

ENGE 2024

The 8th International Conference on Electronic Materials and
Nanotechnology for Green Environment

PROGRAM BOOK

November 24 – 27, 2024 Jeju Shinhwa World, Jeju, Korea

Hosted by



Co-Organized by



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ENGE 2024

The 8th International Conference on Electronic Materials and Nanotechnology for Green Environment

04

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05

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269

06

Exhibition Directory

318

An aerial night photograph of a city, likely Tokyo, with numerous fireworks exploding in the dark sky. The city lights are visible, and the overall scene is captured in a dark blue monochrome palette. The number '01' is overlaid on the left side of the image.

01

An aerial photograph of a city at night, with mountains visible in the background. The image is dark and serves as a background for the text.

CONFERENCE INFORMATION

WELCOME MESSAGE

**“To our esteemed colleagues worldwide,
we eagerly anticipate your active
participation in November 2024 on
Jeju Island, Korea!”**



Greetings,

I am Professor Young Keun Kim, the Chair of the Organizing Committee for ENGE 2024 at Korea University, and I am thrilled to extend a warm welcome to all visitors of the ENGE 2024 official website.

Since its inaugural conference in 2010 on the picturesque island of Jeju, Korea, ENGE has evolved into a prominent international gathering focusing on Electronic Materials and Nanotechnology. Over the years, it has grown significantly in scale and scope. The most recent iteration in 2022 featured around 1,200 presentations and drew 1,720 participants, firmly establishing its status as a pivotal international academic conference.

ENGE 2024 is poised to continue this legacy and is scheduled to take place from November 24th to 27th at Jeju Shinhwa World, nestled in the heart of Jeju Island. This representation, encouraging active involvement not only from academia but also from industry and government agencies. Our preparations are centered around creating a platform for presentations and discussions that encompass a wide range of perspectives, establishing a forum for comprehensive and diverse exchanges.

Sincerely,

Young Keun Kim

Chair, ENGE 2024
Korea University, Seoul, Korea

OVERVIEW

HISTORY

1st

ENGE2010

November 21-24

- 558 presentations
- 477 attendees
- 13 countries

2nd

ENGE2012

September 16-19

- 906 presentations
- 852 attendees
- 12 countries

3th

ENGE2014

November 21-24

- 897 presentations
- 1,019 attendees
- 21 countries

4th

ENGE2016

November 6-9

- 931 presentations
- 1,180 attendees
- 19 countries

5th

ENGE2018

November 11-14

- 1,056 presentations
- 1,466 attendees
- 16 countries

6th

ENGE2020

November 1-4

- 1,002 presentations
- 1,392 attendees
- 17 countries

7th

ENGE2022

November 6-9

- 1,192 presentations
- 1,714 attendees
- 20 countries

8th

ENGE2024

November 24-27

55 Session Topics under 15 Programs 6 Plenary,
22 Keynote, 2 Tutorial, 194 Invited, 233 Oral,
618 Poster Presentations from 21 Countries

TITLE

The 8th International Conference on Electronic Materials and Nanotechnology for Green Environment

DATE

November 24-27, 2024

VENUE

Jeju Shinhwa World, Jeju, Korea

PROGRAM

Welcome Reception, Plenary & Keynote & Tutorial & Invited & Oral & Poster Sessions, Best Oral & Poster Awards, Banquet, Exhibition and Events

HOSTED BY

The Korean Institute of Metals and Materials

CO-ORGANIZED BY

- Korea University BK21 FOUR R&E Center for Materials Science and Engineering
- Yonsei University Department of Materials Science & Engineering Education and Research Division for Futuristic Human-Centric Materials
- Seoul National University Materials Education/Research Division for Creative Global Leaders
- KAIST BK21 FOUR R&E Initiative for K-Materials Global Innovation
- SKKU BK21 FOUR Human Tech Materials-based Global Elite Cultivation Center of Student Success
- Center for Hyperscale, Hyperfunction, Heterogeneous Integration Pioneering Semiconductor Technology
- Seoul National University Institute for Battery Research Innovation

SPONSORED BY

- Jeju Convention & Visitors Bureau
- Korea Tourism Organization
- Tokyo Electron Korea
- Futek Furnace
- Korea Institute of Materials Science

COMMITTEE

Steering Committee

• Chair	Young Keun Kim	Korea University
• Co-Chair	Cheolmin Park	Yonsei University
	Heung Nam Han	Seoul National University
• Vice-Chair	Seokwoo Jeon	Korea University
• Program	Byungha Shin	KAIST
• Secretary General	Wooyoung Shim	Yonsei University
• Treasurer	Miso Kim	Sungkyunkwan University
• Exhibits and Sponsorship	Yong-Mook Kang	Korea University
	Ho Won Jang	Seoul National University
• Publications	Myung-Hwa Jung	Sogang University
	Qi Chen	Beijing Institute of Technology
• Publicity	Ju Hun Lee	Hanyang University
	Eun-Jin Jung	Research Institute of Industrial Science & Technology
• Local Chairs	Soo Young Kim	Korea University
	Oi Lun Helena Li	Pusan National University
• Global Cooperation	Jeehwan Kim	Massachusetts Institute of Technology
	Sung Hoon Kang	KAIST / Johns Hopkins University
	Seok Woo Lee	Nanyang Technological University

