomic Layer Deposition of Tungsten-Based Thin Films Using a New Fluorine-Free W Precursor and Several Reactants Selected by Density Functional Theory Calculation**

14:35-14:50

[Jin-Hyeok Lee](#)¹, Soo-Hyun Kim¹, Dip K. Nandi¹, Won-Jun Lee², Romel Hidayat²

¹Yeungnam University, Korea, ²Sejong University, Korea

1-1445 **Electromigration (EM) Behavior of Ag Interconnect Lines Prepared by Electrohydrodynamic-Jet Printing: Improving EM Failure by Controlling Surface Diffusion**

14:50-15:05

[Prabhakar Jepiti](#), Jihoon Kim

Kongju National University, Korea

1-0397 **Characterizations of Copper Nitride Passivated Surface for Cu Bonding**

15:05-15:20

[Han Kyeol Seo](#)¹, Yoonho Kim¹, Gahui Kim², Young-Bae Park², Sarah Kim¹

¹Seoul National University of Science and Technology, Korea, ²Andong National University, Korea

1-3. FEOL process and materials for scaled CMOS technology

MONDAY, November 2

Ballroom 1 (2F)

Chair Tae Joo Park (Hanyang University, Korea)

1-0281 **Extremely-Low-Power Electron Devices: TFETs and NEM Devices**

16:10-16:40

INVITED

[Woo Young Choi](#)

Sogang University, Korea

1-0224 **Speech Commands Recognition System Built on Embedded Inference SoC with Large-Scale Neural Networks**

16:40-17:10

INVITED

[Choonghyun Lee](#)^{1,2}, Shifan Gao¹, Fan Yang¹, Xiang Qiu², Yi Zhao¹

¹Zhejiang University, China, ²Flash Billion, China

- 1-1546** Density-Functional Theory and Monte Carlo Simulations for Area-Selective Atomic Layer Deposition of Al₂O₃ with Two Al Precursors
 17:10-17:25 [Bonwook Gu](#)¹, Han-Bo-Ram Lee¹, Bonggeun Shong², Chi Thang Nguyen¹, Hyun Gu Kim^{1,3}
¹Incheon National University, Korea, ²Hongik University, Korea, ³Pusan National University, Korea

-  **1-2699** Impact of Stochastic Defects in EUV Lithography
 17:25-17:40 [Sang-Kon Kim](#)
 Hongik University, Korea

- 1-1523** Study about Effects of H₂O and O₃ Reactant on Atomic Layer Deposition HfO₂
 17:40-17:55 [Byeong Guk Ko](#), Bonwook Gu, Mohammad Rizwan Khan, Han-Bo-Ram Lee
 Incheon National University, Korea

TUESDAY, November 3

Ballroom 1 (2F)

Chair Tae Joo Park (Hanyang University, Korea)

-  **1-0245** ALD High-K Dielectrics for Ge- and Graphene-Based Devices: Strategies for the Improvement of Electrical Properties
 10:10-10:40 [Il-Kwon Oh](#)
 INVITED Stanford University, USA

-  **1-0184** Multi-Terminal Memtransistors and Crossbar Array Architecture
 10:40-11:10 [Hong-Sub Lee](#)
 INVITED Kangwon National University, Korea

- 1-1848** Selective Removal of Halogen Atom for Halogen-Free Metal- and Silicon-Nitride with High Film Density and Step Coverage
 11:10-11:25 [Changbong Yeon](#), Jaesun Jung, Hyeran Byun, Sojung Kim, Jin Hee Kim, Kok Chew Tan, Seok Jong Lee, Young-Soo Park
 Soulbrain Co., Ltd., Korea

-  **1-1635** Two-Dimensional Electron Gas at the Interface of an Atomic-Layer-Deposited Binary Oxides Ultrathin (< 5 nm) Film Heterostructures
 11:25-11:40 [Ji Hyeon Choi](#)¹, Tae Jun Seok¹, Yuhang Liu¹, Jae Hyuck Jang², Deok-Yong Cho³, Sang Woon Lee⁴, Tae Joo Park¹
¹Hanyang University, Korea, ²Korea Basic Science Institute, Korea, ³Chonbuk National University, Korea, ⁴Ajou University, Korea

- 1-1463** Simultaneous Reactions of SiO₂ Deposition and Ru Etching during Atomic Layer Deposition
 11:40-11:55 [Sumaira Yasmeen](#), Bonwook Gu, Han-Bo-Ram Lee
 Incheon National University, Korea

-  **1-1092** Atomic Layer Deposition of Metal Thin Film Using Discrete Feeding Method (DFM) and Electric Field/Potential Assisted-Atomic Layer Deposition (EA-ALD)
 11:55-12:10 [Ji Won Han](#), Tae Joo Park, Yoon Jeong Kim
 Hanyang University, Korea

- 1-1235** Atomic Layer Modulation Based on the Steric Hindrance of Precursors
 12:10-12:25 [Chi Thang Nguyen](#)¹, Bonwook Gu¹, Bonggeun Shong², Han-Bo-Ram Lee¹
¹Incheon National University, Korea, ²Hongik University, Korea

1-2. Materials and devices for embedded memory technology

TUESDAY, November 3

Ballroom 1 (2F)

Chair Chun-Yeol You (Daegu Gyeongbuk Institute of Science and Technology, Korea)

-  **1-0275** Recent Development Status of MTJ with TEL PVD EXIM™
 14:00-14:30 [Chang-Man Park](#)¹, Kanto Nakamura², Atsushi Gomi², Hiroki Maehara², Noel Abarra², Naoki Watanabe²
 INVITED ¹Tokyo Electron U.S. Holdings, Inc., USA, ²Tokyo Electron Limited., Japan

-  **1-0279** Past, Present and Future of MRAM Development in Samsung
 14:30-15:00 [Daeshik Kim](#)
 INVITED Samsung Electronics Co., Ltd., Korea

-  **1-0620** Memristive In-Memory Computing
 15:00-15:30 [Kyung Min Kim](#)
 INVITED Korea Advanced Institute of Science and Technology, Korea

-  **1-0686** Spin-Orbit Torque-Induced Magnetization Switching for High-Speed Embedded Memory
 15:30-16:00 [Shunsuke Fukami](#)
 INVITED Tohoku University, Japan

- 1-3060** Enhancing Spin-Orbit Torque Efficiency by Utilizing Ta or V Alloy in the W/CoFeB Interface
 16:00-16:15 [Gyu Won Kim](#)¹, Do Duc Cuong², Yong Jin Kim¹, In Ho Cha¹, Taehyun Kim¹, Minhyeok Lee¹, Oukjae Lee³, Soon Cheol Hong², Sonny H. Rhim², Young Keun Kim¹
¹Korea University, Korea, ²University of Ulsan, Korea, ³Korea Institute of Science and Technology, Korea

- 1-2931** Reduction of Spin-Orbit Torque Switching Current by Inducing Nitrogen-Based Interfacial Engineering
 16:15-16:30 [Minhyeok Lee](#), Yong Jin Kim, Gyu Won Kim, Taehyun Kim, In Ho Cha, Young Keun Kim
 Korea University, Korea

- 1-2216** Proton-Controlled Bimodal Memristor Based on Tyrosine-Rich Peptide
 16:30-16:45 [Min-Kyu Song](#)¹, Seok Daniel Namgung², Daehwan Choi¹, Hyeohn Kim², Hongmin Seo², Misong Ju², Yoon Ho Lee², Taehoon Sung¹, Yoon-Sik Lee², Ki Tae Nam², Jang-Yeon Kwon¹
¹Yonsei University, Korea, ²Seoul National University, Korea

- 1-1494** Biodegradable Magnesium Difluoride Based Bipolar Resistive Switching Memory Devices
 16:45-17:00 [Nayan Chandra Das](#), Min Jae Kim, Janardhanan R. Rani, Sung-Min Hong, Jae-Hyung Jang
 Gwangju Institute of Science and Technology, Korea



1. High performance semiconductor

POSTER PRESENTATION

1-1. Brain-inspired device and architecture

MONDAY, November 2

2F Lobby

- 1-0729 **IGZO Synaptic Transistors with Ta₂O₅ Barrier Layered Chitosan Electric-Double-Layer for Micro-Neural Architecture System**
Sung-Hun Kim, Won-Ju Cho
 Kwangwoon University, Korea
- 1-0731 **Highly Reliable Conductance Modulation of SOI-Based Dual-Gate Charge Trapping Synaptic Transistor**
Shin-Yi Min, Ki-Woong Park, Won-Ju Cho
 Kwangwoon University, Korea
- 1-0806 **Faster Operation with Spike Signal Process Mimicking the Human Brain**
Seungkyu Lee, Steve Park
 Korea Advanced Institute of Science and Technology, Korea
- 1-1139 **Electrochemical Polythiophene Transistors with Enhanced Long-Term Memory Cyclability for Iterative Neuromorphic Computing**
Soo Jin Kim^{1,2}, Jae Seung Jung¹, Ho Won Jang², Hyunsu Ju¹, Jung Ah Lim¹
¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea
- 1-1759 **CBRAM Based on Si Thin Films Grown by Solid Phase Epitaxy and Its Application for Neuromorphic Computing**
Keonhee Kim^{1,2}, Soojin Park^{1,3}, Dae Cheol Kang^{1,2}, Jonghan Song¹, Weoncheol Lim¹, Yeonjoo Jeong¹, Jaewook Kim¹, Suyoun Lee¹, Joon Young Kwak¹, Jongkil Park¹, Byeong-Kwon Ju², Inho Kim¹, Jong Keuk Park¹
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea, ³Hanyang University, Korea
- 1-2018 **Improved Analog Behaviors of Dielectric/a-Si Bilayer Memristors by Ion Implantation for Neuromorphic Computing Applications**
Soojin Park^{1,2}, Keonhee Kim^{1,3}, Daecheol Kang^{1,3}, Su Man Hu^{1,3}, Jonghan Song¹, Weoncheol Lim¹, Yeonjoo Jeong¹, Jaewook Kim¹, Suyoun Lee¹, Joon Young Kwak¹, Jongkil Park¹, Jong Keuk Park¹, Byeong-Kwon Ju³, Doo Seok Jeong², Inho Kim¹
¹Korea Institute of Science and Technology, Korea, ²Hanyang University, Korea, ³Korea University, Korea
- 1-2251 **Study of Linear Synaptic Weight Update in 2D Based Floating Gate Memory**
Eunpyo Park^{1,2}, Minkyung Kim^{1,2}, In Soo Kim¹, Jongkil Park¹, Jaewook Kim¹, Yeonjoo Jeong¹, Suyoun Lee¹, Inho Kim¹, Jong-Keuk Park¹, Gyu Tae Kim², Jiwon Chang³, Kibum Kang⁴, Joon Young Kwak¹
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea, ³Ulsan National Institute of Science and Technology, Korea, ⁴Korea Advanced Institute of Science and Technology, Korea

- 1-2281 **Artificial Synapse Based on CTF Memory with High Coupling Ratio**
Minkyung Kim^{1,2}, Eunpyo Park^{1,2}, In Soo Kim¹, Jongkil Park¹, Jaewook Kim¹, Yeonjoo Jeong¹, Suyoun Lee¹, Inho Kim¹, Jong-Keuk Park¹, Tae-Yeon Seong², Jiwon Chang³, Kibum Kang⁴, Joon Young Kwak¹
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea, ³Ulsan National Institute of Science and Technology, Korea, ⁴Korea Advanced Institute of Science and Technology, Korea
- 1-2540 **Artificial Van Der Waals Hybrid Synapse for Brain-Inspired Neuromorphic Computing**
Seunghwan Seo, Jin-Hong Park
 Sungkyunkwan University, Korea
- 1-2913 **Artificial Synaptic Behaviors in Thin-Film Transistor with HfO_x Gate Insulator and ZnO Channel Layer Deposited by Atomic Layer Deposition**
 Tae-Sik Yoon, Hyerin Lee, Keonwon Beom, Jihye Jeong, Nahyeon Go
 Myongji University, Korea
- 1-2940 **Synaptic Characteristics of Thin-Film Transistor with IZO Channel Layer and HfO_x Gate Insulator**
Keonwon Beom, Hyerin Lee, Chi Jung Kang, Tae-Sik Yoon
 Myongji University, Korea
- 1-2988 **Ferroelectric Synaptic Transistors Based on Epitaxial PZT Film**
Ji Young Lee^{1,2}, Hyung-Jin Choi¹, In-Hwan Baek¹, Seung Hyub Baek¹, Seong Keun Kim¹, Chong Yun Kang^{1,2}, Sahn Nahm², Hyun-Cheol Song¹
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea
- 1-2992 **Fully Digital and Adaptive External Memory Control Circuit for IoT**
 Yong Beom Cho¹, Taepyeong Kim^{1,2}, Sang-Un Park¹
¹Konkuk University, Korea, ²Synopsys, Korea
- 1-3106 **Light-Stimulated Synaptic Characteristics of Photo Transistor with Organic-Inorganic Hybrid Halide Perovskites**
Dohee Lee, Boncheol Ku, Andrey S Sokolov, Yu-Rim Jeon, Haider Abbas, Won Bin Im, Changhwan Choi
 Hanyang University, Korea
- 1-3381 **Stochastic Ovonic Threshold Switch-Based Neuron Device for Restricted Boltzmann Machine**
Seongil Im^{1,2}, Hyejin Lee^{1,2}, Jaeseung Jeong¹, Jeong Ho Cho², Suyoun Lee¹, Hyunsu Ju¹
¹Korea Institute of Science and Technology, Korea, ²Yonsei University, Korea
- 1-3415 **Restricted Boltzmann Machine (RBM)-Oriented Simple Stochastic Neuron Based on the Ovonic Threshold Switch (OTS)**
Hyejin Lee^{1,2}, Seongil Im^{1,2}, Jaesang Lee¹, Seon Jeong Kim^{1,3}, Seong Won Cho^{1,4}, Keunsu Kim², Hyunsu Ju¹, Suyoun Lee^{1,5}
¹Korea Institute of Science and Technology, Korea, ²Yonsei University, Korea, ³Korea University, Korea, ⁴Seoul National University, Korea, ⁵University of Science and Technology, Korea

- 1-3418 **A Study on Electroforming of the Ovonic Threshold Switching (OTS) Device by Using $\text{Sn}_x\text{Ge}_{1-x}\text{Se}_1$ Film**
Jaesang Lee¹, Seongwon Cho^{1,2}, Seonjeong Kim^{1,3}, Hyejin Lee^{1,4}, Suyoun Lee^{1,5}
¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea, ³Korea University, Korea, ⁴Yonsei University, Korea, ⁵University of Science and Technology, Korea

- 1-3419 **Highly Scalable and Frequency-Tunable Nano-Oscillator Based on OTS**
Seon Jeong Kim^{1,2}, Seong Won Cho^{1,3}, Hyejin Lee^{1,4}, Jaesang Lee¹, Tae Yeon Seong², Suyoun Lee^{1,5}
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea, ³Seoul National University, Korea, ⁴Yonsei University, Korea, ⁵University of Science and Technology, Korea

1-4. Advanced interconnect process and materials

MONDAY, November 2

2F Lobby

- 1-0423 **Optimization of Oxidation-Free Cu Bonding Using the Design of Experiment Method**
Hae-Sung Park, Seungmin Park, Sarah Eunkyung Kim
 Seoul National University of Science and Technology, Korea
- 1-0668 **Single Crystalline PMN-PZT Thin Film Bonding Technology for High-Performance MEMS Devices Development**
Ruiguang Ning^{1,2}, Seung-Hyub Baek^{1,2}
¹University of Science and Technology, Korea, ²Korea Institute of Science and Technology, Korea
- 1-0681 **A Study on Diagnostics Method of Pressure Type Vaporizer in In-Situ Processing**
Tae Min Kim^{1,2}, Jae Wook Jeon²
¹Samsung Electronics Co., Ltd., Korea, ²Sungkyunkwan University, Korea
- 1-0896 **Degradation Mechanism of Interfacial Adhesion between Screen-Printed Ag/Polyimide in Temperature/Humidity Environment**
Gahui Kim¹, Kirak Son¹, Byung-Hyun Bae², Hyeonchul Lee³, Young-Bae Park¹
¹Andong National University, Korea, ²VITZROTECH Co., Ltd., Korea, ³STATS ChipPAC Korea Ltd., Korea
- 1-0913 **Ar-N₂ Two-Step Plasma Treatment Effect on the Quantitative Interfacial Adhesion Energy of Cu-Cu Bonding Interface**
Seonghun Choi¹, Gahui Kim¹, Han Kyeol Seo², Sarah Eunkyung Kim², Young-Bae Park¹
¹Andong National University, Korea, ²Seoul National University of Science and Technology, Korea
- 1-1143 **30 A / 900 V AlGaIn/GaN-on-Si Double-Packaged Schottky Barrier Diodes with Controlled Passivation Edge**
JeHo Na, Hyung-Seok Lee, Chi-Hoon Jun, Hyun-Gyu Jang, Zin-Sig Kim, Sang Choon Ko, Woojin Chang, Jae Kyoung Mun, Eun Soo Nam
 Electronics and Telecommunications Research Institute, Korea

- 1-1516 **Fabrication of Graphene Coated Copper Nanoparticles for the Application of TIM (Thermal Interface Materials)**
Dongho Shin¹, Sungjun Choi¹, Sarah Eunkyung Kim², Changsun Yun³, Yik Yee Tan⁴, Caroline Sunyong Lee¹
¹Hanyang University, Korea, ²Seoul National University of Science and Technology, Korea, ³ON Semiconductor, Korea, ⁴ON Semiconductor, USA

- 1-1566 **Observation of Significant Changes in Electrical Properties According to Oxygen Annealing for SrMnO₃/Nb Doped SrTiO₃ Heterostructure**
Jiwoong Yang, Hyunji An, Hojoong Choi, Sanghan Lee
 Gwangju Institute of Science and Technology, Korea

- 1-1854 **Novel Approach of Deposition Method- In-Situ Laser Assisted RF Sputtered Gallium Oxide Thin Films**
Yoo Young Oh, Jung-Hyuk Koh
 Chung-Ang University, Korea

- 1-1858 **CO₂ Laser Assisted RF Sputtered GaN Thin Films on the Sapphire Substrate**
Seoung Hyoun Kim, Jung-Hyuk Koh
 Chung-Ang University, Korea

- 1-1935 **Impedance and Optical Spectroscopy for Degradation Analysis of Doped Organic P-n Heterojunction Charge Generation Layers**
Akpeko Gasonoo¹, Young-Ji Lim¹, Eun-Jeong Jang¹, Hyeon-Sik Ahn^{1,2}, Jonghee Lee¹, Min-Hoi Kim¹, Yonseuk Choi¹, Jae-Hyun Lee¹
¹Hanbat National University, Korea, ²Electronics and Telecommunications Research Institute, Korea

- 1-2458 **A Two-Stage Interposer Based MMIC Power Amplifier**
Hong-Sun Yoon^{1,2}, Minsoo Park¹, Jong-Min Yook¹, Youngcheol Park², Dongsu Kim¹
¹Korea Electronics Technology Institute, Korea, ²Hankuk University of Foreign Studies, Korea

- 1-2527 **Fabrication of Rh Coated NiCo MEMS Probe Tips Using Electroplating Method**
Na-Young Kang, Jae-Ho Lee
 Hongik University, Korea

- 1-2563 **Real Time Raman Monitoring Method on Cleaning Solutions**
Da Won Ahn, Jin Hyun Choe, Jin Seok Kim, Sung Gyu Pyo
 Chung-Ang University, Korea

- 1-2711 **Electrical Properties of SiGe/W Plate Node in DRAM Capacitor**
Yongyeol Lee, Byoungdeog Choi
 Sungkyunkwan University, Korea

- 1-2796 **Joint Properties of Pb-Free Solders by Laser Processes with Joining Conditions for 3-D MID**
Byeongjin Ahn^{1,2}, Gyu-Won Jeong^{1,3}, Dae-Young Park¹, Seungju Baek^{1,4}, Jungsoo Kim¹, Young-Bae Park², Yong-Ho Ko^{1,5}
¹Korea Institute of Industrial Technology, Korea, ²Andong National University, Korea, ³Sungkyunkwan University, Korea, ⁴Incheon National University, Korea, ⁵University of Science and Technology, Korea

- 1-3246 **New Fan-Out Package Structure with Electromagnetic Interference Shielding Effect and Moisture Ventilation at Package Level**
Bokung Joung, Young-Ho Kim
Hanyang University, Korea
- 1-3456 **Microstructure Formation and Joint Strength of Transient Liquid Phase Sintering with Ni and Sn Powders**
 Dongyurl Yu, Jongmin Jeong, Juyoung Kim, Junhyeok Son, Junghwan Bang, Min-Su Kim
Korea Institute of Industrial Technology, Korea

1-2. Materials and devices for embedded memory technology

TUESDAY, November 3

2F Lobby

- 1-0439 **Analog and Digital Bipolar Resistive Switching Characteristics of NiO Based Devices**
Young Ran Park
Hanyang University, Korea
- 1-0869 **Spin Precession and Spin-Charge Conversion in a Strong Rashba Channel at Room Temperature**
Seong Been Kim^{1,2}, Jeehoon Jeon^{1,2}, Hyung-Jun Kim², Joonyeon Chang², Hyun Cheol Koo^{1,2}
¹Korea University, Korea, ²Korea Institute of Science and Technology, Korea
- 1-1225 **The Comprehensive Study of the Growth and Characteristics of SrRuO₃ Thin Films Deposited on SiO₂ Substrates without Buffer Layer by RF Magnetron Sputtering**
 Hyun Min Kim¹, Hyo Jin Bang¹, Jong Hoon Lee², Ahram Yom¹, Hong Seung Kim¹, Ji-Hoon Ahn³
¹Korea Maritime and Ocean University, Korea, ²Ulsan National Institute of Science and Technology, Korea, ³Hanyang University, Korea
- 1-1599 **Resistive Switching Memory Devices Based on 2D Halide Perovskites**
Hyojung Kim, Ho Won Jang
Seoul National University, Korea
- 1-2078 **Low Power Programmable Synaptic Behaviors of Memristive Devices Based on ZIF-8:PVP Hybrid Composites**
Younjae Jeon, Youngpyo Jeon, Taewhan Kim
Hanyang University, Korea
- 1-2371 **Synaptic Behaviors of Memristors Based on Yttrium Oxide/Silicon Oxide Nanoparticle Bilayer Utilizing Their Potential Hydrogen**
Jeong Woon Lee, Young Pyo Jeon, Tae Whan Kim
Hanyang University, Korea
- 1-2390 **Self-Rectifying Resistive Switching Memory with Improved Retention in Pt/TaO_x/HfO₂/Pt Structure**
Ji Hoon Sung, Tae Geun Kim, Ju Hyun Park
Korea University, Korea

- 1-2533 **Off Current Reduction in NbO₂-Based Selector Device Using Ti Doping**
 Dongsu Jeon, Minji Yu, Taegeun Kim
Korea University, Korea
- 1-2861 **Effect of MgO Spacer Layer between Pt and CoFeSiB on Interfacial Dzyaloshinskii-Moriya Interaction**
Taehyun Kim¹, In Ho Cha¹, Yong Jin Kim¹, Gyu Won Kim¹, Andrey Stashkevich², Yves Roussigné², Mohamed Belmeguenai², Salim M. Chérif², Alexander S. Samardak³, Young Keun Kim¹
¹Korea University, Korea, ²Université Sorbonne Paris Nord, France, ³Far Eastern Federal University, Russia
- 1-3588 **Rectifying Behavior of Amorphous Oxide/Insulator Coupled Unipolar Selector**
Tae Kwon Lee, Duck Kyun Choi
Hanyang University, Korea

1-3. FEOL process and materials for scaled CMOS technology

TUESDAY, November 3

2F Lobby

- 1-0659 **The Impacts of Csl and STI Mechanical Stress Effect on Device Performance for UTBB FD-SOI MOSFET**
Byung Eun Yun^{1,2}, Yk Hong¹, Young-Sang Jung¹, Youngmok Kim¹, Jin-Hong Park², Kyung-Lyong Kang¹, Jun-Gu Kang¹
¹Samsung Electronics Co., Ltd., Korea, ²Sungkyunkwan University, Korea
- 1-0736 **Development of Ni Silicidation Process and Schottky Barrier SOI MOSFET Using Low Thermal Budget Microwave Annealing**
 Won-Ju Cho, Man-Ho Cho
Kwangwoon University, Korea
- 1-1757 **Fabrication Technology of Localized Silicon-on-Insulator Using Epitaxial Lateral Over-Growth**
Sang Hoon Kim, Seong Hyun Lee, Tae Moon Roh, Jeong-Woo Park, Kyu-Sung Lee, Dongwoo Suh
Electronics and Telecommunications Research Institute, Korea
- 1-1784 **Low-Resistivity Molybdenum Thin Films Deposited by Atomic Layer Deposition Using a New Reducing Agent**
Min-Ji Ha, Jeong-Hun Choi, Ji-Hoon Ahn
Hanyang University, Korea
- 1-1925 **Kink Effects in AlGaIn/GaN Heterostructure Field-Effect Transistors with Ga₂O_x Interlayers**
Kwangeun Kim
Hongik University, Korea
- 1-2322 **Refresh Improvement in DRAM with Buried Word Line Structure Using Poly/Metal Dual Work Function Gate**
Mijung Jang^{1,2}, Younghan Roh¹
¹Sungkyunkwan University, Korea, ²Samsung Electronics Co., Ltd., Korea

- 1-3803 **Yieldable Digital Twins for Prediction of 3D FinFET Manufacturability**
Jeong Guk Min^{1,2}, Sang Do Noh¹, Jaehyuk Choi¹
¹Sungkyunkwan University, Korea, ²Samsung Electronics Co., Ltd., Korea
- 1-3823 **Reliability Analysis on TIN Gated NMOS Transistors**
Kabjin Nam, Byoungdeog Choi
 Sungkyunkwan University, Korea



2. Extreme low power semiconductor

ORAL PRESENTATION

2-2. Ferroelectric-based materials, devices and architectures

TUESDAY, November 3

Ballroom 4 (2F)

Chair Sanghun Jeon (Korea Advanced Institute of Science and Technology, Korea)

2-2367 **Defect Chemistry in Fluorite-Structure Ferroelectrics and Its Effects on Practical Applications**

14:00-14:30 Min Hyuk Park

INVITED *Pusan National University, Korea*

2-0908 **Unit-Cell-Scale Switchability in Ferroelectric HfO₂ for Ultra-Dense Memory Devices**

14:30-15:00 Jun Hee Lee

INVITED *Ulsan National Institute of Science and Technology, Korea*

2-3069 **Microstructural and Dielectric Properties of Compositionally Graded Ba_{1-x}Sr_xTiO₃ Multilayer Ceramic Capacitor for Wide Temperature Range Tunable Devices**

Hyun-Ju Choi, Hyun-Gyu Hwang, Dae-Su Kim, Sahn Nahm
Korea University, Korea

2-1023 **Growth and Characterization of Single Crystalline Hafnia-Based Thin Film**

15:15-15:30 Jun-Cheol Park, Sehun Seo, Jongmin Lee, Sanghan Lee
Gwangju Institute of Science and Technology, Korea

2-1004 **Experimental Realization of Strain-Induced Ferroelectricity in SrMnO₃ Films via Selective Oxygen Annealing**

Hyunji An, Sanghan Lee
Gwangju Institute of Science and Technology, Korea

2-0932 **Ferroelectric Polymer-Based Artificial Synapse for Neuromorphic Computing**

15:45-16:00 Sungjun Kim, Keun Heo, Jin-Hong Park
Sungkyunkwan University, Korea

2-0699 **Analysis and Modeling of Negative Capacitance Effect in the Equivalent Circuit of Hafnia-Based Ferroelectric Capacitors**

Dante Ahn, Yoseop Lee, Woori Ham, Sungmun Song, Seung-Eon Ahn
Korea Polytechnic University, Korea

2-3731 **Incorporation of Solution Derived Hafnium Zirconate Ferroelectric Negative Capacitor for Low Power Field-Effect Transistors**

Pavan Pujar, Haewon Cho, Sunkook Kim
Sungkyunkwan University, Korea

2-1. Materials and devices for multi-valued logic technology

2-3. Materials and processes for monolithic 3D integration

WEDNESDAY, November 4

Ballroom 4 (2F)

Chair Heo Keun (Sungkyunkwan University, Korea)

 2-0554 Tunneling-Based Ternary Metal–Oxide–Semiconductor Technology for Digital Paradigm Shift
09:00–09:30 [Kyung Rok Kim](#)
INVITED *Ulsan National Institute of Science and Technology, Korea*

 2-0222 Impact of a Nonvolatile Multiple-Valued Circuit Technique for Energy-Efficient Binarized Neural-Network Hardware
09:30–10:00 [Takahiro Hanyu](#)
INVITED *Tohoku University, Japan*

 2-0174 Organic Anti-Ambipolar Transistor for Multi-Valued Logic Circuit
10:00–10:30 [Yutaka Wakayama](#)
INVITED *National Institute for Materials Science, Japan*

 2-1731 Monolithic 3D Technology for Optoelectronic Applications
10:30–11:00 [Sanghyeon Kim](#)
INVITED *Korea Advanced Institute of Science and Technology, Korea*

 2-0208 Surface and Interface Modification with Intense Optical Process for Next Generation Semiconductor Devices
11:00–11:30 [Hyuk-Jun Kwon](#)
INVITED *Daegu Gyeongbuk Institute of Science and Technology, Korea*

 2-0505 Vertical Organic Thin Film Transistors for High Performance and Low Power Operation with Anodization
11:30–11:45 [Kyung-Geun Lim](#)¹, [Hans Kleemann](#)², [Karl Leo](#)²
¹*Korea Research Institute of Standards and Science, Korea*, ²*Dresden Integrated Center for Applied Physics and Photonic Materials, Germany*

 2-2687 Memory Switches Based on Monolayer hBN for RF/5G Communication Systems
13:50–14:20 [Myungsoo Kim](#), [Deji Akinwande](#)
INVITED *The University of Texas at Austin, USA*

 2-0408 Challenges and Opportunities in Memristor-Based Neuromorphic Computing Hardware Towards Artificial Intelligence (AI)
14:20–14:50 [Shinhyun Choi](#), [Tae-Ryong Kim](#), [Beomjin Kim](#)
INVITED *Korea Advanced Institute of Science and Technology, Korea*

 2-0377 Novel Device Applications Using Thickness Modulated Semiconductor to Metal Transformation in 2-Dimensional Materials
14:50–15:20 [Jiwon Chang](#)¹, [Joon Young Kwak](#)², [Tanmoy Das](#)¹, [Eunyeong Yang](#)¹, [Jae Eun Seo](#)¹, [Jeonghyeon Kim](#)¹, [Dongwook Seo](#)¹
¹*Ulsan National Institute of Science and Technology, Korea*, ²*Korea Institute of Science and Technology, Korea*

2-3187 A Novel Gate-Normal Hetero-Gate-Dielectric (GHG) Tunnel Field-Effect Transistors (TFETs) for Improving Subthreshold Swing (SS)
15:20–15:35 [Jang Woo Lee](#), [Woo Young Choi](#)
Sogang University, Korea

2-2935 Island-Style Monolithic Three-Dimensional CMOS–Nanoelectromechanical Reconfigurable Logic Circuits
15:35–15:50 [Hyug Su Kwon](#), [Woo Young Choi](#)
Sogang University, Korea

 2-2934 High Performance Doping-Free All-PtSe₂ Transistor Enabled by PtSe₂ Van Der Waal Electrodes via Thickness-Modulated Phase Transition
15:50–16:05 [Tanmoy Das](#)¹, [Eunyeong Yang](#)¹, [Jae Eun Seo](#)¹, [Jeong Hyeon Kim](#)¹, [Eunpyo Park](#)², [Minkyung Kim](#)², [Dongwook Seo](#)¹, [Joon Young Kwak](#)², [Jiwon Chang](#)¹
¹*Ulsan National Institute of Science and Technology, Korea*, ²*Korea Institute of Science and Technology, Korea*

2-4. Extreme low voltage technology or beyond Boltzman devices and architectures

WEDNESDAY, November 4

Ballroom 4 (2F)

Chairs Changhwan Choi (Hanyang University, Korea)
Byoung Hun Lee (Gwangju Institute of Science and Technology, Korea)

 2-3615 Design/System Technology Co-Optimization for 3nm Node and Beyond
13:20–13:50 [Stanley Song](#)
INVITED *Qualcomm Technologies, Inc., USA*



2. Extreme low power semiconductor

POSTER PRESENTATION

2-1. Materials and devices for multi-valued logic technology

WEDNESDAY, November 4

2F Lobby

- 2-1931 **A Study on the Degradation Mechanism of Vertical Stacked ZnO TFT**
Seung-Mo Kim, Ho-In Lee, So-Young Kim, Yongsu Lee, Hyeon Jun Hwang, Byoung Hun Lee
Gwangju Institute of Science and Technology, Korea
- 2-2037 **Low Temperature and Parameter Controllable ZnO-DNTT Antiambipolar Transistor and Its Ternary Application**
Yongsu Lee, Seung-Mo Kim, Ho-In Lee, So-Young Kim, Cihyun Kim, Hyeon Jun Hwang, Byoung Hun Lee
Gwangju Institute of Science and Technology, Korea
- 2-2512 **Partial Gating-Induced Negative Differential Transconductance for Multi-Valued Logic Computing**
Kyeong-Bae Lee, Jin-Hong Park
Sungkyunkwan University, Korea
- 2-3471 **Flexible Ionic Conducting Hydrogel Based Resistive Memory**
Yun He, Robert K. Y. Li
City University of Hong Kong, Hong Kong

2-2. Ferroelectric-based materials, devices and architectures

WEDNESDAY, November 4

2F Lobby

- 2-0709 **Solution-Processed Organic Polymer Semiconductor in a Dual-Gate Structure to Achieve Multi-Bit Ferroelectric Nonvolatile Memory Device**
Amos Amoako Boampong, Jae-Hyeok Cho, Yoonseuk Choi, Min-Hoi Kim
Hanbat National University, Korea
- 2-1050 **Sensing and Memorising Liquids Information with Polarity-Interactive Ferroelectric Sound**
Eui Hyuk Kim, Cheolmin Park
Yonsei University, Korea
- 2-1194 **Selective Etching Method of Ferroelectric and Dielectric Polymer Layers for Organic Memory Cell**
Jae-Hyeok Cho, Amos Amoako Boampong, Min-Hoi Kim
Hanbat National University, Korea
- 2-1342 **Artificially Intelligent Neuromorphic Tactile Sensing Memory**
Kyuhoo Lee, Cheolmin Park
Yonsei University, Korea

- 2-1559 **Enhanced Electrical Properties of $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$ Thin Films by Various Interface Pre-Treatment**
Hyo-Bae Kim, Seung Won Lee, Ji-Hoon Ahn
Hanyang University, Korea
- 2-1722 **Reduced Annealing Temperature for $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$ Thin Films via Deep-Ultraviolet Irradiation**
Hyunjin Joh¹, Gopinathann Anoop¹, Won Jun Lee¹, Hun Kim², Tae Yeon Kim¹, Jun Young Lee¹, Sanghun Jeon², Seungbum Hong², Ji Young Jo¹
¹Gwangju Institute of Science and Technology, Korea, ²Korea Advanced Institute of Science and Technology, Korea
- 2-1788 **Electrical Characteristics of $\text{Nb}_2\text{O}_5/\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$ Double Layer in MFIM Structure**
Yoseop Lee, Dante Ahn, Woori Ham, Sungmun Song, Seung-Eon Ahn
Korea Polytechnic University, Korea
- 2-2468 **Direct Observation of Electric Field-Induced Ultrahigh Piezoelectric Strain in Sn-Doped BaTiO_3 Relaxor Epitaxial Thin Film**
Tae Yeon Kim¹, Sanjith Unithrattil¹, Gopinathan Anoop¹, Jaegyu Kim², Woosoon Choi³, Jun Young Lee¹, Seong Min Park¹, Woojun Seol¹, Jeoh Choi¹, Hyunjin Joh¹, Su Young Lee⁴, Jiwon Yeom², Seungbum Hong², Young-Min Kim³, Ji Young Jo¹
¹Gwangju Institute of Science and Technology, Korea, ²Korea Advanced Institute of Science and Technology, Korea, ³Sungkyunkwan University, Korea, ⁴Pohang Accelerator Laboratory, Korea
- 2-2476 **In-Situ Strain Engineered SrMnO_3 Epitaxial Thin Films**
Seongmin Park¹, Chang Jae Yoon¹, Gopinathan Anoop¹, Tae Yeon Kim¹, Young Min Kim², Ji Young Jo¹
¹Gwangju Institute of Science and Technology, Korea, ²Sungkyunkwan University, Korea
- 2-2483 **Unconventional Strain Controlled Thin Film Using Exsolution Method**
Je Oh Choi, Tae Yeon Kim, Kwang Sup Eom, Ji Young Jo
Gwangju Institute of Science and Technology, Korea
- 2-3094 **Impacts of O_3 Dose on the Ferroelectric Properties and Its Time-Dependent Deterioration of ALD $\text{Hf}_{1-x}\text{Zr}_x\text{O}_2$ Thin Film**
Youngjun Lee, Boncheol Ku, Yue Ma, Yooncheol Shin, Changhwan Choi
Hanyang University, Korea
- 2-3118 **Influence of Oxidant Types on the Ferroelectric Properties of ALD Undoped HfO_2 Thin Film**
Yooncheol Shin, Boncheol Ku, Yue Ma, Youngjun Lee, Changhwan Choi
Hanyang University, Korea
- 2-3413 **Field-like Spin-Orbit Torque Induced by Bulk Rashba Channel in GeTe/NiFe Bilayers**
Seong Won Cho^{1,2}, Jeehoon Jeon^{1,3}, Seungwu Han², Kyung-Jin Lee³, Hyun Cheol Koo^{1,3}, Suyoun Lee^{1,4}
¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea, ³Korea University, Korea, ⁴Korea University of Science and Technology, Korea

2-3. Materials and processes for monolithic 3D integration

WEDNESDAY, November 4

2F Lobby

- 2-1521 Crystallization of an Amorphous Silicon Thin Film Using Laser Annealing with Simultaneous Use of Continuous-Wave and Pulsed Lasers
Jeongsang Pyo, Han-Youl Ryu
Inha University, Korea
- 2-2598 Determination of Composition Particle Size Distribution in Oxide Abrasive Slurry after Chemical Mechanical Polishing Process Using Raman Spectra
Jin Hyun Choe, Da Won Ahn, Jin Seok Kim, Sung Gyu Pyo
Chung-Ang University, Korea

2-4. Extreme low voltage technology or beyond Boltzman devices and architectures

WEDNESDAY, November 4

2F Lobby

- 2-3215 Plasmonic THz Detector Based on Low Voltage Cold FET for High-Integration THz Imaging System
Sang Hyo Ahn, Min Woo Ryu, E-San Jang, Jong Yul Park, Kyung Rok Kim
Ulsan National Institute of Science and Technology, Korea
- 2-3446 Study on the Electrical Characteristics of MOSFET with VO₂ Layer Stacked on the Gate Oxide
Joonho Park, Unhyun Im, Sangwan Kim
Ajou University, Korea



3. Wearable electronics

ORAL PRESENTATION

3-3. Devices for bio-integrated electronics

MONDAY, November 2

Ballroom 4 (2F)