Program Committee

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	Hyunjoo Choi	Kookmin University
	Ki-Ha Hong	Hanbat National University
	Ho Won Jang	Seoul National University
	Eun-Chae Jeon	University of Ulsan
	Byoungwoo Kang	POSTECH
	Ju-Young Kim	UNIST
	Sang-Woo Kim	Yonsei University
	Soo Young Kim	Korea University
	Jung Heon Lee	Sungkyunkwan University
	Tae-Woo Lee	Seoul National University
	Uk Sim	Korea Institute of Energy Technology
	Jeong-Yun Sun	Seoul National University
	Tae-Sik Yoon	UNIST

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• Member	Jinho Ahn	Hanyang University
	Byung-Ki Cheong	Korea Institute of Science and Technology
	Moon-Ho Jo	POSTECH
	Young Keun Kim	Korea University
	Caroline Sunyong Lee	Hanyang University ERICA
	Hyuck Mo Lee	KAIST
	Woo Young Lee	Yonsei University
	Byungha Shin	KAIST

VENUE LAYOUT

1 Yeongsil

2 Eorimok

3 Baengnok

4 Youngju

5 Olle

6 Udo

• Oral Session

7 Seongsan

• Committee Room

8 Halla

• Tutorial Session
• Oral Session

9 Anduk

• Secretariat

10 Registration



11 Landing A, B, C

• Oral Session
• Welcome Reception (Landing C)
• Plenary Session (Landing A)
• Banquet (Landing A+B)

13 Lobby A

• Event
• Exhibition
• Coffee Break

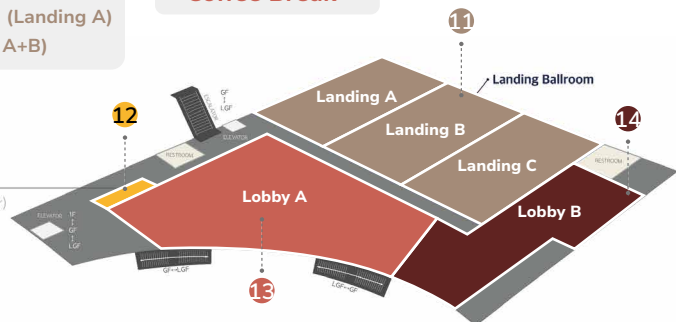
14 Lobby B

• Poster Session

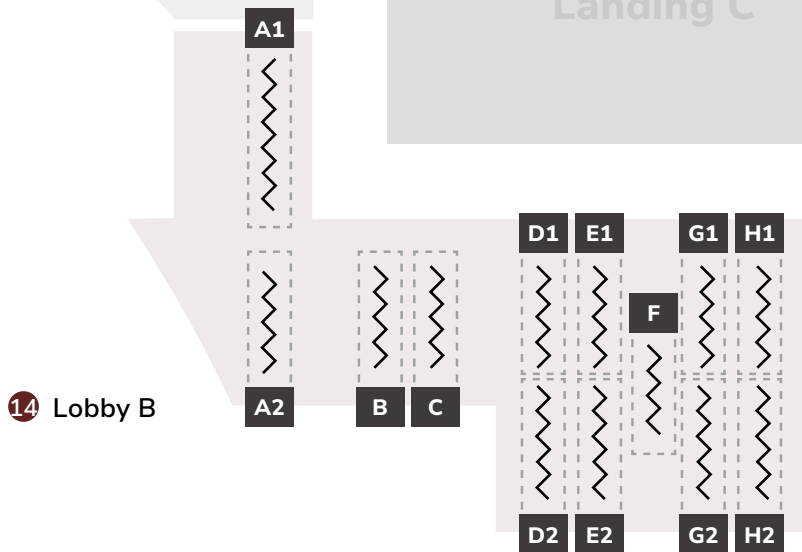
12 KIT Desk

LGF (Lower Ground Floor)

• Landing Ballroom A,B,C



POSTER SESSION LAYOUT



Program	25-Nov	26-Nov	27-Nov
	18:30-19:30	16:50-18:30	13:10-14:10
Program 01		A1, A2	
Program 02			A1, A2
Program 03		B, C, D1, D2, E1, E2	
Program 04	A1, A2, B		
Program 05			B, C, D1
Program 06		E1, E2, F	
Program 07	C, D1, D2, E1		
Program 08			D1, D2
Program 09		G1, G2, H1, H2	
Program 10			E1, E2, F
Program 11			F, G1
Program 12			G1, G2, H1
Program 13	E1, E2, F		
Program 14	G1, G2, H1		
Program 15	H1, H2		



02



USEFUL INFORMATION

PROGRAM AT A GLANCE

November

24

Sunday

15:00- **Registration**
17:00-19:00 **Tutorial Session** Halla
19:00-20:30 **Welcome Reception** Landing C

25

Monday

07:30- **Registration**
08:00-09:20 **Plenary 1&2** Landing A
09:40-12:10 **Keynote & Invited & Oral Sessions**
10:30-12:00 **Satellite Session** Yeongsil
12:10-13:10 **Lunch** Landing Dining, GF
13:10-18:30 **Keynote & Invited & Oral Sessions**
18:30-19:30 **Poster Session**

26

Tuesday

07:30- **Registration**
08:00-12:30 **Keynote & Invited & Oral Sessions**
12:30-13:30 **Lunch** Landing Dining, GF
13:30-14:50 **Plenary 3&4** Landing A
 Group Photo
15:00-18:30 **Keynote & Invited & Oral Sessions**
16:50-18:30 **Poster Session**
18:40-20:30 **Banquet** Landing AB

27

Wednesday

07:30- **Registration**
08:00-09:20 **Plenary 5&6** Landing A
09:40-12:10 **Keynote & Invited & Oral Sessions**
12:10-13:10 **Lunch** Landing Dining, GF
13:10-14:10 **Poster Session**
15:00-18:30 **Keynote & Invited & Oral Sessions**

SOCIAL PROGRAMS

Welcome Reception

November 24 (Sunday) 19:00-20:30
Landing C, LGF

On the first day of the conference, please join an ice-breaking event to get to know each other! All participants who registered ENGE 2024 are invited to the welcome reception.

Event

Group Photo

November 26 (Tuesday) 14:50
Landing A, LGF

Right after Plenary Session 4 concludes, we will gather to take a great group photo, all dressed in the same outfit. Please make sure to bring the sweatshirt you received from the KIT Desk.

4-Cut Photo Booth

November 24 (Sunday) - 27 (Wednesday)
Lobby, LGF

Capture memories at our photo booth! Feel free to take fun photos and create lasting memories during ENGE 2024.

Banquet

November 26 (Tuesday) 18:40-20:30
Landing AB, LGF

The banquet is the place for conference attendees to mingle and enjoy featured entertainment while partaking in a delicious western course meal. Look forward to an unforgettable evening as one of highlight programs of ENGE 2024.

- Welcome Address
- Congratulatory Address
- Statistics Report
- Dedicated Contribution Award Ceremony
- Dinner
- O/X Quiz
- Greetings from the conference chair of ENGE 2026

Don't miss out on this opportunity, as there are plenty of gifts ready!

Awards

'The Best Oral & Poster Award' will be announced after the conference via the website. Best candidates will receive a commemorative certificate each.

USEFUL INFORMATION



Registration Desk

Landing Convention Center Lobby

November 24 Sunday	15:00-19:00
November 25 Monday	07:30-18:30
November 26 Tuesday	07:30-18:30
November 27 Wednesday	07:30-17:00



Secretariat

Lost & Found. Anduk, GF

Tel. +82-42-489-7070

E-mail. secretariat@enge2024.org



On-site Registration Fee

Regular	USD 750	KRW 1,050,000
Fee includes admission to all sessions, abstract e-Book, program e-book, welcome reception, lunches (for 3 days), banquet and coffee breaks		
Student	USD 400	KRW 560,000

Fee includes admission to all sessions, abstract e-Book, program e-book, welcome reception, lunches (for 3 days), and coffee breaks

* **Banquet** USD 60 | KRW 84,000

* 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.



Download Materials

My page: Attendance Certificate, Registration Payment Receipt

Official Website: Abstract E-Book, Statistics Reports, Program Book



Beer Time

Landing Convention Center Lobby

Beer and snacks will be provided during the poster sessions on Monday and Tuesday.

November 25 Monday	18:30-19:30
November 26 Tuesday	16:50-18:30



Lunch Break

Landing Dining, GF

Bring your lunch coupon with your name badge.

November 25 Monday	12:10-13:10
November 26 Tuesday	12:30-13:30
November 27 Wednesday	12:10-13:10

* Vegetarian menu is prepared separately.



Coffee Break

Landing Convention Center Lobby

Fresh coffee and tea will be served during the break times.

November 25 Monday	07:45* / 09:20 / 14:50
November 26 Tuesday	07:45* / 10:30 / 14:50
November 27 Wednesday	07:45* / 09:20 / 13:10* / 16:10