- Chairs Jang-Ung Park (Yonsei University, Korea)
Wooyoung Shim (Yonsei University, Korea)
-  3-1363 Nanostructured Ultra-Compact Semiconductor Devices for Advanced Electronic and Optoelectronic Applications
09:00-09:30
INVITED Munho Kim
Nanyang Technological University, Singapore
-  3-0469 Soft Wearable Sensors Capable of Differentiation and Parallel Processing of Tactile Signals, Inspired from Human Somatosensory System
09:30-10:00
INVITED Steve Park
Korea Advanced Institute of Science and Technology, Korea
- 3-0384 Biointegrated Optoelectronic Devices with Radiative Coolers for Highly Reliable Data Acquisition
10:00-10:30
INVITED Young Min Song
Gwangju Institute of Science and Technology, Korea
-  3-0284 Miniaturized, Wireless, Wearable Sensors for Biomedical Application
10:30-11:00
INVITED Jeonghyun Kim
Kwangwoon University, Korea
-  3-1779 Quantitative Remote Monitoring of Human Diseases with Mobiles through Soft, Smart Contact Lenses
11:00-11:15
Eunkyung Cha, Jang-Ung Park
Yonsei University, Korea
-  3-1453 In Situ Electromechanical Investigations of Strained Nanomaterials
11:15-11:30
Steven Boles
The Hong Kong Polytechnic University, Hong Kong
-  3-1172 Biomedical Modelling of Cardiac Organoid Using Pressure Sensor
11:30-11:45
Moohyun Kim, Jae Chul Hwang, Jang-Ung Park
Yonsei University, Korea
-  3-3748 A Highly Integrated 3D Deformable Heterogeneous Sensors Based Wearable Emergency Device for All-Day Biological Analysis
11:45-12:00
Muhammad Nagi, Srinivas Gandla, Pavan Pujar, Yoochan Won, Seungho Baek, Sunju Kang, Jonghwan Shin, Hyeyun Lee, Sunkook Kim
Sungkyunkwan University, Korea

3-1. Materials for wearable optoelectronics

MONDAY, November 2Ballroom 4 (2F)

- Chairs

Ho Won Jang (Seoul National University, Korea)
Jang-Ung Park (Yonsei University, Korea)
- 3-3533

Fundamentals about 2D Materials for Wearable Devices

13:20-13:50

13:20-13:50

INVITED

Jiong Zhao¹, Thuc Hue Ly²

¹The Hong Kong Polytechnic University, Hong Kong, ²City University of Hong Kong, Hong Kong
- 3-1003

A Bioinspired Ion Channel for Optoelectronic Wearable Sensory Skins

13:50-14:20

13:50-14:20

INVITED

Joo Sung Kim, Vipin Amoli, Yoon Sun Chung, Yunah Kim, Hyukmin Kweon, Hanbin Choi, Do Hwan Kim

Hanyang University, Korea
- 3-0863

3D Integrated Wearables & Sensing Robot Systems

14:20-14:50

14:20-14:50

INVITED

Woo Soo Kim

Simon Fraser University, Canada
- 3-0373

Printable Highly Flexible Electrodes for Organic and Perovskite Solar Cells

14:50-15:20

14:50-15:20

INVITED

Zijian Zheng

The Hong Kong Polytechnic University, Hong Kong
- 3-1170

In-Situ Cardiac Disease Diagnosis and Treatment Using Implantable Flexible Pressure Sensor

15:20-15:35

15:20-15:35

Jae Chul Hwang, Moohyun Kim, Jang-Ung Park

Yonsei University, Korea

3-2. Novel processes and nano-bio interfaces

MONDAY, November 2Ballroom 4 (2F)

- Chairs

Young Min Song (Gwangju Institute of Science and Technology, Korea)
Wooyoung Shim (Yonsei University, Korea)
- 3-0615

Flexible Bio-Integrated Electronics for Applications in Human-Health

16:10-16:40

16:10-16:40

INVITED

Ki Jun Yu

Yonsei University, Korea
- 3-0158

Materials and Technologies for Soft and Multimodal Neural Interfacing

16:40-17:10

16:40-17:10

INVITED

Linlin Lu¹, Siyuan Zhao¹, Gen Li¹, Zheng Xu¹, Jing Zhang¹, Shiyuan Wei¹, Zhifeng Liang², Xiaojie Duan¹

¹Peking University, China, ²Institute of Neuroscience, Chinese Academy of Sciences, China
- 3-3655

Hydrogel-Templated Transfer-Printing of Conductive Nanonetworks for Wearable Sensors on Topographic Flexible Substrates

17:10-17:25

17:10-17:25

Seongjin Park, Hyunjung Yi, Tae-Hyung Kang, Hochan Chang, Dongwon Choi, Soonwoo Kim, Jihee Moon, Jung Ah Lim, Ki-Young Lee

Korea Institute of Science and Technology, Korea

- 3-1371

Wireless Diagnosis and Treatment of Dry Eye Syndrome Based on Smart, Soft Contact Lens

17:25-17:40

17:25-17:40

Jiuk Jang, Jang-Ung Park

Yonsei University, Korea

POSTER PRESENTATION

3-1. Materials for wearable optoelectronics

MONDAY, November 22F Lobby

- 3-0761

Assemblies of Flexible Photodetectors, Circuits, and Data Transmission on Fabrics for Smart Fashion

[Wonjae Lee](#)¹, Son Singh¹, Rahim Abdur¹, Kyung-Wook Paik², Jaegab Lee¹

¹Kookmin University, Korea, ²Korea Advanced Institute of Science and Technology, Korea
- 3-0991

Fiber Optoelectronic Devices for Wearable Applications Based on Conformal Transferring of Inkjet-Printed Carbon Nanotube Microelectrodes

[Hyoung Jun Kim](#), Tae-Hyung Kang, Hyunjung Yi, Jung Ah Lim

Korea Institute of Science and Technology, Korea
- 3-1130

Effects of a Novel Annealing Method and in Doping on Properties of ZnO Films Obtained by Sol-Gel Spin-Coating Method

[Euije Jo](#), Dongwan Kim, Jae-Young Leem

Inje University, Korea
- 3-1729

Magneto-Interactive 3D Motion Tracking Electroluminescence Display

[Seung Won Lee](#), Jihye Jang, Cheolmin Park

Yonsei University, Korea
- 3-2108

Bioenzyme-Functionalized Polymer Semiconductor Gel Based Non-Invasive Biotransistor for Highly Sensitive and Stable Glucose Monitoring in Aqueous Environment

[Hyukmin Kweon](#)¹, Han Wool Park¹, Jaehee Kim¹, Chaeyoung Lee¹, You Seung Rim², Do Hwan Kim¹

¹Hanyang University, Korea, ²Sejong University, Korea
- 3-2142

Low-Voltage and Highly Stretchable Freestanding All-Carbon Transistors Gated by Multifunctional Elastomer Electrolyte

[Han Wool Park](#)¹, Do Hyung Park¹, Kyungah Nam¹, Shinyoung Choi², Yoon Sun Chung¹, Bongsoo Kim², Do Hwan Kim¹

¹Hanyang University, Korea, ²Ulsan National Institute of Science and Technology, Korea
- 3-2151

Cephalopod Inspired Dynamic Multicolor Electrochromic Skin Based on Highly Deformable Iontronic Polymer Pump

[Chaeyoung Lee](#)¹, Jehyoung Koo¹, Hyukmin Kweon¹, Vipin Amoli¹, So Young Kim², Do Hwan Kim¹

¹Hanyang University, Korea, ²Korea Research Institute of Chemical Technology, Korea
- 3-2283

Realization of Indium-Gallium Nanoparticles with Sub-50nm Scale Using Ultrasonication

[Yeonjee Jeon](#), Jung-Yong Lee

Korea Advanced Institute of Science and Technology, Korea

- 3-2352

High Performance Ionic Polymer-Metal Composite Based Mechanotransducer Enables Haptic Feedback

[Hanbin Choi](#)¹, Yongchan Kim², Joo Sung Kim¹, Changhyeon Cho², Hojin Lee², Do Hwan Kim¹

¹Hanyang University, Korea, ²Soongsil University, Korea
- 3-2359

A Flexible, Dual Mode Tactile Sensor Facilitated by Spreading of Ionic Liquid Pinned on Graphene Grid

[Joo Sung Kim](#)¹, Wi Hyoung Lee², Do Hwan Kim¹

¹Hanyang University, Korea, ²Konkuk University, Korea
- 3-2427

LEGO Type Assembly of Perovskite Solar Cell on Textile Fabrics to Make Module

[Rahim Abdur](#), Kuddus Sheikh Md Abdul, Son Singh, Wonjae Lee, Jaegab Lee

Kookmin University, Korea
- 3-2793

A Novel Three-Dimensional (3D) Polymer Electrolyte Layer for the Flexible Electrochromic Devices

[Jinhyeok Ahn](#), Jinsol Im, Kuk Young Cho

Hanyang University, Korea
- 3-3315

Strain-Induced Enhancement of Photocurrent in Transferred ZnO Thin Films onto Flexible Substrates

[Jeong Heum Mun](#), Hanjin Lee, Dong Hun Kim

Myongji University, Korea

3-2. Novel processes and nano-bio interfaces

MONDAY, November 22F Lobby

- 3-2137

Combining Interference Lithography and Two Photon Lithography Technique for Large Area Covered Photonic Crystal Structures with Controlled Defect

[Hongsub Jee](#), Jaehyeong Lee

Sungkyunkwan University, Korea
- 3-2872

Textile Strain Sensor Knitted with Conductive Aluminum-Coated Yarn, for Wearable Electronics

[Junhyeok Jang](#), Suji Kim, Hyemi Kim, Seungjun Park, Mijung Lee

Kookmin University, Korea
- 3-3184

Atomic Layer Deposition Processed Fibertronic Pressure Sensor with Metal-Insulator-Oxide Semiconductor Diode

[Joo Hyung Kim](#), Hye-In Yeom, Sang-Hee Ko Park

Korea Advanced Institute of Science and Technology, Korea
- 3-3287

Process Development for Internal Strain Evaluation in Wearable Devices

[Tae-Ik Lee](#)

Korea Institute of Industrial Technology, Korea

3-3. Devices for bio-integrated electronics

MONDAY, November 2

2F Lobby

- 3-0752 **Enhancing Humidity Sensing Performance by Inkjet Printing of Polyimide and TiO₂ Nanoparticles**
[Frances Danielle Fernandez](#), Bissannagari Murali, Jihoon Kim
Kongju National University, Korea
- 3-1073 **Flexible Neural Electrode Array for Three-Dimensional Mapping of Electrical Activity from the Cerebral Cortex**
[Younguk Cho](#), Sanghoon Park, Juyoung Lee, Kijun Yu
Yonsei University, Korea
- 3-1151 **Ultra-Sensitive, Multi-Channel and Stretchable Strain Sensor for Epidermal Electronics**
[Gwanho Kim](#), Kiho Kim, Kyowon Kang, Taemin Kim, Ki Jun Yu
Yonsei University, Korea
- 3-1191 **Omnidirectional Deformable CNT-Polymer Hybrid Textile for Human Joint Movement Compatible Wearable Supercapacitors**
[Seung-Bo Ko](#)¹, Joonwon Lim², Sang Ouk Kim¹
¹Korea Advanced Institute of Science and Technology, Korea, ²LG Chem Ltd., Korea
- 3-1312 **Flexible and Implantable Artificial Tactile Sensory System**
[Kyowon Kang](#), Jongwoon Shin, Selin Lim, Ki Jun Yu
Yonsei University, Korea
- 3-1346 **Small Band-Pass-Filter in L-Band Using Low Temperature Co-Fired Ceramic**
Min-Su Park, [Jongin Ryu](#)
Korea Electronics Technology Institute, Korea
- 3-1406 **Fully Implantable, Battery-Free Wireless Optofluidic Device for Interstitial and Metronomic Photodynamic Therapy**
[Seungwon Hwang](#), Kiho Kim, Kijun Yu
Yonsei University, Korea
- 3-1420 **Flexible and Transparent Silicon Nano-Membrane Electrode for Optogenetics**
[Myeongki Cho](#), Mingu Sang, Jungmin Suh, Ki Jun Yu
Yonsei University, Korea
- 3-1440 **Ionic Conductor Based Shear Sensor for High Sensitivity**
[Wonjeong Suh](#), Tae Yeong Kim, Minsik Kong, Unyong Jeong
Pohang University of Science and Technology, Korea
- 3-1462 **Battery-Free, Wireless, Fully Implantable Bioelectronic System for Real-Time Electrical Stimulation of Nerve and Recording of Bladder Strain for Neuromodulation**
[Kyubeen Kim](#), Jaejin Park, Ki Jun Yu
Yonsei University, Korea

- 3-1712 **Evaluation of Surface Functionalization for the Biomedical Applications Based on Silicon Carbide**
[Sung-Woong Han](#), Seongjun Kim, Han-Sol Ro, Jung-Hun Kim, Sang-Jo Kim, Min-Jae Kang, Dong-Eun Kim, Min-Sik Kang
Pohang University of Science and Technology, Korea
- 3-3530 **Human Hormone System Inspired Energy Free Thermoregulation Hydrogel Device**
[Gyeongsuk Park](#), Steve Park
Korea Advanced Institute of Science and Technology, Korea
- 3-3623 **Mechanoreceptor Mimic Tactile Sensor for Densely Integrated Electronic Skin**
[Ye Rim Lee](#), Steve Park
Korea Advanced Institute of Science and Technology, Korea
- 3-3757 **Highly Transparent and Biocompatible Wearable Heater**
[Yoochan Won](#), Jung Joon Lee, Srinivas Gandla, Jonghwan Shin, Sunkook Kim
Sungkyunkwan University, Korea
- 3-3761 **Flexible Heterogeneous Temperature and Humidity Sensors for a Smart HVAC Control System Based on Physiological Signals**
[Sunju Kang](#), Muhammad Naqi, Srinivas Gandla, Sunkook Kim
Sungkyunkwan University, Korea
- 3-3765 **Fractal Serpentine-Shaped Kirigami Design and Facile Fabrication for Highly Conformable Electrophysiological Sensors**
[Jonghwan Shin](#), Srinivas Gandla, Yoochan Won, Sunkook Kim
Sungkyunkwan University, Korea



4. Materials for frontier displays and optoelectronics

ORAL PRESENTATION

4-1. Organic and organic-inorganic hybrid light-emitting materials and devices

MONDAY, November 2

Tamna (8F)

Chair Tae-Woo Lee (Seoul National University, Korea)

4-2433 Highly Efficient and Long Lifetime Blue Organic Light-Emitting Diodes

09:00-09:30 [Jun Yeob Lee](#)

INVITED *Sungkyunkwan University, Korea*

4-0434 Spontaneous Orientation Polarization of OLED Materials: Control of Polarization and Device Performance

09:30-10:00

INVITED Noritaka Matsuura, Hokuto Hamada, Yuki Tazo, Masahiro Ohara, Yuya Tanaka, [Hisao Ishii](#)
Chiba University, Japan

4-0409 Production of 2D C₃N₄-Based Materials and Their Electroluminescent Properties

10:00-10:30 [Sungjin Park](#)

INVITED *Inha University, Korea*

4-0268 Organic-Perovskite Hybrid Organic Light-Emitting Diodes

10:30-11:00 [Toshinori Matsushima](#)

INVITED *Kyushu University, Japan*

4-1579 Luminescence Enhancement of Perovskite Quantum Dot Films via Synergistic Coupling of Upconversion Nanoparticle Sensitization and Plasmonic Effect by Amphiphilic Diblock Copolymer Capped Gold Nanorods

11:00-11:15

[Minju Kim](#), Youngji Kim, Hong Yuan, Jerome K Hyun, Dong Ha Kim
Ewha Womans University, Korea

Perovskite Semiconductor Optics and Photonics

11:15-11:45 [Qihua Xiong](#)

KEYNOTE *Nanyang Technological University, Singapore*

4-2. Composites, organic, inorganic, and polymeric materials

MONDAY, November 2

Tamna (8F)

Chair Jonghee Lee (Hanbat National University, Korea)

4-0864 Thermally Activated Delayed Fluorescence Emitters with the Enhanced Space Charge Transfer for Solution-Processed OLEDs

13:20-13:50

INVITED [Guohua Xie](#)
Wuhan University, China

4-0260 The Role of Heteroleptic Phosphors and Host Molecules in Organic LEDs

13:50-14:20 [Jeong-Hwan Lee](#)

INVITED *Inha University, Korea*

4-0228 OLED Displays: Brilliant Colors, Sharp Picture and Environment Friendly

14:20-14:50 [Remi Anemian](#)

INVITED *Merck KGaA, Germany*

4-0164 Efficient, Low-Cost Organic Optoelectronic Devices with Highly Conductive Polymers

14:50-15:20 [Yong Hyun Kim](#)

INVITED *Pukyong National University, Korea*

Key Molecular Parameters of Non-Fullerene Acceptors for High Performance Organic Solar Cells

15:20-15:50 [Ji-Seon Kim](#)

KEYNOTE *Imperial College London, UK*

MONDAY, November 2

Tamna (8F)

Chair Jonghee Lee (Hanbat National University, Korea)

4-3126 Highly Infrared Transparent ZnS Ceramics Sintered by Vacuum Hot Press Using Hydrothermally Synthesized ZnS Nanopowders

16:10-16:25 [Bumjoo Kim](#)¹, [Daesu Kim](#)¹, [Jeong-Su Kang](#)², [Sahn Nahm](#)¹

¹Korea University, Korea, ²Jinoid, Korea

4-2551 Photo-Electrochemical Etching of Single Crystalline β -Ga₂O₃ for Enhanced Performance of Solar-Blind Photodetector

16:25-16:40

[Yongha Choi](#), Suhyun Kim, Dongryul Lee, Jinho Bae, Sujeong Yang, Cheolhee Cho, Hohyun Im, Jihyun Kim
Korea University, Korea

4-2488 Measurement of Spontaneous Polarization of Wet-Processed Organic films by Rotary Kelvin Probe Method

16:40-16:55

[Masahiro Ohara](#), Yuya Tanaka, Hisao Ishii
Chiba University, Japan

4-2243 Physical and Optical Characteristic Control of Blended Material with Quantum Dot and ZnO Nanoparticles

16:55-17:10

[Jae Hyun Han](#)^{1,2}, Shinyoung Jeong^{1,2}, Il Ki Han², Sohye Cho²

¹Korea University, Korea, ²Korea Institute of Science and Technology, Korea

4-1665 Fabrication of Multi-Mode Electrochromic Mirror Device Using Kinetically Deposited WO₃

17:10-17:25

[Minhee Son](#), Dongwon Shin, Caroline Sunyong Lee
Hanyang University, Korea

4-1491 17:25-17:40	Sensitive Taste Sensors Using Graphene Decorated with Metal or Nafion for High Selectivity to Glucose and PH <u>Chungwon Lee</u> , Jun Min Suh, Ho Won Jang <i>Seoul National University, Korea</i>
4-0834 17:40-17:55	Electrochromic Performance of Amorphous Tungsten Oxide Thin Film Prepared by Facile Sol-Gel Process <u>Tuan Van Nguyen</u> ¹ , Soo Young Kim ² , Sang Hyun Ahn ¹ ¹ <i>Chung-Ang University, Korea</i> , ² <i>Korea University, Korea</i>
4-0543 17:55-18:10	Driving Performance Effect of Encapsulated Ionic Polymer Metal Composite Actuator Using Various Coating Materials <u>Hanbin Lee</u> ¹ , Minjeong Park ¹ , Seonpil Kim ² , Minhyon Jeon ¹ ¹ <i>Inje University, Korea</i> , ² <i>Gyeongju University, Korea</i>
 4-2953 18:10-18:25	High Performance of GaSnO/Ag/GaSnO Transparent Conducting Electrode for Optoelectronic Devices <u>Jong-Ho Kim</u> ¹ , Jin-Woo Cho ² , Su-Kyung Kim ¹ , Jae-Ho Kim ¹ , Sun-Kyung Kim ² , Tae-Yeon Seong ¹ ¹ <i>Korea University, Korea</i> , ² <i>Kyung Hee University, Korea</i>

4-3. Thin film transistors	
TUESDAY, November 3	
Chairs	Sang-Hee Ko Park (Korea Advanced Institute of Science and Technology, Korea) Sung Haeng Cho (Electronics and Telecommunications Research Institute, Korea)
4-0213 10:10-10:40 INVITED	High-Performance Oxide Semiconductor Thin-Film Transistor Backplane Technology for Active-Matrix Light Emitting Diode Diaplay <u>Sung Haeng Cho</u> , Jae Bon Koo, Jong-Heon Yang, Chan Woo Park <i>Electronics and Telecommunications Research Institute, Korea</i>
4-0355 10:40-11:10 INVITED	Development of Organic Semiconducting Materials for Organic Thin Film Transistor <u>Yun-Hi Kim</u> <i>Gyeongsang National University, Korea</i>
4-0320 11:10-11:40 INVITED	Stability of InGaZnO Thin-Film Transistors for Displays and Hybrid Applications <u>Saeroonter Oh</u> <i>Hanyang University, Korea</i>
 4-0181 11:40-12:10 INVITED	Heterojunction Channel Engineering for Oxide Thin-Film Transistors <u>Mamoru Furuta</u> <i>Kochi University of Technology, Japan</i>
4-0641 12:10-12:40 INVITED	Unveiling N-Doped Graphene Thin Film Transistors <u>Soon-Gil Yoon</u> <i>Chungnam National University, Korea</i>

4-3. Thin film transistors	
4-4. Light emitting diode	
TUESDAY, November 3	
Chairs	Saeroonter Oh (Hanyang University, Korea) Young Wook Ko (GLVISION CO., LTD, Korea)
4-3252 14:00-14:15	Effect of Oxygen Plasma Time during PEALD SiO₂ Deposition on Electrical Properties of High Mobility Top-Gate Oxide TFTs <u>Seong-In Cho</u> , Jong Beom Ko, Sang-Hee Park <i>Korea Advanced Institute of Science and Technology, Korea</i>
4-2885 14:15-14:30	Effects of Donor Units Substituted with Chalcogen Atoms on Charge Transport Properties in Conjugated Donor–Acceptor Type Semiconducting Polymer Films <u>Hyun Woo Lee</u> , Ji Youl Lee <i>Pukyong National University, Korea</i>
4-2881 14:30-14:45	Investigation on the Ion Exchange Doping of π-Conjugated Polymer Film with an Electrolyte-Gated Transistor <u>Ju Han Lee</u> , Ji Youl Lee <i>Pukyong National University, Korea</i>
4-2879 14:45-15:00	High-Performance Thin-Film Transistors with Wire Bar-Coated Semiconducting Polymer Film <u>Do-Yeon Kim</u> , Ji Youl Lee <i>Pukyong National University, Korea</i>
4-2724 15:00-15:15	Effects of Incorporating Ni Capping Layer in P-Channel Tin Monoxide Thin-Film Transistors <u>Min-Gyu Shin</u> , Hyuck-In Kwon, Kang-Hwan Bae, Hyun-Seok Cha, Hwan-Seok Jeong, Dae-Hwan Kim <i>Chung-Ang University, Korea</i>
4-1909 15:15-15:30	Solution-Processed, High-Performance Light-Emitting Transistors Using Electrolyte Gate Insulator <u>Seonjeong Lee</u> , Han Ju Lee, Yena Ji, Kihyon Hong <i>Chungnam National University, Korea</i>
4-1902 15:30-15:45	High Performance, P-Channel Copper(I) Iodide Thin Film Transistors <u>Han Ju Lee</u> , Seonjeong Lee, Yena Ji, Kihyon Hong <i>Chungnam National University, Korea</i>
 4-1242 15:45-16:00	In-Gap States of a-IGZO Thin Films Studied by High Sensitivity Ultraviolet Photoemission Spectroscopy and Photothermal Deflection Spectroscopy <u>Ryotaro Nakazawa</u> ¹ , Atsushi Matsuzaki ¹ , Kohei Shimizu ¹ , Hiroshi Tokairin ² , Emi Kawashima ² , Mojtaba Abdi Jalebi ³ , Sam Stranks ³ , Shohei Tadano ¹ , Peter Krueger ¹ , Yuya Tanaka ¹ , Hisao Ishii ¹ ¹ <i>Chiba University, Japan</i> , ² <i>Idemitsu Kosan Company Limited, Japan</i> , ³ <i>University of Cambridge, UK</i>

4-0430 Characterization and Optimization of Quantum-Dot-Based Backlights for LCD Applications

16:00-16:30 [Jae-Hyeon Ko](#)¹, Jung Gyun Lee¹, Gi Jung Lee¹, Young Wook Ko², Yongduk Kim³

INVITED ¹Hallym University, Korea, ²GLVISION Co., Ltd., Korea, ³Cheorwon Plasma Research Institute, Korea

 4-1055 Full Color Active-Matrix Organic-Light Emitting Diode Display with a Large Area MoS₂ Backplane

16:30-16:45 [Sa Rang Bae](#), Soo Young Kim

Korea University, Korea



4. Materials for frontier displays and optoelectronics

POSTER PRESENTATION

4-1. Organic and organic-inorganic hybrid light-emitting materials and devices

MONDAY, November 2

2F Lobby

- 4-0444 Luminance Performance of FA Doped CsPbBr₃ Quantum-Dot Light-Emitting Diodes: Self-Passivation Behaviors via Hydrogen-Bonding between Fa Insertion and Halide
[Young Ran Park](#), Sangwon Eom, Youngjong Kang
Hanyang University, Korea
- 4-0695 Chemical Origin of Photoluminescence in Cesium-Bismuth-Bromide Nanocrystals and Enhanced Photoluminescence Quantum Yield via Metal Chloride Additives
[Joonyun Kim](#), Jinu Park, Byungha Shin
Korea Advanced Institute of Science and Technology, Korea
- 4-0784 Understanding the Origin of Ultrasharp Sub-Bandgap Emission from Zero-Dimensional Perovskite Cs₄PbBr₆
[Mingue Shin](#)¹, Sung-Wook Nam², Aditya Sadhanala³, Ravichandran Shivanna⁴, Miguel Anaya⁴, Alberto Jiménez-Solano⁵, Hyewon Yoon Yoon¹, Seokwoo Jeon¹, Samuel D. Stranks⁴, Robert L. Z. Hoyer^{4,6}, Byungha Shin¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Kyungpook National University, Korea, ³Indian Institute of Science, India, ⁴University of Cambridge, UK, ⁵Max Planck Institute for Solid State Research, Germany, ⁶Imperial College London, UK
- 4-0825 Photoluminescence Enhancement and Recovery of CsPbI₃ Perovskite Quantum Dots
[Kim Anh Huynh](#)¹, Quyet Van Le², Sang Hyun Ahn¹, Soo Young Kim³
¹Chung-Ang University, Korea, ²Duy Tan University, Vietnam, ³Korea University, Korea
- 4-0921 Highly Efficient Quantum Dot and Polymer Composite by Embedding Hollow Inorganic Particles
[Kyeong Min Song](#), Yeon Sik Jung
Korea Advanced Institute of Science and Technology, Korea
- 4-1063 Alternating Current (AC) MXene(Ti₃C₂) Polymer Light Emitting Diodes
[Seokyeong Lee](#), Eui Hyuk Kim, Wookyoung Jin, Cheolmin Park
Yonsei University, Korea
- 4-1161 Quantum Dot Light-Emitting Diodes by Using Surface Modified ZnMgO Nanoparticles as Electron Transport Layer
[Hongjoo Shin](#), Hyunjin Cho, Yeon Sik Jung
Korea Advanced Institute of Science and Technology, Korea
- 4-1555 Thermodynamically Induced Hybridization of Organic-Inorganic Perovskite with Nitrogen Doped Carbon Nanotubes
[Daewon Kim](#), Gilyong Lee, Sangouk Kim
Korea Advanced Institute of Science and Technology, Korea

- 4-1618 **Red-Shifted Electroluminescence from Mixed Halide Perovskite Results from Halide Migration and Selective Hole Injection**
Yoonseo Nah¹, Omar Adel Allam², Seung Soon Jang², Dong Ha Kim¹
¹Ewha Womans University, Korea, ²Georgia Institute of Technology, USA
- 4-1753 **Multifunctional Stimuli Interactive Sensing Display through Color Mixing**
Wookyoung Jin, Seokyeong Lee, Euihyuk Kim, Cheolmin Park
 Yonsei University, Korea
- 4-1877 **Blue Organic Light-Emitting Diodes Using 9-(10-Phenylanthracen-9-yl)-7H-Fluoreno[4,3-b]Benzofuran Derivatives**
Beomsu Jang¹, Youngkwan Kim², Seungsoo Yoon¹
¹Sungkyunkwan University, Korea, ²Hongik University, Korea
- 4-2293 **Effect of Rapid Thermal Annealing on the Photoluminescence Properties of Eu-Doped CaTa₄O₁₁ Thin Films Deposited on Sapphire Substrates**
Shinho Cho
 Silla University, Korea
- 4-2415 **P-Type Doping on Quantum Dot Emissive Layer for High Efficiency ZnSe/ZnS Quantum Dot Light-Emitting Diode**
Hyunjin Cho, Sunjoong Park, Hongjoo Shin, Moohyun Kim, Hanhwi Jang, Yeon Sik Jung, Duk Young Jeon
 Korea Advanced Institute of Science and Technology, Korea
- 4-2450 **TADF-Based Top-Emitting OLEDs Using Multilayer Cathodes**
Wan Qi Ren, Kyung Rock Son, Il Gyu Jang, Won Ho Jung, Tae Geun Kim
 Korea University, Korea
- 4-2522 **IZO-Based Perforated Electrodes for Flexible Blue TADF OLEDs**
 Taegeun Kim, Ilgyu Jang, Hojin Lee, Kyungrock Son, Taehoon Park
 Korea University, Korea
- 4-2692 **Device Characteristics of Inverted Red Colloidal Quantum-Dot Light-Emitting Diodes Depending on Hole Transport Layers**
 Donggu Lee¹, Jaehoon Lim², Myeongjin Park³, Chan-Mo Kang⁴, Hyunkoo Lee⁵
¹Gyeongsang National University, Korea, ²Sungkyunkwan University, Korea, ³Seoul National University, Korea, ⁴Electronics and Telecommunications Research Institute, Korea, ⁵Sookmyung Women's University, Korea
- 4-3560 **Electroless Silver Plating on BaSnO₃ as a Transparent Conductive Oxide (TCO)**
Su Hyeong Kim, Young Soo Yoon, You Na Lee, In Yea Kim, Unho Lee, Dae Yun Kim, Yoo Lim Cha, Hyeong Cheol Ro, Jong Woo Kim
 Gachon University, Korea
- 4-3566 **The Electrical and Optical Effect of La Doping on BaSnO₃ as a Transparent Conducting Oxide (TCO)**
Yoo Lim Cha, You Na Lee, In Yea Kim, Unho Lee, Dae Yun Kim, Hyeong Cheol Ro, Su Hyeong Kim, Jong Woo Kim, Young Soo Yoon
 Gachon University, Korea

- 4-3848 **Air-Gap-Embedded Robust Hazy Films to Reduce the Screen-Door Effect in Virtual Reality Displays**
Won Seok Cho, Jae Yong Park, Sangwon Baek, Jong-Lam Lee
 Pohang University of Science and Technology, Korea

4-2. Composites, organic, inorganic, and polymeric materials

TUESDAY, November 3

2F Lobby

- 4-0452 **Properties of SnO_x Thin Films Doped with Indium**
Myeong Kyun Lyou, Hyunki Kim, Byung Seong Bae, Eui-Jung Yun
 Hoseo University, Korea
- 4-0456 **Intense Pulse Light Sintering of an Ag Microparticle-Based, Highly Stretchable, and Conductive Electrode**
Hyun Jin Nam, Se-Hoon Park
 Korea Electronics Technology Institute, Korea
- 4-0461 **Large-Scale Rapid Laser Sintering of Highly Stretchable Electrodes Using a Homogenized Rectangular Laser Beam**
Hyun Jin Nam, Se-Hoon Park
 Korea Electronics Technology Institute, Korea
- 4-0517 **Effect of Seed Layer on Crystal Polarity and Electrical Properties of ZnO-Based Ultraviolet Photodetector Grown by Sol-Gel Process**
Gun-Woo Lee, Seung-Hye Baek, Hee-Wung Kim, Sung-Nam Lee
 Korea Polytechnic University, Korea
- 4-0546 **Interface Layer Effect of the Ionic Polymer Metal Composite Using Metal Oxide-Nafion Composite**
Mindong Kim¹, Minjeong Park¹, Seonpil Kim², Minhyon Jeon¹
¹Inje University, Korea, ²Gyeongju University, Korea
- 4-0562 **Mechanical Performance Effect of Ionic Electroactive Polymer Using Metal Oxide-Nafion Composite Membrane**
Hui Yeong Noh¹, Minjeong Park¹, Hanbin Lee¹, Seonpil Kim², Minhyon Jeon¹
¹Inje University, Korea, ²Gyeongju University, Korea
- 4-0567 **Fabrication and Characteristics of Stacked Ionic Polymer-Metal Composite Actuator Using Insulating Layer Based on Hexagonal Boron Nitride**
Da-Eun Bae¹, Minjeong Park¹, Mindong Kim¹, Seonpil Kim², Minhyon Jeon¹
¹Inje University, Korea, ²Gyeongju University, Korea
- 4-0635 **Low-Temperature Thermal Evaporation Synthesis of SnO₂ Nanowires Using Metal Powder as the Reducing Agent in Air Atmosphere**
Ho-Jin So, Su-Been Ham, Geun-Hyoung Lee
 Dong-Eui University, Korea

- 4-0651 **Properties of Graphite Block with Ordered Natural Graphite for Heat-Spreader**
[Jong Seok Woo](#)¹, Byung Choon Kim¹, Joon Young Cho², Moon Hee Lee¹, Kwang Sang Park¹, Joong Tark Han²
¹Morgan Advanced Materials, Korea, ²Korea Electrotechnology Research Institute, Korea
- 4-0705 **Development of Thermo-Setting Low Loss Dielectric Material Suitable for 5G and Evaluation of Transmission Loss at 28 GHz**
[Se-Hoon Park](#), Jiyeon Lim, Chang Hoon Lee, Jaewoo Song, Jongin Ryu
 Korea Electronics Technology Institute, Korea
- 4-0749 **Effects of Microwave-Assisted Heat Treatments on the Synthesis of γ -Fe₂O₃ with Hydrates**
[Han-Sol Yun](#)¹, So-Young Shin¹, Kwon-Jin Park², Chun-Yeol You², Nam-Hee Cho¹
¹Inha University, Korea, ²Daegu Gyeongbuk Institute of Science and Technology, Korea
- 4-0770 **Colloidal Synthesis of Rare Earth-Doped Oxide Perovskite Nanocrystals for Their Bifunctionality**
 Heesun Yang, [Yuri Kim](#), Sun-Kyo Kim, Seung-Wan Choi, Jee-Na Han, Jung-Sik Bang
 Hongik University, Korea
- 4-0780 **Heterostructural Designing of Green ZnSeTe Quantum Dots: Beyond InP Counterparts**
 Heesun Yang, [Sun-Hyoung Lee](#), Seung-Won Song, Chang-Yeol Han, Dae-Yeon Jo, Yuri Kim
 Hongik University, Korea
- 4-0781 **Effect of Annealing Process on Interfacial Characterization of Al/Cu Cladding Fabricated by Caliber-Rolling Process**
[Jongbeom Lee](#), Haguk Jeong
 Korea Institute of Industrial Technology, Korea
- 4-0782 **Dimensional Effects of ZnSe/ZnTe Double Shells of InP Quantum Dots on Stability and Electroluminescence**
 Heesun Yang, [Suk-Young Yoon](#), Jung-Ho Jo, Seung-Wan Choi, Hyun-Min Kim
 Hongik University, Korea
- 4-0788 **Effect of Annealing Temperature on Microstructure and Texture Evolution of Al/Cu Cladding Processed by Caliber-Rolling Process**
[Jongbeom Lee](#), Haguk Jeong, Sangyong Park
 Korea Institute of Industrial Technology, Korea
- 4-0872 **Optically Activated 3D TiO₂ Nanostructures for Super-Sensitive Chemoresistive Responses**
 Jun Min Suh¹, Donghwi Cho², Sang-Hyun Nam², Young-Seok Shim³, Ho Won Jang¹, Seokwoo Jeon²
¹Seoul National University, Korea, ²Korea Advanced Institute of Science and Technology, Korea, ³Silla University, Korea
- 4-0881 **Nickel Doping-Enhanced Emission Efficiency of CsPbBr₃ Nanocrystals for Light-Emitting Diodes**
[Hayeong Kim](#), Soo Young Kim
 Korea University, Korea

- 4-0890 **Fabrication of Graphene-Inserted Organic Flexible Transparent Electrodes for Organic Optoelectronics**
[Do Hee Lee](#), Hyung Duk Yun, Eui Dae Jung, Jae Hwan Chu, Yun Seok Nam, Seunguk Song, Shi-Hyun Seok, Myung Hoon Song, Soon-Yong Kwon
 Ulsan National Institute of Science and Technology, Korea
- 4-0930 **Effects of Microwave-Irradiation on the Synthesis of ZnFe₂O₄ Nanopowders with Hydrated Compounds**
 Nam-Hee Cho, [So-Young Shin](#), Han-Sol Yun, Su-Yeon Kim, Byeong-Gyu Yun, Chun-Yeol You
 Inha University, Korea
- 4-1001 **Structural Features and Gas Sensitivities of Sn:ZnO Nanowires Synthesized by Chemical Vapor Deposition**
 Byeong-Gyu Yun¹, So-Young Shin¹, Han-Sol Yun¹, Nae-Hyung Jang¹, Jae-Hyun Shim², [Nam-Hee Cho](#)¹
¹Inha University, Korea, ²Dongshin University, Korea
- 4-1034 **Effects of Deposition Condition on the Structure and Properties of ZnO Thin Films Grown on C-Plane Sapphire by Metal-Organic Chemical Vapor Deposition Using Ultrasonic Nebulization**
 Choon-Ho Lee, [Seong-Bok Kim](#)
 Keimyung University, Korea
- 4-1039 **Effects of Ga-Doping Concentration on the Microstructure and Properties of Ga-Doped ZnO Thin Films Deposited on C-Plane Sapphire Substrates by MOCVD Using Ultrasonic Nebulization**
 Choon-Ho Lee, [Seong-Bok Kim](#)
 Keimyung University, Korea
- 4-1149 **Microstrip Lines and Trough Via-Holes for 5G Antenna Module Using Low Loss Materials**
 Jae Woong Jung, Se-Hoon Park, [Jongin Ryu](#)
 Korea Electronics Technology Institute, Korea
- 4-1215 **Block Copolymer Based Quantum Dot Protective Layer for Improving Thermal and Moisture Stability**
[Nammyoung Cho](#), Yeon Sik Jung
 Korea Advanced Institute of Science and Technology, Korea
- 4-1236 **Desolvation-Triggered Versatile Transfer-Printing of Pure BN Films with Thermal-Optical Dual Functionality**
 Yujin Han, Yeon Sik Jung, Nammyoung Cho
 Korea Advanced Institute of Science and Technology, Korea
- 4-1239 **Periodic Doped Lanthanum-Modified Bismuth-Titanate Thin Films Grown by RF Sputtering**
[Rui Tang](#), Chung Wung Bark
 Gachon University, Korea
- 4-1240 **Controllable Diffusion-Assisted Patterning for High Resolution OLED**
[So-Hyeon Lee](#), Eun-Kyung Noh, Kyeong Min Yu, Min-Hoi Kim
 Hanbat National University, Korea

- 4-1243 **Crystallization Mechanism and Optical Properties of Oxy-Fluoride Glass According to La/Ca Ratio**
[Tae Wan Ha](#), Seung Gu Kang
 Kyonggi University, Korea
- 4-1244 **Surface Charge Effects on the Growth Mechanism of Alq₃ in [C₁₂mim][TFSI] Ionic Liquids**
[Sun Hee Hwang](#), Su Ho Park, Dong Chan Shin
 Chosun University, Korea
- 4-1267 **Photoluminescence Properties of BaCO₃-TiO₂-SiO₂ Glass-Ceramics with Crystallization Temperature**
[Sungmin Son](#), Seunggu Kang
 Kyonggi University, Korea
- 4-1278 **Perovskite Nanocrystals in Block Copolymer Photonic Crystal Films for Dual-Responsive Anticounterfeiting**
[Hyowon Han](#), Jin Woo Oh, Cheolmin Park
 Yonsei University, Korea
- 4-1331 **Effects of Flowing Ozone Gas on Structure Change of Emim[TFSI] Ionic Liquid**
[Su Ho Park](#), Sun Hee Hwang, Dong Chan Shin
 Chosun University, Korea
- 4-1359 **Versatile Reductive Interlayer for High Performance Printed and Flexible Electronic Devices**
[Young Jae Lee](#), Kang-Jun Baeg
 Pukyong National University, Korea
- 4-1402 **Reinforced Through-Plane Thermal Conductivity of Cellulose Film with Modified Hybrid Fillers Comprising Boron Nitride and Aluminum Nitride**
[Wondu Lee](#), Seonmin Lee, Eyop Wondu Shiferaw, Jooheon Kim
 Chung-Ang University, Korea
- 4-1415 **Enhanced Photoluminescence Properties of In-Doped ZnO Thin Films Prepared by the Regrowth Method and Their Application in Fast-Response UV Photodetectors**
[Dongwan Kim](#), Jae-Young Leem
 Inje University, Korea
- 4-1433 **Integrated Strategy for Light Emission from Block Copolymers-Quantum Dots Composites**
 Geon Yeong Kim, Shinho Kim, Jinyoung Choi, Min Seok Jang, Duk Young Jeon, Yeon Sik Jung
 Korea Advanced Institute of Science and Technology, Korea
- 4-1452 **Circularly Polarized Light-Sensing Near-Infrared Organic Phototransistors Based on Conjugated Polymer and Cholesteric Liquid Crystal Network for Optoelectronic Primitives**
[Hyemi Han](#)¹, Yoojin Lee², Jihoon Kyhm³, Jae Seung Jeong¹, Jae-Hoon Han¹, Hyunsu Ju¹, Suk-Kyun Ahn², Jung Ah Lim¹
¹Korea Institute of Science and Technology, Korea, ²Pusan National University, Korea, ³Dongguk University, Korea
- 4-1475 **Ecofriendly, Low Temperature Processible Conductive Paste with Strong Durability and High Adhesion Strength Using Catechol Lipid Bioresin**
[Hanna Lee](#), Bora Lee, Dongyoung Kim, Sang-Soo Lee, Jung Ah Lim
 Korea Institute of Science and Technology, Korea
- 4-1507 **Study of Anti-Glare Pattern Glass to Improve Image Quality Obtained through Display Surface Etching Applications**
[Heesu Woo](#), Seunggu Kang
 Kyonggi University, Korea
- 4-1541 **Effect of Annealing Temperature on the Structural and Optical Properties of ZnO Thin Film Annealed with Novel Annealing Method**
[Sihun Lee](#), Jae-Young Leem
 Inje University, Korea
- 4-1574 **Electroluminescence Displays Being Shape-Transformed and Electrical & Mechanical Self-Healed by Viscoelastic Polymer Composite**
[Jihye Jang](#), Seung Won Lee, Cheolmin Park
 Yonsei University, Korea
- 4-1664 **Introducing Low Temperature Fabrication Method of V₂O₅ Thin Film for Multiple Electrochromic Performance**
[Dongwon Shin](#), Minhee Son, Caroline Sunyong Lee
 Hanyang University, Korea
- 4-1720 **Enhanced Surface Deformation in Stacked Dielectric Elastomers with Different Moduli**
[Seung-Youl Kang](#), Jaehyun Moon, Seong-Deok Ahn
 Electronics and Telecommunications Research Institute, Korea
- 4-1746 **Microscopic Deformation Behavior of High Strength New Al Alloy-Al₂Ca Material for Application to Display and Electronic Device**
[Seung Y. Yang](#)¹, Bong H. Kim², Da B. Lee², Kweon H. Choi², Nam S. Kim², Seong H. Ha², Young O. Yoon², Hyun K. Lim², Shae K. Kim², Young J. Kim¹
¹Sungkyunkwan University, Korea, ²Korea Institute of Industrial Technology, Korea
- 4-1806 **Defects Controlled Engineering Stress in Al Doped ZnO Transparent Multilayered Thin Films**
[Jihye Kang](#)¹, Masao Kamiko², Jung-Hyuk Koh¹
¹Chung-Ang University, Korea, ²The University of Tokyo, Japan
- 4-1983 **Enhanced Electrical Properties of CO₂ Laser/RTA Annealed Ti-Doped ZnO Thin Films**
[Jaeyong Yun](#), Jung-Hyuk Koh
 Chung-Ang University, Korea
- 4-2079 **Effect of Substrate Temperature during Crystallization of Sol-Gel Spin-Coated ZnO Thin Films and Improved Ultraviolet Photoresponse Properties**
[Soyoon Kim](#), Jae-Young Leem
 Inje University, Korea

- 4-2199 **Improving the Responsivity of Graphene/Ge Schottky Junction Infrared Photodetector via Impact Ionization**
Cihyun Kim, Tae Jin Yoo, Min Gyu Kwon, Yongsu Lee, Hyeon Jun Hwang, Byoung Hun Lee
Gwangju Institute of Science and Technology, Korea
- 4-2290 **Effect of Inert gas (Ar-Kr) on ITO Films Grown by Facing Target Sputtering**
Yujin Kim, Sangmo Kim, Jungsoo Hong, Kyung Hwan Kim
Gachon University, Korea
- 4-2716 **Characteristics of Palladium Doped Amorphous Carbon Films Fabricated by Unbalanced Magnetron Sputtering System for Hydrogen Sensor**
Yong Seob Park¹, Young-Baek Kim², Sung Hwan Hwang³, Jaehyeong Lee⁴
¹*Chosun College of Science and Technology, Korea*, ²*Korea Institute of Industrial Technology, Korea*,
³*Korea Photonics Technology Institute, Korea*, ⁴*Sungkyunkwan University, Korea*
- 4-2759 **Facile Synthesis of ZnO Microrod Photodetector by Solid-State Reaction**
Hanjin Lee, Dong Hun Kim, Jeong Heum Mun
Myongji University, Korea
- 4-2867 **Improved Performances of Solution-Processed Amorphous Metal Oxide Thin Film Transistors with Amine Polymer Interlayer**
Seveon Park, Yeoryang Lee, Youjin Koo, Changmin In, Mijung Lee
Kookmin University, Korea
- 4-2870 **Control of Crystallinity of Zone Cast Semiconductors in Binary System**
 Yongjin Jo, Jihyang Yoon, Jonghan Lee, Changmin In, Mijung Lee
Kookmin University, Korea
- 4-2907 **Synthesis of Quaternary ZnCdSse Quantum Dots with Composition Gradient Interface Based on Thermodynamic Calculation**
 Ro Woon Lee, Yongbum Kwon, Jeonghoon Lee, Sung Taek Hong, Da-Woon Jeong
Korea Institute of Industrial Technology, Korea
- 4-3084 **Characteristics of HfO₂ Thin Film Capacitor for Thin Film Transistor Applications**
Yang Gyu Bak, Ji Woon Park, Hee Young Lee
Yeungnam University, Korea
- 4-3099 **Crystallization Behavior and Electrical Properties of IZTO Thin Films for Thin Film Transistor Applications**
Jiwoon Park, Yang Gyu Bak, Hee Young Lee
Yeungnam University, Korea
- 4-3136 **Response Time of Electrochromic WO₃ Thin Films Fabricated by Using Sputtering Method**
Seongkyun Choi, Sara Kim, Sakal Pech, Geum-Bae Cho, Nam-Hoon Kim
Chosun University, Korea
- 4-3142 **Fabrication of Web-Structured Metal-Nanofiber-Films with Improved Mechanical Strength for High-Performance Transparent Electrodes via Selectively PDMS Coating**
Jong-Myeong Park, Hwan-Jin Jeon
Korea Polytechnic University, Korea
- 4-3158 **Characteristics of Tin-Niobate Sn_{2-x}Nb₂O_{7-x} Semiconducting Thin Films Prepared by Pulsed Laser Deposition**
Joon Hee Kim, Jai-Yeoul Lee, Hee Young Lee
Yeungnam University, Korea
- 4-3219 **New Approach for Fabricating Flexible Transparent Substrate with Highly Uniform Micro-Sized High-Curvature Structures**
Sang-Ah Oh, Hwan-Jin Jeon
Korea Polytechnic University, Korea
- 4-3279 **Effect of Third Elements on Iron Removal for Purification of Aluminum Melts**
Jin-Kyu Lee¹, Young-Kyun Kim², Seong-Ho Ha³, Shah Abdul Wahid³
¹*NICE LMS Co., Ltd., Korea*, ²*Institute for Advanced Engineering, Korea*, ³*Korea Institute of Industrial Technology, Korea*
- 4-3286 **Experimental Study of Reaction between Silica and Al-Mg Alloy Melts**
Young-Kyun Kim¹, Jin-Kyu Lee², Seong-Ho Ha³, Shah Abdul Wahid³
¹*Institute for Advanced Engineering, Korea*, ²*NICE LMS Co., Ltd., Korea*, ³*Korea Institute of Industrial Technology, Korea*
- 4-3288 **Structural Color Filters Creating Angle-Insensitive, High-Purity, and Additive Reflection Colors**
Incheol Jung, Hojae Kwak, Hyeonwoo Kim, Donggyu Kim, Kyu-Tae Lee
Inha University, Korea
- 4-3304 **Correlation between Distribution Coefficients of Impurities and Purification Effect during Al Zone Refining**
Seong-Ho Ha, Shah Abdul Wahid, Bong-Hwan Kim, Young-Ok Yoon, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea
- 4-3323 **Segregation of Impurity Elements in Al Alloys during Directional Solidification**
Seong-Ho Ha, Shah Abdul Wahid, Bong-Hwan Kim, Young-Ok Yoon, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea
- 4-3386 **Influence of Sputtering Power on the Structure, Morphological and Electrical Properties of β -Ga₂O₃/4H-SiC Hetero Junction Diodes**
Dong-Wook Byun, Young-Jae Lee, Woo-Young Son, Yong-In Kim, Sang-Mo Koo
Kwangwoon University, Korea
- 4-3443 **Impedance Characteristics under Different Temperatures of n-Type NC-FeSi₂/p-Type Si Heterojunctions Manufactured by Facing-Targets Direct-Current Sputtering**
Pattarapol Sittisart¹, Nathaporn Promros¹, Rawiwan Chaleawpong¹, Peerasil Charoenyuenyao¹,
 Nattakorn Borwornpornmetee¹, Phongsaphak Sittimart², Tsuyoshi Yoshitake²
¹*King Mongkut's Institute of Technology Ladkrabang, Thailand*, ²*Kyushu University, Japan*

- 4-3451** **Characteristics of Alternating Current Impedance under Different Applied Bias Voltages for p-Type Si/n-Type β -FeS₂ Heterojunctions**
Rawiwan Chaleawpong¹, Nathaporn Promros¹, Peerasil Charoenyuenyao¹, Nattakorn Borwornpornmetee¹, Pattarapol Sittisart¹, Phongsaphak Sittimart², Tsuyoshi Yoshitake²
¹King Mongkut's Institute of Technology Ladkrabang, Thailand, ²Kyushu University, Japan
- 4-3458** **Nitrogen Plasma Etching of Indium Tin Oxide Nanorod Film Surface at Different Radio-Frequency Powers**
Nattakorn Borwornpornmetee¹, Nathaporn Promros¹, Pitoon Noymaliwan¹, Peerasil Charoenyuenyao¹, Rawiwan Chaleawpong¹, Surachart Kamoldirok¹, Tanapoj Chaikereee², Benjarong Samransuksamer³, Peerapong Nuchua², Chanunthorn Chananonnawathorn², Saksorn Limwichean², Mati Horprathum², Pitak Eiamchai², Viyapol Patthanasettakul², Rungrueng Pattanakul⁴
¹King Mongkut's Institute of Technology Ladkrabang, Thailand, ²International Electronics and Computer Technology Center, Thailand, ³King Mongkut's University of Technology Thonburi, Thailand, ⁴Synchrotron Light Research Institute, Thailand
- 4-3463** **Impact of Annealing Time on the Structural, Morphological and Wettability Properties of NC-FeSi₂ Produced by Radio-Frequency Magnetron Sputtering**
Peerasil Charoenyuenyao¹, Nathaporn Promros¹, Pattarapol Sittisart¹, Rawiwan Chaleawpong¹, Nattakorn Borwornpornmetee¹, Phongsaphak Sittimart², Tsuyoshi Yoshitake²
¹King Mongkut's Institute of Technology Ladkrabang, Thailand, ²Kyushu University, Japan
- 4-3485** **Doping Effect of ZnO Film on Photocatalytic Degradation of Dyes**
Shenawar Ali Khan¹, Yunsook Yang¹, Woo Young Kim¹, Muhammad Zafar²
¹Jeju National University, Korea, ²University of the Punjab, Pakistan
- 4-3569** **Tribological and Electrical Properties of TiCN Films Fabricated by Unbalanced Magnetron Sputtering System at Low Temperature for Bio Medical Application**
Ki-Noh Kang¹, Jaehyeong Lee², Yong Seob Park³
¹Masan University, Korea, ²Sungkyunkwan University, Korea, ³Chosun College of Science and Technology, Korea
- 4-3616** **IPL-Induced Processing of Cu-CNT Composite Film to Fabricate TIM for LED Lighting Module**
Myunghun Kim, Jang-Woo Han, Kwang-Seok Kim
Korea Institute of Industrial Technology, Korea
- 4-3630** **Improved Dark Current of Organic Photodetectors by Inserting of HfOx Doped SnO₂ Film Using Combustion Method as a Hole Blocking Layer**
Seyoung Oh¹, Seonju Lee¹, Keetae Kim²
¹Sogang University, Korea, ²Sustainable Energy and Environmental Research Institute, Korea
- 4-3632** **Study on the Characteristic and Fabrication of Organic-Inorganic Hybrid Photodetector Using Quantum Dot**
Woo-Seong Kim, Se-Ri Lee, Ji-Young Lee, Se-Young Oh
Sogang University, Korea

- 4-3649** **Improving High Performances of Coating Effects of Graphene in CNTF/Cu Composites**
Mina Park^{1,2}, Dong-Myeong Lee¹, Hyeon Su Jeong¹, Byung Hee Hong², Sukang Bae³
¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea, ³Korea Advanced Institute of Science and Technology, Korea
- 4-3650** **The Properties of Epitaxial Growth SrMnO₃ Glass and Ordered Crystal SrTiO₃ Substrates by Off-Axis Sputtering**
Rui He, Chung Wung Bark
Gachon University, Korea
- 4-3791** **Design of LiDAR Detectable Black Colourants**
Young-Seok Kim, Jinyoung Jeong, Ji-Min Chun, Bokyung Cho
Korea Electronics Technology Institute, Korea
- 4-3812** **The Effect of Neutral Particle Showering to CVD-based Crystallization Process for Flexible Display**
Hyunki Kim, Byoungdeog Choi
Sungkyunkwan University, Korea
- 4-3841** **Transparent Oxide/Metal/Oxide Multilayer Thin Film Heater with Flexibility and Chemical Stability**
Joohee Jang^{1,2}, Ji-Won Choi^{1,2}
¹Korea Institute of Science and Technology, Korea, ²University of Science and Technology, Korea
- 4-3852** **Spatial Multiplexing Method for Achromatic Metals**
Sangwon Baek, Jae Yong Park, Won Seok Cho, Jong-Lam Lee
Pohang University of Science and Technology, Korea
- 4-3857** **Embedding Scattering Centers in Polymer Substrate to Yield Robust Hazy Film with High Optical Transmittance: Application to Virtual-Reality Display**
Jae Yong Park, Won Seok Cho, Sangwon Baek, Jong-Lam Lee
Pohang University of Science and Technology, Korea

4-3. Thin film transistors

TUESDAY, November 3

2F Lobby

- 4-0500** **Gate Bias-Controlled High Responsivity Ultraviolet AlGaIn/GaN Phototransistor**
Seung-Hye Baek¹, Chu-Young Cho², Gun-Woo Lee¹, Sung-Nam Lee¹
¹Korea Polytechnic University, Korea, ²Korea Advanced Nano Fab Center, Korea
- 4-0507** **Optimizing Oxide Mixing Ratio for Achieving Energy Efficient Thin Film Transistors Having Binary Oxide Channels**
Jaehyun Moon, Jeong-Mu Lee, Hwan-Jae Lee, Jae-Eun Pi, Jeho Na, Seong-Deok Ahn, Seung-Youl Kang
Electronics and Telecommunications Research Institute, Korea
- 4-0725** **High-Performance 1-Dimensional In-Ga-Zn-O Nanofiber Field-Effect Transistors on High-K Gate Dielectrics by Microwave Irradiation and Oxygen Plasma Treatment**
Seong-Kun Cho, Won-Ju Cho
Kwangwoon University, Korea

4-1311	Effect of Source-Drain Electric Field on Charge Transport Mechanism in Polymer Based Thin Film Transistor Swarup Biswas ¹ , Jun-Ik Park ² , Jin-Hyuk Bae ² , Hyeok Kim ¹ ¹ University of Seoul, Korea, ² Kyungpook National University, Korea	4-2011	Charging Compensation Method Caused by Polyimide of Flexible TFT Hyojung Kim ^{1,2} , Jungmin Park ¹ , Hyuntaek Woo ¹ , Bohyeon Jeon ¹ , Jongyoon Lee ¹ , Nara Lee ¹ , Jangkun Song ¹ , Byoungdeog Choi ¹ ¹ Sungkyunkwan University, Korea, ² Samsung Display Co., Ltd., Korea
4-1584	Morphological Influence of 2,8-difluoro-5,11-bis(triethylsilylethynyl)anthradithiophene Semiconductor Films on Electrical Stability of Thin-Film Transistors Joel Ndikumana , Jyothi Chintalapalli, Sungkeun Baang, Jaehoon Park Hallym University, Korea	4-2441	Demonstration of Frequency Doubler Using ZnO-DNTT Antiambipolar Transistor with High Peak-to-Valley Ratio (> 10⁶) Ho-In Lee , Yongsu Lee, Seung-Mo Kim, So-Young Kim, Hyeon Jun Hwang, Byoung Hun Lee Gwangju Institute of Science and Technology, Korea
4-1596	Raman Study of Solution-Processed Copper Oxide Semiconductors for Thin-Film Transistors Hyeonju Lee ¹ , Xue Zhang ^{1,2} , Ji-Hoon Choi ¹ , Jaehoon Park ¹ ¹ Hallym University, Korea, ² Shandong University of Science and Technology, China	4-3203	Intense Pulsed Light (IPL) Post-Annealing Process on Solution-Processed In-Ga-Zn-O Thin Film Transistors Array Hyun Jae Kim ¹ , Yong-Hoon Kim ² , Kimoon Lee ³ , Kyu Hyoung Lee ⁴ , Min Suk Oh ¹ ¹ Korea Electronics Technology Institute, Korea, ² Sungkyunkwan University, Korea, ³ Kunsan National University, Korea, ⁴ Yonsei University, Korea
4-1608	Synthesis and Thin Film Properties of a Perfluorocyclobutane Containing Crosslinked Polyimide Gate Dielectric for Organic Thin Film Transistors Kyeongmin Kim, Taek Ahn Kyungsung University, Korea	4-3369	Low-Band Gap Zinc Oxynitride Thin-Film Transistor for Wide-Range of Photo Detection Junghoon Yang , Sang-Hee Ko Park Korea Advanced Institute of Science and Technology, Korea
4-1609	Iodine Vapor-Sensing Characteristics of Solution-Processed Indium Oxide Thin-Film Transistors Ji-Hoon Choi ¹ , Hyeonju Lee ¹ , Xue Zhang ² , Jaehoon Park ¹ , Sungkeun Baang ¹ ¹ Hallym University, Korea, ² Shandong University of Science and Technology, China	4-3370	Fabrication and Characteristics of Ga₂O₃/4H-SiC Static Induction Transistors Young-Jae Lee , Hee-Jae Lee, Dong-Wook Byun, Jong-Min Oh, Sang-Mo Koo Kwangwoon University, Korea
4-1610	Low-Temperature Processable Polyimide Gate Insulators for Flexible Pentacene Thin Film Transistors Taek Ahn Kyungsung University, Korea	4-3389	High-Performance Metal Oxide Thin-Film-Transistor (TFT) on a Ultra-Flexible Film for Wearable Application Jeonghyoung Lee , Soobin Lee, Jaekyun Kim Hanyang University, Korea
4-1669	Bias Stress Instability of Amorphous IGZO TFTs with Free-Space-Gap as the Gate Dielectric Kyeong Min Yu, Min Jung Kim, Min-Hoi Kim Hanbat National University, Korea	4-3406	Highly-Detective Room-Temperature Operable InAs Nanowire with Amorphous Indium-Tin-Zinc Oxide Mid-infrared Phototransistor Jeongho Lee ¹ , Minji Park ¹ , Jaechul Shin ² , Jaekyun Kim ¹ ¹ Hanyang University, Korea, ² Yeungnam University, Korea
4-1751	A Study on the Electrical Characteristic of Ultra-Thin Oxide Semiconductor Field-Effect Transistor So-Young Kim ¹ , So Ryun Kim ² , Seung-Mo Kim ² , Yongsu Lee ² , Ho-In Lee ² , Haewon Lee ² , Kiyung Kim ² , Hyeon Jun Hwang ² , Byoung Hun Lee ² ¹ Pohang University of Science and Technology, Korea, Korea, ² Gwangju Institute of Science and Technology, Korea	4-3424	β-Ga₂O₃/ 4H-SiC Heterojunction pn Diode DUV Detectors Hee-Jae Lee , Young-Jae Lee, Hye-In Park, Weon Ho Shin, Jong-Min Oh, Chulhwan Park, Sang-Mo Koo Kwangwoon University, Korea
4-1789	Comparative Study on Interface Properties of ALD and PEALD Deposited Al₂O₃ Gate Insulator of Amorphous IGZO Thin-Film Transistor Jungmin Park ^{1,2} , Pyungho Choi ¹ , Hyojung Kim ¹ , Bohyun Jeon ¹ , Jongyoon Lee ¹ , Changyong Oh ³ , Bosung Kim ³ , Byoungdeog Choi ¹ ¹ Sungkyunkwan University, Korea, ² Samsung Electronics Co., Ltd., Korea, ³ Korea University, Korea	4-3531	In-Situ Analysis of Dendrite Formation Which Hinder Charge Transport in Meniscus Guided Coating (MGC) Process Hyeji Seo , Steve Park Korea Advanced Institute of Science and Technology, Korea
4-1999	Electrical Properties of InGaZnO Films Due to Partial Pressure of Oxygen Bohyeon Jeon , Byoungdeog Choi Sungkyunkwan University, Korea	4-3537	Optoelectronic Neuromorphic Circuit Arrays for Artificial Visual Perception System Sung Woon Cho Suncheon National University, Korea

4-3799 Analysis of Generation Current by Trap States through Extraction of Activation Energy of Low Temperature Poly Silicon Leakage
[Kihwan Kim](#)^{1,2}, SoonKon Kim¹, Minjun Song¹, Gaeun Lee¹, Hyojung Kim^{1,2}, Byoungdeog Choi¹
Sunchon National University, Korea

4-3817 The Electrical Properties of a CVD-based Crystallization Process Using Neutral Particle Showering Deposition for Flexible Display
[Hyunki Kim](#), Byoungdeog Choi
Sungkyunkwan University, Korea

4-2499 Incorporation of Donor and Acceptor Quantum Dots to Understand the Charge Carrier Dynamics in Quantum Dot Light Emitting Diodes
[Ji Hyun Roh](#), Nam Young Gwak, Nuri Oh
Hanyang University, Korea

4-2645 Self-Protective GaInN-Based Light-Emitting Diodes with VO₂ Nanowires
 Jong Won Lee¹, [Jeonghyeon Park](#)¹, Heera Kwon², Woong-Ki Hong³, Jong Kyu Kim¹, Jaehee Cho²
¹Pohang University of Science and Technology, Korea, ²Chonbuk National University, Korea, ³Korea Basic Science Institute, Korea

4-2647 AlGa_N Deep Ultraviolet Light-Emitting Diodes with Localized Surface Plasmon Resonance by High-Density Array of 40 nm Al Nanoparticles
 Jong Won Lee¹, Gyeongwon Ha¹, [Jeonghyeon Park](#)¹, Hyun Gyu Song², Jaeyong Park¹, Jaeyong Lee¹, Yong-Hoon Cho², Jong-Lam Lee¹, Jin Kon Kim¹, Jong Kyu Kim¹
¹Pohang University of Science and Technology, Korea, ²Korea Advanced Institute of Science and Technology, Korea

4-2772 Enhanced Brightness and Device Lifetime of Quantum Dot Light-Emitting Diodes by Atomic Layer Deposition
[Gi-Hwan Kim](#), Seong-Yong Cho
Myongji University, Korea

4-2782 Sonochemical Synthesis of CsPbBr₃ Perovskite Quantum Dots and Fabrication of Electroluminescence Devices
[Kyeongchan Noh](#), Chan-Sol Jo, Seong-Yong Cho
Myongji University, Korea

4-3056 Solution-Processed Nickel Oxides as a Hole Injection Layer for PEDOT: PSS-Free Quantum Dots Light-Emitting Diodes
[Sangwon Lee](#), Jiwan Kim
Kyonggi University, Korea

4-3076 Efficient Quantum Dots Light-Emitting Diodes with Double ZnO Layers by RF Sputtering Method
[Myongsuk Kang](#), Jiwan Kim, Young Jin Kim
Kyonggi University, Korea

4-3149 Unconventional Electroluminescence Devices Using a Mixed Layer of Quantum Dots and Hole Transport Materials
[Changgi Yoon](#), Jiwan Kim
Kyonggi University, Korea

4-3338 Investigation of Size-Dependent Leakage Current and Emission Characteristics of Micro-Sized InGa_N-based Green Light-Emitting Diodes
[Youngwook Shin](#)¹, Jinwoo Park¹, Junseok Hwang¹, Sangjin Min¹, Jun-Beom Park², Dongsoo Shin¹, Jong-In Shim¹, Tak Jeong², Jaekyun Kim¹
¹Hanyang University, Korea, ²Korea Photonics Technology Institute, Korea

4-4. Light emitting diode

TUESDAY, November 3

2F Lobby

4-0502 Chemical Wet Etched Micro-Cylinder Type Semipolar GaN-Based Light-Emitting Diodes
[Hee-Wung Kim](#), Seung-Hye Baek, Sung-Nam Lee
Korea Polytechnic University, Korea

4-0769 Blue-to-Red Emissive Zn–Cu–Ga–(Se, S) Quantum Dots for Their Application to White Electroluminescent Devices
 Heesun Yang, [Yang-Hee Kim](#), Suk-Young Yoon, Hyun-Min Kim, Sun-Kyo Kim
Hongik University, Korea

4-0775 High-Efficiency, High-Color Rendering Tricolored White Electroluminescence Based on All Non-Cd Quantum Dots
 Heesun Yang, [Dae-Yeon Jo](#), Chang-Yeol Han, Sun-Hyoung Lee, Jee-Na Han, Seung-Won Song, Jung-Sik Bang
Hongik University, Korea

4-1381 Flexible Light-Emitting Diodes Using Flash Induced Ultrafast Recrystallization of Perovskite
[Chobi Kim](#)¹, Dong Hun Jung², Sang Ouk Kim¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Samsung Electronics Co., Ltd., Korea

4-2333 Design Improvement of Monolithic Ge-on-Si Laser for the Reduction of Threshold Current
[Mingjun Jiang](#)¹, Asahi Degawa², Yasuhiko Ishikawa², Kazumi Wada³, Donghwan Ahn¹
¹Kookmin University, Korea, ²Toyohashi University of Technology, Japan, ³Massachusetts Institute of Technology, USA

4-2423 Resistive Switching Electrodes for Compact Driving Circuitry of Microscale Light-Emitting Diodes
[Kyung Rock Son](#), Byeong Ryong Lee, Won Ho Jung, Tae Geun Kim
Korea University, Korea

4-2496 Applied Voltage Waveform Control for Enhanced the Electroluminescence Intensity in Alternating Current-Driven Polymer Light Emitting Diode
[Su-Min An](#), Byeonggon Kim, Hak-Rin Kim
Kyungpook National University, Korea

4-3363 Improved Optoelectronic Performances and Stability of 1024 Pixelated Flip-Chip Micro-LED Arrays for Automotive Headlamps

[Cheol Jeong](#), Jea Hyeok Lee, Tae Kyoung Kim, Dhruv Sharma, Xuan Zhang, Yu-Jung Cha, Abu Bashar Mohammad Hamidul Islam, Joon Seop Kwak
Sunchon National University, Korea



5. Two-dimensional (2D) van der Waals materials

ORAL PRESENTATION

5-2. Structure, electronic and optical properties of 2D materials and vdW heterostructures

TUESDAY, November 3

Ora (8F)

Chair Kwanpyo Kim (Yonsei University, Korea)



10:10-10:40

KEYNOTE

Nanoscale Investigation of Local Optical Properties from Low-Dimensional Materials Using Electron Energy-Loss Spectroscopy

[Kazu Suenaga](#)

National Institute of Advanced Industrial Science and Technology, Japan



5-0677

10:40-11:10

INVITED

Tunable Magnetic and Topological Properties of Iron-Based Van Der Waals Magnets

[Jun Sung Kim](#)^{1,2}

¹Pohang University of Science and Technology, Korea, ²Institute for Basic Science, Korea



5-0366

11:10-11:40

INVITED

2D Materials Visualized at the Atomic Scale

[Adina Luican-Mayer](#)

University of Ottawa, Canada

5-0273

11:40-12:10

INVITED

Bipolar Pseudospin Semiconductor for Future Pseudospintronics

[Keun Su Kim](#)

Yonsei University, Korea

5-3506

12:10-12:25

Carrier Multiplication in PbS Quantum Dots Anchored on Au Tip Using Photo-Conductive Atomic Force Microscope

[Sung-Tae Kim](#)

Sungkyunkwan University, Korea



5-0886

12:25-12:40

Tailoring Single- and Double-Sided Fluorination of Bilayer Graphene via Substrate Interactions

[Jangyup Son](#)¹, Huije Ryu², Junyoung Kwon³, Siyuan Huang⁴, Jaehyung Yu⁵, Jingwei Xu⁶,

Kenji Watanabe⁷, Takashi Taniguchi⁷, Arend Van Der Zande⁴, Gwan-Hyoung Lee²

¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea, ³Yonsei University, Korea, ⁴University of Illinois at Urbana-Champaign, USA, ⁵University of Chicago, USA, ⁶Cornell University, USA, ⁷National Institute for Materials Science, Japan

5-1. Large-area growth and integration of 2D materials

TUESDAY, November 3

Ora (8F)

- Chairs Feng Ding (Ulsan National Institute of Science and Technology, Korea)
Hyeon Suk Shin (Ulsan National Institute of Science and Technology, Korea)
- 5-0625 Hexagonal and Amorphous Boron Nitrides**
14:00-14:30 [Hyeon Suk Shin](#)
INVITED *Ulsan National Institute of Science and Technology, Korea*
-  **5-0243 Wafer-Scale Growth and Assembly of 2D Layered Semiconductors**
14:30-15:00 [Kibum Kang](#)
INVITED *Korea Advanced Institute of Science and Technology, Korea*
- 5-3303 Semiconducting Graphene Nanoribbons Network with Sub-10nm Widths**
15:00-15:15 [Namjo Kim](#)¹, Un Seung Jeon¹, Yangjin Lee², Shinyoung Choi¹, Seong-Jun Yang¹, Kwanghee Park¹,
Cheol-Joo Kim¹, Jewook Park¹, Sunmin Ryu¹, Kwanpyo Kim²
¹Pohang University of Science and Technology, Korea, ²Yonsei University, Korea
-  **5-2279 Wafer-Scale Homogeneous Growth of High Quality Tungsten Disulfides via Surfactant-Assisted Metal-Organic Chemical Vapor Deposition**
15:15-15:30 [Do Hyoung Koo](#), Hee Seong Kang, Chul-Ho Lee
Korea University, Korea
- 5-2159 Enhanced Nucleation and Growth of MOCVD GaN on 2D h-BN by Thermal Nitridation**
15:30-15:45 [Jaewon Kim](#)¹, Min Han², Hokyong Jeong¹, Seokho Moon¹, Jiye Kim¹, Odongo Francis Ngome Okello¹,
Dong Yeong Kim¹, Nam Han¹, Si-Young Choi¹, Jong Kyu Kim¹
¹Pohang University of Science and Technology, Korea, ²Jeonbuk National University, Korea
- 5-1470 Low Temperature Growth of Wafer-Scale 2D MoS₂ Thin Films by Cyclic Metal-Organic Chemical Vapor Deposition**
15:45-16:00 [Jeong-Hun Choi](#), Min-Ji Ha, Ji-Hoon Ahn
Hanyang University, Korea
- 5-1367 Programmed Band Gap Modulation within Van Der Waals Semiconductor Monolayers by Metalorganic Vapor-Phase Epitaxy**
16:00-16:15 [Chang-Soo Lee](#)^{1,2}, Gangtae Jin^{1,2}, Seung-Young Seo^{1,2}, Juho Kim^{1,2}, Cheolhee Han^{1,2},
Min Yeong Park^{1,2}, Heon Su Ahn^{1,2}, Suk Ho Lee^{1,2}, Soonyoung Cha², Moon-Ho Jo^{1,2}
¹Pohang University of Science and Technology, Korea, ²Institute for Basic Science, Korea
-  **5-0602 The Coalescence Behavior of Two-Dimensional Materials Revealed by Multi-Scale in Situ Imaging during Chemical Vapor Deposition Growth**
16:15-16:45 [Zhu-Jun Wang](#)
INVITED *Eidgenössische Technische Hochschule Zürich, Switzerland*

5-3. Advanced electronics based on 2D materials and vdW heterostructures

WEDNESDAY, November 4

Ora (8F)

- Chair Heejun Yang (Sungkyunkwan University, Korea)
-  **5-0412 Pico-Watt Complementary Inverter with Negative Capacitance Two-Dimensional Semiconductor Transistors**
09:00-09:30 [Yang Chai](#)
INVITED *The Hong Kong Polytechnic University, Hong Kong*
- 5-0231 Thickness-Controlled Black Phosphorus Tunnel Field-Effect Transistor for Low Power Switches**
09:30-10:00 [Sungjae Cho](#)
INVITED *Korea Advanced Institute of Science and Technology, Korea*
- 5-1398 Reconfigurable Doping of Atomically Thin Van Der Waals Semiconductors by Light Colours**
10:00-10:15 [Seung-Young Seo](#)^{1,2}, Gunho Moon^{1,2}, Odongo Francis Ngome Okello¹, Min Yeong Park^{1,2},
Cheolhee Han^{1,2}, Soonyoung Cha², Hyunyong Choi³, Han Woong Yeom^{1,2}, Si-Young Choi¹,
Jewook Park², Moon-Ho Jo^{1,2}
¹Pohang University of Science and Technology, Korea, ²Institute for Basic Science, Korea, ³Seoul National University, Korea
-  **5-0723 Accelerated Dirac Fermions via Moiré Excitonic Interaction**
10:15-10:30 [Shoujun Zheng](#), Yanggeun Joo, Mali Zhao, Kyungrok Kang, Heejun Yang
Sungkyunkwan University, Korea
- 5-2381 Ultra-Wide Bandgap Junction Field-Effect Transistor Based on β -Ga₂O₃/4H-SiC p-n Heterojunctions for Efficient Thermal Management**
10:30-10:45 [Dongryul Lee](#)¹, Hyoung Woo Kim², Janghyuk Kim¹, Jeong Hyun Moon², Geonyeop Lee¹, Yongha Choi¹,
Jihyun Kim¹, Hyunuk Park¹, Ayeong Kim¹, Junghun Kim¹
¹Korea University, Korea, ²Korea Electrotechnology Research Institute, Korea
-  **5-1776 Interlayer Band Screening Gating in MoTe₂**
10:45-11:00 [Geunwoo Hwang](#), Eunah Kim, Shoujun Zheng, Linfeng Sun, Heejun Yang
Sungkyunkwan University, Korea
-  **5-1776 Mixed-Dimensional Stackable Electronics Enabled by Freestanding 2D/3D Materials**
11:00-11:30 [Jeehwan Kim](#)
KEYNOTE *Massachusetts Institute of Technology, USA*
- 5-2154 Broad Spectral Responsivity of MoS₂ Photodetector via Gate Modulation**
11:30-11:45 [Wonkil Sakong](#)¹, Seongchu Lim¹, Hamza Zad Gul¹, Suar Oh¹, Giheon Kim¹, Eunji Sim¹, Jaeuk Bahng¹,
Junhee Kim¹, Hojoon Yi¹, Minhee Yun²
¹Sungkyunkwan University, Korea, ²University of Pittsburgh, USA
-  **5-1571 Fabrication of Foldable Metal Interconnections by Hybridizing with Amorphous Carbon Ultrathin Anisotropic Conductive Film**
11:45-12:00 [Monalisa Pal](#), Unyong Jeong
Pohang University of Science and Technology, Korea



5. Two-dimensional (2D) van der Waals materials

POSTER PRESENTATION

5-1. Large-area growth and integration of 2D materials

TUESDAY, November 3

8F Lobby

- 5-0894 **Epitaxial Van Der Waals Semiconductor Superlattices**
Suk-Ho Lee^{1,2}, Gangtae Jin^{1,2}, Chang-Soo Lee^{1,2}, Soonyoung Cha¹, Francis Odongo Ngome Okello^{1,2}, Seung-Young Seo^{1,2}, Min Yeong Park^{1,2}, Cheolhee Han^{1,2}, Donghwan Yang^{1,2}, Gi-Yeop Kim^{1,2}, Jonghwan Kim^{1,2}, Hyunyoung Choi³, Si-Young Choi^{1,2}, Moon-Ho Jo^{1,2}
¹Institute for Basic Science, Korea, ²Pohang University of Science and Technology, Korea, ³Seoul National University, Korea
- 5-0903 **Synthesis of Inkable 2D Carbide MXene Flakes Exhibiting High Yield and Performance Using Highly-Purified-Precursor**
Shi-Hyun Seok¹, Seungjun Choo¹, Jinsung Kwak¹, Hyejin Ju¹, Ju-Hyoung Han¹, Woo-Seok Kang¹, Joonsik Lee², Se-Yang Kim¹, Do Hee Lee¹, Jungsoo Lee¹, Wook Jo¹, Byung Mun Jung², Han Gi Chae¹, Jae Sung Son¹, Soon-Yong Kwon¹
¹Ulsan National Institute of Science and Technology, Korea, ²Korea Institute of Materials Science, Korea
- 5-0935 **Atomic Healing of Chalcogen Vacancies in Monolayer WSe₂**
Min Yeong Park^{1,2}, Gunho Moon^{1,2}, Chang-Soo Lee^{1,2}, Soonyoung Cha², Moon-Ho Jo^{1,2}
¹Pohang University of Science and Technology, Korea, ²Institute for Basic Science, Korea
- 5-1032 **Wafer-Scale Formation of Patterned Transition Metal Ditungstate Electrodes with Ideal Schottky Barriers**
Seunguk Song¹, Yeoseon Sim¹, Se-Yang Kim¹, Jung Hwa Kim¹, Inseon Oh¹, Woongki Na², Do Hee Lee¹, Jaewon Wang¹, Shili Yan³, Yanan Liu⁴, Jian-Hao Chen⁴, Hyeonsik Cheong², Jung-Woo Yoo¹, Zonghoon Lee¹, Soon-Yong Kwon¹
¹Ulsan National Institute of Science and Technology, Korea, ²Sogang University, Korea, ³Beijing Academy of Quantum Information Sciences, China, ⁴Peking University, China
- 5-1079 **Wafer-Scale Growth of Hexagonal Boron Nitride on Gallium Nitride Substrates by Metal-Organic Chemical Vapor Deposition**
Seokho Moon, Jaewon Kim, Hokyong Jeong, Jiye Kim, Francis Ngome Okello Odongo, Subeom Song, Jonghwan Kim, Si-Young Choi, Jong Kyu Kim
Pohang University of Science and Technology, Korea
- 5-1103 **Wafer-Scale and Selective-Area Growth of High-Quality Hexagonal Boron Nitride on Ni(111) by Metal-Organic Chemical Vapor Deposition**
Hokyong Jeong, Jaewon Kim, Seokho Moon, Jong Kyu Kim
Pohang University of Science and Technology, Korea
- 5-1180 **Growth of Wafer-Scale Monolayer MoS₂ Using Adsorbate-Controlled Atomic Layer Deposition**
Dae Hyun Kim¹, Jae Chan Park¹, Woohee Kim¹, Jeongwoo Park², Bonggeun Shong², Ji-Hoon Ahn¹, Tae Joo Park¹
¹Hanyang University, Korea, ²Hongik University, Korea