* with snack



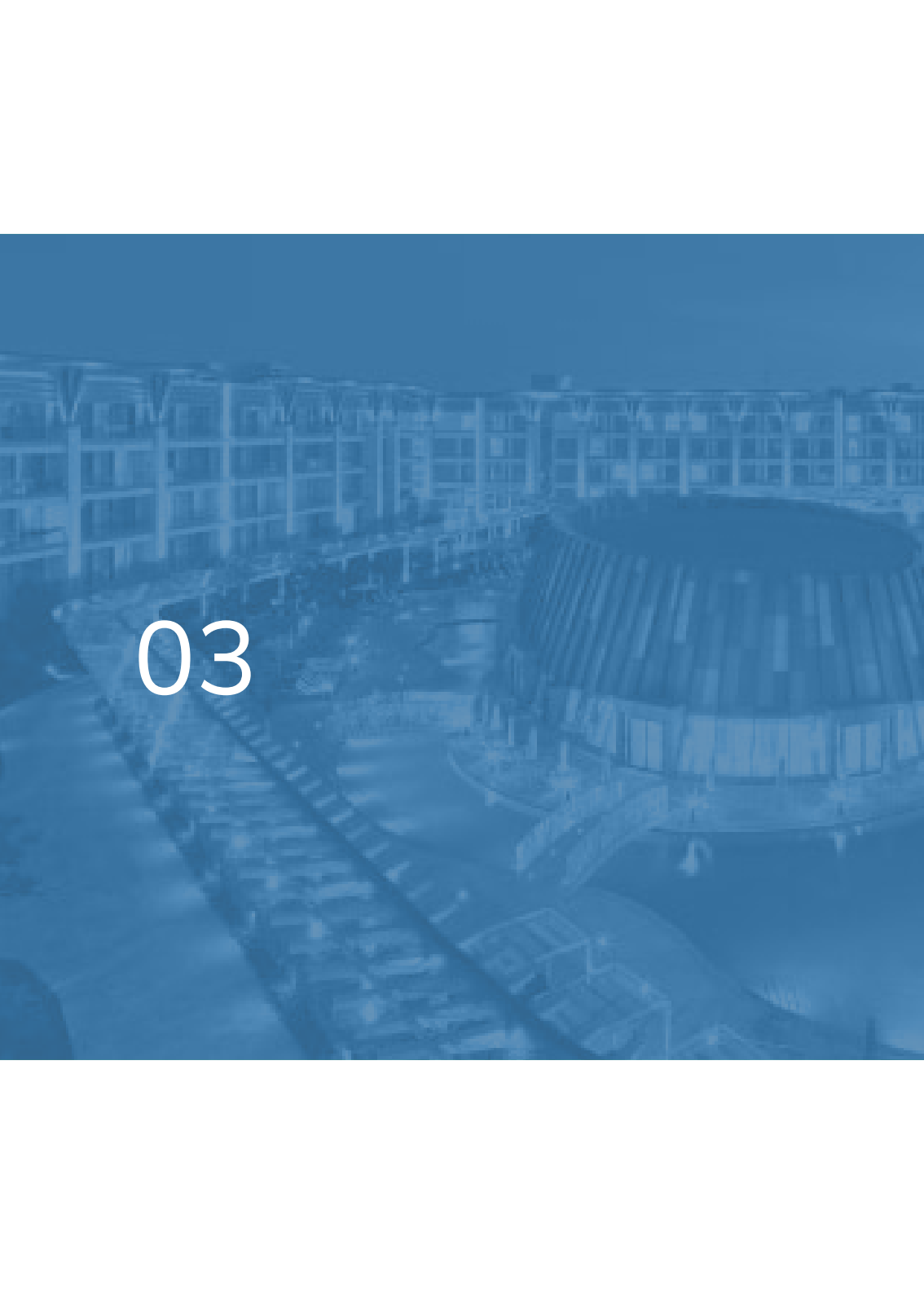
Venue Information

• Wi-Fi Access

Wireless Network #JSW-FREE

• Jeju Shinhwa World Map



An aerial photograph of a modern architectural complex, overlaid with a semi-transparent blue filter. The image shows a large, circular building with a distinctive, ribbed exterior, surrounded by several long, rectangular residential or commercial blocks. A winding path or road cuts through the complex. The overall scene is captured from a high angle, providing a comprehensive view of the layout.

03

An aerial photograph of a modern university campus, featuring large multi-story academic buildings, a central courtyard with a swimming pool, and landscaped green spaces. The entire image is overlaid with a semi-transparent blue filter.

TECHNICAL PROGRAMS

SESSION TIMETABLE

NOV. 24
(Sun.)

15:00	Registration	Lobby
17:00-19:00	Tutorial Session Hyunjoo Lee & Donghwa Lee	Halla (GF)
19:00-20:30	Welcome Reception	Landing C (LGF)

NOV. 25
(Mon.)

	LandingA	LandingB	LandingC	Yeongsil
07:45-08:00				
08:00-08:40	Plenary Session 1 Stuart Parkin			
08:40-09:20	Plenary Session 2 Jaihyung Won			
09:20-09:40				
09:40-12:10	03 p. 81 Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (1)	09 p. 172 Hydrogen Future and Its Economic and Environmental Consideration (1)	04 p. 105 Synthesis and Integration of Low-Dimensional Materials and 2D vdW Heterostructures (1)	Satellite Session
12:10-13:10				
13:10-14:50	03 p. 82 Wearable and Stretchable Devices for Body-Implantable and Healthcare Applications (1)	09 p. 173 Hydrogen Future and Its Economic and Environmental Consideration (2)	04 p. 107 Synthesis and Integration of Low-Dimensional Materials and 2D vdW Heterostructures (2)	14 p. 246 Functional Nanostructured Materials for Healthcare Applications (1)
14:50-15:00				
15:00-16:40	03 p. 83 Flexible/Stretchable Materials for Wearable Electronics (1)	09 p. 174 Hydrogen Future and Its Economic and Environmental Consideration (3)	04 p. 108 Fundamental Properties and Nano-characterization of Low-dimensional Materials and 2D vdW Heterostructures (1)	14 p. 247 Functional Nanostructured Materials for Healthcare Applications (2)
16:40-16:50				
16:50-18:30	03 p. 84 Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (2)	09 p. 175 Hydrogen Future and Its Economic and Environmental Consideration (4)	04 p. 109 Fundamental Properties and Nano-characterization of Low-dimensional Materials and 2D vdW Heterostructures (2)	14 p. 247 Functional Nanostructured Materials for Healthcare Applications (3)
18:30-19:30				
	P04. Low-Dimensional Materials and 2D van der Waals Heterostructures			p. 114
	P07. Materials for Batteries and Energy Storage Systems			p. 155
	P13. Structural Materials for Sustainable Future			p. 238
	P14. Functional Nanostructured Materials for Healthcare Applications			p. 250
	P15. Advanced Characterizations for Functional Materials			p. 264

Eorimok	Baengnok	Youngju	Olle	Udo	Halla
Coffee Break					

Coffee Break					
11 p. 204 Text and Image Processing for Materials Science	06 p. 136 Advanced Soft Magnetic Materials for Next-Generation Mobility and Robotics	01 p. 56 Advanced Processes and Materials for Future Devices (1)	15 p. 256 Advanced Characterizations for Functional Materials (1)	07 p. 149 Materials for Batteries and Energy Storage Systems (1)	13 p. 233 Nanomechanics for Advanced Structural Materials (1)

Lunch Break (Landing Dining, GF)					
11 p. 205 Integration of Simulation and Machine Learning for Accelerated Materials Modeling (1)	06 p. 137 Magnonics: Harnessing Spin Waves for Future Technology	01 p. 57 Progress in Quantum Electronics	15 p. 258 Advanced Characterizations for Functional Materials (2)	07 p. 151 Materials for Batteries and Energy Storage Systems (2)	13 p. 235 Nanomechanics for Advanced Structural Materials (2)

Coffee Break					
11 p. 206 Integration of Simulation and Machine Learning for Accelerated Materials Modeling (2)	06 p. 138 Innovative Spintronics Devices	01 p. 58 3D Heterogeneous Integration & Advanced Packing Technology	15 p. 259 Advanced Characterizations for Functional Materials (3)	07 p. 151 Materials for Batteries and Energy Storage Systems (3)	13 p. 235 High-Performance Metallic Materials for Sustainable Future (1)

Break					
11 p. 207 Integration of Simulation and Machine Learning for Accelerated Materials Modeling (3)	06 p. 139 Emerging Magnetic Materials for Innovative Robotics, Sensors, and Devices		15 p. 261 Advanced Characterizations for Functional Materials (4)	07 p. 152 Materials for Batteries and Energy Storage Systems (4)	13 p. 236 High-Performance Metallic Materials for Sustainable Future (2)

Poster Session 1

SESSION TIMETABLE

NOV. 26
(Tue.)

	LandingA	LandingB	LandingC	Yeongsil
07:45-08:00				
08:00-10:30	03 p. 85 Wearable and Stretchable Devices for Body-Implantable and Healthcare Applications (2)	10 p. 192 Thermal Engineering Materials and Devices (1) : Plenary	04 p. 110 Advanced Applications of Low-dimensional Materials and 2D vdW Heterostructures (1)	12 p. 216 Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications (1)
10:30-10:50				
10:50-12:30	03 p. 86 Soft, Wearable, and Neuromorphic Electronics for Human Interfacing (1)	09 p. 176 Hydrogen Future and Its Economic and Environmental Consideration (5)	04 p. 111 Advanced Applications of Low-dimensional Materials and 2D vdW Heterostructures (2)	12 p. 217 Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications (2)
12:30-13:30				
13:30-14:10	Plenary Session 3 Elvira Fortunato			
14:10-14:50	Plenary Session 4 Hua Zhang			
14:50-15:00				
15:00-16:40	03 p. 86 Flexible/Stretchable Materials for Wearable Electronics (2)	09 p. 176 Hydrogen Future and Its Economic and Environmental Consideration (6)	04 p. 112 Industrial Prospects of Low-dimensional Materials and 2D vdW Heterostructures (1)	12 p. 218 Computational Catalyst Design for Green Energy (1)
	Piezoelectric, p. 87 Triboelectric and Hybrid Energy Harvesting Materials and Systems (3)			
16:40-16:50				
16:50-18:30	Poster Session 2		04 p. 113 Industrial Prospects of Low-dimensional Materials and 2D vdW Heterostructures (2)	12 p. 219 Computational Catalyst Design for Green Energy (2)
	P01. Advanced Logic Semiconductors & Beyond CMOS Applications p. 63			
	P03. Sensors and Energy Harvesting for Smart Healthcare Devices p. 91			
	P06. Magnetic Materials and Spintronics p. 143			
	P09. Hydrogen Future and Its Economic and Environmental Consideration p. 180			
18:30-20:30				

Eorimok	Baengnok	Youngju	Olle	Udo	Halla AB	Halla C
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Coffee Break