WEDNESDAY, November 4

Ora (8F)

Chair Sungjae Cho (Korea Advanced Institute of Science and Technology, Korea)

 5-3524 **Analog and Digital Resistive Switching Based on WO_x Memristor for Energy Efficient Memory and Spatiotemporal Pattern Learning**

13:20-13:50

INVITED

Zhongqiang Wang, Ya Lin, Xiaoning Zhao, Haiyang Xu, Yichun Liu
Northeast Normal University, China

5-0178 **Neuron and Synapse Using Floating-Gate Memristor**

13:50-14:20

INVITED

Woo Jong Yu
Sungkyunkwan University, Korea

 5-1589 **Short-Term Plasticity for Neuromorphic Computing in Two-Dimensional Materials**

14:20-14:35

Lin Feng Sun, Geunwoo Hwang, Heejun Yang
Sungkyunkwan University, Korea

 5-2438 **Negative-Differential Transconductance Device with Stepped Gate Dielectric toward Multi-Valued Logic Applications**

14:35-14:50

Maksim Andreev, Jae-Woong Choi, Jin-Hong Park
Sungkyunkwan University, Korea

 5-2703 **Room Temperature Monoclinic to Orthorhombic Phase Transition of MoTe₂ via W Substitution**

14:50-15:05

Yonas Assefa Eshete, Heejun Yang
Sungkyunkwan University, Korea

5-3238 **Large-Area Selective Laser Annealing of WS₂/MoS₂ Homo/Heterostructure for Use in an Electronic Device**

15:05-15:20

Seoungwoong Park^{1,2}, Kwang-Hun Choi¹, Seok-Ki Hyeong¹, Byung Hee Hong², Seoung-Ki Lee¹
¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea

- 5-1630 **Transfer-Free Direct Growth of Wafer Scale Hexagonal Boron Nitride on Silicon Dioxide by MOCVD for Integration of Si-Based Electronics**
[Jiye Kim](#), Hokyong Jeong, Jaewon Kim, Seokho Moon, Jong Kyu Kim
Pohang University of Science and Technology, Korea
- 5-2048 **Large Area Exfoliation Pof Graphene Using Stressor Film**
[Jiyun Moon](#), Seung-Il Kim, Jae-Hyun Lee
Ajou University, Korea
- 5-2058 **Morphologies of Synthesized Wafer Scale MoS₂ at Various Pressure**
[Hyun-Geun Oh](#), Gwan-Hyoung Lee
Seoul National University, Korea
- 5-2567 **Graphene Nanopore Fabrication**
[Eunji Ji](#)¹, Gwan-Hyoung Lee²
¹Yonsei University, Korea, ²Seoul National University, Korea
- 5-2650 **High-Performance Room Temperature SnS₂ Gas Sensor Enhanced by Proton Conduction**
[Gwangsu Kim](#)^{1,2}, Jung Joon Pyeon^{1,2}, Young Geun Seong¹, Seong Keun Kim¹, Chong Yun Kang^{1,2}
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea
- 5-2785 **Fabrication of Continues Film of MoS₂ by Using Mo, Na, and Seeding Promoter-Based Coating as a Solid Precursor**
[Jae-Kwan Kim](#), Maddumage Don Sandeepa Lakshad Wimalananda, Ji-Myon Lee
Sunchon National University, Korea
- 5-3495 **Experimental Realization of Large-Sized, Few-Layered Two-Dimensional Organic-Inorganic Halide Perovskite Magnets**
[Ki-Yeon Kim](#)¹, Garam Park¹, Jaehun Cho², Joonwoo Kim², June-Seo Kim², Jinyong Jung³, Kwonjin Park², Chun-Yeol You², In-Hwan Oh¹
¹Korea Atomic Energy Research Institute, Korea, ²Daegu Gyeongbuk Institute of Science and Technology, Korea
- 5-3844 **Optimization of Parameters for the Synthesis of Large-Area Titania Nanosheets**
[JeongJun Kim](#)^{1,2}, [Ji-Won Choi](#)^{2,3}
¹Chung-Ang University, Korea, ²Korea Institute of Science and Technology, Korea, ³University of Science and Technology, Korea

5-2. Structure, electronic and optical properties of 2D materials and vdW heterostructures

TUESDAY, November 3

8F Lobby

- 5-0966 **Self-Nanostructuring of Two-Dimensional Layered Catalysts by Coherent Heteroepitaxial Stacking for Robust Hydrogen Evolution**
[Yeoseon Sim](#)¹, Aram Yoon¹, Hee Seong Kang², Jinsung Kwak¹, Yongsu Jo¹, Daeseong Choe¹, Woong Ki Na³, Min Hee Lee¹, Seunguk Song¹, Jung-Woo Yoo¹, Hyeonsik Cheong³, Jae Sung Lee¹, Chul-Ho Lee², Zonghoon Lee¹, Soon-Yong Kwon¹
¹Ulsan National Institute of Science and Technology, Korea, ²Korea University, Korea, ³Sogang University, Korea
- 5-1169 **Interface Originated Anomalous Dimensionality-Driven Phase Transition of MoTe₂**
[Huije Ryu](#)¹, Yangjin Lee², Hyun-Jung Kim^{3, 4}, Kangwon Kim⁵, Jungcheol Kim⁵, Blanka E. Janicek⁶, Kenji Watanabe⁷, Takashi Taniguchi⁷, Pinshane Y. Huang⁶, Hyeonsik Cheong⁵, Kwanpyo Kim², Young-Woo Son⁴, Gwan-Hyoung Lee¹
¹Seoul National University, Korea, ²Yonsei University, Korea, ³Forschungszentrum Jülich, Germany, ⁴Korea Institute for Advanced Study, Korea, ⁵Sogang University, Korea, ⁶University of Illinois at Urbana-Champaign, USA, ⁷National Institute for Materials Science, Japan
- 5-1376 **Facile Synthesis of Sulfur Doped Graphene Quantum Dots by Pulsed Laser Ablation for Enhancing Optical Properties**
[Kang Min Kim](#)
Korea Institute of Industrial Technology, Korea
- 5-1754 **Sub Band-Gap Photoresponse by Hot Electron Injections in AU-Nanorod Decorated Van Der Waals Semiconductor Monolayers**
[Juho Kim](#)^{1,2}, [Gunho Moon](#)^{1,2}, Gangtae Jin^{1,2}, Min Yeong Park^{1,2}, Soonyoung Cha², Yoon-Jong Moon², Moon-Ho Jo^{1,2}
¹Pohang University of Science and Technology, Korea, ²Institute for Basic Science, Korea
- 5-1790 **Van Der Waals Epitaxial Growth of Superconductive NbS₂**
[Jaehong Yoon](#)¹, Heonsu Ahn², Jewook Park¹, Un Seung Jeon¹, Ju-Hyun Jung², Cheol-Joo Kim², Moon-Ho Jo^{1,2}
¹Institute for Basic Science, Korea, ²Pohang University of Science and Technology, Korea
- 5-1899 **Observing Grain Boundaries of Chemically Grown MoS₂ by Atomic Force Microscopy**
[Jae Hwan Jeong](#)¹, Yeonjoon Jung², Jong Hun Kim², Gwan-Hyoung Lee²
¹Yonsei University, Korea, ²Seoul National University, Korea
- 5-2072 **Investigation of Crystal Structure, Band Structure, Conductance, Defect States in Plasma-Treated hBN**
[Younsung Na](#), Jong Hun Kim, Gwan-Hyoung Lee
Seoul National University, Korea
- 5-2269 **Strain and Charge Doping Modulation of Graphene by Epitaxial Growth of MoO₃**
[Hangyeol Kim](#), Jong Hun Kim, Gwan-Hyoung Lee
Seoul National University, Korea

5-2287 **Growth of Metallic MoO₂ – Semiconducting MoS₂ Heterostructures Using Two-Step Chemical Vapor Deposition**

Yeonjoon Jung, Gwan-Hyoung Lee
Seoul National University, Korea

5-2443 **Highly Flexible Graphene-PDMS Pressure Strain Sensors with Proximity-Sensing Capacity**

Min Jung Kim¹, Gwan-Hyoung Lee²
¹Yonsei University, Korea, ²Seoul National University, Korea

5-2500 **Atomic-Layer-Confined Multiple Quantum Wells Enabled by Monolithic Bandgap Engineering of Transition Metal Dichalcogenides**

Yoon Seok Kim¹, Sojung Kang², Jae-Pil So¹, Jong Chan Kim³, Kangwon Kim⁴, Seunghoon Yang¹,
Yeonjoon Jung⁵, Yongjun Shin⁵, Seong Won Lee¹, Donghun Lee¹, Jin-Woo Park², Hyeonsik Cheong⁴,
Hu Young Jeong³, Chul-Ho Lee¹
¹Korea University, Korea, ²Yonsei University, Korea, ³Ulsan National Institute of Science and Technology,
Korea, ⁴Sogang University, Korea, ⁵Seoul National University, Korea

5-2558 **Atomic-Layer Quantum Wells Fabrication Using Layer-by-Layer Oxidation of MoS₂**

Sojung Kang¹, Yoon Seok Kim², Jae Hwan Jeong¹, Jong Hun Kim³, Chul-Ho Lee², Gwan-Hyoung Lee³
¹Yonsei University, Korea, ²Korea University, Korea, ³Seoul National University, Korea

5-2630 **Optical Doping Modulation Driven Phase Transition in VTe₂**

Dongyeun Won¹, Heejun Yang¹, Suyeon Cho²
¹Sungkyunkwan University, Korea, ²Ewha Womans University, Korea

5-2655 **Epitaxial Growth Single-Crystalline Metal Films on Black Phosphorus**

Yangjin Lee^{1,2}, Han-Gyu Kim^{1,2}, Tae Keun Yun^{1,2}, Jong Chan Kim³, Sol Lee^{1,2}, Sung Jin Yang^{1,2},
Myeongjin Jang^{1,2}, Donggyu Kim^{1,2}, Huije Ryu⁴, Gwan-Hyoung Lee⁴, Seongil Im^{1,2}, Jinwoo Cheon^{1,2},
Hu Young Jeong³, Hyoung Joon Choi^{1,2}, Kwanpyo Kim^{1,2}
¹Yonsei University, Korea, ²Institute for Basic Science, Korea, ³Ulsan National Institute of Science and
Technology, Korea, ⁴Seoul National University, Korea

5-2952 **Synthesis of a New Layered Hexagonal Phase of Germanium Selenide**

Sol Lee¹, Joong-Eon Jung¹, Yangjin Lee¹, Jeongsu Jang², Tae Keun Yun¹, Je Myoung Park³,
Hyeonsik Cheong³, Kwanpyo Kim¹
¹Yonsei University, Korea, ²Ulsan National Institute of Science and Technology, Korea, ³Sogang University, Korea

5-3382 **Vertically Stacked Ultrathin IGZO/MoS₂ Heterostructure for High-Sensitivity Visible Photodetectors**

Kumin Kang¹, Dongyun Lee¹, Seon Kyeong Kang², Hyun Seok Lee², Jaekyun Kim¹
¹Hanyang University, Korea, ²Chungbuk National University, Korea

5-3668 **Defect-Engineered Controllable n-Type Doping of Layered WSe₂ via Argon Plasma Treatment**

Junghun Kim, Hyunik Park, Yongha Choi, Dongryul Lee, Jihyun Kim
Korea University, Korea

5-3775 **Improved Metal-Graphene Contact Resistance Using N-Type Doped Phosphosilicate Glass (PSG)**

Sung-Hun Lee, Jin-Hong Park
Sungkyunkwan University, Korea

5-3831 **Concurrent I-V and XRD Measurement of Electrochemical Intercalation Process in 2D van der Waals Materials**

Minkyung Jo^{1,2}, Jeongtae Kim^{2,3}, In-Young Jung^{2,4}, Minhyuk Choi^{2,4}, Seungwoo Song²
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea Research Institute of Standards &
Science, Korea, ³Chungnam National University, Korea, ⁴Hanyang University, Korea

5-3. Advanced electronics based on 2D materials and vdW heterostructures

WEDNESDAY, November 4

8F Lobby

5-0157 **Quantum Transition Properties of ZnS and Si in Electron Deformation Potential Phonon Interacting Quasi-Two Dimensional System**

Su-Ho Lee¹, E.S. Lee², S.H. Kim¹, S.M. Joo³
¹Dong-A University, Korea, ²Dong-Eui University, Korea, ³Masan University, Korea

5-0923 **Lifshitz Transition and Non-Fermi Liquid Behavior in Highly Doped Semimetals**

Kyungrok Kang, Heejun Yang
Sungkyunkwan University, Korea

5-1119 **Resistive Switching in Few-Layer Hexagonal Boron Nitride Mediated by Defects and Interfacial Charge Transfer**

Jiye Kim, Hokyong Jeong, Jaewon Kim, Seokho Moon, Jong Kyu Kim
Pohang University of Science and Technology, Korea

5-1176 **One-Dimensional Light-Emitting Diode Based on Van Der Waals Heterostructure**

Junc-Chul Shin, Gwan-Hyoung Lee
Seoul National University, Korea

5-1343 **Development of Confirmation Platform Using Graphene Oxide (GO) to Verify the Adsorption of Aptamer**

Yejin Park, Seungjun Lee, Seongmin Roh, Eunji Lee, Yujin Jung, Heena Kim, Jinsik Kim
Dongguk University, Korea

5-1485 **Surface Potential Characterizations of 2D Heterostructure Photodetectors Using Kelvin Probe Force Microscopy**

Eunah Kim, Geunwoo Hwang, Linfeng Sun, Heejun Yang
Sungkyunkwan University, Korea

5-1550 **Visualizing Gate Tunable Thermoelectric Power Fluctuation in Graphene with Different Stacking Orders**

Mali Zhao, Shoujun Zheng, Heejun Yang
Sungkyunkwan University, Korea

- 5-1706 **Two-Dimensional Nanosheet Inks Using Zwitterionic Detergent for Biocompatible Inkjet Printing**
[Hyeokjung Lee](#), Hyowon Han, Cheolmin Park
Yonsei University, Korea
- 5-1881 **Remote Modulation Doping in Van Der Waals Heterostructures toward High-Mobility Two-Dimensional Transistor**
[Donghun Lee](#)¹, Jea Jung Lee², Yoon Seok Kim¹, Yeonho Kim¹, Jong Chan Kim³, Woong Huh¹, Jaeho Lee¹, Hu Young Jeong³, Young Duck Kim², Chul-Ho Lee¹
¹Korea University, Korea, ²Kyung Hee University, Korea, ³Ulsan National Institute of Science and Technology, Korea
- 5-1922 **Monolithic Interface Contact Engineering to Boost Optoelectronic Performances of 2D Semiconductor Photovoltaic Heterojunctions**
[Seunghoon Yang](#)¹, Janghwan Cha², Jong Chan Kim³, Donghun Lee¹, Yoon Seok Kim¹, Seong Won Lee¹, Hong-Gyu Park¹, Hu Young Jeong³, Suklyun Hong², Gwan-Hyoung Lee⁴, Chul-Ho Lee¹
¹Korea University, Korea, ²Sejong University, Korea, ³Ulsan National Institute of Science and Technology, Korea, ⁴Seoul National University, Korea
- 5-2434 **Ultrathin Non-Volatile Ferroelectric Memory Based on Monolayer MoTe₂**
[Ji-Hwan Baek](#), Gwan-Hyoung Lee, Huije Ryu
Seoul National University, Korea
- 5-2520 **Graphene Multi-via Contacts for 3D Integration of 2D Devices**
[Yongjun Shin](#)¹, Junyoung Kwon², Gwan-Hyoung Lee¹
¹Seoul National University, Korea, ²Samsung Advanced Institute of Technology, Korea
- 5-2628 **Two-Dimensional Semiconducting Covalent Organic Nanosheets for Highly Sensitive and Humidity-Independent NO₂ Sensing**
[Youngkyu Jeong](#)
Korea Institute of Industrial Technology, Korea
- 5-3224 **Enhanced Thermoelectric Properties of Graphene through Grain Boundary Engineering via Mobile Hot-Wire CVD System**
[Myungwoo Choi](#)¹, Jicheol Byen², Jinwook Baek¹, Seonggu Hong², Hosun Shin², Seokwoo Jeon¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea Research Institute of Standards and Science, Korea
- 5-3366 **Large-Area and Free-Standing MoS₂/Ion-Gel Composite Film for High-Sensitivity Low-Power Photodetection**
[Soobin Lee](#)¹, Seohyun Maeng¹, Hyunseok Lee², Jaekyun Kim¹
¹Hanyang University, Korea, ²Chungbuk National University, Korea
- 5-3434 **Characterization of Graphene-Doped ZnO Thin Film, and Its Application for Humidity Sensor**
[Muhammad Sagib](#), Shenawar Ali Khan, Woo Young Kim
Jeju National University, Korea

- 5-3540 **Impact of Oxide Grown inside Multi Epitaxy on Super Junction IGBT**
[Geon Hee Lee](#), Byoung Sub Ahn, Jong Mun Choi, Ey Goo Kang
Far East University, Korea
- 5-3541 **A Study on Optimization of Planar Gate Type MOSFET Multi Epitaxial Process in Super-Junction Structure**
[Chang Hyeon Jo](#), O Yong Kwon, Yoon Young Huh, Ey Goo Kang
Far East University, Korea
- 5-3544 **Study on the Electric Characteristics of the Trench Gate Field Stop IGBT through Two-Step Field Stop**
[Hae Seock Lee](#), Ghen Hee Lee, Byoung Sub Ahn, Ey Goo Kang
Far East University, Korea
- 5-3548 **A Study on the Optimization of Deep-Trench Super Junction MOSFET**
[Yoon Young Huh](#), Byoung Sub Ahn, Jong Mun Choi, Chang Hyeon Jo, Ey Goo Kang
Far East University, Korea
- 5-3551 **Comparative Analysis of Electrical Characteristics of RC IGBT in NPT IGBT and NPT Structure**
[Se-Young Kim](#), Byoung-Sub Ahn, Ey-Goo Kang
Far East University, Korea
- 5-3715 **Nitrogen Dioxide Gas Sensor Array Based on Large-Area Grown MoS₂ Field Effect Transistor**
[Sehwan Kim](#), Heekyeong Park, Seungho Baek, Sunkook Kim
Sungkyunkwan University, Korea



6. Emerging bottom-up nanofabrication

ORAL PRESENTATION

6-1. Directed self-assembly of block copolymers

MONDAY, November 2

Ora (8F)

Chairs
Sheng Li (Korea Advanced Institute of Science and Technology, Korea)
Sung Woo Hong (Korea Institute of Industrial Technology, Korea)

Three Dimensional Nonprinting via Charged Aerosols

09:00-09:30
KEYNOTE
[Mansoo Choi](#)
Seoul National University, Korea

Chirality-Specific Synthesis of Single-Walled Carbon Nanotubes by Catalyzed Chemical Vapor Deposition

09:30-10:00
KEYNOTE
[Yan Li](#)
Peking University, China

6-0595 Self-Assembly of Bottle-Brush Copolymers

10:00-10:30
INVITED
[June Huh](#)
Korea University, Korea

6-0591 Simulation Studies on Boundary-Directed Epitaxy of Block Copolymers

10:30-11:00
INVITED
[Su-Mi Hur](#)
Chonnam National University, Korea

6-0283 Self-Assembled PS-b-PMMA Block Copolymer Thin Films as a Viable Platform for Nanostructured Material Synthesis

11:00-11:30
INVITED
[Michele Perego](#)
National Research Council, Italy

6-0688 Dispersity Stabilized Complex Morphologies in AB Diblock Copolymers

11:30-11:45
Inho Kim¹, Rui Shi², Yeonji Choe¹, Eun Ji Kim¹, Bumjoon Kim¹, Hu-Jun Qian², [Sheng Li](#)¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Jilin University, China

6-3081 Graphene Foam Cantilever Produced via Simultaneous Foaming and Doping Effect of an Organic Coagulant

11:45-12:00
[Sung Hyun Noh](#), Tae Hee Han
Hanyang University, Korea

6-0656 In Situ Fabrication of Organic/Inorganic Semiconductor Nanowire Array for Broadband Photodetector by Crack Photolithography-Based Micro-/Nanofluidic Platforms

12:00-12:15
[Jun Gyu Park](#)¹, Qitao Zhou², Taesung Kim¹
¹Ulsan National Institute of Science and Technology, Korea, ²China University of Geosciences, China

6-2. Nanomaterial assembly for material discovery

MONDAY, November 2

Ora (8F)

Chair
Tae Hee Han (Hanyang University, Korea)

6-3554 Structural Design of 2D Transition Metal Carbides and Carbonitrides MXenes for Electromagnetic Interference Shielding

13:20-13:50
INVITED
[Chong Min Koo](#)
Korea Institute of Science and Technology, Korea

6-0323 Metallic Oxides for the Green Deal

13:50-14:20
INVITED
[Paloma Fernández Sánchez](#)
Complutense University of Madrid, Spain

6-0252 Synthesis Design and Device Integration of Colloidal Semiconductor Nanocrystals for Optoelectronic Applications

14:20-14:50
INVITED
[Nuri Oh](#)
Hanyang University, Korea

6-0229 Interfacial Assembly of Nanosheets into Porous Macrostructures

14:50-15:20
INVITED
[Franklin Kim](#)
ShanghaiTech University, China

6-2807 Multi-Component Mesocrystalline Assemblies for the Efficient Wastewater Purification System

15:20-15:35
[Min Jun Ko](#), Bum Chul Park, Thomas MyeongSeok Koo, Yoo Sang Jeon, Myeong Soo Kim, Young Keun Kim
Korea University, Korea

6-3074 Room-Temperature, Highly Durable Ti₃C₂T_x MXene/Graphene Hybrid Fibers for NH₃ Gas Sensing

15:35-15:50
[Wonsik Eom](#), Tae Hee Han
Hanyang University, Korea

6-3633 Functional Porous Organic Materials for Energy Efficient Soft Touch Artificial Muscles

15:50-16:05
[Manmatha Mahato](#), Il-Kwon Oh
Korea Advanced Institute of Science and Technology, Korea

6-3. Bottom-up nanofabrication for device applications

MONDAY, November 2

Ora (8F)

Chair
Nuri Oh (Hanyang University, Korea)

6-0194 Carbohydrate Block Copolymer Self-Assemblies: Nanoparticles and Highly Nanostructured Thin Films

16:10-16:40
INVITED
[Redouane Borsali](#)
University Grenoble Alpes, France

-  **6-0132** Sequential Infiltration Synthesis (SIS): Principles and Applications
16:40-17:10 [Seth Darling](#)
INVITED *Argonne National Laboratory, USA*
-  **6-0122** Microparticle-Based Soft Electronic Devices
17:10-17:40 [Unyong Jeong](#)
INVITED *Pohang University of Science and Technology, Korea*
- 6-2099** A Study on the Patterning Method Using Solvent-Free Aerodynamically Focused Nanoparticle (AFN) Printing
17:40-17:55 [Taehyeob Im](#), Minhee Son, Caroline Sunyong Lee
Hanyang University, Korea
-  **6-1989** Electrical/Optical Multimodal Sensing for Trace-Level Mixed Gas Detection via 3D Nanoarchitectures
17:55-18:10 Hyeuk Jin Han^{1,2}, [Seunghee Cho](#)¹, Yeon Sik Jung¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Yale University, USA
-  **6-1538** Improvement of Ru Thin Films Selectivity with Advanced Area-Selective Atomic Layer Deposition
18:10-18:25 [Jeong-Min Lee](#), Ji Won Han, Tae Joo Park, Woo-Hee Kim
Hanyang University, Korea
- 6-0756** Dewetting-Induced Nano Patterning and Transfer-Printing of Nanoparticles for Device Applications
18:25-18:40 [Tae Won Nam](#)¹, Moohyun Kim¹, Yanming Wang², Duk Young Jeon¹, Jeffrey C. Grossman², Yeon Sik Jung¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Massachusetts Institute of Technology, USA



6. Emerging bottom-up nanofabrication

POSTER PRESENTATION

6-1. Directed self-assembly of block copolymers

MONDAY, November 2

8F Lobby

- 6-0370** Pattern Formation of Hybrid Nanostructures with Functionality via Self-Assembly of Block Copolymers
[Tae Wan Park](#)¹, Young Lim Kang², Chan Park², Woon Ik Park²
¹Korea Institute of Ceramic Engineering and Technology, Korea, ²Pukyong National University, Korea
- 6-0666** 3D Tailored Crumpling of Block-Copolymer Lithography on Chemically Modified Graphene
[Youngkyu Ko](#)¹, Ju Young Kim², Sangouk Kim¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Electronics and Telecommunications Research Institute, Korea
- 6-1177** Synthesis of Si Block-Containing Gradient Block Copolymer with Increased Assembly Kinetics via Systematic Homopolymer Control for the Fabrication of a Perpendicular Lamellar Pattern
[Yemin Park](#), Seungwon Song, Yeon Sik Jung
Korea Advanced Institute of Science and Technology, Korea
- 6-1575** Permanent Structural Color of Self-Assembled Block Copolymer by Thermal Cross-Linking for Colorful Data Storage
[Chang Eun Lee](#), Hongkyu Eoh, Han Sol Kang, Youngdoo Jung, Cheolmin Park
Yonsei University, Korea
- 6-1913** Visualization of Strain Sensor by Structural Color of Block Co-Polymer
[Youngdoo Jung](#), Tae Hyun Park, Han Sol Kang, Chang Eun Lee, Cheolmin Park
Yonsei University, Korea

6-2. Nanomaterial assembly for material discovery

MONDAY, November 2

8F Lobby

- 6-0742** Research for NO₂ Gas Detection of ZrO₂-Shelled Nanowires
[Hyouun Woo Kim](#), Jae Hoon Bang, Sanjit Manohar Majhi, Seung Min Han, Ha Young Lee, Ka Yoon Shin
Hanyang University, Korea
- 6-1354** Use of Unzipping Nitrogen-Doped Carbon Nanotubes for Synthesis of Highly Crystalline Semiconducting Graphene Nanoribbons
[Yong Park](#), Ho Jin Lee, Sang Ouk Kim
Korea Advanced Institute of Science and Technology, Korea

- 6-2419 **Free-Standing Array of Single Colloidal Nanoparticles by Template Dissolution Strategy**
[Joong Bum Lee](#)¹, Harriet Walker², Yi Li³, Tae Won Nam¹, Aliaksandra Rakovich⁴, Riccardo Sapienza²,
 Yeon Sik Jung¹, Yoon Sung Nam¹, Stefan A. Maier^{2,5}, Emiliano Cortés⁵
¹Korea Advanced Institute of Science and Technology, Korea, ²Imperial College London, UK, ³Southern
 University of Science and Technology, China, ⁴King's College London, UK,
⁵Ludwig-Maximilians-Universität München, Germany
- 6-2590 **Synthesis of Nickel Nanotube Composites by Electrospinning and Electroless Deposition**
 Areum Kim¹, [Jin Seok Kim](#)², Da Won Ahn², Jin Hyun Choe², Sung Gyu Pyo²
¹Stanford University, USA, ²Chung-Ang University, Korea
- 6-2680 **Naofiber Based Chemical/Physical Filter Platform Using Metal-Organic Framework (MOF)
 Decorated on Fe-Doped TiO₂ Nanorod Composites**
[Dongyeon Kim](#)^{1,2}, Ki Ro Yoon¹
¹Korea Institute of Industrial Technology, Korea, ²Sungkyunkwan University, Korea
- 6-2813 **New Fabrication Process for the Hierarchical Self-Assembly of PDI without Using an Additional
 Synthetic Method or Additives**
 Yong-Jae Kim¹, Hee-Tae Jung¹, [Hwan-Jin Jeon](#)²
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea Polytechnic University, Korea
- 6-3167 **Graphene Quantum Dots/Graphene Fiber Nanochannels for Osmotic Power Generation**
[Dong Jun Kang](#), Tae Hee Han
 Hanyang University, Korea
- 6-3181 **Facile Fabrication of Nanoporous Tin-Monoxide and Its Application to Gas Sensors**
[Woomi Gwon](#), Eunji Lee, Sangwoo Ryu
 Kyonggi University, Korea
- 6-3190 **Promoted Enhancement Factor of SERS of Silver Nanoporous Structures Fabricated by Control of
 Nucleation and Growth**
[Eunji Lee](#), Woomi Gwon, Sangwoo Ryu
 Kyonggi University, Korea
- 6-3284 **Finite Element Method Analysis of Electrodynamic Behavior in the III-V Nanowires in the
 Suspension**
[Byeong-U Bak](#), Minji Park, Jaekyun Kim
 Hanyang University, Korea
- 6-3515 **Facile Photochemical Synthesis of 0D/2D Ag-CdS Nanocomposites for Enhanced Photocatalytic
 Performance under Visible Light**
[Jin Hyeok Lee](#), A.N. Kadam, Yeyoung Kang, Yechan Lee, Sang-Wha Lee
 Gachon University, Korea
- 6-3529 **Photocatalytic Activity of Z Scheme Cubic-Fe₂O₃@rGO@g-C₃N₄ under Solar Light**
[Soo Hyeon Park](#), Sang Wha Lee
 Gachon University, Korea

- 6-3742 **Phosphate Based Cationized Starch as an Excellent Flame Suppressant Deposited on Cotton
 Fabric Using LBL Technique**
[Ur Rehman Zeeshan](#), Ihsan Ullah, Bon Heun Koo
 Changwon National University, Korea

6-3. Bottom-up nanofabrication for device applications

MONDAY, November 2

8F Lobby

- 6-0463 **Fast Fabrication of Metal-Functionalized SnO₂ Nanowires and Their Applications in Gas Sensor**
[Myung Sik Choi](#), Changhyun Jin
 Yonsei University, Korea
- 6-0766 **Fabrication of BiTe-Based Thermoelectric Modules Using ENEPIG as a Diffusion Barrier Layer**
[Yen Ngoc Nguyen](#), Injoon Son
 Kyungpook National University, Korea
- 6-0972 **Particulate Matter Filter Based on Carbon Nanotube Sheet**
[Sungmun Song](#), Woori Ham, Dante Ahn, Yoseop Lee, Seung-Eon Ahn
 Korea Polytechnic University, Korea
- 6-1029 **Soft Robot Based on Carbon Nanotube(CNT) Sheet**
[Woori Ham](#), Sungmun Song, Dante Ahn, Yoseop Lee, Seung-Eon Ahn
 Korea Polytechnic University, Korea
- 6-1064 **Self-Assembled Block Copolymer Templates for Nanopatterning of Perovskites Enhancing
 Photoluminescence and Environmental Stability**
[Jin Woo Oh](#), Hyowon Han, Cheolmin Park
 Yonsei University, Korea
- 6-1306 **Mechanical Strength Improvement by Using Highly Concentrated Hydrogen Nano-Bubble
 Water in Cement Mixture**
[Won Kyung Kim](#), Young Sun Sim, Jung-Geun Han
 Chung-Ang University, Korea
- 6-1393 **Evaluation of Mechanical Strength and Thermal Efficiency on the Mortar of CO₂ Reduction Type**
[Ji-Sun Kim](#), Jung-Geun Han, Young-Ho Kim
 Chung-Ang University, Korea
- 6-1411 **Comparison between Direct Optical Ablation and Sequent Thermal Effect for the Ultra-Fast
 Pulsed Laser Photo-Thermal Processing**
[C. Y. HO](#)
 Hwa Hsia University of Technology, Taiwan
- 6-1645 **Application of an Alkanethiols Self-Assembled Monolayers for Area Selective Atomic Layer
 Deposition**
[Jeong-Bin Lee](#), Jin-Seon Lee, Tae Joo Park, Woo-Hee Kim
 Hanyang University, Korea

6-1740 **Microheater Based on Nickel-Chromium Alloy Fabricated by Co-Sputtering Method**
[Hyeokjoo Choi](#), Seok Hun Kwon, Seokwon Lee, Yonghyeon Kim, Jung Hyun Kim, Hyunil Kang, Wonseok Choi
Hanbat National University, Korea

6-1834 **Synthesis of Boron Nitride Nanotubes (BNNTs) Using Triple Torch DC Thermal Plasma System**
[Kyu-Hang Lee](#), Hyoung-Jun Kim, Tae-Wook Kim, Ye-Jin Jin, Seung-Ho Han, Byung-Koo Son
Cheorwon Plasma Research Institute, Korea

6-1849 **Synthesis of Nano-Glass Frit Using Triple Torch DC Thermal Plasma System**
[Ye-Jin Jin](#), Kyu-Hang Lee, Hyoung-Jun Kim, Tae-Wook Kim, Byung-Koo Son
Cheorwon Plasma Research Institute, Korea

6-1998 **Hydrophobicity Modification of Au-Based SERS Substrates for the Collection and Detection of Trace-Amount Analytes**
[Minjoon Kim](#), Seunghee H. Cho, Hyungjoon Park, Yeon Sik Jung
Korea Advanced Institute of Science and Technology, Korea

6-2049 **Soluble Functional Polymers Self-Aligned Patterning for Organic Electronics Applications**
[Min Jea Sung](#), Chae Won Kim, Mi Jin Kim, Keon Joo Park, Sam Nyung Yi, Hyung Soo Ahn, Young Tea Chun
Korea Maritime and Ocean University, Korea

6-2071 **Mechanical Strength Improvement of CO₂ Reducing Mortar Using Feldspar and Hydrogen Nano-Bubble Water**
[Jin Kim](#), Junggeun Han, Jongyeong Lee
Chung-Ang University, Korea

6-2258 **Improved Sensitivity and Selectivity of an Ethanol Gas Sensor Based on Ru-Loaded MoO₃ Nanoribbons**
[Ungkana Inpan](#)¹, Jajiya Soonklang¹, Pimpan Leangtanom¹, Anurat Wisitsoraat², Viruntachar Kruefu¹
¹Maejo University, Thailand, ²National Electronics and Computer Technology Center, Thailand

6-2284 **Metal Oxide-Based Gas Sensor with Asymmetric Back-to-Back Schottky Contacts for Enhancing Sensitivity and Selectivity**
[Hyeonwoong Hwang](#)¹, Hyunah Kwon², Dongyeong Kim³, Jong Kyu Kim¹
¹Pohang University of Science and Technology, Korea, ²Max-Planck-Institut für Intelligente Systeme, Germany, ³Max Planck Institute for Solid State Research, Germany

6-2334 **Novel Design of Amine-Functionalized Semiconducting Polymer Gel for Highly Sensitive and Selective NO₂ Sensor**
[Pureunsan Go](#), Jaehee Kim, Han Wool Park, Hyukmin Kweon, Haejung Hwang, Do Hwan Kim
Hanyang University, Korea

6-2420 **Development of Cu-rGO/In₂O₃ as Low Temperature Gas Sensors**
[Pimpan Leangtanom](#)¹, Pimtanarat Mungkan¹, Thanyarat Phongton¹, Jajiya Soonklang¹, Anurat Wisitsoraat², Viruntachar Kruefu¹
¹Maejo University, Thailand, ²National Electronics and Computer Technology Center, Thailand

6-2449 **MoO₃ Nanoscale Pattern Fabrication by Nanotransfer Printing for Light Out-Coupling Efficiency Enhancement of Quantum Dot Light-Emitting Diodes**
[Moohyun Kim](#), Yeon Sik Jung
Korea Advanced Institute of Science and Technology, Korea

6-2455 **Robust Thermal Stability Enhancement of Germanium Nanowires Using Disordered Boron Nitride as a Protective Shell**
[Hyun-Sik Hwang](#)¹, Min-Ki Hong¹, Seyedmahdi Sattari Esfahlan¹, Sangyeob Lee², Jae-Hyun Lee¹
¹Ajou University, Korea, ²Hanbat National University, Korea

6-2492 **Light Induced Ligand Crosslinking and Patterning of Perovskite Nanocrystals for All-Solution-Processed Light-Emitting Diodes**
[Yoonkyu Kim](#), Seungki Shin, Jihyun Roh, Nuri Oh
Hanyang University, Korea

6-3057 **Humidity Tolerance Semiconducting Sensors Using a Water Screen Layer**
[Yumin Park](#), Young Geun Song, Gwang Su Kim, Chong-Yun Kang
Korea Institute of Science and Technology, Korea

6-3327 **Fabrication of Poly-Si Membrane Using Water-Soluble Sacrificial Sr₃Al₂O₈ Layer**
[Jungkyu Kwon](#), Sangwoo Ryu
Kyonggi University, Korea

6-3438 **Highly Versatile Fabrication Process for Nanoscale Etch Masks Using Block Copolymer Self-Assembly**
[Taehwa Oh](#)
Korea Advanced Institute of Science and Technology, Korea

6-3621 **Mechanical and Corrosion Characteristics of Plastic Waste Composite Upcycled with IPL-Irradiated Carbon Fiber**
[Myounghun Kim](#), Duyoung Choi, Jang-Woo Han, Jungpil Kim, Kwang-Seok Kim
Korea Institute of Industrial Technology, Korea



7. Emerging photovoltaic materials

ORAL PRESENTATION

7-3. New materials and device physics in organic & hybrid solar cells

MONDAY, November 2

Ballroom 3 (2F)