11 p. 208 Automated/ Autonomous Experiments	06 p. 140 Hard Magnetic Materials for Sustainable Urban Mobility	01 p. 59 Compound Semiconductors and Power Electronic Devices	15 p. 262 Advanced Characterizations for Functional Materials (5)	07 p. 153 Materials for Batteries and Energy Storage Systems (5)	13 p. 237 Additive Manufacturing for Sustainable Future
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Coffee Break

11 p. 209 Data-Driven Materials Discovery (1)	06 p. 141 Novel Spin-Textures for Advancements in Spintronics	01 p. 60 2D and Carbon- based Materials for Logic and Beyond CMOS Applications (1)	15 p. 263 Advanced Characterizations for Functional Materials (6)	07 p. 154 Materials for Batteries and Energy Storage Systems (6)	02 p. 69 Emerging Memory and Brain-inspired Systems (1)
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Lunch Break (Landing Dining, GF)

Group Photo (Landing A)

Coffee Break

11 p. 210 Data-Driven Materials Discovery (2)	06 p. 142 Emerging Magnetism and 2D Magnetic Materials	01 p. 61 Advanced Processes and Materials for Future Devices (2)	05 p. 124 Halide Perovskite Materials and Devices	10 p. 193 Thermal Engineering Materials and Devices (2)	02 p. 70 Materials and Devices for Computing- in-Memory Applications	14 p. 248 Functional Nanostructured Materials for Healthcare Applications (4)
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Break

11 p. 211 Data-Driven Materials Discovery (3)	01 p. 62 2D and Carbon- based Materials for Logic and Beyond CMOS Applications (2)	08 p. 164 Advances in Photovoltaic Materials and Devices (1)	05 p. 125 Emerging Technologies for Advanced Displays	10 p. 193 Thermal Engineering Materials and Devices (3)	02 p. 71 Emerging Memory and Brain-inspired Systems (2)	14 p. 249 Functional Nanostructured Materials for Healthcare Applications (5)
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Banquet (Landing AB)

SESSION TIMETABLE

NOV. 27
(Wed.)

	LandingA	LandingB	LandingC	Yeongsil
07:45-08:00				
08:00-08:40	Plenary Session 5 David Weitz			
08:40-09:20	Plenary Session 6 Kazuhiro Hono			
09:20-09:40				
09:40-12:10	03 p. 88 Soft, Wearable, and Neuromorphic Electronics for Human Interfacing (2)	09 p. 177 Hydrogen Future and Its Economic and Environmental Consideration (7)		12 p. 220 Computational Modeling of Energy Storage Materials (1)
12:10-13:10				
13:10-14:10	P02. Advanced Memory and Neuromorphic Materials & Device Applications p.75 P05. Emerging Materials for Metaverse Display p. 129 P08. Advances in Photovoltaic Materials and Devices p. 168 P10. Thermal Engineering Materials and Devices p. 197 P11. Artificial Intelligence for Materials p. 212 P12. Advances in Computational Materials p. 225			
14:10-16:10	03 p. 89 Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (4)	09 p. 178 Hydrogen Future and Its Economic and Environmental Consideration (8)		12 p. 222 Computational Modeling of Energy Storage Materials (2)
16:10-16:30				
16:30-18:30		09 p. 179 Hydrogen Future and Its Economic and Environmental Consideration (9)		12 p. 223 Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications/ Computational Catalyst Design for Green Energy

Eorimok	Baengnok	Youngju	Olle	Udo	Halla
Coffee Break					

Coffee Break								
	08	p. 165	05	p. 126	10	p. 194	02	p. 72
	Advances in Photovoltaic Materials and Devices (2)		Quantum Dots for Advanced Display Technology		Thermal Engineering Materials and Devices (4)		Brain-inspired Systems and Advanced Tin Film Processing for Future Memory	

Lunch Break (Landing Dining, GF)					
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Poster Session 3

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	08	p. 166	05	p. 127	10	p. 195	02	p. 73
	Advances in Photovoltaic Materials and Devices (3)		Materials and Devices for Metaverse Display		Thermal Engineering Materials and Devices (5)		Emerging Memory and Brain-Inspired System	

Coffee Break					
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	08	p. 167	05	p. 128	10	p. 196	02	p. 74
	Advances in Photovoltaic Materials and Devices (4)		Flexible and Stretchable Displays for Wearable Applications		Thermal Engineering Materials and Devices (6)		Advanced Thin Film Processing for Future Memory	

TECHNICAL PROGRAMS

1

Advanced Logic Semiconductors & Beyond CMOS Applications

Changhwan Choi

Hanyang University

- 1-1 **Advanced Processes and Materials for Future Devices**
Sangwan Kim Sogang University
Sihyun Kim Sogang University
- 1-2 **3D Heterogeneous Integration & Advanced Packing Technology**
Sungdong Kim Seoul National University of Science and Technology
- 1-3 **Quantum Devices and Computing**
Dohun Kim Seoul National University
- 1-4 **Compound Semiconductors and Power Electronic Devices**
Hyung-Seok Lee Electronics and Telecommunications Research Institute
- 1-5 **2D and Carbon-Based Materials for Logic and Beyond CMOS Applications**
Kiyoung Lee Hongik University

2

Advanced Memory and Neuromorphic Materials & Device Applications

Tae-Sik Yoon

UNIST

- 2-1 **Emerging Memory**
(Ferroelectric Memory, Phase Change Memory, Resistive Memory, etc.)
Hong-Sub Lee Kyung Hee University
- 2-2 **Materials and Devices for Computing-in-Memory Applications**
Kyung Min Kim KAIST
- 2-3 **Advanced Thin Film Processing for Future Memory**
Il-Kwon Oh Ajou University
- 2-4 **Brain-Inspired Devices and Architecture**
Seyoung Kim POSTECH

3

Sensors and Energy Harvesting for Smart Healthcare Devices

Sang-Woo Kim Yonsei University
Miso Kim Sungkyunkwan University

- 3-1 **Flexible/Stretchable Materials for Wearable Electronics**
 Hyunjung Yi Korea Institute of Science and Technology
 Jeong-Yun Sun Seoul National University
- 3-2 **Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems**
 Sang-Woo Kim Yonsei University
 Miso Kim Sungkyunkwan University
- 3-3 **Soft, Wearable, and Neuromorphic Electronics for Human Interfacing**
 Hyunhyub Ko UNIST
 Do Hwan Kim Hanyang University
- 3-4 **Wearable and Stretchable Devices for Body-Implantable and Healthcare Applications**
 Dae-Hyeong Kim Seoul National University
 Suk-Won Hwang Korea University

4

Low-Dimensional Materials and 2D van der Waals Heterostructures

Hyeon-Jin Shin GIST

- 4-1 **Synthesis and Integration of Low-Dimensional Materials and 2D vdW Heterostructures**
 Ki Kang Kim Sungkyunkwan University
- 4-2 **Fundamental Properties and Nano-Characterization of Low-Dimensional Materials and 2D vdW Heterostructures**
 Jangyup Son Korea Institute of Science and Technology
 Sukang Bae Korea Institute of Science and Technology
- 4-3 **Advanced Applications of Low-Dimensional Materials and 2D vdW Heterostructures**
 Woo Jong Yu Sungkyunkwan University
- 4-4 **Industrial Prospects of Low-Dimensional Materials and 2D vdW Heterostructures**
 Changhyun Kim Samsung Advanced Institute of Technology

TECHNICAL PROGRAMS

5

Emerging Materials for Metaverse Display

Tae-Woo Lee Seoul National University
Soo Young Kim Korea University

5-1 Halide Perovskite Materials and Devices

Tae-Woo Lee Seoul National University
Soo Young Kim Korea University

5-2 Quantum Dots for Advanced Display Technology

Jaehoon Lim Sungkyunkwan University
Jiwan Kim Kyonggi University

5-3 Materials and Devices for Metaverse Display

Jaehyun Moon Electronics and Telecommunications Research Institute
Himchan Cho KAIST

5-4 Flexible and Stretchable Displays for Wearable Applications

Steve Park KAIST
Moon Kee Choi UNIST

6

Magnetic Materials and Spintronics

Ki-Suk Lee UNIST

6-1 Hard Magnets for Future Mobility and Robotics Applications

Tae Hoon Kim Korea Institute of Materials Science

6-2 Soft Magnets for Future Mobility and Robotics Applications

Jae Won Jeong Korea Institute of Materials Science

6-3 Spintronic Materials and Devices

Soong-Geun Je Chonnam National University
Seungmo Yang Korea Research Institute of Standards and Science

7

Materials for Batteries and Energy Storage Systems

Byoungwoo Kang

POSTECH

Yong-Mook Kang

Korea University

7-1 Current State-of-the-Art Lithium-Ion Batteries

Yong-Mook Kang

Korea University

7-2 Li-Free Next Generation Batteries

Won-Hee Ryu

Sookmyung Women's University

7-3 Emerging Solid-State Batteries and the Beyond

Jungdon Suk

Korea Research Institute of Chemical Technology

8

Advances in Photovoltaic Materials and Devices

Jin Young Kim

UNIST

8-1 Inorganic Thin Film Solar Cells

Donghyeop Shin

Korea Institute of Energy Research

8-2 Halide Perovskite Solar Cells

Dong Suk Kim

UNIST

8-3 Organic and Hybrid Solar Cells

Jae Won Shim

Korea University

TECHNICAL PROGRAMS

9

Hydrogen Future and Its Economic and Environmental Consideration

Uk Sim

Korea Institute of Energy Technology

Ho Won Jang

Seoul National University

9-1 Future Hydrogen and Potential Hydrogen Carrier Production

Eric Han

Stanford University

9-2 Advanced Materials for Hydrogen Storage and Transportation

Dong Han Seo

Korea Institute of Energy Technology

9-3 Next-generation Hydrogen Utilization

Kyoungsuk Jin

Korea University

9-4 Materials and System for the Future of Hydrogen Mobility

Sung Eun Jerng

University of Suwon

9-5 CO₂ Electrolysis for Sustainable Chemical Manufacturing

Dae-Hyun Nam

Korea University

10

Thermal Engineering Materials and Devices

Su Dong Park

Korea Electrotechnology Research Institute

Il-Ho Kim

Korea National University of Transportation

10-1 High-potential Thermoelectric Materials and Processing

In Chung

Seoul National University

Kyu Hyoung Lee

Yonsei University

10-2 New Thermal Functional Materials

Woochul Kim

Yonsei University

10-3 Thermoelectric Modules and Systems (for Cooling and Power Generation)