- Chairs Bongsoo Kim (Ulsan National Institute of Science and Technology, Korea)
Jaewon Lee (Chungnam National University, Korea)
- 7-3036 **Bandgap Narrowing in Organic Semiconductors Towards Near-Infrared Organic Solar Cells**
09:00-09:30 [Jaewon Lee](#)
INVITED *Chungnam National University, Korea*
- 7-2898 **Recent Progress in Solar Cells Employing Semiconducting Polymers and Perovskites**
09:30-10:00 [Taiho Park](#)
INVITED *Pohang University of Science and Technology, Korea*
- 7-0379 **High-Performance and Heavy-Duty Transparent and Flexible Organic Solar Cells**
10:00-10:30 [Wallace C.H. Choy](#)
INVITED *The University of Hong Kong, Hong Kong*
- 7-2961 **Estimation of Internal Quantum Efficiency of Solar Cells with the Help of Optical Simulation**
10:30-10:45 [Swarup Biswas](#), Hyeok Kim
University of Seoul, Korea
- 7-2732 **Impact of Structural Modulation of Co-Absorbing Polymer on the Performance of Ternary Polymer Solar Cells**
10:45-11:00 [Insoo Shin](#)¹, Hyun-Seock Yang¹, Yuanyuan Zhang¹, Eunhye Yang¹, Yun Kyung Jung², Semo Son¹, Sung Heum Park¹
¹Pukyong National University, Korea, ²Inje University, Korea
- 7-1468 **Fabrication of DSSC(Dye-Sensitized Solar Cell) by Using Cellulose Nanostructure Derivatives**
11:00-11:15 [Yonghee Yoon](#)¹, Cheolhwan Jeong¹, Eunjeong Jeon¹, Jaeyoung Gwon², Wonhee Lee¹
¹Sejong University, Korea, ²National Institute of Forest Science, Korea
- 7-1349 **Electronic Structure of Photovoltaic Organic Films and Interfaces Investigated by High-Sensitivity Ultraviolet Photoelectron Spectroscopy**
11:15-11:30 [Shunsuke Kimata](#)¹, Hiroko Susa², Yuya Tanaka¹, Toshio Nishi², Hisao Ishii¹
¹Chiba University, Japan, ²Sony Corporation, Japan

7-1. Photovoltaic halide perovskite materials and devices

MONDAY, November 2

Ballroom 3 (2F)

- Chairs Ji-Hyun Jang (Ulsan National Institute of Science and Technology, Korea)
Hyun Suk Jung (Sungkyunkwan University, Korea)
- 7-2727 **A Thin Film Hematite for an Efficient Unassisted Water Splitting System**
13:20-13:50 [Ji-Hyun Jang](#)
INVITED *Ulsan National Institute of Science and Technology, Korea*
- 7-0198 **Highly Efficient and Stable Perovskite Photovoltaics with All-Inorganic Charge Transporting Layers**
13:50-14:20 [Hyunjung Shin](#)
INVITED *Sungkyunkwan University, Korea*
- 7-2745 **Stable and Efficient Perovskite Planar Solar Cells via Introduction of 2 Dimensional Perovskite Seeding Layer**
14:20-14:35 [Pesi Mwitumwa Hangoma](#), Danbi Kim, Bo Ram Lee, Jung Hyun Jeong, Sung Heum Park
Pukyong National University, Korea
- 7-1059 **Development of Lead-Free Perovskite Solar Cells Using Halide-Based Additives**
14:35-14:50 [Do Yeon Heo](#), Soo Young Kim
Korea University, Korea
- 7-0627 **Adopted 2D/3D Halide Perovskite Heterointerface for Substantially Enhanced Endurance in Resistive Switching Memory**
14:50-15:05 [Sangmyeong Lee](#)¹, Hyojung Kim², Won Bin Kim¹, Gill Sang Han¹, Ho Won Jang², Hyun Suk Jung¹
¹Sungkyunkwan University, Korea, ²Seoul National University, Korea
- Efficient, Stable and Scalable Perovskite Solar Cells**
15:05-15:35 [Jangwon Seo](#)
KEYNOTE *Korea Research Institute of Chemical Technology, Korea*
- Material Strategies to Accelerate Printed Photovoltaics Towards a GW Technology**
15:35-16:05 [Christoph J. Brabec](#)
KEYNOTE *Friedrich-Alexander University Erlangen-nürnberg, Germany*

7-2. Inorganic thin film solar energy materials and devices

MONDAY, November 2

Ballroom 3 (2F)

- Chair Byungha Shin (Korea Advanced Institute of Science and Technology, Korea)
- 7-0413 **Status of Emerging Thin Film Photovoltaic Inorganic Materials: Kesterite and Beyond**
16:10-16:40 [Zacharie Jehl](#)¹, Joaquim Puigdollers¹, Marcel Placidi¹, Sergio Giraldo², Kunal Tiwari², [Edgardo Saucedo](#)¹
INVITED ¹Polytechnic University of Catalonia, Spain, ²Catalonia Institute for Energy Research, Spain

 7-0256 Development of High-Efficiency Cu(In,Ga)Se₂ Thin-Film Photovoltaics on Flexible Stainless Steel Substrates: Significance of GA Profile in Cigs Film
16:40-17:10
INVITED [Donghyeop Shin](#), Kihwan Kim, Inyoung Jeong, Young-Joo Eo, Soomin Song, Ara Cho, Seung Kyu Ahn, Jun-Sik Cho, Joo Hyung Park, Jinsu Yoo, Sejin Ahn, Jae Ho Yun, Jihye Gwak
Korea Institute of Energy Research, Korea

 7-0117 Method to Simultaneously Determine Minority-Carrier Diffusion Length and Back-Surface Recombination Velocity in Graded-Band-Gap Solar Cells
17:10-17:40
INVITED [Choong-Heui Chung](#)
Hanbat National University, Korea



7. Emerging photovoltaic materials

POSTER PRESENTATION

7-1. Photovoltaic halide perovskite materials and devices

MONDAY, November 2

2F Lobby

- 7-0672 **Monolithic Silicon Tandem Cells Enabled by Efficient and Stable Wide Bandgap Perovskite via Anion-Engineered Two-Dimensional Additives**
[Daehan Kim](#)¹, Hee Joon Jung², Ik Jae Park³, Bryon W. Larson⁴, Sean P. Dunfield⁴, Chuanxiao Xiao⁴, Jekyung Kim¹, Jinhui Tong⁴, Passarut Boonmongkolras¹, Su Geun Ji³, Joseph J. Berry⁴, Jin Young Kim³, Kai Zhu⁴, Dong Hoe Kim⁵, Byungha Shin¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Northwestern University, USA, ³Seoul National University, Korea, ⁴National Renewable Energy Laboratory, USA, ⁵Sejong University, Korea
- 7-0750 **Enhancing the Power Conversion Efficiency Using Hemisphere TiO₂ Photonic Crystal for Perovskite Solar Cell**
Dong In Kim, Ji Won Lee, Rak Hyun Jeong, Ju Won Yang, Seong Park, [Jin-Hyo Boo](#)
Sungkyunkwan University, Korea
- 7-1102 **Understanding Effects of Precursor Solution Aging in Triple Cation Lead Perovskite**
[Passarut Passarut](#)¹, Daehan Kim¹, Esra Alhabshi², Issam Gereige², Byungha Shin¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Saudi Aramco Research and Development Center, Saudi Arabia
- 7-1207 **Structure and Optical Properties of Chemically Strained La_{1-x}Sr_xMnO₃**
[Shin-Kyu Lee](#), Chung Wung Bark, Rui He
Gachon University, Korea
- 7-1220 **Self-Powered Photodetector in Vertical Architecture Using Mixed Halide Perovskite for Highly Sensitive UVC Detection**
[Thi My Huyen Nguyen](#), Chung Wung Bark
Gachon University, Korea
- 7-1804 **Oxygen Plasma Treated Surface Engineering of Low-Temperature Processed TiO₂ Electron Transport Layer for Flexible Perovskite Solar Cells**
[Jiyeon Nam](#)¹, Jae-Ho Kim², Chang Su Kim², Jung-Dae Kwon², Sungjin Jo³
¹Daegu Mechatronics and Materials Institute, Korea, ²Korea Institute of Materials Science, Korea, ³Kyungpook National University, Korea
- 7-2318 **Chracteristics of Phosphor Downconverting Layer Applied to Perovskite Solar Cells**
[Ji Yong Hwang](#), Hyung Wook Choi
Gachon University, Korea
- 7-2335 **Enhancement of Perovskite Solar Cells Based on FAPbBr₃/I₃ with Methylammonium Chloride**
[Sung Hwan Joo](#), Hyung Wook Choi
Gachon University, Korea

- 7-2356 **Fabrication of Highly Efficient PbS Colloidal Quantum Dot Solar Cells via Two-Step Post Annealing Processes**
Changjo Kim¹, Se-Woong Baek², Junho Kim¹, Byeongsu Kim¹, Jung-Yong Lee¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea University, Korea
- 7-2375 **Optimize PbS Quantum Dot Solar Cells by Using Solution Phase Ligand Exchange Process**
Junho Kim, Jung-Yong Lee
 Korea Advanced Institute of Science and Technology, Korea
- 7-2825 **Fabrication of Water-Repellent Platinum(II) Complex-Based Photon Down-Shifting Layers for Perovskite Solar Cells by Ultrasonic Spray Deposition**
Eunhye Hwang¹, Hyungwoo Kim¹, Sang-Hak Lee¹, Ji Hoon Seo^{1,2}, Hyun-Tak Kim¹, Chaiheon Lee¹, Sung-Yeon Jang¹, Kwanyong Seo¹, Tae-Hyuk Kwon¹
¹Ulsan National Institute of Science and Technology, Korea, ²Korea Electric Power Research Institute, Korea
- 7-2844 **Effect on the Double-Stacked SiN_x/SiO_x Layers for N-Type Bifacial Crystalline Silicon Solar Cells**
Hyeongsik Park, Muhammad Quddamah Khokhar, Jaehyeong Lee, Youngkuk Kim, Eun-Chel Cho, Younghyun Cho, Jae Chun Song, Junsin Yi
 Sungkyunkwan University, Korea
- 7-3228 **Effect of A-Site Mixing on Phase Engineering of FAPbI₃ during the Shear Coating Process**
Hansol Kim¹, Hyewon Gu¹, Choong-Heui Chung¹, Chang Eun Song², Ki-Ha Hong¹
¹Hanbat National University, Korea, ²Korea Research Institute of Chemical Technology, Korea
- 7-3592 **Temperature Dependent Raman Scattering Study of Hybrid Perovskite Methylammonium Lead Chloride Single Crystals**
Furqan Ul Hassan Naqvi¹, Jae Hyeon Ko¹, Jeong Woo Lee¹, Chang Won Ahn², Tae Heon Kim²
¹Hallym University, Korea, ²University of Ulsan, Korea
- 7-3606 **A Study on the Performance Improvement of Perovskite Based Ultraviolet Sensor**
Seong Gwan Shin, Hyung Wook Choi
 Gachon University, Korea

7-2. Inorganic thin film solar energy materials and devices

MONDAY, November 2

2F Lobby

- 7-0911 **Effects of Plasma and Evaporated Atoms on the Spatial Distribution of Coating Film Thickness for Electron Beam-Induced Material Evaporation**
C. Y. Ho¹, D. Qiao²
¹Hwa Hsia University of Technology, Taiwan, ²Guangdong University of Petrochemical Technology, China
- 7-1115 **Effect of Anion-Cation Double Substitution in Solution Processed CZTSSe Solar Cell**
Giuk Jeong, Byungha Shin
 Korea Advanced Institute of Science and Technology, Korea

- 7-1138 **Carrier Transport Mechanism in Low-Temperature Processed Cu(In,Ga)Se₂ Thin Film Solar Cells**
Hojin Lee¹, Kihwan Kim², Byungha Shin¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea Institute of Energy Research, Korea
- 7-1273 **The Effect of Precursor Type and Molarity on Structural Optical and Electrical Characteristics of Mg_{1-x}Zn_xO Thin Films by Sol-Gel Process**
Ahram Yom, Min Sang Lee, Hyo Jin Choi, Hong Seung Kim, Nakwon Jang, Young Yun, Hyung Soo Ahn
 Korea Maritime and Ocean University, Korea
- 7-1298 **Optical and Electrical Characteristics of In-Doped MgZnO Thin Films Deposited by Sol-Gel Method with Various Indium Precursors**
Hyo Jin Choi, Min Sang Lee, Ahram Yom, Hong Seung Kim, Nakwon Jang, Hyung Soo Ahn
 Korea Maritime and Ocean University, Korea
- 7-1489 **Carbon Diffusion Barrier Properties of ITO Thin Film for Graphite-Based Solar Cell**
 Hyunchul Sohn, Jaeyeon Kim, Taeho Kim
 Yonsei University, Korea
- 7-1772 **Fabrication of β -Ga₂O₃ MOSFET on Si Substrate by In-Situ One Step Process**
 Min Yang, So Yoon Kim, Han Sol Lee, Kyoung Hwa Kim, Hyung Soo Ahn
 Korea Maritime and Ocean University, Korea
- 7-1838 **Structural Design and Characteristic Simulation of High Power Shingled Photovoltaic Module**
Seyoung Jeong, Jaesung Bae, Jangwon Yoo, Hongsung Jee, Inju Baek, Jaehyeong Lee
 Sungkyunkwan University, Korea
- 7-1850 **Raman Spectra and Structure of Hexagonal Si Needles Grown by Using a Mixed-Source Hydride Vapor Phase Epitaxy**
Jun Hyeon Jang¹, Kyoung Hwa Kim¹, Gang Seok Lee¹, Jung Hyun Park¹, Jae Hak Lee¹, Hyung Soo Ahn¹, Young Tea Chun¹, Min Yang¹, Sam Nyung Yi¹, Sanghoon Ryu², Suck-Whan Kim²
¹Korea Maritime and Ocean University, Korea, ²Andong National University, Korea
- 7-1905 **Characteristics and Growth of HVPE AlN Epilayer for UV Optoelectronic Devices**
Jang Hee Oh¹, Gang Seok Lee¹, Jung Hyun Park¹, Kyoung Hwa Kim¹, Kisu Jo¹, Jun Hyeon Jang¹, Hyung Soo Ahn¹, Young Tea Chun¹, Min Yang¹, Sam Nyung Yi¹, Suck-Whan Kim²
¹Korea Maritime and Ocean University, Korea, ²Andong National University, Korea
- 7-1949 **Comparison of Carbon Diffusion Barrier Properties for Solar Cells on Graphite Sheet**
Seran Park¹, Hyelim Cho¹, Jaeyeon Kim¹, Soobong Kim², Hyunjong Kim², Dae-Hong Ko¹
¹Yonsei University, Korea, ²New Power Plasma Inc., Korea
- 7-1984 **Growth of Hexagonal Si Needles by Using a Mixed-Source HVPE Method for Optoelectronics Devices**
Jung Hyun Park¹, Kyoung Hwa Kim¹, Gang Seok Lee¹, Jae Hak Lee¹, Hyung Soo Ahn¹, Young Tea Chun¹, Min Yang¹, Sam Nyung Yi¹, Sanghoon Ryu², Suck-Whan Kim²
¹Korea Maritime and Ocean University, Korea, ²Andong National University, Korea

- 7-2055 **The Effect of Molarity on Electrical and Optical Properties of Ga-Doped Zn_xMg_{1-x}O Thin Films Deposited by Sol-Gel Method**
Min Sang Lee, Hyo Jin Choi, Ahram Yom, Hong Seung Kim, Hyung Soo Ahna, Nak Won Jang
Korea Maritime and Ocean University, Korea
- 7-2067 **Novel Photo-Sintering Technique for the Fabrication of CZTS Thin Film Solar Cells**
 Vu Minh Han Cao¹, Jaesung Bae¹, Inju Back¹, Joong-Pyo Shim², Byungyou Hong¹, Jaehyeong Lee¹
¹*Sungkyunkwan University, Korea, ²Kunsan National University, Korea*
- 7-2073 **Temperature Reduction Effect of Coated Thin Films for Solar Cell Modules Characterized by Coating Thickness**
Gukpeel Lee, Hyeokjoo Choi, Seokwon Lee, Young Park, Jung Hyun Kim, Wonseok Choi
Hanbat National University, Korea
- 7-2090 **Characteristics of Functional Coating According to the Annealing Treatment Times and Thickness Synthesized on the Cover Glass of Photovoltaic Modules**
Yonghyeon Kim, Changyeon Lee, Hyeokjoo Choi, Seokwon Lee, Jung Hyun Kim, Young Park, Wonseok Choi
Hanbat National University, Korea
- 7-2323 **Properties of In₂O₃:Sb Thin Films Deposited on Quartz Substrates by Radio-Frequency Magnetron Sputtering**
Shinho Cho
Silla University, Korea
- 7-2593 **High Performance, Ultra-Lightweight Flexible InGaP/GaAs/InGaAs Triple Solar Cell**
Tae Soo Kim¹, Hyo Jin Kim², Namgi Hong¹, Won Jun Choi³, Ki Jun Yu¹
¹*Yonsei University, Korea, ²Korea Photonics Technology Institute, Korea, ³Korea Institute of Science and Technology, Korea*
- 7-2751 **Circuit Design with Smart Diodes to Reduce Shading Loss in High Power Shingled Photovoltaic Modules**
Jaesung Bae, Jangwon Yoo, Hongsub Jee, Jaehyeong Lee
Sungkyunkwan University, Korea
- 7-2923 **Multi-Colored, Semitransparent a-Si Solar Cells Employing Dielectric Mirrors**
 Sungkyun Im, Hyeonwoo Kim, Donggyu Kim, Kyu-Tae Lee
Inha University, Korea
- 7-3138 **Rapid Thermal Annealing of Co-Sputtered CuSbSe₂ Thin Films for Photovoltaic Applications**
Sara Kim, Sakal Pech, Seongkyun Choi, Geum-Bae Cho, Nam-Hoon Kim
Chosun University, Korea
- 7-3157 **Fabrication of Tens of μm Thick Kerf-Less Silicon Wafers Using NI Electro-Deposition**
Changhoon Jeong, Jungi Min, Sangwoo Ryu
Kyonggi University, Korea

- 7-3164 **Na⁺ Diffusion Barrier to Prevent PID of P-Type PERC Solar Cells**
Eunjin Jang, Dongwook Jung, Sangwoo Ryu
Kyonggi University, Korea
- 7-3298 **Organic/Inorganic Hybrid Coatings to Reduce Moisture Permeability through the Back Sheet of Crystalline Si Solar Cell Modules**
Dongwook Jung, Eunjin Jang, Sangwoo Ryu
Kyonggi University, Korea
- 7-3854 **Highly-Transparent All-Dielectric Metasurface to Block Near-Infrared Region of Solar Spectrum**
 Eunjong Kim¹, Jiwon Kim¹, Sangwon Baek¹, Jae Yong Park¹, Kwang Ho Kim², Jong-Lam Lee³
¹*Pohang University of Science and Technology, Korea, ²Pusan National University, Korea*

7-3. New materials and device physics in organic & hybrid solar cells

MONDAY, November 2

2F Lobby

- 7-0835 **Application of Conducting Polymers/Ionic Liquids Composite for Printable Top Electrodes in Semi-Transparent Organic Solar Cells**
Hyunmin Park, Steve Park
Korea Advanced Institute of Science and Technology, Korea
- 7-1532 **Investigation on Correlation between Molecular Design and Morphology of Star Shaped Non-Fullerene Acceptors with J-/H-Type Aggregations**
Hye Won Cho¹, Chang Woo Koh², Md Al Mamunur Rashid^{2,3}, Tack Ho Lee¹, Song Yi Park¹, Wonho Lee⁴, Kyungwon Kwak², Han Young Woo², Jin Young Kim¹
¹*Ulsan National Institute of Science and Technology, Korea, ²Korea University, Korea, ³Chung-Ang University, Korea, ⁴Kumoh National Institute of Technology, Korea*
- 7-1545 **Effect of Substituents of Thienylene–Vinylene–Thienylene-Based Conjugated Polymer Donors on the Performance of Organic Solar Cells**
Jiwoo Yeop¹, Hee Su Kim², Tack Ho Lee¹, Jaewon Kim¹, Hye Won Cho¹, Song Yi Park¹, Jin Young Kim¹, Do-Hoon Hwang²
¹*Ulsan National Institute of Science and Technology, Korea, ²Pusan National University, Korea*
- 7-1945 **Fabrication of Pearlescent Pigment-Based Front Color Glass for Building Integrated Photovoltaic (BIPV) System**
Hyeon-Sik Ahn^{1,2}, Seong-Min Lim¹, Akpeko Gasonoo¹, Jae-Hyun Lee¹, Yoonseuk Choi¹
¹*Hanbat National University, Korea, ²Electronics and Telecommunications Research Institute, Korea*
- 7-2040 **Surface Passivation of the Crystalline Silicon Wafer Using by H₂S Gas for High Efficiency Solar Cells**
 Jian Lin¹, Hongsub Jee¹, Jangwon Yoo¹, Junsin Yi¹, Chaehwan Jeong², Jaehyeong Lee¹
¹*Sungkyunkwan University, Korea, ²Korea Institute of Industrial Technology, Korea*
- 7-2094 **Long-Term Colloidal Stability ZnO Nanoparticles Independent on Solvent Polarity and Their Application in Organic Solar Cells**
Woojin Lee, Jiwoo Yeop, Jungwoo Heo, Jongnam Park, Jin Young Kim
Ulsan National Institute of Science and Technology, Korea

7-2462 Effect of Post Annealing Temperature on the Carbon Diffusion of the Ni Layer Deposited by DC Sputtering

[Ju-Young Jeong](#), Jaeyeon Kim, Hyunchul Sohn,
Yonsei University, Korea

7-2543 High Indoor Performance of Organic Photovoltaics with Optimized Electron-Collecting Interlayers under 1000 lx LED Condition

[Sang Hyeon Kim](#), Jae Won Shim
Korea University, Korea

7-2737 Improved Photovoltaic Performance of Quinoxaline-Based Polymer Donors via π -Bridge Engineering for NFA Solar Cells

[Soyeong Jang](#)¹, Seong Beom Lee¹, Yun Kyung Jung², Semo Son¹, Sung Heum Park¹
¹Pukyong National University, Korea, ²Inje University, Korea

7-2818 Ionic Ir(III) Complex Based Versatile Interfacial Layer for Polymer Solar Cells via Electrical Double Layer Formation

[Minsoo Lee](#), Tae-Hyuk Kwon
Ulsan National Institute of Science and Technology, Korea

7-2857 Decent Performance of Indoor Organic Photovoltaics Using PEDOT: PSS Electrodes on Flexible Substrate

[Muhammad Ahsan Saeed](#)¹, Sang Hyeon Kim², Jae Won Shim²
¹Dongguk University, Korea, ²Korea University, Korea

7-2911 Characteristics of ZnCdSe Quantum Dots with Modified Interface and Their Application to Quantum Dot-Sensitized Solar Cells

Jeonghoon Lee, Sung Taek Hong, Ro Woon Lee, Yongbum Kwon, [Da-Woon Jeong](#)
Korea Institute of Industrial Technology, Korea

7-3040 Advantage of Narrow Bandgap Approach for All-Day Operation Organic Photovoltaics

Hyeok Kim, [Yongju Lee](#), Bo-Yeon Lee, Hyeong-Won Lee
University of Seoul, Korea

7-3068 Inverted Organic Photovoltaics for Stable Indoor Light Harvesting

Hyeok Kim, [Hyeong-Won Lee](#), Yongju Lee, Bo-Yeon Lee
University of Seoul, Korea

7-3235 Side Alkyl Chain Engineering for High Performance Organic Solar Cells

Bhim Raju Telugu, [Young Wan Lee](#), Dohun Yuk, Jin Young Kim, Bongsoo Kim
Ulsan National Institute of Science and Technology, Korea

7-3790 Durable Icephobic Coating for Solar Cell Panel

[Young-Seok Kim](#), Ji Min Chun
Korea Electronics Technology Institute, Korea



8. Hydrogen energy conversion and storage

ORAL PRESENTATION

8-2. Fuel cell: materials for electrodes and electrolytes

TUESDAY, November 3

Ara (8F)

Chair Chanhok Pak (Gwangju Institute of Science and Technology, Korea)

8-0482 Metal-Metalloid Compounds as a High-Performance Electrocatalyst for Water Splitting

10:10-10:40 [Hyuksu Han](#), Enhbayer Enhtuwshin
INVITED Konkuk University, Korea

 8-0405 A Highly Efficient Perovskite LSCF2882 Oxygen Electrode for Reversible SOC's at Reduced Temperatures

10:40-11:10 [Kang Taek Lee](#)
INVITED Korea Advanced Institute of Science and Technology, Korea

8-0160 Materials Interface Engineering of Polymeric Composite Membranes for Hydrogen Fuel Cell Applications

11:10-11:40 [Jin Young Kim](#)
INVITED Korea Institute of Science and Technology, Korea

8-2660 The Design of Vertically Aligned Architecture in PTFE Nanofiber Reinforced Composite Membranes for PEM Fuel Cells

11:40-11:55 [Ki Ro Yoon](#)
Korea Institute of Industrial Technology, Korea

8-1250 Enhanced Single Cell Performance by Adding Polytetrafluoroethylene-Coated Vulcan in High Temperature Polymer Electrolyte Membrane Fuel Cell

11:55-12:10 [Do-Hyung Kim](#), Hyeon-Seung Jung, Eunae Lee, Chanhok Pak
Gwangju Institute of Science and Technology, Korea

8-1. Water splitting and CO2 reduction

TUESDAY, November 3

Ara (8F)

Chairs Yun Jeong Hwang (Korea Institute of Science and Technology, Korea)
Caroline Sunyong Lee (Hanyang University, Korea)

 8-2396 Electrocatalysts for the Carbon Dioxide Electrochemical Reduction Reaction

14:00-14:30 [Minhua Shao](#)
INVITE The Hong Kong University of Science and Technology, Hong Kong

8-1692 **Highly Selective and Scalable Electrolysis for Gaseous CO₂ Reduction in the Zero-Gap Electrolyzer**
 14:30-15:00 [Hyung-Suk Oh](#)
 INVITED *Korea Institute of Science and Technology, Korea*

 8-0306 **Time-Resolved FT-Infrared Spectroscopy for CO₂ Reduction Reaction**
 15:00-15:30 [Wooyul Kim](#)
 INVITED *Sookmyung Women's University, Korea*

 8-0168 **Enhancing CO₂ Electroreduction to Oxygenates**
 15:30-16:00 [Boon Siang Yeo](#)
 INVITED *National University of Singapore, Singapore*

8-3343 **TiO₂ Nanorods Array Conformally Coated with a Monolayer MoS₂: An Efficient Electro-Catalyst for Hydrogen Evolution Reaction**
 16:00-16:15 [Anh Duc Nguyen](#), Thao Nhi Nguyen Tran, Jongwoo Park, Thi Hue Pham, Young Han Shin, Yong Soo Kim
University of Ulsan, Korea

8-2644 **Mn³⁺/Co³⁺ Active Site Enhanced Mn-Co Phosphate Nanostructures for Effective Total Water Splitting Applications**
 16:15-16:30 [Kandasamy Prabakar](#), Chinnadurai Deviprasath
Pusan National University, Korea

8-2123 **Synthesis of High Activity Hybrid Structured 1-D NiTiO₃/g-C₃N₄ with Improved Visible Light Photoactivity for the Photodegradation of Pollutants**
 16:30-16:45 [Haritham Khan](#), Caroline Sunyong Lee, Suhee Kang
Hanyang University, Korea

8-1255 **Efficient and Stable Organometal Halide Perovskite-Based Photocathode with Earth-Abundant and Cost-Effective MoS₂/Ti Foil Encapsulation Layer**
 16:45-17:00 [Hojoong Choi](#)¹, Sehun Seo¹, Ju-Hyeon Kim¹, Seungkyu Kim¹, Jongmin Lee¹, Guangxia Piao², Jong-Hoon Lee³, Hyungwoong Park², Kwanghee Lee¹, Sanghan Lee¹
¹Gwangju Institute of Science and Technology, Korea, ²Kyungpook National University, Korea, ³Huree University of Information and Communication Technology, Mongolia

WEDNESDAY, November 4

Ara (8F)

Chair Yun Jeong Hwang (Korea Institute of Science and Technology, Korea)

8-2043 **Zero-Bias Photoelectrochemical Water Splitting Photoanode in Tandem with Perovskite/Si Solar Cell over 7.3% Solar-to-Hydrogen Conversion Efficiency**
 09:00-09:15 [Jin Wook Yang](#), Ho Won Jang
Seoul National University, Korea

 8-2003 **Atomic Layer Deposition of Ir Thin Films Using a New Metal-Organic Precursor for Water-Splitting Application**
 09:15-09:30 [Na-Yeon Park](#), Soo-Hyun Kim, Rahul Ramesh, Dip K. Nandi
Yeungnam University, Korea

8-1940 **Direct Cathodic Electrodeposition of NiFeW Hydroxides as Efficient Electrocatalyst for Water Oxidation**
 09:30-09:45 [Rajmohan Rajendiran](#), Prabakar Kandasamy, Oi Lun Li
Pusan National University, Korea

8-1928 **Heterogeneous Ni-Based Catalysts on Silicon for Photoelectrochemical Water Oxidation**
 09:45-10:00 [Sol A Lee](#), Ho Won Jang
Seoul National University, Korea

8-1715 **Growth of MoSe₂ Nanosheets on TiO₂ Nanofibers Decorated with G-C₃N₄ for the Photocatalytic CO₂ Reduction**
 10:00-10:15 [Suhee Kang](#), Haritham Khan, Caroline Sunyong Lee
Hanyang University, Korea

8-0925 **Template Engineering of CuBi₂O₄ Single-Crystal Thin Film Photocathodes**
 10:15-10:30 [Jongmin Lee](#), Sanghan Lee
Gwangju Institute of Science and Technology, Korea

8-0853 **Vertically Grown MoS_x on CNT-rGO Composite as Efficient Catalysts for Hydrogen Evolution Reaction**
 10:30-10:45 [Mahider Asmare Tekalgne](#)¹, Soo Young Kim², Sang Hyun Ahn¹
¹Chung-Ang University, Korea, ²Korea University, Korea

8-1095 **Photoelectrochemical Selective Glycerol Conversion Using Fe Doped ZnS/ZnO Heterostructure Electrode**
 10:45-11:00 [Seungkyu Kim](#), Yoonsung Jung, Sanghan Lee
Gwangju Institute of Science and Technology, Korea

8-1025 **Wrinkled Ir/IrO_x Oxy-Hydroxide with Improved Activity and Stability for Polymer Electrolyte Membrane Water Electrolyzer**
 11:00-11:15 [Seung Woo Lee](#), Chae Kyung Baik, Jeong In Cha, Chanho Pak
Gwangju Institute of Science and Technology, Korea

8-0797 **Synthesis of NiSe₂ on Porous Carbon from Ni-Based Metal-Organic Framework for Hydrogen Evolution Reaction in Both Acidic and Alkaline Media**
 11:15-11:30 [Ha Huu Do](#)¹, Quyet Van Le², Sang Hyun Ahn¹, Soo Young Kim³
¹Chung-Ang University, Korea, ²Duy Tan University, Vietnam, ³Korea University, Korea

8-3. Next generation hydrogen energy storage

WEDNESDAY, November 4

Ara (8F)

Chair Hyangsoo Jeong (Korea Institute of Science and Technology, Korea)

8-2640 13:20-13:50 INVITED Syntheses of Nickel-Based Catalysts via Low-Temperature Chemical Alloying/Dealloying and Their Applications for Hydrogen Production

Yu-Jin Lee^{1,2}, Jun Young Cha¹, Hyun A Shin¹, Seongeun Moon¹, Young Suk Jo¹, Hyangsoo Jeong¹, Hyuntae Sohn¹, Chang Won Yoon¹, Suk Woo Nam¹, Yongmin Kim¹
¹Korea Institute of Science and Technology, Korea, ²Yonsei University, Korea

8-0411 Feasibility Study of Hydrogen Transportation via Liquid Hydrogen Carriers

13:50-14:20
INVITED Byeong Soo Shin, Young Jin Cho, Dong Hoon Nam, Kyung Moon Lee
Hyundai Motor Company, Korea

8-0147 14:20-14:50 INVITED Crystal-Amorphous Junctioned Photo- and Electro-Catalyst Systems for Highly Active and Cost-Effective Water Splitting

Heechae Choi
University of Cologne, Germany

8-1212 14:50-15:05 Highly Stable Organometal Halide Perovskite-Based Photocathode for Photoelectrochemical Hydrogen Production

Ju-Hyeon Kim¹, Sehun Seo¹, Jong-Hoon Lee², Sanghan Lee¹, Kwanghee Lee¹
¹Gwangju Institute of Science and Technology, Korea, ²Huree University of Information and Communication Technology, Mongolia



8. Hydrogen energy conversion and storage

POSTER PRESENTATION

8-1. Water splitting and CO₂ reduction

WEDNESDAY, November 4

8F Lobby

- 8-0295 Photochemically Deposited Ir-Doped NiCo Oxyhydroxide Nanosheets for Oxygen Evolution Reaction
Hyeyoung Shin¹, Liang-Ai Huang², Jianming Wang², William A. Goddard³
¹Chungnam National University, Korea, ²Zhejiang University, China, ³California Institute of Technology, USA
- 8-0820 Facile Microwave Irradiation Synthesis of Silver Catalyst in Ionic Liquids for Reduction of Carbon Dioxide to CO by Solar-Driven Electrochemical
Jeon Ryang Lee^{1,2}, Jae Cheol Park¹, Jeong Hyeon Lee³, Mirikhan Bae¹, Subin Cheon², Eun Mi Han², Tae-Won Kim¹
¹Korea Institute of Industrial Technology, Korea, ²Chonnam National University, Korea, ³Gwangju Institute of Science and Technology, Korea
- 8-0839 Unassisted Water Electrolysis Using Porous Nanowire Structured Efficient Low-Ir OER Catalyst with Perovskite-CIGS Tandem System
Yungi Nam, Byungha Shin
Korea Advanced Institute of Science and Technology, Korea
- 8-0970 Microwave-Assisted Evolution of WO₃ and WS₂/WO₃ Hierarchical Nanotrees for Hydrogen Evolution Reaction
Noho Lee¹, Jungheok Kwak¹, Ji Hye Kwak², Jaerim Kim¹, Anupam Giri¹, Sunshin Jung², Jong Kyu Kim¹, Unyong Jeong¹
¹Pohang University of Science and Technology, Korea, ²Korea Electrotechnology Research Institute, Korea
- 8-1075 Electrochemical Reduction of CO₂ to Formate by Catalysis of Doped Tin Oxide Nanoparticles
Junyong Kim^{1,2}, Woong Hee Lee¹, Hyung-Suk Oh¹, Young-Jin Ko¹, Wook-Seong Lee¹, Tae-Yeon Seong²
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea
- 8-1089 Efficient and Stable IrCoOx/C Nanocatalyst for Oxygen Evolution Reaction in Neutral Condition
Woonghee Lee, Yun Jeong Hwang, Byoung Koun Min, Hyung-Suk Oh
Korea Institute of Science and Technology, Korea
- 8-1124 Growth of a Bendable BiVO₄/WO₃ Crystalline Thin Film on a IBAD MgO/Hastelloy Metal Substrate via Pulsed Laser Deposition for Efficient Photoelectrochemical Water Splitting
Jeongsu Lee, Seungchul Lee, Sehun Seo, Seungkyu Kim, Jongmin Lee, Jaesun Song, Jiwoong Yang, Yoonsung Jung, Sanghan Lee
Gwangju Institute of Science and Technology, Korea
- 8-1156 Hydrogen Evolution Reaction of Metallic Ultrathin WTe₂ by O₂ Plasma Engineering
Ning Ling, Heejun Yang
Sungkyunkwan University, Korea

- 8-1373 **Fabrication of Efficient Electrocatalyst with Nickel Foam for Water Splitting by One-Step Hydrothermal Process**
[Kang Min Kim](#)
Korea Institute of Industrial Technology, Korea
- 8-1401 **Growth of Sb₂Se₃ Thin Films Using Pulsed Laser Deposition**
[Yoonsung Jung](#), Sehun Seo, Jongmin Lee, Hojoong Choi, Sanghan Lee
Gwangju Institute of Science and Technology, Korea
- 8-1490 **NiFe Layered Double Hydroxide for Efficient Water Splitting Anode**
[Sungkyun Choi](#), Ho Won Jang
Seoul National University, Korea
- 8-1650 **Ultra-Thin Ni-Fe Layered Double Hydroxide from Facile Route for Highly Efficient and Stable Water Splitting**
[Young-Jin Ko](#), Man Ho Han, Woong Hee Lee, Jun-Yong Kim, Hyung-Suk Oh, Wook-Seong Lee
Korea Institute of Science and Technology, Korea
- 8-2107 **Tailoring Binding Abilities by Incorporating Oxophilic Transition Metals on 3-Dimensional Nanostructured Ni Arrays for Accelerated Alkaline Hydrogen Evolution Reaction**
[Jaerim Kim](#), Hyeonjung Jung, Sang-Mun Jung, Jinwoo Hwang, Noho Lee, Dong Yeong Kim, Yong-Tae Kim, Jeong Woo Han, Jong Kyu Kim
Pohang University of Science and Technology, Korea
- 8-2168 **Photochemical Synthesis of Photocatalytic Bismuth Vanadate Thin Films for Efficient Solar Water Splitting**
[Sang Yun Jeong](#), Sanghan Lee
Gwangju Institute of Science and Technology, Korea
- 8-2263 **Study of Sulfurized NiFeCo Oxide for Oxygen Evolution Reaction in Alkaline Media**
[Man Ho Han](#), Yun Jeong Hwang, Byoung Koun Min, Hyung-Suk Oh
Korea Institute of Science and Technology, Korea
- 8-2358 **Effect of Carbon Properties as a Support Material with Ag Nanoparticles for Gas-Phase CO₂RR**
[Chul Wan Lim](#), Woong Hee Lee, Hyung-Suk Oh, Yun Jeong Hwang, Byoung Koun Min
Korea Institute of Science and Technology, Korea
- 8-2388 **A Highly Active Bifunctional PtNi Catalyst with Octahedral Structure for United Regenerative Alkaline Fuel Cell (UR-AFC)**
[Eunseo Ban](#), Yun Jeong Hwang, Byoung Koun Min, Hyung-Suk Oh
Korea Institute of Science and Technology, Korea
- 8-2412 **Nickel-Based Nanoalloys on Nitrogen-Doped Graphene with Higher Activity and Durability for Hydrogen Evolution in Alkaline Media**
[Seung Geun Jo](#), Yeon Wook Jung, Taeseob Lim, Hae-In Moon, Young Won Kim, Gil Ryeong Park, Yujin Shin, Jung Woo Lee
Pusan National University, Korea

- 8-2430 **Hybrid Molybdenum Carbide / Heteroatom-Doped Carbon Electrocatalyst for Advanced Oxygen Evolution Reaction in Hydrogen Production**
[Jihun Kim](#), Oi Lun Li
Pusan National University, Korea
- 8-2447 **Copper Molybdenum Sulfide Anchored on Ni Foam as a Binder-Free Electrode Catalyst for Efficient Electrochemical Water Splitting**
[Aparna Sajeey](#), Karthikeyan Krishnamoorthy, Parthiban Pazhamalai, Sang-Jae Kim
Jeju National University, Korea
- 8-2467 **Chalcopyrite Platelets as an Efficient Bi-Functional Catalyst for Electrochemical Water Splitting**
[Arunprasath Sathyaseelan](#), Vimal Kumar Mariappan, Karthikeyan Krishnamoorthy, Sang-Jae Kim
Jeju National University, Korea
- 8-2601 **Vertically Aligned MoS₂ Thin Film Catalysts Decorated with Metal Sulfide for Efficient Solar Water Splitting**
[Changyeon Kim](#), Seokhoon Choi, Ho Won Jang
Seoul National University, Korea
- 8-2627 **Co Nanoparticle/N-Doped Carbon Nanotube Hybrids as Efficient Electrocatalysts for the Oxygen Evolution Reaction**
[Youngkyu Jeong](#)
Korea Institute of Industrial Technology, Korea
- 8-2637 **Preparation of Porous Metal Ceramic Composite by Spray Drying**
[Seung-Min Yang](#)
Korea Institute of Industrial Technology, Korea
- 8-2927 **Plasmonic Metal Connected Z-Scheme Composite Ag@Cu₂O-WO₃ Thin Films on Reusable Glass-Fiber Substrates with Highly Efficient Visible Light-Driven Photocatalytic Activity**
[Ui-Seok Song](#), Chadrsekhar Loka, Kee-Sun Lee
Kongju National University, Korea
- 8-3144 **Investigating the Cause of Performance Degradation of Nanoparticles in CO₂ Reduction Reaction through Identical-Location Transmission Electron Microscopy**
[Hyewon Yun](#)^{1,2}, Yun Jeong Hwang²
¹Korea University, Korea, ²Korea Institute of Science and Technology, Korea
- 8-3194 **Photoelectrochemical Water Oxidation Properties of Sulfur Doped CuBi₂O₄**
[Woomi Gwon](#), Eunhwa Kim, Sangwoo Ryu
Kyonggi University, Korea
- 8-3491 **MoS₂ /CdTe p-n Nanojunction for Water Splitting and Methanol Oxidation**
[S V Prabhakar Vattikuti](#), Jaesool Shim
Yeungnam University, Korea

- 8-3510 Nitrogen-Doped ZnO for Sunlight-Driven Photocatalysis to Achieve Dye Degradation and Photoelectrochemical Water Splitting
Dayoung Kwon, Jongsung Kim
Gachon University, Korea
- 8-3512 Synthesis and Characterization of ZnO Coated with Gold Nanoparticles for Improved Photocatalytic Activity
Juyoung Yu, Jongsung Kim
Gachon University, Korea
- 8-3552 Rational Design of Metal Anchored Carbon Quantum Dots as Efficient Electrocatalysts for Hydrogen Evolution Reaction Using Machine Learning Optimization
Yujin Chae¹, Duong Nguyen Nguyen², Namsoo Shin³, Jaehyoung Lim¹, Heechae Choi⁴, Jung Kyu Kim², Uk Sim¹
¹Chonnam National University, Korea, ²Sungkyunkwan University, Korea, ³Deep Solution Inc., Korea, ⁴University of Cologne, Germany
- 8-3779 CdS/Bi₂S₃ QDs/TiO₂ Nanorods for Photocatalytic Conversion to Fuels
Quyet Win¹, Jun Mo Yang², Bee Lyong Yang¹
¹Kumoh National Institute of Technology, Korea, ²National Nanofab Center, Korea
- 8-3782 Study of TiO₂-Based Photoelectrodes for Solar Conversion of CO₂ into Fuels
Quyet Win¹, J. M. Yang², Bee Lyong Yang¹
¹Kumoh National Institute of Technology, Korea, ²National Nanofab Center, Korea
- 8-3855 Spontaneously Formed Cu_xS Catalysts for Selective and Stable Electrochemical Reduction of Industrial CO₂ gas to Formate
Jin Wook Lim¹, Wan Jae Dong¹, Jae Yong Park¹, Dae Myung Hong¹, Wanho Kim², Jong-Lam Lee¹
¹Pohang University of Science and Technology, Korea, ²POSCO, Korea
- 8-3859 Ultrathin Bi Nanoflake Fabricated by Pulse Electrodeposition as Highly Selective Catalysts for Electrochemical Reduction of CO₂ to Formate
Dae Myung Hong, Jae Yong Park, Sungjoo Kim, Wan Jae Dong, Jin Wook Lim, Chul Jong Yoo, Jong-Lam Lee
Pohang University of Science and Technology, Korea

8-2. Fuel cell: materials for electrodes and electrolytes

WEDNESDAY, November 4

8F Lobby

- 8-0650 Influence of Graphite Nanoplate Fillers on Physical Properties for Poly(Phenylene Sulfide)/Graphite Composites
Jong Seok Woo¹, Sang-Ha Kim², Soo-Young Park²
¹Morgan Advanced Materials, Korea, ²Kyungpook National University, Korea
- 8-1216 Two-Dimensional Titanium Carbide MXenes with Different Termination Groups as Platinum Supports for Fuel Cells
Haeji Hong¹, Filipe Marques Mota¹, Nur Aqlili Riana Binti Che Mohamad¹, Won Il Cho², Dong Ha Kim¹
¹Ewha Womans University, Korea, ²Korea Institute of Science and Technology, Korea
- 8-1268 Electrochemical Properties of Non-Stoichiometric Layered Perovskites, Sm_{1-x}BaCo₂O_{5+d}, for IT-SOFCs
Chan Gyu Kim, Sung Hun Woo, Hyun Il Kang, Won Seok Choi, Jung Hyun Kim
Hanbat National University, Korea
- 8-1292 SmBa_{1-x}Ca_xCo₂O_{5+d} Layered Perovskite Cathodes for Intermediate Temperature-Operating Solid Oxide Fuel Cells
Kyeong Eun Song, Sung Hun Woo, Jae Woong Lee, Hyunil Kang, Won Seok Choi, Jung Hyun Kim
Hanbat National University, Korea
- 8-1297 Electrical Conductivity Characteristics of Sr Substituted Layered Perovskite Cathode for IT-SOFC
Ki Sang Baek, Jae Woong Lee, Hyun Il Kang, Won Seok Choi, Jung Hyun Kim
Hanbat National University, Korea
- 8-1613 Electrochemical Catalysts for Anion Exchange Membrane Fuel Cells : Silver Chloride Decorated Silver Nanowire
Suyeon Choi¹, Youngtae Park¹, Changsoo Lee², Hyuck Mo Lee¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea Institute of Energy Research, Korea
- 8-1658 An Investigation on the Corrosion Behavior of Novel Non-Heat Treatable Aluminum Alloy in Acidic Solution
Kweon-Hoon Choi, Bong-Hwan Kim, Da-Bin Lee, Seung-Yoon Yang, Nam-Seok Kim, Seong-Ho Ha, Young-Ok Yoon, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea
- 8-1792 Pore Modification and Phosphorus Doping Effect on Phosphoric Acid-Activated Fe-N-C Catalyst for Oxygen Reduction Reaction in Alkaline Medium
Jong Gyeong Kim, Chanhoo Pak
Gwangju Institute of Science and Technology, Korea
- 8-2082 Superior Oxygen Reduction Reaction Activity of Nano-Sized Cobalt/ Nitrogen Doped Carbon Catalysts
Seonghee Kim, Oi Lun Li
Pusan National University, Korea

- 8-2173 **Sintering Behaviors of Pt Nanopowders with Different Particle Sizes: A Real-Time Synchrotron X-Ray Scattering Study**
[Jang-Hyeong Lee](#), Tae-Sik Cho
Kyungpook National University, Korea
- 8-2190 **High Performance Low Pt-Transition Metal Nanowires for Oxygen Reduction Electrocatalysts**
[Jaeyoung Yoo](#)¹, Youngtae Park¹, Jisu Kim¹, Changsoo Lee², Hyuck Mo Lee¹
¹*Korea Advanced Institute of Science and Technology, Korea, ²Korea Institute of Energy Research, Korea*
- 8-2304 **Development of Single-Atom Cobalt as Major Active Sites in Nitrogen-Doped Carbon for Advanced Oxygen Reduction Reaction**
[Jaepil Yoon](#), Seonghee Kim, Oi Lun Li
Pusan National University, Korea
- 8-2616 **Unravelling Nature Electrocatalysis of Fe-Ni Catalyst through Phase Transformation**
[Kai Chen](#), Seonghee Kim, Oi Lun Li
Pusan National University, Korea
- 8-2708 **Characterization on Cell Performance for Electrode and Operation Parameters in Anion Exchange Membrane-Unitized Regenerative Fuel Cells**
[Joongpyo Shim](#)¹, Md. Masud Rana¹, Hyung-Ryul Rim², Hong-Ki Lee²
¹*Kunsan National University, Korea, ²Woosuk University, Korea*

- 8-3654 **Enhanced Photoelectrochemical Hydrogen Production of Si Photocathode with Nitrogenated Graphene Quantum Dots**
[Minji Im](#)^{1,2}, Sukang Bae², Gunyoung Jung¹
¹*Gwangju Institute of Science and Technology, Korea, ²Korea Institute of Science and Technology, Korea*

8-3. Next generation hydrogen energy storage

WEDNESDAY, November 4

8F Lobby

- 8-1000 **Randomly Entangled and Twisted 3D Structures of N Doped PDEB Chain Combined with Co Single-Atom as a High-Efficiency Oxygen Reduction Reaction Catalyst**
[Taeoh Kang](#), Kwanwoo Kim, Jaehyun Wie, Youjin Kim, Jooheon Kim
Chung-Ang University, Korea
- 8-1046 **MoS₂/WS₂ Hybrid Hedgehog Heterostructure : An Advanced Catalyst for Hydrogen Evolution Reaction**
[Jin Hyuk Cho](#)
Korea University, Korea
- 8-2755 **Evaluations of Hydrogenation Properties and Material Life Cycle Assessment on Mg₂NiH_x-10wt.% CaF₂ Hydrogen Storage Composites**
[Je Seon Yu](#), Jung Hum Han, Hyo Won Shin, Tae Whan Hong
Korea National University of Transportation, Korea
- 8-2765 **Evaluations of Hydrogenation Properties and Material Life Cycle Assessment on Mg₂NiH_x-10wt.% CaO Hydrogen Storage Composites**
[Hyo Won Shin](#), Jeong Heum Han, Je Seon Yu, Tae Whan Hong
Korea National University of Transportation, Korea



9. High-capacity, low-cost, and safe energy storage

ORAL PRESENTATION

9-2. All-solid-state battery

MONDAY, November 2

Ara (8F)

Chairs Yun Jung Lee (Hanyang University, Korea)
Yong Joon Park (Kyonggi University, Korea)

The Interlayer Chemistry in Li-Metal Growth through a Solid Electrolyte

09:00-09:30 [Kisuk Kang](#)
KEYNOTE Seoul National University, Korea

9-0285 **Challenges and Strategies for Practical All-Solid-State Lithium Batteries Based on Sulfide Solid Electrolytes**

09:30-10:00 [Yoon-Cheol Ha](#), Byung Gon Kim, You-Jin Lee, Sang-Min Lee
INVITED Korea Electrotechnology Research Institute, Korea

9-0134 **Rheological Properties and Its Electrochemical Characteristics of Reversible Thixotropic Gel Electrolytes for Flexible and All-Solid-State Batteries**

10:00-10:30 [Young-Gi Lee](#)¹, Sang-Young Lee², Je Young Kim³
INVITED ¹Electronics and Telecommunications Research Institute, Korea, ²Ulsan National Institute of Science and Technology, Korea, ³LG Chem Ltd., Korea

9-1084 **Composite Solid Electrolytes for Molten-Salt Batteries**

10:30-10:45 [Hae-Won Cheong](#), Minu Kim, Seung-Ho Kang, Jang-Hyeon Cho
Agency for Defense Development, Korea

9-1. Lithium and sodium ion batteries

MONDAY, November 2

Ara (8F)

Chairs Byoungwoo Kang (Pohang University of Science and Technology, Korea)
Changshin Jo (Chung-Ang University, Korea)

 9-0340 **Electrochemical and Electrocatalytic Behaviour of Sodium Metal Fluorophosphates**

10:45-11:15 [Prabeer Barpanda](#)
INVITED Indian Institute of Science, India

9-0331 **First-Principles Study on the Reaction Mechanisms of the Electrode Materials for LI-Ion Batteries**

11:15-11:45 [Dong-Hwa Seo](#)
INVITED Ulsan National Institute of Science and Technology, Korea

9-1. Lithium and sodium ion batteries

MONDAY, November 2

Ara (8F)

Chairs Dong-Hwa Seo (Ulsan National Institute of Science and Technology, Korea)
Byoungwoo Kang (Pohang University of Science and Technology, Korea)

9-0217 **Micrometer Sized High Capacity Additives for Lithium Ion Battery Graphite Electrodes**

13:20-13:50 [Changshin Jo](#)
INVITED Chung-Ang University, Korea

9-3432 **Facile Hydrothermally Grown Vanadium Carbide Nanowires Cathode Materials for Lithium-Ion Batteries**

13:50-14:05 [Sanghee Nam](#), Saewoong Oh, Il-Kwon Oh
Korea Advanced Institute of Science and Technology, Korea

9-3427 **High-Strength Intertwined Nanosponge Solid-State Composite Polymer Electrolyte for Multifunctional Lithium-Ion Battery**

14:05-14:20 [Saewoong Oh](#), Sanghee Nam, Il-Kwon Oh
Korea Advanced Institute of Science and Technology, Korea

 9-2139 **A Theoretical Study for Revealing the Mechanism of Sodiation in Hard Carbon for High Capacity Anode**

14:20-14:35 [Yong Youn](#)¹, Azusa Kamiyama², Kei Kubota^{2,3}, Shinichi Komaba^{2,3}, Yoshitaka Tateyama^{1,3}
¹National Institute for Materials Science, Japan, ²Tokyo University of Science, Japan, ³Kyoto University, Japan

 9-1449 **Progress Towards Enabling Al and Al-Alloys for Lithium-Ion Battery Anodes**

14:35-14:50 [Steven Boles](#)
The Hong Kong Polytechnic University, Hong Kong

9-1178 **Enhancing the Cyclability and Rate Performance of Ni-Rich LiNi_{0.91}Co_{0.06}Mn_{0.03}O₂ NCM Cathode Material by Ca Doping and Li₃PO₄ Coating for Lithium Ion Batteries**

14:50-15:05 [Tahir Sattar](#)^{1,2}, Bong Soo Jin¹, Hyun Soo Kim¹
¹Korea Electrotechnology Research Institute, Korea, ²University of Science and Technology, Korea

9-3. Next generation energy storage

MONDAY, November 2

Ara (8F)

Chairs Taeseup Song (Hanyang University, Korea)
Seok Ju Kang (Ulsan National Institute of Science and Technology, Korea)

9-0611 **Design of Eco-Friendly Catalyst Materials for Improved Lithium-Carbon Dioxide Batteries**

15:05-15:35 [Won-Hee Ryu](#)
INVITED Sookmyung Women's University, Korea

-  9-0571 NiCo₂O₄ Nanofeathers Derived from Prussian Blue Analogues with Enhanced Electrochemical Performance for Supercapacitor
15:35-15:50 [Yan He](#), Jiangshan Gao, Zhiming Liu
Qingdao University of Science and Technology, China

9-3. Next generation energy storage

MONDAY, November 2

Ara (8F)

- Chairs
Taeseup Song (Hanyang University, Korea)
Won-Hee Ryu (Sookmyung Women's University, Korea)
- 9-0607 Hierarchical Alignment of Chitin Fiber for Energy Storage and Harvesting Devices
16:10-16:40 [Seok Ju Kang](#)
INVITED *Ulsan National Institute of Science and Technology, Korea*
-  9-0265 Structure-Designed Synthesis of Carbon-Based Nanomaterials and Their Applications for Next Generation Energy Storage Devices
16:40-17:10 INVITED [Zhiming Liu](#), Xiaojun Wang, Qing Wei, Changmeng Xu, Hongran Sun, Haichang Li
Qingdao University of Science and Technology, China
- 9-2510 Self-Charging Electrochemical Capacitor Using MoS₂ Quantum Sheets Sandwiched Solid Polyelectrolyte
17:10-17:25 [Parthiban Pazhamalai](#), Karthikeyan Krishnamoorthy, Sang-Jae Kim
Jeju National University, Korea
- 9-2446 Boron-Oxy-Carbide Nanostructures as Electrodes for High-Power Supercapacitors Operating over Wide Voltage Window
17:25-17:40 [Dhanasekar Kesavan](#), Karthikeyan Krishnamoorthy, Parthiban Pazhamalai, Sang-Jae Kim
Jeju National University, Korea
-  9-1795 Incorporating a Br₃⁻/Br₂-Based Redox Mediator in CO₂-Driven Li-O₂ Batteries: Performance and Mechanism
17:40-17:55 [Filipe Marques Mota](#)¹, Hye Ryung Byon², Dong Ha Kim¹
¹*Ewha Womans University, Korea*, ²*Korea Advanced Institute of Science and Technology, Korea*



9. High-capacity, low-cost, and safe energy storage

POSTER PRESENTATION

9-1. Lithium and sodium ion batteries

MONDAY, November 2

8F Lobby

- 9-0914 Enhanced Electrochemical Performance of Si Nanosheets Based Anode by Carbon Coating Derived from Parylene
[Sang Won Park](#)¹, Jung Hoon Ha², Byung Won Cho², Heon Jin Choi¹
¹*Yonsei University, Korea*, ²*Korea Institute of Science and Technology, Korea*
- 9-1041 Doping Behavior of Br in Li₄Ti₅O₁₂ Anode Materials and Their Electrochemical Performance for Li-Ion Batteries
[Sang Ouk Kim](#), [Jun Beom Kim](#)
Korea Advanced Institute of Science and Technology, Korea
- 9-1066 Structure Classification for Li Containing Oxides by Machine Learning
[Risa Yasuda](#)¹, Taruto Atsumi¹, Naoto Tanibata^{1,2}, Hayami Takeda^{1,2}, Masanobu Nakayama^{1,2}
¹*Nagoya Institute of Technology, Japan*, ²*Kyoto University, Japan*
- 9-1186 MoS₂/Silicon Oxycarbide Heterostructure as an Anode Material for Enhanced Sodium-Ion Storage Performance
[Hyojun Lim](#), Sang-Ok Kim
Korea Institute of Science and Technology, Korea
- 9-1260 Brown TiO₂ Supported 3D MXene as Efficient Electrocatalyst in Li-O₂ Battery
[Nur Aqlili Riana Che Mohamad](#), Haeji Hong, Filipe Marques Mota, Dong Ha Kim
Ewha Womans University, Korea
- 9-1429 Electrochemical Characteristics of Multiwall-Shaped ZnO Nanowire via RF-Magnetron Sputtering System
[Seokwon Lee](#), Hyeokjoo Choi, Jung Hyun Kim, Young Park, Wonseok Choi
Hanbat National University, Korea
- 9-1583 Effects of Lithium Tungsten Oxide Coating on LiNi_{0.90}Co_{0.05}Mn_{0.05}O₂ Cathode for Enhanced Performances of Lithium-Ion Batteries
[Seong-Ju Sim](#), Bong-Soo Jin, Hyun-Soo Kim
Korea Electrotechnology Research Institute, Korea
- 9-1693 The Effect of Annealing Temperature of NiFe₂O₄ Thin Film and Its Electrochemical Properties in Li-Ion Batteries
[Mansoo Choi](#)¹, Sung-Joo Sim², Yang-Il Jung¹
¹*Korea Atomic Energy Research Institute, Korea*, ²*Korea Electrotechnology Research Institute, Korea*

- 9-1721 **Facile Modified Buckypaper Composite Based Anode for Flexible Lithium Ion Batteries**
[Hyungjoo Kim](#)¹, Vitalii Ri², Chunjoong Kim², Hosun Shin¹
¹Korea Research Institute of Standards and Science, Korea, ²Chungnam National University, Korea
- 9-1840 **Enhanced High-Voltage Cycling Performance of LiNi_{0.6}Co_{0.2}Mn_{0.2}O₂ by Al₂O₃ Coating Derived from Urea Assisted Sol-Gel Method**
[Jongwoo Kang](#), Jieun Hwang, Eunmi Jo, Wonyoung Chang
 Korea Institute of Science and Technology, Korea
- 9-2144 **A Comparative Study of the Electrochemical Characteristics of Lithium Vanadates as Negative Electrode Materials for Lithium-Ion Batteries**
[Tae Hun Kim](#), Gyeong Rae Gim, Haebeen Kim, Ji Heon Ryu
 Korea Polytechnic University, Korea
- 9-2180 **Cycle Performance and Thermal Stability of Silicon Monoxide Negative Electrode According to Electrode Configuration**
[Eunbi Go](#), Hyoung Woo Kim, Haebeen Kim, Ji Heon Ryu
 Korea Polytechnic University, Korea
- 9-2208 **Enhanced Cycle Performance of Bi-Layered Silicon Monoxide and Graphite Negative Electrode for Lithium-Ion Batteries**
[Gyeong Rae Gim](#), Hyang Sun Jeon, Nan Young Go, Eun Bi Go, Tae Hun Kim, Ji Heon Ryu
 Korea Polytechnic University, Korea
- 9-2340 **Silicon Nanoparticles Embedded in a Micron-Sized Carbon Ball (SN – MCB) with Corn Starch as Anode Materials for Li-Ion Batteries**
[Ayeon Kim](#)^{1,2}, Min Gi Jeong^{1,3}, Hyeonji Shin¹, Hun-Gi Jung¹
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea, ³Hanyang University, Korea
- 9-2892 **Synthesis of Spherical Hollow Void and Porous LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ Materials Using Sol-Gel Method with Sufactants**
 Seon-Jin Lee, Seo Yeon Jung, Song Hee Oh, Hae In Kim, Hyun Ju Jang, Eui Jeong Park, Jin Ryu, Tae Whan Hong, Jeong Won Kang, [Jong-Tae Son](#)
 Korea National University of Transportation, Korea
- 9-2930 **Thick Electrode Using Polytetrafluorethylene (PTFE) Binder for High Energy Lithium-Ion Batteries**
[Jeong Min Kang](#), Hyoung Woo Kim, Young Seok Jang, Haebeen Kim, Ji Heon Ryu
 Korea Polytechnic University, Korea
- 9-2951 **High Voltage Electrolyte Additive for NMC Electrodes in Lithium-Ion Battery**
[Jinsol Im](#), Jinhyeok Ahn, Kuk Young Cho
 Hanyang University, Korea
- 9-3562 **CuV₂O₆, Promising Cathode Material for Thermal Battery**
[Hyeong Chul Roh](#), Young Soo Yoon, You Na Lee, In Yea Kim, Un Ho Lee, Dae Yun Kim, Yoo Lim Cha, Su Hyeong Kim, Jong Woo Kim
 Gachon University, Korea

9-2. All-solid-state battery

MONDAY, November 2

2F Lobby

- 9-0735 **Preparation of Metastable Chloride Solid Electrolyte with High Formability for All-Solid-State Lithium Metal Batteries**
[Shuta Takimoto](#)¹, Koki Nakano¹, Naoto Tanibata^{1,2}, Hayami Takeda^{1,2}, Masanobu Nakayama^{1,2}
¹Nagoya Institute of Technology, Japan, ²Kyoto University, Japan
- 9-0790 **Highly Efficient Composition Optimization of NASICON-Type High Li-Ion Conductors Using Material Simulation and Bayesian**
 Koki Nakano¹, Naoto Tanibata^{1,2}, Hayami Takeda^{1,2}, Masanobu Nakayama^{1,3}, Yusuke Noda^{3,4}, Ryo Kobayashi^{1,3}, Ichiro Takeuchi^{1,5}
¹Nagoya Institute of Technology, Japan, ²Unit of Elements Strategy Initiative for Catalysts and Batteries, Japan, ³National Institute for Materials Science, Japan, ⁴Kanazawa Gakuin University, Japan, ⁵RIKEN Center for Advanced Intelligence Project, Japan
- 9-1673 **Liquid-Phase Coating on Cathode Active Material with Sulfide Solid Electrolyte for the All-Solid-State Lithium Ion Batteries**
[Jun Tae Kim](#)^{1,2}, Hyeon-Ji Shin¹, Hun-Gi Jung¹
¹Korea Institute of Science and Technology, Korea, ²Hanyang University, Korea
- 9-1709 **Investigation for Capacity Degradation on LiNi_{0.5}Co_{0.2}Mn_{0.3}O₂ Cathode Composite Using Li₆PS₅Cl Solid Electrolyte in All-Solid-State Batteries**
 Hyeon-Ji Shin¹, Jun-Tae Kim^{1,2}, Hun-Gi Jung¹
¹Korea Institute of Science and Technology, Korea, ²Hanyang University, Korea
- 9-1822 **All Solid-State Li-Ion Batteries with PEGDME Solid Polymer Electrolyte**
[Injun Jeon](#)^{1,2}, Yunju Choi¹, Won G. Hong¹, Jong-Pil Kim¹, Jong-Seong Bae¹, Hae Jin Kim¹
¹Korea Basic Science Institute, Korea, ²Pusan National University, Korea
- 9-2117 **Research of Li-Mg Alloy Electrode for All Solid States Battery**
[Sangwoo Kim](#), Yun Sik Choi, Dongeung Kim
 Korea Institute of Industrial Technology, Korea
- 9-2193 **Investigation Mechanical Process of Lithium Metal Foil Using All Solid State Battery**
[Sangwoo Kim](#), Dongeung Kim
 Korea Institute of Industrial Technology, Korea
- 9-3525 **Polyethylene Oxide/Garnet-Type Li_{6.4}La₃Zr_{1.4}Nb_{0.6}O₁₂ Composite Polymer Electrolytes with Enhanced Electrochemical Performance for All-Solid-State Lithium Rechargeable Batteries**
[Kangqiang He](#), Robert Li
 City University of Hong Kong, Hong Kong

9-3. Next generation energy storage

MONDAY, November 2

2F Lobby

- 9-0551 **Effect of Electrolyte Additives for Lithium-Sulfur Batteries**
Sollee Kim, Jihoon Kim, [Sukeun Yoon](#)
Kongju National University, Korea
- 9-0579 **Electro-Optical Properties of Vanadium Oxide Thin Films Prepared by DC Magnetron Sputtering**
[Bunyod Allabergenov](#)^{1,2}, Sanghun Yun¹, Hui-Sup Cho¹, Hong-Kun Lyu¹, Byeongdae Choi¹
¹*Daegu Gyeongbuk Institute of Science and Technology, Korea, ²Urgench State University, Uzbekistan*
- 9-0811 **Sparked Reduced Graphene Oxide/Silver Nanoparticle Cathode for High Capacity Aluminum-Air Battery**
[Minjeong Kim](#), Sangjin Choi, Sungsoon Kim, Dana Jin, Wooyoung Shim
Yonsei University, Korea
- 9-0854 **Aluminum-Air Battery with High Degree of Deformation**
[Sangjin Choi](#), Gwangmook Kim, Jooho Moon, Wooyoung Shim
Yonsei University, Korea
- 9-0953 **The Use of Reduced Graphene Oxide Sheets for Low Temperature Na-BASE Batteries**
[Dana Jin](#), Wooyoung Shim
Yonsei University, Korea
- 9-0957 **The Use of Bi Islands Layer for Low Temperature Na-BASE Batteries**
[Jihong Bae](#), Dana Jin, Wooyoung Shim
Yonsei University, Korea
- 9-1183 **Synthesis of Enhanced Initial Coulombic Efficiency of SiO_x Anode Material for Lithium-Ion Battery by Simple Magnesium Thermic Reduction Process**
[Asif Raza](#)^{1,2}, Sang-Min Lee^{1,2}
¹*University of Science and Technology, Korea, ²Korea Electrotechnology Research Institute, Korea*
- 9-1248 **Nitrogen Contained Activated Carbon for Supercapacitors Prepared by Mild Activation of Ionic Liquid**
[Juyeon Kim](#), Junhui Jeong, Min Ju O, Kwangchul Roh
Korea Institute of Ceramic Engineering and Technology, Korea
- 9-1333 **Effects on Si Addition on Microstructure, Mechanical Properties and Thermal Conductivity of the Extruded Al 6013 Based Alloy Systems for Light-Weight Heat-Sinks of the Store Energy Components**
[Hyeon-Taek Son](#), Yong-Ho Kim, Sang-Soo Na, Byeon-Kwon Lee
Korea Institute of Industrial Technology, Korea
- 9-1511 **Sulfuric Acid Processed Hard Wood Derived Activated Carbon for Supercapacitors**
[Geon Hae Lim](#), Min Ju O, Ji Su Chae, Kwang Chul Roh
Korea Institute of Ceramic Engineering and Technology, Korea
- 9-1646 **A Hybrid Supercapacitor Fabricated with a Cokes-Derived Activated Carbon and a Li₄Ti₅O₁₂/CNT Composite**
[Seo Hui Kang](#), Kwang Chul Roh
Korea Institute of Ceramic Engineering and Technology, Korea
- 9-1697 **The Influence of MM (Misch Metal) Addition on Microstructure and Mechanical Properties of an Al-Fe-B Alloy**
[Hyosang Yoo](#), Yongho Kim, Hyeontaek Son
Korea Institute of Industrial Technology, Korea
- 9-1738 **Ionic Liquid Incorporated in Quasi Solid State Electrolyte for High-Temperature Supercapacitor Applications**
[Jeong Han Lee](#), Yun-Hyung Ahn, Mi Jang, Kwang Chul Roh
Korea Institute of Ceramic Engineering and Technology, Korea
- 9-1845 **Electrochemical Performances of Activated Carbon Decorated with Carbon Dots**
[Su-Jin Jang](#), Kwang Chul Roh
Korea Institute of Ceramic Engineering and Technology, Korea
- 9-2039 **Improved Cycling Stability, High Rate Capability of a Li-O₂ Batteries Derived Stabilization of Li Metal Anode**
[Min-Gi Jeong](#)^{1,2}, Hun-Gi Jung¹
¹*Korea Institute of Science and Technology, Korea, ²Hanyang University, Korea*
- 9-2103 **Effect of Fine Precipitates on the Mechanical Properties of Lightweight Mg Alloy with Li Addition for Energy Storage**
[Yongho Kim](#), Hyosang Yoo, Byeongkwon Lee, Sangsu Na, Hyeontaek Son
Korea Institute of Industrial Technology, Korea
- 9-2125 **Activated Magnesium Negative Electrode for High Voltage Mg-Li Hybrid Batteries**
[Haebeen Kim](#), Ji Heon Ryu
Korea Polytechnic University, Korea
- 9-2167 **Electrochemical Characteristics of MnO₂ as an Insertion Host for Li and Mg Rechargeable Batteries**
[Seong Tae Yoo](#), Jeong Min Kang, Haebeen Kim, Ji Heon Ryu
Korea Polytechnic University, Korea
- 9-2204 **Antimonene Dendrites Nanostructure for Advanced Energy Conversion and Electrochemical Energy Storage Device**
[Vimal Kumar Mariappan](#), Karthikeyan Krishnamoorthy, Parthiban Pazhamalai, Sang-Jae Kim
Jeju International University, Korea
- 9-2266 **Change of Castability and Tensile Properties of Al-Mg-Si Ternary Alloys with Varying Si Content**
[Shah Abdul Wahid](#)^{1,2}, Seong-Ho Ha², Bong-Hwan Kim², Young-Ok Yoon², Hyun-Kyu Lim², Shae K. Kim^{1,2}
¹*University of Science and Technology, Korea, ²Korea Institute of Industrial Technology, Korea*

- 9-2542 **Highly Efficient MoS₂ Quantum Sheets Integrated PVDF for Photovoltaically Self-Charging Cell**
[Swapnil Nardekar](#), Vimalkumar Mariappan, Parthiban Pazhamalai, Sang Jae Kim
Jeju National University, Korea
- 9-2670 **Influences of Intermetallic Compound Thickness on Energy Efficiency of Al-Cu Hybrid Rotor for IE4 Motor**
[Se-Weon Choi](#)
Korea Institute of Industrial Technology, Korea
- 9-2675 **Effect of Secondary Precipitation on Thermal Diffusivity of Al-Si-Mg-Cu-(Ti) Alloys**
[Se-Weon Choi](#)
Korea Institute of Industrial Technology, Korea
- 9-2718 **Effect of Electrolyte Circulation for Charging and Discharging on Zn-Air Batteries**
[Joongpyo Shim](#)¹, Jin-Hee Baik¹, Hyung-Ryul Rim², Hong-Ki Lee², Jung-Hwan Lee³, Daehee Lee³, Gun-Sub Lee³, Unki Han⁴
¹Kunsan National University, Korea, ²Woosuk University, Korea, ³Duck Jin Industry Co., Ltd., Korea, ⁴We Energy Co., Ltd., Korea
- 9-3125 **Effect of Artificial Solid Electrolyte Interphase on the Electrochemical Properties of Si-(Fe, Cr) Silicide Nanocomposite Anode Material for High Performance Li-Ion Batteries**
[Reddyprakash Maddipatla](#), Da Seul Kim, Ryun Kyeong Lee, Ji Hyeon Yun, Kee-Sun Lee
Kongju National University, Korea
- 9-3249 **Enhanced Capacitance of 3D Networked Bamboo-Like CNT/Laser-Induced Graphene Nanocomposite for Supercapacitors**
[Seok-Ki Hyeon](#)^{1,2}, Seong-Woong Park¹, Kwang-Hun Choi¹, Jae-Hyun Lee², Seoung-Ki Lee¹
¹Korea Institute of Science and Technology, Korea, ²Ajou University, Korea
- 9-3265 **High Conductive Micro-Supercapacitor - Based on Sodium Ionic Gel Polymer Electrolyte for the Eco-Friend Next-Generation Energy Storage Devices**
[Nguyen Thi Huyen](#)¹, Dawoon Lee¹, U Hyeok Choi², JaeKyun Kim¹
¹Hanyang University, Korea, ²Inha University, Korea
- 9-3293 **Characterization of Oxide Growth on Al-Mg Alloy Melts with Different Heating Rates**
[Young-Ok Yoon](#), Seong-Ho Ha, Shah Abdul Wahid, Bong-Hwan Kim, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea
- 9-3317 **Growth of Oxide Clusters in Solid-Liquid Transition of Al-Mg Alloys**
[Shae K. Kim](#), Seong-Ho Ha, Shah Abdul Wahid, Bong-Hwan Kim, Young-Ok Yoon, Hyun-Kyu Lim
Korea Institute of Industrial Technology, Korea
- 9-3319 **Influence of Mg on Oxide Growth Rate of Al-Cu Alloys at Elevated Temperature**
[Seong-Ho Ha](#), Shah Abdul Wahid, Bong-Hwan Kim, Young-Ok Yoon, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea

- 9-3379 **High Performance Micro-Supercapacitor via Hybrid Ion-Gel Electrolyte and Laser-Reduced Graphene Electrode for On-Chip Design Energy Storage Devices**
[Dawoon Lee](#)¹, U Hyeok Choi², Jaekyun Kim¹
¹Hanyang University, Korea, ²Inha University, Korea
- 9-3411 **Effect of Gas Annealing on the Properties of Ni/AlN/SiC Structures**
[Dong-Hyeon Kim](#), Young-Jea Lee, Sang-Mo Koo
Kwangwoon University, Korea
- 9-3479 **Temperature Sensors Based on AlN/4H-SiC Diodes**
[Myeong-Cheol Shin](#), Dong-Hyeon Kim, Jong-Min Oh, Weon Ho Shin, Chulhwan Park, Sang-Mo Koo
Kwangwoon University, Korea
- 9-3797 **Challenging Multi-Functional Saponin Additive toward Advanced Lithium-Sulfur Batteries**
[Soochan Kim](#), Kaiwei Yang, Misuk Cho, Youngkwan Lee
Sungkyunkwan University, Korea
- 9-3826 **Control of Swelling Behavior of Anode of Li Ion Batteries by Microstructural Engineering**
[Keemin Park](#), Jiseok Kwon, Dongsoo Lee, Seungcheol Myeong, Seungwoo Lee, Taeseup Song, Ungyu Paik
Hanyang University, Korea
- 9-3829 **A Self-Buffering Structure for Application in High-Performance Sodium-Ion Batteries**
[Seho Sun](#)¹, Chanho Kim¹, Sungmin Kim¹, Jeongheon Kim¹, Jeong-Gu Yeo², Yeongil Jung³, Taeseup Song¹, Ungyu Paik¹
¹Hanyang University, Korea, ²Korea Institute of Energy Research, Korea, ³Changwon University, Korea



10. Energy harvesting materials

ORAL PRESENTATION

10-1. Piezoelectric and ferroelectric energy harvesting materials

MONDAY, November 2

Halla (8F)

Chair Sangtae Kim (Hanyang University, Korea)

 10-0202 A Highly Efficient Au-MoS₂ Nanocatalyst for Tunable Piezocatalytic and Photocatalytic Water

09:00-09:30 Disinfection

INVITED

[Zong-Hong Lin](#)

National Tsing Hua University, Taiwan

 10-1799 Piezo-Catalysis for Nondestructive Tooth Whitening via Harvesting Toothbrush Energy

09:30-10:00 [Yaojin Wang](#)

INVITED

Nanjing University of Science and Technology, China

 10-0266 Flexible PZT Thin-Film Energy Harvesters for Wearable Applications

10:00-10:30 [Isaku Kanno](#)

INVITED

Kobe University, Japan

10-0211 (Na_{1-x}K_x)NbO₃-Based Piezoelectric Nanomaterials and Their Application to Piezoelectric Energy Harvester

10:30-11:00

INVITED

Jong-Un Woo, Jong-Hyun Kim, [Sahn Nahm](#)

Korea University, Korea

10-2972 Tailoring Materials and Structures for Piezoelectric Fiber-Based Energy Harvesting

11:00-11:30 [Miso Kim](#)

INVITED

Korea Research Institute of Standards and Science, Korea

MONDAY, November 2

Halla (8F)

Chairs Sangtae Kim (Hanyang University, Korea)
Hyun Cheol Song (Korea Institute of Science and Technology, Korea)

 Low Frequency Wireless Power Transfer for Biomedical Implants

13:20-13:50

KEYNOTE

[Shad Roundy](#)

University of Utah, USA

10-3115 Piezoelectric Properties of (Li,Na,K)(Nb,Sb)O₃-CaZrO₃ Thick Films and Their Application to Multilayer Actuator

13:50-14:05

[Dae Su Kim](#)¹, Seok-June Chae¹, Hyung-Won Kang², Seung Ho Han², Sahn Nahm¹

¹Korea University, Korea, ²Korea Electronics Technology Institute, Korea

10-2836 Self-Resonance Tuning Mechanism through the Adaptive Clamping System

14:05-14:20

[Dong-Gyu Lee](#)^{1,2}, Sahn Nahm², Chong-Yun Kang^{1,2}, Hyun-Cheol Song¹

¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea

10-1503 A Colossal Pyroelectric Response in Domain Engineered Lead-Free (K_{0.5}Bi_{0.5}TiO₃-BaTiO₃)-Na_{0.5}Bi_{0.5}TiO₃ Ferroelectric Ceramics

14:20-14:35

[Atul Thakre](#)¹, Deepam Maurya², Do Yoen Kim¹, Yunseok Kim³, Panithan Sriboriboon³, Il-Ryeol Yoo⁴,

Kyung-Hoon Cho⁴, Hyun-Cheol Song⁵, Jungho Ryu¹

¹Yeungnam University, Korea, ²Center for Energy Harvesting Materials and Systems, USA,

³Sungkyunkwan University, Korea, ⁴Kumoh National Institute of Technology, Korea, ⁵Korea Institute of Science and Technology, Korea

10-1438 Enhanced Energy-Storage Properties with Electric-Field- and Thermally Stable Energy Efficiency of Aerosol Deposited Relaxor and Anti-Ferroelectric PLZT Thick Films

14:35-14:50

[Ajeet Kumar](#), So Hyeon Kim, Jungho Ryu

Yeungnam University, Korea

 10-1307 Flexible Piezoelectric Nano Generator for Self-Powered Cardiac Pacemaker Enabled by Single Crystalline PMN-PT

14:50-15:05

[Mingi Chung](#), Keon Jae Lee

Korea Advanced Institute of Science and Technology, Korea

10-1862 Eco-Friendly and Cost-Effective Synthesis of Self-Assembled Peptide Nanotube for Piezoelectric Nanogenerators

15:05-15:20

[Hyojin Park](#), Ju-Hyuck Lee

Daegu Gyeongbuk Institute of Science and Technology, Korea

10-2. Triboelectric energy harvesting materials

MONDAY, November 2

Halla (8F)

Chairs Ju-Hyuck Lee (Daegu Gyeongbuk Institute of Science and Technology, Korea)
Sanghoon Lee (Daegu Gyeongbuk Institute of Science and Technology, Korea)

10-3612 Mechano-Neuromodulation of Peripheral Nervous System Using Triboelectric Energy Harvester

16:10-16:40

INVITED

[Sanghoon Lee](#)

Daegu Gyeongbuk Institute of Science and Technology, Korea

10-0427 Tunable Timescales in Mechanical Energy Harvesting

16:40-17:10

INVITED

[Sangtae Kim](#)

Hanyang University, Korea

 10-3188 Diatom Frustule, Fascinating Ocean Biomaterial for Highly Efficient Bio-Triboelectric Nanogenerators

17:10-17:25

[Araz Rajabi-Abhari](#), Jong-Nam Kim, Il-Kwon Oh

Korea Advanced Institute of Science and Technology, Korea

- 10-2916 **Ionic Spiderweb Robots**
17:25-17:40 [Younghoon Lee](#), Won Jun Song, Jeong-Yun Sun
Seoul National University, Korea
- 10-3131 **Skin Attachable Motion Sensor Based on Triboelectric Nanogenerator with Chitosan-Diatom Composite Film**
17:40-17:55 [Jong-Nam Kim](#), Araz Rajabi-Abhari, Manmatha Mahato, Il-Kwon Oh
Korea Advanced Institute of Science and Technology, Korea
- 10-3242 **Surface Morphology Control of Laser Induced Graphene for Energy Harvesting System**
17:55-18:10 [Kwang-Hun Choi](#)^{1,2}, Seoungwoong Park^{1,3}, Seok-Ki Hyung¹, Seongwoo Ryu², Seoung-Ki Lee¹
¹*Korea Institute of Science and Technology, Korea*, ²*Suwon University, Korea*, ³*Seoul National University, Korea*
- 10-1883 **PVC Gel-Based Skin-Attachable Triboelectric Nanogenerator**
18:10-18:25 [Daeyeong Kim](#), Ju-Hyuck Lee
Daegu Gyeongbuk Institute of Science and Technology, Korea

TUESDAY, November 3

Halla (8F)

Chair Ju-Hyuck Lee (Daegu Gyeongbuk Institute of Science and Technology, Korea)

10-0143 Conductive Composite for Flexible Triboelectric Generator

10:10-10:40 [Haixia Zhang](#)
INVITED *Peking University, China*

10-0367 Piezo/Triboelectric Potential Modulated Semiconductor Devices

10:40-11:10 [Qijun Sun](#)
INVITED *Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China*

10-2787 **Ferroelectric Ceramic-Embedded Ultrasound Triboelectric Energy Harvester with Acoustic Meta-Plate**

11:10-11:25 [Hyun Soo Kim](#), Chong Yun Kang, Hyun Cheol Song
Korea Institute of Science and Technology, Korea

10-1953 Enhanced Sustainability and Power of Cam Based Triboelectric Nanogenerator Utilizing Permanent Magnets

11:25-11:40 [Hakjeong Kim](#)¹, Hee Jae Hwang¹, Dahoon Ahn², Dukhyun Choi¹
¹*Kyung Hee University, Korea*, ²*Kongju National University, Korea*

10-2315 Versatile Energy Loss Conversion System via Energy Transfer Medium

11:40-11:55 [Hyungseok Yong](#)¹, Dongseob Kim², Sangmin Lee¹
¹*Chung-Ang University, Korea*, ²*Korea Institute of Industrial Technology, Korea*

10-2536 **Battery-Free Tribotronic MoS₂ Touch Memory**

11:55-12:10 [Jae-Hwan Jung](#)¹, Usman Khan², Sang-Woo Kim¹
¹*Sungkyunkwan University, Korea*, ²*National University of Sciences and Technology, Pakistan*

10-2026 Water Behavior Based Electric Generation via Self-Ionization

12:10-12:25 [Jihoon Chung](#), Deokjae Heo, Sangmin Lee
Chung-Ang University, Korea

10-2535 **Modulus Controllable Hydrogel for Ultrasound-Driven Implantable Triboelectric Nanogenerator**

12:25-12:40 [Bosung Kim](#), Hong-Joon Yoon, Sang-Woo Kim
Sungkyunkwan University, Korea

10-3. Hybrid and emerging energy harvesting materials

TUESDAY, November 3

Halla (8F)

Chairs Jungho Ryu (Yeungnam University, Korea)
Geon Tae Hwang (Pukyong National University, Korea)

10-0381 Energy Harvesting from Vibration, Magnetic, and Dual Stimuli Field

14:00-14:30 [Zhaoqiang Chu](#)¹, Xiaoting Yuan¹, Zehuan Wang¹, Xiangyu Gao², Jingen Wu², Shuxiang Dong¹
INVITED ¹*Peking University, China*, ²*Xi'an Jiaotong University, China*

10-0328 **High-Performance Magneto-Mechano-Triboelectric Generator for Internet of Things (IoT) and Biomedical Applications**

14:30-15:00 [Geon Tae Hwang](#)¹, Jongmoon Jang², Yuho Min², Jong-Woo Kim², Cheol-Woo Ahn², Jong-Jin Choi², Byung-Dong Hahn², Joon-Hwan Choi², Woon-Ha Yoon², Dong-Soo Park², Jungho Ryu³
INVITED ¹*Pukyong National University, Korea*, ²*Korea Institute of Materials Science, Korea*, ³*Yeungnam University, Korea*

10-2777 **Interfacial Adhesion Layer Effect on the Energy Harvesting Performance of the Magneto-Mechano-Electric Generator**

15:00-15:15 [So Hyeon Kim](#)¹, Atul Thakre¹, Sung Hoon Park¹, Timothy Alexander Listyawan¹, Nokeun Park¹, Geon-Tae Hwang², Jungho Ryu¹
¹*Yeungnam University, Korea*, ²*Pukyong National University, Korea*

10-2774 **Enhanced Energy Harvesting Performance of Magneto-Mechano-Electric Generator with Aspect Ratio Variation of Piezoelectric Single Crystal**

15:15-15:30 [Sung Hoon Park](#), Kumar Ajeet, Jungho Ryu
Yeungnam University, Korea

10-3310 Thermoelectric Generator Based Bismuth Telluride via Optimized Solution Phase P-Type Bi₂Te₃ Ink

15:30-15:45 [Sun Woo Kim](#), Jeong Min Baik
Sungkyunkwan University, Korea

10-2118 **Fabrication of Micro-Thermoelectric Generator with Trapezoidal-Shaped Legs for Large Temperature Gradient and High-Power Density**

15:45-16:00 [Choong Sun Kim](#), Ji Won Park, Hyeongdo Choi, Yong Jun Kim, Gyu Soup Lee, Byung Jin Cho
Korea Advanced Institute of Science and Technology, Korea

10-1624 Effect of the Addition of Oxide Ceramic Fillers on the Properties of Bi-Te-Se(BTS) for Thermoelectric N-Type Materials

16:00-16:15 [Sang Gon Kim](#)¹, Sangwook Lee¹, Hyungeui Lee²
¹Kyungpook National University, Korea, ²LG Innotek, Korea

10-0988 Phase Boundary-Robust Holes as Origin of High Thermoelectric Performance of Sb₂Si₂Te₃

16:15-16:30 [Hanhwi Jang](#)¹, Abbey Stanley², Chien Viet Nguyen³, Ho Sun Shin³, Brakowaa Frimpong², Yeon Sik Jung¹, Min-Wook Oh²
¹Korea Advanced Institute of Science and Technology, Korea, ²Hanbat National University, Korea, ³Korea Research Institute of Standards and Science, Korea

10-0200 Design and Development of Biomolecular Piezoelectric Nanogenerators

16:30-17:00 [Ju-Hyuck Lee](#)
INVITED Daegu Gyeongbuk Institute of Science and Technology, Korea

TUESDAY, November 3

Halla (8F)

Chairs Jungho Ryu (Yeungnam University, Korea)
Geon Tae Hwang (Pukyong National University, Korea)

 10-0360 Hybridized and Coupled Nanogenerators

18:00-18:30 [Ya Yang](#)
INVITED Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China

10-3339 Performance Enhance of Carbon Foam Based Steam Generator with Increase of Active Area

18:30-18:45 [Sungdo Kim](#), Jongwoo Park, Tam Le, Jin Jae Park, Yong Soo Kim
University of Ulsan, Korea

10-0658 Material Level Hybridization of Dye-Sensitized Solar Cell and Thermoelectric Element to Improve Charge Transport Characteristics

18:45-19:00 [Yong Jun Kim](#)¹, Hyeongdo Choi¹, Choong Sun Kim¹, Gysoup Lee¹, Jiwon Park¹, Seong Eun Park², Byung Jin Cho¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Korea Institute of Energy Research, Korea



10. Energy harvesting materials

POSTER PRESENTATION

10-1. Piezoelectric and ferroelectric energy harvesting materials

TUESDAY, November 3

8F Lobby

10-0702 Preparation of Transparent Polyvinylidene Fluoride Layers for Optoelectronic Devices

[Da-Bin Park](#)¹, Da-Young Kim¹, Seung Hwangbo², Seung-Dae Kim¹, Kyu-Seog Hwang¹
¹Nambu University, Korea, ²Honam University, Korea

10-0876 Post-Annealing Effect on the Crystallinity and Lattice Parameter in Epitaxial Growth on Silicon Substrate

[Hyung-Jin Choi](#), Seung-Hyub Baek
Korea Institute of Science and Technology, Korea

10-0900 Thermochromic Display Using Molecular Printing to Achieve Fast Switching

[Jongbum Won](#), Wooyoung Shim
Yonsei University, Korea

10-0978 Epitaxial PMN-PZT Thin Film on Silicon with Buffer Layers

[Soo Young Jung](#)^{1,2}, Jin Soo Park^{1,3}, Byeong-Hyeon Lee¹, Sung-Ok Won¹, Byung Chul Lee¹, Ho Won Jang², Seung-Hyub Baek^{1,4}
¹Korea Institute of Science and Technology, Korea, ²Seoul National University, Korea, ³Korea University, Korea, ⁴University of Science and Technology, Korea

10-1385 Piezoelectric Energy Harvesting System for Emergency by Checking Movement

[Seyeong Jeong](#), Tae Hyun Sung
Hanyang University, Korea

10-1424 Power Enhancement in Piezoelectric Energy Harvester Using Poling Tuning Technique

[Anuruddh Kumar](#), Tae Hyun Sung
Hanyang University, Korea

10-1478 A Lever-Type Piezoelectric Energy Harvester with Stress Deformation Support (SDS) for a walkway

[Deok Hwan Jeon](#), Sung Do Hong, Wonseop Hwang, Chul Hee Ryu, Tea Hyun Sung
Hanyang University, Korea

10-1481 Porous Sandwich Structures Based on BaZrTiO₃/BaCaTiO₃ Ceramics for Piezoelectric Energy Harvesting

[Dong-Jin Shin](#), Dong-Hwan Lim, Bo-Kun Koo, Min-Soo Kim, Soon-Jong Jeong
Korea Electrotechnology Research Institute, Korea

10-1488 Synthesis and Characterization of High Performance Lead-Free Piezoelectric Materials for Energy Harvesting Devices

[Dong Hwan Lim](#), Soon Jong Jeong, Dong Jin Shin
Korea Electrotechnology Research Institute, Korea

- 10-1653 **The Morphotropic Phase Boundary Based Ferroelectric System for Energy Harvesting and Water Remediation**
Nirmal Prashanth Maria Joseph Raj, Nagamalleswara Rao Alluri, Gaurav Khandelwal, Sang-Jae Kim
Jeju National University, Korea
- 10-1683 **Development of 0.4Bi_{0.5}Zr_{0.5}-0.58PbTiO₃ Piezoelectric Ceramic Materials with High Frequency Coefficient for Ultrasonic Application**
So Won Kim, Yong Jeong Jeong, Hee Chul Lee
Korea Polytechnic University, Korea
- 10-1742 **Effect of Sonochemical Mixing in the Solid-State Synthesis on the Structural and Dielectric Properties of BaTiO₃ Ceramics**
Seung Hyun Jin¹, Hae Won Lee¹, Na Won Kim¹, Mun Hwi Lee¹, Gil Geun Lee¹, Woo Hyun Nam², Young Soo Lim¹
¹Pukyong National University, Korea, ²Korea Institute of Ceramic Engineering and Technology, Korea
- 10-1747 **Effect of Sonochemical Surface Modification on the Sintering Behavior and Dielectric Properties of BaTiO₃ Ceramics**
Na Won Kim¹, Seung Hyun Jin¹, He Won Lee¹, Dong Wook Koo¹, Gil Geun Lee¹, Woo Hyun Nam², Young Soo Lim¹
¹Pukyong National University, Korea, ²Korea Institute of Ceramic Engineering and Technology, Korea
- 10-1794 **Synthesis of BaZrO₃ through the Solid-State Reaction Using Sonochemically Mixed BaCO₃-ZrO₂ Powders**
Hae Won Lee¹, Seung Hyun Jin¹, Na Won Kim¹, In Ho Joo¹, Woo Hyun Nam², Gil-Geun Lee¹, Young Soo Lim¹
¹Pukyong National University, Korea, ²Korea Institute of Ceramic Engineering and Technology, Korea
- 10-1833 **Low Temperature Sintered CuO Doped PZT-PZNN Piezoelectric Materials for Sensors Applications**
Bo Su Kim, Hong-Tae Kim, Jung-Hyuk Koh
Chung-Ang University, Korea
- 10-1885 **(1-x)Bi_{0.5}Na_{0.5}TiO₃-xBiYbO₃ Piezoelectric Ceramics for High Curie-Temperature Applications**
Jin Su Baek, Jung-Hyuk Koh
Chung-Ang University, Korea
- 10-1936 **Piezoelectric Properties and Microstructure of CuO Doped Ba(Zn,Ti)O₃-0.5(Ba,Ca)TiO₃ Lead-Free Piezoelectric Ceramics Sinter at Low Temperature**
Chao Li, Jung-Hyuk Koh
Chung-Ang University, Korea
- 10-2052 **Flexible Magneto-Piezoelectric Energy Harvest Fiber through Twisted-Poled PVDF-TrFE-CTFE for Autonomous IoT Network**
Chulhee Ryu, Jae Yong Cho, Tae Hyun Sung, Wonseop Hwang, Se Yeong Jeong, Deok Hwan Jeon
Hanyang University, Korea

- 10-2232 **Piezoelectric Properties and Microstructures of Crystal-Oriented NKLNT Ceramics**
Bo-Kun Koo, Dong-Hwan Lim, Dong-Jin Shin, Soon-Jong Jeong, Min-Soo Kim
Korea Electrotechnology Research Institute, Korea
- 10-2348 **High-Frequency Response Using Polarization Switching in Single-Crystalline PMN-PZT Based PMUT**
Jin Soo Park^{1,2}, Soo Young Jung^{1,3}, Seung-Hyub Baek¹, Byung Chul Lee¹
¹Korea Institute of Science and Technology, Korea, ²Korea University, Korea, ³Seoul National University, Korea
- 10-2394 **Mn Doped PZT-PSN Hard Piezoelectric Ceramics for Sensors Applications**
Hong-Tae Kim, Jae-Hoon Ji, Jung-Hyuk Koh
Chung-Ang University, Korea
- 10-2406 **AC Conductivity and Dielectric Properties of (1-x)BiScO₃-xPbTiO₃ Piezoelectric Ceramics**
Jae-Hoon Ji, Bo Su Kim, Jung-Hyuk Koh
Chung-Ang University, Korea
- 10-2411 **Piezoelectric Properties (1-x)BiScO₃-xPbTiO₃ System for Energy Harvester Applications**
Jae-Hoon Ji, Jin Su Baek, Jung-Hyuk Koh
Chung-Ang University, Korea

10-2. Triboelectric energy harvesting materials

TUESDAY, November 3

8F Lobby

- 10-1148 **Submicron Particle Removal in Water Thorough Triboelectric Nanogenerators**
Byung-Geon Park^{1,2}, Young Jung^{1,2}, Doyeon Kim¹, Taekyung Lee¹, Hanchul Cho¹
¹Korea Institute of Industrial Technology, Korea, ²Pusan National University, Korea
- 10-1638 **Device Scale Control for Planar Triboelectric Nanogenerator**
Giyong Kim¹, Jinah Kim¹, Sungyeol Kim¹, Jinhyoung Park²
¹Kyungpook National University, Korea, ²Korea University of Technology and Education, Korea
- 10-1641 **High Performance Triboelectric Nanogenerator Based Plasma Discharging System for Water Treatment**
Jinah Kim¹, Giyoung Kim¹, Sungyeol Kim¹, Jinhyong Park²
¹Kyungpook National University, Korea, ²Korea University of Technology and Education, Korea
- 10-1659 **Mixed Linker Metal-Organic Framework for Triboelectric Nanogenerator**
Gaurav Khandelwal, Nirmal Prashanth Maria Joseph Raj, Sang-Jae Kim
Jeju National University, Korea
- 10-1865 **3d Printed Pressure-Insensitive Bending Sensor Capable of Bi-Directional Measurement**
Gihyeon Han¹, Jinkyem Kim², Jeongmin Baik²
¹Ulsan National Institute of Science and Technology, Korea, ²Sungkyunkwan University, Korea

10-1901	Design of Mechanical Frequency Regulator with Automatic Switching for Continuous Scavenging Energy Using Triboelectric Nanogenerator <u>Khanh Duy Pham</u> ¹ , Nghia Dinh Huynh ¹ , Hakjeong Kim ¹ , Divij Bhatia ² , Dukhyun Choi ¹ ¹ Kyung Hee University, Korea, ² Korea Advanced Institute of Science and Technology, Korea	10-2128	Synthesis of Li-Doped ZnO Nanosheet Using Hydrothermal Method for a Piezoelectric Nanogenerator <u>Jeongeun Kim</u> , Ju-Hyuck Lee, Yuseok Kim Daegu Gyeongbuk Institute of Science and Technology, Korea
10-1920	Electrospinning Electrostatic Filter Made of Light Stabilizer Improved Performance with Hydro-Charging That Charged on Surface with Efficiency of Triboelectric Nanogenerators (TENGs) <u>Jinkyom Kim</u> ¹ , Jeongmin Baik ¹ , Sungbum Kang ² ¹ Sungkyunkwan University, Korea, ² Ulsan National Institute of Science and Technology, Korea	10-2149	Organic-Metal Halide Perovskite Nanocomposite Piezoelectric Nanogenerator <u>Chihyeon Ha</u> , Hyejin Park, Ju-Hyuck Lee Daegu Gyeongbuk Institute of Science and Technology, Korea
10-1932	Triboelectric Behavior of Surface Engineered Polymers Using the Neutral Beam <u>Wook Kim</u> , Dukhyun Choi Kyung Hee University, Korea	10-2240	Improved Output Performance of Triboelectric Nanogenerator via Polarized Ferroelectric Polymers Composites <u>Viet Anh Cao</u> , Sol Lee, Minje Kim, Kyung Seok Han, Min Cheol Kim, Junghyo Nah Chungnam National University, Korea
10-1939	Mesoporous Composite Polymer Embedded Metal Powder for Cushion Sensor on Triboelectric Nanogenerators <u>Hee Jae Hwang</u> , Dukhyun Choi Kyung Hee University, Korea	10-2328	Triboelectric Energy Harvester via Stream Flow <u>Banseok Kim</u> , Hakseong Mun, Sehhoon Chung, Gunsub Shin, Sangmin Lee Chung-Ang University, Korea
10-1968	Microporous-Micropattern Combine Structure Based Highly Sensitive Triboelectric Nanogenerators <u>Cheoljae Lee</u> , Ju-Hyuck Lee Daegu Gyeongbuk Institute of Science and Technology, Korea	10-2548	Ultraflexible Electorspun Nanofibers for Triboelectric and Thermoresistive Sensing of Human Motion and Breathing <u>Sol Lee</u> , Minje Kim, Kyung Seok Han, Mincheol Kim, Yongwoo Sung, Junghyo Nah Chungnam National University, Korea
10-1970	Triboelectric Speed Bumper for Self-Powered Automobile Warning and Velocity Sensing <u>Deokjae Heo</u> ¹ , Dongseob Kim ² , Sangmin Lee ¹ ¹ Chung-Ang University, Korea, ² Korea Institute of Industrial Technology, Korea	10-2552	The Cohesion-Type Turbine Design for Boosting Hybrid System Performance <u>Nghia Dinh Huynh</u> , Dukhyun Choi Kyung Hee University, Korea
10-1978	Screw Pump Based Triboelectric Nanogenerator for Active Water Flow Control <u>Seh-Hoon Chung</u> , Sangmin Lee Chung-Ang University, Korea	10-2575	High Permittivity Particle-Induced Internal Polarization Enhancement for High-Performance Triboelectric Nanogenerators <u>Dabin Kim</u> , Jihye Kim, Sang-Woo Kim Sungkyunkwan University, Korea
10-2034	Ferroelectric Polymer Nanoparticle Nanocomposite Flexible and Stretchable Piezoelectric Nanogenerator <u>Hyosik Park</u> , Cheoljae Lee, Ju-Hyuck Lee Daegu Gyeongbuk Institute of Science and Technology, Korea	10-2579	Stable, High Output Triboelectric Nanogenerators Using Butylated Melamine Formaldehyde as a Durable and Highly Positive Friction Layer <u>Sera Jeon</u> , Sung Soo Kwak, Seong Min Kim, Sang-Woo Kim Sungkyunkwan University, Korea
10-2074	ZnSnO₃/PDMS Perovskite-Polymer Hybrid Triboelectric Nanogenerator <u>Yuseok Kim</u> , Ikhee Han, Hae-Seong Kim, Woojin Jeon, Cheoljae Lee, Ju-Hyuck Lee Daegu Gyeongbuk Institute of Science and Technology, Korea	10-2584	Motion-Driven Electroluminescence System Based on Triboelectrification <u>Hye-Jeong Park</u> ¹ , Chong-Yun Kang ^{1,2} , Sang-Woo Kim ³ ¹ Korea Institute of Science and Technology, Korea, ² Korea University, Korea, ³ Sungkyunkwan University, Korea
10-2085	Flexible and Self-Healable Thermoplastic Polyurethane Based Triboelectric Nanogenerator <u>Hyeonseo Joo</u> , Ju-Hyuck Lee Daegu Gyeongbuk Institute of Science and Technology, Korea	10-2592	Boosting and Maintaining the Output Performance of Rotating Triboelectric Nanogenerator Using Specific Properties of the Glass Transition State of Polyurethane <u>Han-Yup Yum</u> , Ahrum Sohn, Jeonghwan Lee, Sang-Woo Kim Sungkyunkwan University, Korea

- 10-3247 **Triboelectric Nanogenerator Based on Sustainable and Eco-Friendly Materials for Energy Autonomous Sensor Systems**
[Vivekananthan Venkateswaran](#), Gaurav Khandelwal, Nagamalleswara Rao Alluri, Manisha Sahu, Sugato Hajra, Sang-Jae Kim
Jeju National University, Korea
- 10-3359 **High Performance Micro-Patterned Piezoelectric Nanoparticle-Embedded Flexible Triboelectric Nanogenerator (TENG)**
[Junsu Seong](#), Youngkyun Kim, Dakyung Yu, Jaekyun Kim
Hanyang University, Korea
- 10-3719 **Microdischarge Based Direct Current Triboelectric Nanogenerators**
[Najaf Rubab](#), Hongjoon Yoon, Minki Kang, Sang-Woo Kim
Sungkyunkwan University, Korea
- 10-3773 **Interlocked Polymer-Carbon Interface for Improved Triboelectric Nanogenerators**
[Srinivas Gandla](#), Seung ho Baek, Minwoo Lee, Yoochan Won, Sunkook Kim
Sungkyunkwan University, Korea

10-3. Hybrid and emerging energy harvesting materials

TUESDAY, November 3

8F Lobby

- 10-0484 **Thermoelectric Properties of Mn-Doped Tetrahedrites $\text{Cu}_{12-x}\text{Mn}_x\text{Sb}_4\text{S}_{13}$**
 Sung-Yoon Kim, Ji-Hee Pi, Go-Eun Lee, [Il-Ho Kim](#)
Korea National University of Transportation, Korea
- 10-0486 **Electronic Transport and Thermoelectric Properties of $\text{Cu}_{12}\text{Sb}_{4-y}\text{Te}_y\text{S}_{13}$ Prepared by MA-HP Process**
[Sung-Gyu Kwak](#), Ji-Hee Pi, Go-Eun Lee, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0488 **Solid-State Synthesis and Thermoelectric Properties of $\text{Cu}_3\text{Sb}(\text{S}/\text{Se})_4$**
[Go-Eun Lee](#), Ji-Hee Pi, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0489 **Thermoelectric Properties of Cu_3SbS_4 - Cu_3SbSe_4 Solid Solutions**
[Go-Eun Lee](#), Ji-Hee Pi, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0491 **Solid-State Synthesis and Thermoelectric Properties of Famatinites $\text{Cu}_3\text{Sb}_{1-y}\text{Si}_y\text{S}_4$**
[Ji-Hee Pi](#), Go-Eun Lee, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0495 **Charge Transport and Thermoelectric Properties of $\text{Cu}_3\text{Sb}_{1-y}\text{B}^{\text{IV}}_y\text{S}_4$**
[Ji-Hee Pi](#), Go-Eun Lee, Il-Ho Kim
Korea National University of Transportation, Korea

- 10-0584 **Increase in P-Type Thermoelectric Properties of Mg_3Sb_2 Synthesized through Melting, Pulverizing and Vacuum Hot Pressing**
 Md. Mahmudur Rahman, [Soon-Chul Ur](#)
Korea National University of Transportation, Korea
- 10-0802 **Bio-Inspired Energy Harvesting from Salinity Gradient Energy**
[Sungsoon Kim](#), Wooyoung Shim
Yonsei University, Korea
- 10-0840 **Conducting Polymer Electrode for Passing Wireless Signals**
[Taehoon Kim](#), Gwangmook Kim, Wooyoung Shim
Yonsei University, Korea
- 10-0843 **Mechanically Stable Elastomeric Photomask for Near-Field Non-Planar Photolithography**
[Gwangmook Kim](#)¹, Sangyoon Paik^{1,2}, Wooyoung Shim¹
¹Yonsei University, Korea, ²LG Display Co., Ltd., Korea
- 10-0918 **Transparent Capacitive Pressure Sensor with Nanoparticle Embedded Microstructured Dielectric Layer**
[Youngjun Cho](#), Hyeohn Kim, Gwangmook Kim, Taehoon Kim, Wooyoung Shim
Yonsei University, Korea
- 10-0996 **Visually Recognizable Interactive Pressure Sensor Using Thermochromic Display**
[Taeyoung Kim](#), Gwangmook Kim, Sungjun Cho, Wooyoung Shim
Yonsei University, Korea
- 10-1018 **Enhancement Thermoelectric Power Factor of $\text{Bi}_2\text{O}_2\text{Se}$ via Nb Doping**
[Minsu Kim](#), Dabin Park, Zelalem Chernet Lule, Jooheon Kim
Chung-Ang University, Korea
- 10-1154 **Directly Assembled Nanostructure of Photosystems and Protonated Carbon Nitride Nanosheets for Efficient Light Harvesting**
[Nyeongbeen Jo](#), Yoon Sung Nam
Korea Advanced Institute of Science and Technology, Korea
- 10-1992 **A Study on the Reduction of Thermal Conductivity by Lattice Deformation of Bi-Te-Based Thermoelectric Materials**
[Min Soo Park](#)
Korea Institute of Materials Science, Korea
- 10-2714 **Characteristics of Tungsten-Doped VO_2 Thin Films Fabricated by Pulsed DC Sputtering for Smart-Window Applications**
[Yong Seob Park](#)¹, Jaehyeong Lee²
¹Chosun College of Science and Technology, Korea, ²Sungkyunkwan University, Korea
- 10-2808 **New Approach for Fabricating Flower-Like Nickel Sulfide Coated Carbon Nanofiber Webs for High-Performance Pseudocapacitor Electrodes**
 Bong-Gill Choi¹, [Hwan-Jin Jeon](#)²
¹Kangwon National University, Korea, ²Korea Polytechnic University, Korea

- 10-2833 **A Study on the Surface Plasmons Using Silver and Platinum Deposited inside the GaAs Microvoid Structure**
Sam Nyung Yi, [Sung-Hyun Kim](#), Jae-Hoon Ryu, Han-Sol Kim, Ha Young Lee, Min Sub Kwak, Hyung Soo Ahn, Young Tea Chun
Korea Maritime and Ocean University, Korea
- 10-2848 **Enhancing Generating-Electrical Power from Composite Carbon Nanotube Yarn**
[Shi Hyeong Kim](#)
Korea Institute of Industrial Technology, Korea
- 10-3024 **Effect of Pulsed Nd: YAG Laser Focusing Lens on Textured Silicon Surfaces**
[Nurul Huda Abdul Razak](#)
Universiti Kebangsaan Malaysia, Malaysia
- 10-3048 **Enhanced Thermoelectric Properties via the Controlled Particles Size and Uniformity in N-Type Bi₂Te₃**
[Nayoung Lee](#)^{1,2}, Jamil Ur-Rahman², Woohyun Nam², Weonho Shin³, Jungyoung Cho², Wonseon Seo², Walter Commerell⁴, Jongwook Roh¹
¹Kyungpook National University, Korea, ²Korea Institute of Ceramic Engineering and Technology, Korea, ³Kwangwoon University, Korea, ⁴Technische Hochschule Ulm, Germany
- 10-3223 **Enhanced Energy Harvesting Performance of Magneto-Mechano-Electric Generator with Permeability Variation of Magnetic Flux Concentrator**
[Han Seung Choi](#), Hyun Seok Song, Atul Thakre, Jungho Ryu
Yeungnam University, Korea
- 10-3330 **A Highly Efficient Soot Based Bilayer Solar Vapor Generator**
[Mamoon Ur Rashid](#), Zeeshan Tahir, Sungdo Kim, Nhi Nguyen Tran Thao, Jong Woo Park, Jin Jae Park, Yong Soo Kim
University of Ulsan, Korea
- 10-3470 **Influence of Gas Annealing of AlN/4H-SiC Schottky Diodes**
[Seung-Woo Jung](#), Sang-Mo Koo
Kwangwoon University, Korea
- 10-3697 **Improvement of Thermoelectric Properties of P-Type Mg₃Sb₂ with Ultra-Low Thermal Conductivity Synthesized by Control Melting, Pulverizing Followed by Vacuum Hot Pressing**
Soon-Chul Ur, [Md. Mahmudur Rahman](#)
Korea National University of Transportation, Korea
- 10-3786 **Enhanced Thermo-Voltage Induced by Seebeck and Soret Effect in Carbon Nanotube Incorporated PEDOT: Tos Thin Films**
[Kyungwho Choi](#)¹, Choongho Yu²
¹Korea Aerospace University, Korea, ²Texas A&M University, USA



11. Biomaterials

ORAL PRESENTATION

11-1. Biomaterials for tissue engineering and regenerative medicine

TUESDAY, November 3

Ballroom 4 (2F)

Chair Myung-Han Yoon (Gwangju Institute of Science and Technology, Korea)

11-0870 Freeform 3D Printing Systems for Biomedical Applications

10:10-10:40 Shengyang Chen, [Juha Song](#)
INVITED *Nanyang Technological University, Singapore*

11-0299 Conductive PEG-Based Hydrogels with Microgrooves for Potential Application of Tissue Engineering Scaffold

10:40-11:10 **INVITED** [Won-Gun Koh](#), Hye Yeon Gong
Yonsei University, Korea

11-0238 Nanomechanics of Cells and Tissues Probed by Atomic Force Microscopy

11:10-11:40 [Takaharu Okajima](#)
INVITED *Hokkaido University, Japan*

11-0235 Highly Ordered Protein-Based Hydrogel Platforms for Three-Dimensional Tissue Analogues

11:40-12:10 [Bae Hoon Lee](#)¹, Gaia Ferracci², Hitomi Shirahama², Lay Poh Tan², Nam-Joon Cho²
INVITED ¹Wenzhou Institute, University of Chinese Academy of Sciences, China, ²Nanyang Technological University, Singapore

11-2980 Terbium Ions Coordinated Iron Oxide Nanoparticles Detecting Bacterial Spores via Emitting Fluorescent Signals

12:10-12:25 [Thomas Myeongseok Koo](#), Min Jun Ko, Bum Chul Park, Myeong Soo Kim, Young Keun Kim
Korea University, Korea

11-0945 Femtomolar Quantum Dot-DNA Hydrogel-Based DNA Assay

12:25-12:40 [Jae Chul Park](#)¹, Cheol Am Hong², Yoon Sung Nam¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Yeungnam University, Korea

11-3. Biomaterials and biointerfaces for smart biosensors

WEDNESDAY, November 4

Ballroom 2 (2F)

Chairs Seung Soo Oh (Pohang University of Science and Technology, Korea)
Ju Hun Lee (Hanyang University, Korea)

Real-Time Biosensors for Continuous Measurements of Biomolecules in Live Subjects

09:00-09:30 [H. Tom Soh](#)
KEYNOTE *Stanford University, USA*

11-0127 Precise Capture and Dynamic Relocation of Nanoparticulate Biomolecules through the Dielectrophoretic Enhancement by Vertical Nanogap
09:30-10:00
INVITED [Yong-Sang Ryu](#)
Korea Institute of Science and Technology, Korea

 11-2557 Biological Lasers: Micro-Nano Lasers for Sensing at the Biointerface
10:00-10:30
INVITED [Yu-Cheng Chen](#)
Nanyang Technological University, Singapore

11-3484 Magnetic Biosensors for Genomic Mutation and Methylation Detection
10:30-11:00
INVITED [Jung-Rok Lee](#)
Ewha Womans University, Korea

11-3176 Biomimetic Self-Assembly System
11:00-11:30
INVITED [Ju Hun Lee](#)
Hanyang University, Korea

11-2901 Barcode Nanowire Based Simultaneously Cell and Interferon-Gamma Sensing Platform at the Single Cell Level
11:30-11:45
[Yoo Sang Jeon](#)¹, Hyun Mu Shin², Yu Jin Kim¹, Da Yeon Nam¹, Bum Chul Park¹, Eunmin Yoo¹, Hang-Rae Kim², Young Keun Kim¹
¹Korea University, Korea, ²Seoul National University, Korea

11-0536 Specific Detection of Histamine in Complex Solutions within a Few Minutes
11:45-12:00
[Byunghwa Kang](#), Gyuri Park, Seung Soo Oh
Pohang University of Science and Technology, Korea

11-3261 Remote Active Control of Nanoengineered Materials for Dynamic Nanobiomedical Engineering
14:50-15:05
[Heemin Kang](#)
Korea University, Korea

11-2917 Application of Radially Grown ZnO Nanowires on Poly(Lactic Acid) Microfibers for Cancer Immunotherapy
15:05-15:20
[Sang Won Byun](#)¹, Prashant Sharma², Ji Beom Shin¹, Bum Chul Park¹, Yu Jin Kim¹, Dae Beom Lee¹, Young Keun Kim¹, Nam-Hyuk Cho²
¹Korea University, Korea, ²Seoul National University, Korea

11-2506 Hybrid Palladium and Anisotropic Plasmonic Nanomaterials for Combinational Catalytic and Photothermal Cancer Treatment
15:20-15:35
[Subin Yu](#)¹, Dong Ha Kim¹, Dohyub Jang^{2,3}, Sehoon Kim²
¹Ewha Womans University, Korea, ²Korea Institute of Science and Technology, Korea, ³Korea University, Korea

11-2479 NIR-Responsive Hybrid Gold Nanobipyramids@anatase Titanium Dioxide Core/Shell Structure for Synergistic Dual Photo Cancer Therapy
15:35-15:50
[Dohyub Jang](#)¹, Subin Yu², Dong June Ahn³, Sehoon Kim¹, Dong Ha Kim²
¹Korea Institute of Science and Technology, Korea, ²Ewha Womans University, Korea, ³Korea University, Korea

11-2475 Effects of Piezoelectric Pulse on Fully Bioresorbable Magnesium Alloy-Based Implants
15:50-16:05
[Abisegapriyan K S](#), Nirmal Prashanth Maria Joseph Raj, Nagamalleswara Rao Alluri, Sang-Jae Kim
Jeju National University, Korea

11-2. Nanomaterials as therapeutic platforms for biomedical applications

WEDNESDAY, November 4

Ballroom 2 (2F)

Chair Yoon Sung Nam (Korea Advanced Institute of Science and Technology, Korea)

 11-0617 Pollen Engineering for Eco-Friendly Materials Innovation
13:20-13:50
INVITED [Nam-Joon Cho](#)
Nanyang Technological University, Singapore

 11-0599 Facile Aqueous Phase Synthesis of Therapeutic Bimetallic Metal and Oxide Nanoparticles
13:50-14:20
INVITED [Taekyung Yu](#)¹, Euiyoung Jung^{1,2}, Jiyong Chung¹, Jaeyoung Lee¹
¹Kyung Hee University, Korea, ²Ewha Womans University, Korea

 11-0290 Development of a Broad-Spectrum Antiviral Peptide Using Nanoscale Viral Membrane-Mimicking Platforms
14:20-14:50
INVITED [Joshua Jackman](#)
Sungkyunkwan University, Korea



11. Biomaterials

POSTER PRESENTATION

11-1. Biomaterials for tissue engineering and regenerative medicine

WEDNESDAY, November 4

2F Lobby

- 11-0645 **Characteristics and Cell Growth Behavior of Gelatin/PVA Porous Scaffolds**
Soyeon Kim¹, Deuk Yong Lee¹, Bae-Yeon Kim², Jung In Yoon³
¹Daelim University, Korea, ²Incheon National University, Korea, ³HANBIO Co., Ltd., Korea
- 11-0648 **Poly(ε-Caprolactone)/Gelatin Hybrid Scaffolds Prepared by Electrospinning**
Jin-Woo Oh¹, Deuk Yong Lee¹, Bae-Yeon Kim², Yo-Seung Song³
¹Daelim University, Korea, ²Incheon National University, Korea, ³Korea Aerospace University, Korea
- 11-2008 **Immunological Cloaking for Enhanced Efficacy of in Vivo Anti-Bacterial Phage Therapy**
Yunje Sung¹, Jeongheon Yu¹, Howon Seo¹, Moonyoung Yang², Pilhan Kim¹, Cheol Am Hong³, Yoonsung Nam¹
¹Korea Advanced Institute of Science and Technology, Korea, ²California Institute of Technology, USA, ³Yongnam National University, Korea
- 11-2226 **Laser Treatment Effect on the Surface Microstructure of Nitinol Alloy**
Haneul Choi¹, Min Young Na¹, Indong Jun², Hojeong Jeon¹, Yu-Chan Kim¹, Jin Woo Park³, Hye Jung Chang¹
¹Korea Institute of Science and Technology, Korea, ²Korea Institute of Science and Technology Europe, Germany, ³Yonsei University, Korea
- 11-3253 **Study on Microstructurally Porous CP-Ti Scaffold Fabricated by Selective Laser Melting with Pre-Sintering Conditions**
Gyung Bae Bang^{1,2}, Hyung Giun Kim¹, Won Rae Kim¹
¹Korea Institute of Industrial Technology, Korea, ²Inha University, Korea

11-2. Nanomaterials as therapeutic platforms for biomedical applications

WEDNESDAY, November 4

2F Lobby

- 11-1166 **Influence of Vanadium Doped TiO₂ on the Hydrophilic Property of HA-TiO₂ Composite for Biomedical Applications**
Van Quy Hoang, Hai Truyen Dang, Chung Wung Bark
Gachon University, Korea
- 11-1364 **Fabrication of Graphene Oxide Quantum Dots via Pulsed Laser Ablation in Liquid for Bio-Imaging Applications**
Sukhyun Kang¹, Jeong Ho Ryu², Kang Min Kim¹
¹Korea Institute of Industrial Technology, Korea, ²Korea National University of Transportation, Korea

- 11-1498 **Genetically Engineered Ferritin Expressing Fibrin Binding Peptide for Enhanced Tumor Targeting and Therapy**
Dong Jae Lee¹, Moon Young Yang², Yoon Sung Nam¹
¹Korea Advanced Institute of Science and Technology, Korea, ²California Institute of Technology, USA
- 11-1963 **Self-Assembled Protein-Lipid Multilamellar Nanovesicles for Therapeutic Protein Delivery**
Bon Il Koo¹, Inhye Kim², Moon Young Yang¹, Sung Duk Jo¹, Eunji Lee², Yoon Sung Nam¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Gwangju Institute of Science and Technology, Korea
- 11-2635 **Flow Synthesis of Magnetic Nanoparticles by Hydrazine Reduction**
Seung-Min Yang
Korea Institute of Industrial Technology, Korea
- 11-3519 **Synthesis and Characterization of Mesoporous Silica Nanoparticles with Different CTAB Ratio for Reduced Toxicity**
Min Ji Son, Sang-Wha Lee
Gachon University, Korea
- 11-3520 **Preparation of Bio-Compatible Nir-Light Emitting Quantum Dots for Bio-Imaging Applications**
Sia Won, Jongsung Kim
Gachon University, Korea

11-3. Biomaterials and biointerfaces for smart biosensors

WEDNESDAY, November 4

2F Lobby

- 11-0509 **Development of Nucleic Acid Aptamers Capable of Controlling Cell Proliferation**
Moohyun Han, Minjong Lee, Kyunsang Ji, Seung Soo Oh
Pohang University of Science and Technology, Korea
- 11-0522 **Aptamer-Directed Covalent Conjugation of DNA to an Intact Protein**
Hyesung Jo, Seung Soo Oh
Pohang University of Science and Technology, Korea
- 11-0524 **Size-Selective Protocell Based on Protein-Polymer Conjugate Structures**
Jinmin Kim, Seung Soo Oh
Pohang University of Science and Technology, Korea
- 11-0528 **Engineering Lipid Droplets for Highly Improving the Production of Valuable Hydrophobic Biochemicals**
So-Hee Son^{1,2}, Jae-Eung Kim², Seung Soo Oh¹, Ju Young Lee²
¹Pohang University of Science and Technology, Korea, ²Korea Research Institute of Chemical Technology, Korea
- 11-0534 **Particle Display for Structure-Switching Aptamer Discovery**
Soyeon V. Park¹, H. Tom Soh², Seung Soo Oh¹
¹Pohang University of Science and Technology, Korea, ²Stanford University, USA

- 11-0538 **Generation of Ion-Selective Membranes Using Ion Recognition Channels**
[Hyebin Yoo](#)¹, Ha Jung Lee¹, Kunwoong Park², Byeang Hyeon Kim¹, Hyun-Ho Lim², Seung Soo Oh¹
¹Pohang University of Science and Technology, Korea, ²Korea Brain Research Institute, Korea
- 11-0575 **Highly Improving Aptamer Selection Efficiency by Introducing Multiple Targets**
[Minjong Lee](#)¹, Byunghwa Kang¹, H. Tom Soh², Seung Soo Oh¹
¹Pohang University of Science and Technology, Korea, ²Stanford University, USA
- 11-1110 **Surface Modification of High Photoluminescence Quantum Yields Nitrogen-Doped Carbon Quantum Dots by Single-Stranded DNA**
[Saehan Choi](#), Yoonsung Nam
Korea Advanced Institute of Science and Technology, Korea
- 11-1204 **AgPDMS Based Spiral Microfluidic Chip for Separation of Microparticle**
[Seong Min Roh](#)¹, Seungjun Lee¹, Eunji Lee¹, Yejin Park¹, Heena Kim¹, Yujin Jung¹, Hye Jin Kim², Jinsik Kim¹
¹Dongguk University, Korea, ²Kyung Hee University, Korea
- 11-1562 **Inertial Microfluidic Particle Separation System with Spiral Channel Obstacle Structure**
[Soon Yeol Kwon](#), Jae Yong Lee, Yu Seong Kim, Seung Deok Kim, June Soo Kim, Dong Geon Jung, Seong Ho Kong
Kyungpook National University, Korea
- 11-1827 **Plasmonic Au Half Shell Particles for DNA Sensing Based on Plasmon-Enhanced Fluorescence**
[Shinyoung Choi](#), Yoon Sung Nam
Korea Advanced Institute of Science and Technology, Korea
- 11-1831 **Highly Stable Silica-Dye Hybrid Material for Bio Application**
[Hyebin Na](#), Jae Chul Park, Yoon Sung Nam
Korea Advanced Institute of Science and Technology, Korea
- 11-2256 **Photo-Assisted Recovery of Precious Metals on Nature-Derived Surfaces**
[Jeonga Kim](#), Kimoon Lee, Yoon Sung Nam
Korea Advanced Institute of Science and Technology, Korea
- 11-2685 **Improving the SWCNTs Based Device for Highly Accurate and Sensitive Biosensing through Langmuir-Blodgett Assembly Process**
Steve Park, [Su Yeong Kim](#)
Korea Advanced Institute of Science and Technology, Korea
- 11-3536 **Silver-Enriched Porous Silicon Chip for SERS Detection of Catecholamine Neurotransmitters**
[Youngju Gwon](#), You Kyung Yang, Sang-Wha Lee
Gachon University, Korea
- 11-3794 **Design of Highly Sensitive and Selective Virus-Based Electronic Nose towards Explosives Guided by Computational Big Database**
[JungYun Park](#), Hoje Chun, Sung Jun Hong, HyunWook Jung, Byungchan Han
Yonsei University, Korea



12. Computational materials science

ORAL PRESENTATION

12-1. Data-driven material design

MONDAY, November 2

Ballroom 2 (2F)

Chair Sang Soo Han (Korea Institute of Science and Technology, Korea)

 **12-0344 Data-Driven Materials Design and Discovery Based on High-Throughput Computation and Experiment**
09:00-09:30

INVITED [Ryoji Asahi](#)
Toyota Central R&D Labs., Inc., Japan

 **12-0337 Machine Learning Potentials Enabling Large-Scale Simulation and Accelerated Material Discovery**
09:30-10:00

INVITED [Seungwu Han](#)
Seoul National University, Korea

 **12-0251 Polymer Informatics: Current Status and Critical Next Steps**
10:00-10:30

INVITED [Chiho Kim](#)
Georgia Institute of Technology, USA

 **12-0144 Design Space Visualization for Guiding Investments in Biodegradable and Sustainably Sourced Materials**
10:30-11:00

INVITED James Peerless¹, Emre Sevgen¹, Stephen Edkins¹, Jason Koeller¹, [Edward Kim](#)¹, Yoolhee Kim¹, Astha Garg², Erin Antono¹, Julia Ling¹
¹Citrine Informatics, USA, ²Agency for Science, Technology and Research, Singapore

12-3609 Identification of Crystal Symmetry from Noisy Diffraction Patterns by A Shape Analysis and Deep Learning
11:00-11:15

[Leslie Ching Ow Tiong](#), Jeongrae Kim, Sang Soo Han, Donghun Kim
Korea Institute of Science and Technology, Korea

12-3121 Neural Network Prediction of III-V Compounds
11:15-11:30

[Hiroshi Mizuseki](#)¹, Babu Ram¹, Ryoji Sahara², Yoshiyuki Kawazoe^{3,4}, Kenta Hongo⁵
¹Korea Institute of Science and Technology, Korea, ²National Institute for Materials Science, Japan, ³Tohoku University, Japan, ⁴SRM Institute of Science and Technology, India, ⁵Japan Advanced Institute of Science and Technology, Japan

12-4. Computational approaches for materials characterization

MONDAY, November 2

Ballroom 2 (2F)

Chair Donghwa Lee (Pohang University of Science and Technology, Korea)

12-0559 High Throughput Virtual Screening (HTVS) of OLED Materials; A Practical Approach

13:20-13:50 Minki Hong

INVITED Kyulux North America, Inc., USA

12-0247 Electronic Excitations and Ultrafast Dynamics: First-Principles Simulations

13:50-14:20 Andre Schleife

INVITED University of Illinois at Urbana-Champaign, USA

12-0416 Computational Studies of Materials Interfaces for Optimization of Energy Storage and Conversion Devices

14:20-14:50 Vincenzo Lordi

INVITED Lawrence Livermore National Laboratory, USA

12-0631 Catalytic Supremacy of CeO_x-TiO₂ Interface-Confined Pt Single-Atoms

14:50-15:20 Mi Yoo¹, Young-Sang Yu², Siwon Lee³, Hyunwoo Ha¹, David A. Shapiro², Woochul Jung³, Chunjoong Kim¹, Hyun You Kim¹

¹Chungnam National University, Korea, ²Lawrence Berkeley National Laboratory, USA,

³Korea Advanced Institute of Science and Technology, Korea

MONDAY, November 2

Ballroom 2 (2F)

Chair Donghwa Lee (Pohang University of Science and Technology, Korea)

12-0529 Ab Initio Simulation of Various DNA Base-Pairing Layers and Their Stacking Interactions

16:10-16:25 Gyuri Park, Byunghwa Kang, Soyeon V. Park, Donghwa Lee, Seung Soo Oh

Pohang University of Science and Technology, Korea

12-0746 Free Energy of Chemically Absorbed Molecules on Metal Surface

16:25-16:40 Seokmin Lim^{1,2}, Seungchul Kim¹

¹Korea Institute of Science and Technology, Korea, ²University of Science and Technology, Korea

12-3634 Stepwise Addition Reactions in Ammonia Synthesis over Co-Ru (0001) Alloy Surface Studied by Density Functional Calculations

16:40-16:55 Mosab Banisalman, Sang Soo Han

Korea Institute of Science and Technology, Korea

12-3171 Understanding the Physical Origin of Anisotropic Oxygen Diffusion Process during TiO₂ Epitaxy on VO₂ Surface through First-Principles Calculations

16:55-17:10 Kyung-Yeon Doh, Hyeji Sim, Gi-Yeop Kim, Yunkyu Park, Minguk Jo, Junwoo Son, Si-Young Choi, Donghwa Lee

Pohang University of Science and Technology, Korea

12-0401 Direct Synthesis of Hydrogen Peroxide on Nickel Platinum Nanoparticle Alloy Using Water as a Hydrogen Source: A Study Combining ReaxFF and DFT

17:10-17:25 Mosab Banisalman, Sang Soo Han

Korea Institute of Science and Technology, Korea

12-0962 Phase Stability Diagrams of Group 6 Magnéli Oxides and Their Implications for Photon-Assisted Applications

17:25-17:40 Yun-Jae Lee, Aloysius Soon

Yonsei University, Korea

12-1687 Atomistic Simulation of Plastic Deformation in Bi-Crystalline Zr-ZrH₂

17:40-17:55 Hadi Ghaffarian, Dongchan Jang

Korea Advanced Institute of Science and Technology, Korea

12-2. Low dimensional materials: from surfaces to clusters

TUESDAY, November 3

Ballroom 2 (2F)

Chairs Byung Chul Yeo (Pukyong National University, Korea)

Woosun Jang (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany)

12-0350 Transport Phenomena in TMD-Based Heterostructures

10:10-10:40 Alessandro Fortunelli¹, Zahra Golsanamlou¹, Poonam Kumari¹, Luca Sementa¹, Teresa Cusati²,

INVITED Giuseppe Iannaccone²

¹National Research Council, Italy, ²University of Pisa, Italy

12-0214 Growth of Metal Nanocubes, Nanowires, and Nanoplates

10:40-11:10 Kristen Fichthorn¹, Zihao Chen¹, Junseok Kim¹, Myung-Jun Kim², Ben Wiley³

INVITED ¹The Pennsylvania State University, USA, ²Kyung Hee University, Korea, ³Duke University, USA

12-0189 Computational Design of Defect-Based Spin Qubit Candidates in 2-Dimensional Hexagonal Boron Nitride

11:10-11:40 Hosung Seo

INVITED Ajou University, Korea

12-0983 Atomic Structure and Work Function Modulations in Two-Dimensional Ultrathin Cu Films on Cu(111) from First-Principles

11:40-11:55 Giyeok Lee¹, Yun-Jae Lee¹, Krisztián Palotás², Taehun Lee¹, Aloysius Soon¹

¹Yonsei University, Korea, ²Wigner Research Center for Physics, Hungary

12-0973 Strain-Driven Control of Material Properties in Polymorphic Alkali-Metal Niobates

11:55-12:10 Woohyun Hwang, Seungjae Yoon, Aloysius Soon

Yonsei University, Korea

 **12-0716** Enabling and Boosting Size Convergence for Surface Calculations of Materials Exhibiting Spontaneous Polarization
12:10-12:25 [Su-Hyun Yoo](#)¹, Mira Todorova¹, Chris Van de Walle², Joerg Neugebauer¹
¹Max-Planck-Institut für Eisenforschung GmbH, Germany, ²University of California, Santa Barbara, USA

12-0638 Modelling a Non-Electrochemical System Electrochemically: Hydrogen Peroxide Direct Synthesis on Palladium Nanoparticles with First Principles
12:25-12:40 [Min-Cheol Kim](#), Sang Soo Han
Korea Institute of Science and Technology, Korea

12-3. Computational design of solar fuel materials

TUESDAY, November 3

Ballroom 2 (2F)

Chair Hyungjun Kim (Korea Advanced Institute of Science and Technology, Korea)

 **12-3064** Chemical Dynamics in Catalysis and Electrochemistry
14:00-14:30 [Jun Cheng](#)
INVITED Xiamen University, China

 **12-0308** DFT Sampling Studies on Interface Ionics at Heterogeneous Solid-Solid Interfaces in Batteries
14:30-15:00 [Yoshitaka Tateyama](#)
INVITED National Institute for Materials Science, Japan

12-0293 Computational Study of Fe-Doped Ni Oxyhydroxide Catalysts for Oxygen Evolution Reaction
15:00-15:30 [Hyeyoung Shin](#)¹, William A. Goddard²
INVITED ¹Chungnam National University, Korea, ²California Institute of Technology, USA

12-0159 First-Principles Electrocatalyst Design at Electrified Solid-Liquid Interfaces
15:30-16:00 [Stefan Ringe](#)
INVITED Daegu Gyeongbuk Institute of Science and Technology, Korea

 **12-2966** Atomic Details of the Electrical Double Layer and Insights to the Electrocatalysts
16:00-16:15 [Seung-Jae Shin](#), Hyungjun Kim
Korea Advanced Institute of Science and Technology, Korea

12-2814 Electrical and Optical Properties of 2D Materials for Solar Fuels in Solvents with High-Level Theory
16:15-16:30 [Se-Jun Kim](#)¹, Stefan Ringe^{2,3}, Sébastien Lebègue⁴, Hyungjun Kim¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Stanford University, USA, ³Daegu Gyeongbuk Institute of Science and Technology, Korea, ⁴Centre National de la Recherche Scientifique, France

 **Knowledge-Based Approaches in Catalysis and Energy Modeling**
16:30-17:00 [Karsten Reuter](#)
KEYNOTE Fritz Haber Institute of the Max Planck Society, Germany



12. Computational materials science

POSTER PRESENTATION

12-1. Data-driven material design

TUESDAY, November 3

2F Lobby

12-2066 Contents Modularization for Simulation Web Platform
Jungho Lee¹, Minhoo Lee¹, [Seungchul Kim](#)², Kwang-Ryeol Lee²
¹Virtual Lab Inc., Korea, ²Korea Institute of Science and Technology, Korea

12-3465 Fabrication and Control of Vertical Nano-Channel Array via Angle-Resolved Single Exposure Process in Proximity-Field Nanopatterning
[Sang-Hyeon Nam](#)¹, Myungwoo Choi¹, Gayea Hyun¹, Junyong Park², Seokwoo Jeon¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Kumoh National Institute of Technology, Korea

12-3600 Deep Learning for Direct Prediction of Material Properties from Their Compositions and Diffraction Patterns
[Jeongrae Kim](#), Lesile Ching Ow Tiong, Sang Soo Han, Donghun Kim
Korea Institute of Science and Technology, Korea

12-3604 High-Throughput Screening Protocol as Catalyst for H₂O₂ Direct Synthesis
Byung Chul Yeo¹, Hyun-ji Nam², [Hong Woo Lee](#)^{2,3}, Hyobin Nam², Min-Cheol Kim², Kwan-Young Lee³, Seung Yong Lee², Sang Soo Han²
¹Pukyong National University, Korea, ²Korea Institute of Science and Technology, Korea, ³Korea University, Korea

12-2. Low dimensional materials: from surfaces to clusters

TUESDAY, November 3

2F Lobby

12-1069 Web Platform That Removes Barriers of Catalytic Material Calculation
[Doyeon Kim](#), Seungchul Kim
Korea Institute of Science and Technology, Korea

12-3. Computational design of solar fuel materials

TUESDAY, November 3

2F Lobby

12-2748 ReaxFF-Based Multiscale Simulation of Electrode-Electrolyte Interface with Reactions and Electronic Polarizations
[Minho Kim](#), Seung-Jae Shin, Hyungjun Kim
Korea Advanced Institute of Science and Technology, Korea

- 12-3208 **Seamless Modeling of Pauli Repulsion Interaction for QM/MM Simulations**
[Taehwan Jang](#)¹, Seung-Jae Shin¹, Hyung-Kyu Lim², Hyungjun Kim¹
¹Korea Advanced Institute of Science and Technology, Korea, ²Kangwon National University, Korea

12-4. Computational approaches for materials characterization

TUESDAY, November 3

2F Lobby

- 12-0152 **Properties of Optical Quantum Transition of GaN and CdS in Electron Deformation Potential Phonon Interacting Qusi Two Dimensional System under Two Circularly Oscillating Fields**
[Su-Ho Lee](#)¹, E. S. Lee², S. H. Kim¹, S. M. Joo³
¹Dong-A University, Korea, ²Dong-Eui University, Korea, ³Masan University, Korea
- 12-0692 **Prediction of the Dissolved Hydrogen Content in Liquid Aluminum with a Machine Learning Approach**
Moon-Jo Kim, Jong Pil Yun, Seung-Jun Choi, [Donggeung Kim](#)
Korea Institute of Industrial Technology, Korea
- 12-1666 **Design of a Fine Dust Sensor Based on the Surface Acoustic Wave(SAW) Devices by Using Computational Fluid Dynamics(CFD)**
[Se Yong Park](#), Min Ji Kim, Hee Chul Lee
Korea Polytechnic University, Korea
- 12-1674 **Energy Competition Oriented Atomic Mixing Patterns in Bimetallic Nano-Particles**
Kayoung Yun¹, Ho-Seok Nam², [Seungchul Kim](#)¹
¹Korea Institute of Science and Technology, Korea, ²Kookmin University, Korea
- 12-2607 **Radon Emission Characteristics of Phospho-Gypsum Cement Paste Using Deep Neural Network Analysis Model**
Hongseok Jang, Shuli Xing, [Jijohn Kang](#), Yongtaek Lim, Hai Nguyen Van
Jeonbuk National University, Korea
- 12-2624 **Loess Classification by Region Using Machine Learning Property Values and Reliability Assessment Methods**
[Hongseok Jang](#), Shuli Xing, Jijohn Kang, Yongtaek Lim, Seungyoung So
Jeonbuk National University, Korea
- 12-2664 **Effect of Casting Designs and Process Parameters on Shrinkage Porosity in Aluminum/Copper Die-Casting Rotor**
[Young-Chan Kim](#)
Korea Institute of Industrial Technology, Korea
- 12-2669 **Effect of Heat Transfer Coefficient and Heating System Designs on High Pressure Die-Casting of Al/Cu Hybrid Rotor**
[Young-Chan Kim](#)
Korea Institute of Industrial Technology, Korea

- 12-2761 **High Purity Tantalum Powder Manufacturing by External Continuous Na Reductants Feeding**
[Jaejin Sim](#), Yongkwan Lee, Sung-Gue Heo, Seok-Jun Seo, Kyoung-Tae Park
Korea Institute of Industrial Technology, Korea

- 12-3140 **Developing Automatic Calculation Packages of Organic-Inorganic Hybrid Perovskites toward Massive Data Gathering**
[Jong-Goo Park](#), Ki-Ha Hong
Hanbat National University, Korea

- 12-3154 **Effect of Oxygen Vacancies on Electrical Conductivity of $\text{La}_{0.5}\text{Sr}_{0.5}\text{FeO}_{3-\delta}$ from First-Principles Calculations**
[Yonghun Shin](#)¹, Kyung-Yeon Doh¹, Seong Hun Kim¹, June Ho Lee¹, Hohan Bae², Sun-Ju Song², Donghwa Lee¹
¹Pohang University of Science and Technology, Korea, ²Chonnam National University, Korea

- 12-3702 **First-Principles Mechanism Study on Distinct Optoelectronic Properties of Cl-Doped 2D Hybrid Tin Iodide Perovskite**
[Sung Jun Hong](#), Hoje Chun, Kyung-Ah Min, Byungchan Han
Yonsei University, Korea

- 12-3709 **First-Principles Study on Selective Etching Mechanism of Concentrated Phosphoric Acid on Si_3N_4 over SiO_2**
[Soyong Park](#), Hyunwook Jung, Kyung-Ah Min, Junyeop Kim, Byungchan Han
Yonsei University, Korea



13. Advanced nanocharacterization and microscopic modelling

ORAL PRESENTATION

13-3. Quantitative local analysis using TEM/SPM

TUESDAY, November 3

Ballroom 3 (2F)

Chairs Young-Min Kim (Sungkyunkwan University, Korea)
Yunseok Kim (Sungkyunkwan University, Korea)

13-3504 2020 A New Resolution Odyssey: An Electron Microscope for Quantum Materials Research

10:10-10:40 [Juan Carlos Idrobo](#)
INVITED Oak Ridge National Laboratory, USA

13-0414 In Operando Potential Probing with KPFM in Electrochemical Devices

10:40-11:10 [Evgheni Strelcov](#)
INVITED National Institute of Standards and Technology, USA

13-1265 Direct Observation of Electrochemical Behavior on Metal Electrode Thin Film Surface Using Combined In-Situ EC-AFM and CV Measurement

11:10-11:25 [Mohades Beigtan](#), Changhyo Sun, Yunseok Kim
Sungkyunkwan University, Korea

13-0277 In-Situ Transmission Electron Microscopy of Battery Electrodes under Operation

11:25-11:55 [Jong Min Yuk](#)
INVITED Korea Advanced Institute of Science and Technology, Korea

13-1961 Control of Magnetic Anisotropy by Strain-Induced Structural Distortion in Double Perovskite $\text{Sr}_2\text{FeReO}_6$

11:55-12:10 [Gahee Noh](#)¹, Yeongrok Jin², Yongjin Kim³, Jaekwang Lee², Chan-Ho Yang³, Changhee Sohn⁴,
Ho Nyung Lee⁵, Si-Young Choi¹
¹Pohang University of Science and Technology, Korea, ²Pusan National University, Korea, ³Korea Advanced Institute of Science and Technology, Korea, ⁴Ulsan National Institute of Science and Technology, Korea, ⁵Oak Ridge National Laboratory, USA

13-2175 Atomic Scale Analysis of Transition Metal Decorated h-BN via Cs-STEM

12:10-12:25 [Odongo Francis Ngorome Okello](#), Kyung-Yeon Doh, Hye Su Kang, Donghwa Lee, Yong-Tae Kim,
Si-Young Choi
Pohang University of Science and Technology, Korea

TUESDAY, November 3

Ballroom 3 (2F)

Chair Si-Young Choi (Pohang University of Science and Technology, Korea)

13-0586 Selective Control of Multiple Ferroelectric Polarization Switching Pathways Using Trailing Flexoelectric Field

14:00-14:30 [Sang Mo Yang](#)
INVITED Sogang University, Korea

13-1894 Out-of-Plane Piezoelectricity in 2H-MoTe₂ Flake by Atomic-Scale Inversion Symmetry Breaking

14:30-14:45 [Seunghun Kang](#)¹, Sera Kim¹, Sera Jeon², Woo-Sung Jang¹, Daehee Seol¹, Young-Min Kim¹,
Jaekwang Lee², Heejun Yang¹, Yunseok Kim¹
¹Sungkyunkwan University, Korea, ²Pusan National University, Korea

13-2800 Direct Atomic-Scale Observation of Structural Evolution of LaAlO₃ (001) Polar Surface

14:45-15:00 [Zhipeng Wang](#)¹, Jinho Byun², Bumsu Park¹, Zhen Wang¹, Yaolong Xing¹, Jeehun Jeong¹, Jinsol Seo¹,
Jong Chan Kim³, Hu Young Jeong³, Jaekwang Lee², Sang Ho Oh¹
¹Sungkyunkwan University, Korea, ²Pusan National University, Korea, ³Ulsan National Institute of Science and Technology, Korea

13-2984 Direct Mapping of Local Crystal Symmetry in Ferroelectric Materials by Position-Averaged Convergent Beam Electron Diffraction

15:00-15:15 [Young-Hoon Kim](#)¹, Sang-Hyeok Yang¹, Myoungcho Jeong², Eunha Lee², Young-Min Kim¹
¹Sungkyunkwan University, Korea, ²Samsung Advanced Institute of Technology, Korea

13-0504 Simultaneous Mapping of Atomic Distribution and Ionic Displacement in Ferroelectric Thin Films via Picoscale-Precision STEM-EDX

15:15-15:45 [Young-Min Kim](#)
INVITED Sungkyunkwan University, Korea

13-2141 Direct Observation of Metastable Atomic Distortions Coupled with Ferroelectricity in CaTiO₃ Thin Film

15:45-16:00 [Jinhyuk Jang](#)¹, Kyoung-June Go¹, Jeong Rae Kim², Tae Won Noh², Daesu Lee¹, Si-Young Choi¹
¹Pohang University of Science and Technology, Korea, ²Seoul National University, Korea

13-3375 Direct Atomic-Resolution EDS Elemental Mapping of Dopants in BaTiO₃-Based Multilayer Ceramic Capacitors

16:00-16:15 [Hyejin Jeong](#)^{1,2}, Zhipeng Wang¹, Jeehun Jeong¹, Yaolong Xing¹, Sangho Oh¹
¹Sungkyunkwan University, Korea, ²Samsung Electro-Mechanics Co., Ltd., Korea

13-1813 Deep Learning Driven Pico-Metric Structural Analysis in Scanning Transmission Electron Microscopy

16:15-16:30 [Kyoung-June Go](#)¹, Dong-Hwan Yang¹, Jinhyuk Jang¹, Junghun Han², Sejung Yang², Si-Young Choi¹
¹Pohang University of Science and Technology, Korea, ²Yonsei University, Korea

13-2838 Deep Learning Assisted Quantification of Atomic Defects in Two-Dimensional TMD Materials

16:30-16:45 [Sang-Hyeok Yang](#), Woosoon Choi, Young-Min Kim
Sungkyunkwan University, Korea

13-1. Imaging and spectroscopic characterization of ultrafast phenomena

WEDNESDAY, November 4

Ballroom 3 (2F)

Chair Oh-Hoon Kwon (Ulsan National Institute of Science and Technology, Korea)

13-2815 Imaging Ultrafast Nanoscale Dynamics by Femtosecond Electron Pulses

09:00-09:30 [Sascha Schäfer](#)
INVITED *Carl-von-Ossietzky University, Germany*

13-0633 Optical Second-Harmonic Generation and Its Interference in Atom-Thick Crystals

09:30-10:00 [Sunmin Ryu](#)
INVITED *Pohang University of Science and Technology, Korea*

13-0303 Carrier Dynamics Revealed by Dynamic Secondary Electrons Emitted from Materials Surfaces

10:00-10:30 [Jongweon Cho](#)
INVITED *Myongji University, Korea*

13-3644 Ultrafast Optical Studies of Valley States in 2D Transition Metal Dichalcogenides

10:30-10:45 [Jonghwan Kim](#)
Pohang University of Science and Technology, Korea

13-3640 Real Space Mapping of Surface Charge Carrier Dynamics on Photoactive Semiconductor Nanowires: Insights from Ultrafast Time Resolved Microscopy

10:45-11:00 [Aniruddha Adhikari](#)¹, [Jafar Iqbal Khan](#)², [Omar F. Mohammed](#)²
¹*Ulsan National Institute of Science and Technology, Korea*, ²*King Abdullah University of Science and Technology, Saudi Arabia*

13-3199 Ultrafast Electron Microscopy Reveals Anisotropic Structural Dynamics of Thin Black Phosphorus

11:00-11:15 [Ye-Jin Kim](#), [Oh-Hoon Kwon](#)
Ulsan National Institute of Science and Technology, Korea

13-1768 Dynamics of Carrier Transport and Chemical Reaction in Photo-Catalytic Materials

11:15-11:30 [Soonnam Kwon](#)
Pohang Accelerator Laboratory, Korea

13-0332 Evolution of Nanoprecipitates in a Cast Aluminum Alloy during the Aging Treatments

13:50-14:20 [Won Sang Shin](#), [Donghyuck Jung](#), [Yoon-Jun Kim](#)
INVITED *Inha University, Korea*

13-0311 Atom Probe Tomography: Methodology and Application

14:20-14:50 [Torben Boll](#)
INVITED *Karlsruhe Institute of Technology, Germany*

13-3646 Effects of Alloying Elements on Microstructures of Co-Based Superalloys by Atom Probe Tomography

[Hyeji Im](#)¹, [Surendra Kumar Makineni](#)², [Baptiste Gault](#)³, [Dierk Raabe](#)³, [Pyuck-Pa Choi](#)¹
¹*Korea Advanced Institute of Science and Technology, Korea*, ²*Indian Institute of Science, India*, ³*Max-Planck-Institut für Eisenforschung GmbH, Germany*

13-2921 Investigation of Nanosized Heusler Precipitates by Correlative APT and TEM Analyses

15:05-15:20 [Chanwon Jung](#)¹, [Biswanath Dutta](#)², [Poulumi Dey](#)², [Seong-Jae Jeon](#)³, [Seungwoo Han](#)³, [Hyun-Mo Lee](#)⁴, [Jin-Seong Park](#)⁴, [Seong-Hoon Yi](#)⁵, [Pyuck-Pa Choi](#)¹
¹*Korea Advanced Institute of Science and Technology, Korea*, ²*Delft University of Technology, Netherlands*, ³*Korea Institute of Machinery and Materials, Korea*, ⁴*Hanyang University, Korea*, ⁵*Kyungpook National University, Korea*

13-2741 Three-Dimensional Atomic Mapping of Ligands on Nanoparticles

15:20-15:35 [Kyuseon Jang](#)¹, [Se-Ho Kim](#)^{1,2}, [Hosun Jun](#)¹, [Chanwon Jung](#)¹, [Jiwon Yu](#)³, [Sangheon Lee](#)³, [Pyuck-Pa Choi](#)¹
¹*Korea Advanced Institute of Science and Technology, Korea*, ²*Max-Planck-Institute für Eisenforschung, Germany*, ³*Ewha Womans University, Korea*

13-2. 3D imaging using APT and TEM tomography

WEDNESDAY, November 4

Ballroom 3 (2F)

Chairs [Pyuck-Pa Choi](#) (Korea Advanced Institute of Science and Technology, Korea)
[Yongsoo Yang](#) (Korea Advanced Institute of Science and Technology, Korea)

13-0138 Atomic Electron Tomography: A Novel Approach for Atomic-Scale 4D Imaging

13:20-13:50 [Yongsoo Yang](#)
INVITED *Korea Advanced Institute of Science and Technology, Korea*



13. Advanced nanocharacterization and microscopic modelling

POSTER PRESENTATION

13-1. Imaging and spectroscopic characterization of ultrafast phenomena

WEDNESDAY, November 4

2F Lobby

- 13-2368 **Annealing Behaviors of Al-Mn and Al-Mg Alloys : A Real-Time Synchrotron X-ray Scattering Study**
[Nan-Nan Liang](#)¹, [Tae-Sik Cho](#)¹, [Seong-Goo Han](#)²
¹Kyungpook National University, Korea, ²MIT Korea Co., Ltd., Korea
- 13-2804 **Implantation Studies in Zinc Ferrite Thin Film Investigated Using Various Synchrotron Radiation Based Techniques**
[Jitendra Pal Singh](#)¹, [Weon Cheol Lim](#)², [Jonghan Song](#)², [Sangsul Lee](#)¹, [Keun Hwa Chae](#)²
¹Pohang University of Science and Technology, Korea, ²Korea Institute of Science and Technology, Korea
- 13-3266 **Entangled Carrier Relaxation Pathways for CdSe Nanorods**
[Won-Woo Park](#)¹, [Ji Yong Choi](#)², [Hyunjoon Song](#)², [Oh-Hoon Kwon](#)¹
¹Ulsan National Institute of Science and Technology, Korea, ²Korea Advanced Institute of Science and Technology, Korea

13-2. 3D imaging using APT and TEM tomography

WEDNESDAY, November 4

2F Lobby

- 13-1135 **Dissolution and Nucleation Behavior at the Early Stage of Two-Step Aging in Al-Mg-Si Alloy Characterized by 3DAP**
[Jaehwang Kim](#)¹, [Minyoung Song](#)¹, [Hyeonjin Choi](#)¹, [Jiyoung Lee](#)², [Jaepyoung Ahn](#)²
¹Korea Institute of Industrial Technology, Korea, ²Korea Institute of Science and Technology, Korea
- 13-3713 **A Study on Partial Crystallization Phenomena of Amorphous NbCo_{1.1}Sn Half-Heusler Alloy during the Ball Milling Process**
[Hail Park](#)¹, [Chanwon Jung](#)¹, [Pyuck-Pa Choi](#)¹, [Seung-Hoon Yi](#)²
¹Korea Advanced Institute of Science and Technology, Korea, ²Kyungpook National University, Korea
- 13-3722 **Investigation of Yttria Stabilized Zirconia Nanoparticles in Additively Manufactured Ti-Based Composites**
[Gwanghyo Choi](#)
Korea Advanced Institute of Science and Technology, Korea
- 13-3724 **Analysis on 3-Dimensional Distribution of Minor Element in Ternary Metal Nanoparticles Using Atom Probe Tomography**
[Chanwon Jung](#), [Hosun Jun](#), [Kyuseon Jang](#), [Pyuck-Pa Choi](#)
Korea Advanced Institute of Science and Technology, Korea

13-3. Quantitative local analysis using TEM/SPM

WEDNESDAY, November 4

2F Lobby

- 13-1604 **Visualization of the Crystallographic Effect on Oxygen Diffusion in VO₂**
[Hyeji Sim](#), [Kyung-Yeon Doh](#), [Gi-Yeop Kim](#), [Yunkyu Park](#), [Minguk Jo](#), [Junwoo Son](#), [Donghwa Lee](#), [Si-Young Choi](#)
Pohang University of Science and Technology, Korea
- 13-1623 **Point Defect Analysis in Laser Illuminated 2H-MoTe₂ by Deep Learning Based Atomic Structure Analysis**
[Dong-Hwan Yang](#), [Odongo Francis Ngome Okello](#), [Seung-Young Seo](#), [Moon-Ho Jo](#), [Si-Young Choi](#)
Pohang University of Science and Technology, Korea
- 13-1944 **Exploring of Wake-Up Effect in Ferroelectric Hf_{1-x}Zr_xO₂ Using Piezoresponse Force Microscopy**
[Yeehyun Park](#), [Seunghun Kang](#), [Owoong Kwon](#), [Yunseok Kim](#)
Sungkyunkwan University, Korea
- 13-2874 **Visualization of Domain Structure and Switching Properties of Hf_{0.5}Zr_{0.5}O₂ at Various Annealing Temperatures for Integrated Ferroelectrics**
[Seokjung Yun](#)¹, [Hoon Kim](#)¹, [Myungsoo Seo](#)¹, [Min-Ho Kang](#)², [Yang-Kyu Choi](#)¹, [Seungbum Hong](#)¹
¹Korea Advanced Institute of Science and Technology, Korea, ²National NanoFab Center, Korea

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A BIG THANK YOU TO ALL OF OUR SUPPORTERS AND PARTNERS FOR
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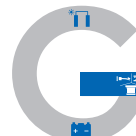
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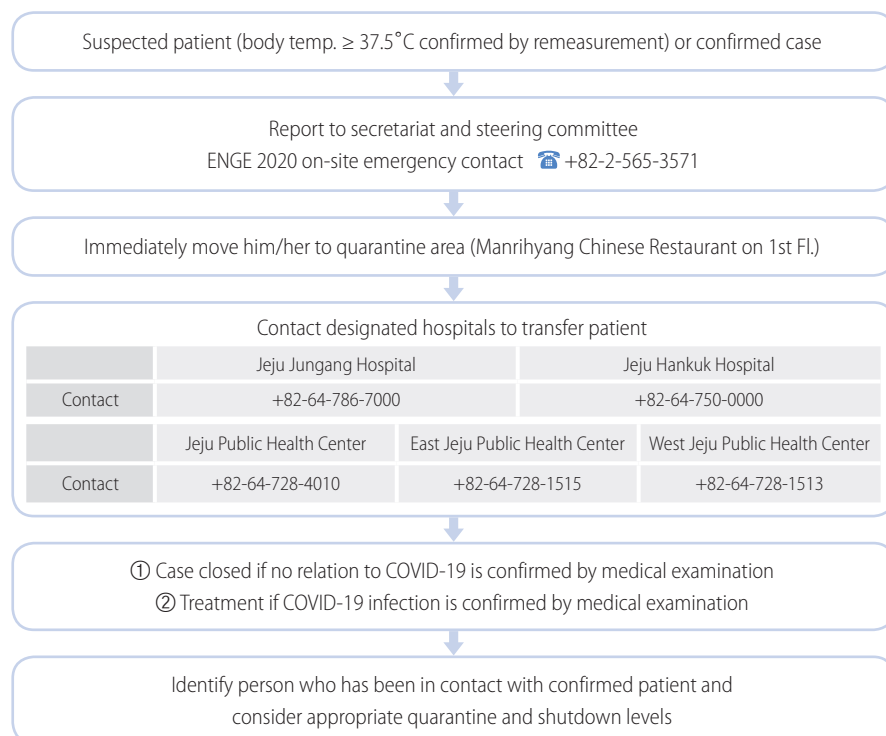


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ATTENDEES' DUTIES

- Keep distancing during the conference.
- Wear a KF94 (or equivalent) mask (access denied if wearing no mask).
- Follow occupancy limits per session hall.
- Use particular care for personal hygiene with the "HEALTH KIT" and disease control items furnished in the hotel.
- Change "BODY TEMPERATURE STICKER" every day at the registration desk (access will not be allowed without a sticker).
- Avoid physical contact with other attendees, e.g. handshaking.
- Refrain from talking while having meals/refreshments (wear a mask when talking and at all times).
- Refrain from having group gatherings or congregate dining or visiting crowded public spaces.

RESPONSE TO SUSPECTED PATIENT AND CONFIRMED CASE



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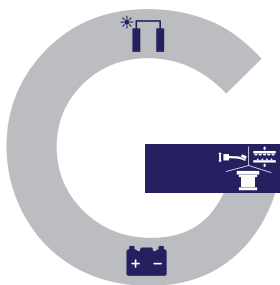
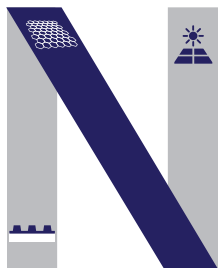
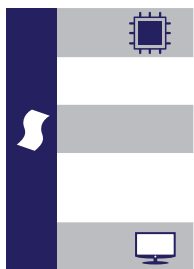
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