Hyung Eui Lee

LG Innotek

Min-Wook Oh

Hanbat National University

10-4 Thermoelectric and Thermal-Electrical Property Evaluation Techniques

Hyejin Jang

Seoul National University

Hosun Shin

Korea Research Institute of Standards and Science

11

Artificial Intelligence for Materials

Sang Soo Han

KAIST

Ki-Ha Hong

Hanbat National University

- 11-1 Text and Image Processing for Materials Science
Jihan Kim KAIST
- 11-2 Automated/Autonomous Experiments
Yong Joo Kim Korea University
- 11-3 Data-Driven Materials Discovery
Donghun Kim Korea Institute of Science and Technology
- 11-4 Integration of Simulation and Machine Learning for Accelerated Materials Modeling
Dong-Hwa Seo KAIST

12

Advances in Computational Materials

Hyungjun Kim

KAIST

Ki-Ha Hong

Hanbat National University

- 12-1 Computational Modeling of Energy Storage Materials
Byungju Lee Korea Institute of Science and Technology
- 12-2 Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications
Youngho Kang Incheon National University
- 12-3 Computational Catalyst Design for Green Energy
Hyeyoung Shin Chungnam National University

TECHNICAL PROGRAMS

13

Structural Materials for Sustainable Future

Hyunjoo Choi
Ju-Young Kim,
Eun-Chae Jeon

Kookmin University
UNIST
University of Ulsan

- 13-1 Nanomechanics for Advanced Structural Materials
Eun-Ji Gwak Korea Institute of Machinery and Materials
- 13-2 High-performance Metallic Materials for Sustainable Future
Sang Yong Shin University of Ulsan
Seok Su Sohn Korea University
- 13-3 Additive Manufacturing for Sustainable Future
Kee-Ahn Lee Inha University
Kyung Tae Kim Korea Institute of Materials Science

14

Functional Nanostructured Materials for Healthcare Applications

Heemin Kang
Jung Heon Lee

Korea University
Sungkyunkwan University

- 14-1 Biomaterials for Nano/Micro-Physiological Systems
Junmin Lee POSTECH
- 14-2 Functional Nanomaterials for Advanced In Vitro Diagnostics (IVD)
Ho Sang Jung Korea Institute of Materials Science
- 14-3 Human/Nanomaterials Interface for Precision Healthcare Applications
Jahyun Koo Korea University

15

Advanced Characterizations for Functional Materials

Jong Min Yuk

KAIST

15-1 Multi-Dimensional Imaging Based in TEM Technique

Si-Young Choi

POSTECH

15-2 Advanced SPM and APT Analysis

Seungbum Hong

KAIST

Pyuck-Pa Choi

KAIST

15-3 Advanced X-Ray and Neutron Analysis

Hyeong Min Jin

Chungnam National University

Hyungsub Kim

Korea Atomic Energy Research Institute

**ENGE
2024**

The 8th International Conference on Electronic Materials and
Nanotechnology for Green Environment

PLENARY SPEAKERS

November 25 (Monday)

Stuart Parkin

Max Planck Institute of
Microstructure Physics

“

**2D and 3D Racetrack
Memories Enabled by
Spintronic Materials
and Phenomena**

”



Jaihyung Won

Tokyo Electron Korea Ltd.

“

**Advanced Package
& Plasma Enhanced
Process Technology
for the Semiconductor
Device**

”



08:00-08:40

Landing A (LGF)

Chair: Hyeon Han (POSTECH)

08:40-09:20

Landing A (LGF)

Chair: Tae-Sik Yoon (UNIST)

PLENARY SPEAKERS

November 26 (Tuesday)

Elvira Fortunato

NOVA University

“

**From Forest to
Electronics:
Green Graphene**

”



Hua Zhang

City University of Hong Kong

“

**Phase Engineering of
Nanomaterials**

”



13:30-14:10

Landing A (LGF)

Chair: Byungha Shin (KAIST)

14:10-14:50

Landing A (LGF)

Chair: Wooyoung Shim (Yonsei University)

PLENARY SPEAKERS

November 27 (Wednesday)

David Weitz

Harvard University

“

**Materials for Drug
Delivery Made with
Microfluidics**

”



Kazuhiro Hono

National Institute for Materials
Science

“

**Development of
Permanent Magnet
Materials with Reduced
Use of Rare Elements**

”



08:00-08:40

Landing A (LGF)

Chair: Heemin Kang (Korea University)

08:40-09:20

Landing A (LGF)

Chair: Ki-Suk Lee (UNIST)

TUTORIAL SPEAKERS

November 24 (Sunday)



Hyunjoo Lee

KAIST

“Bi-directional Brain Machine Interface”

This talk will cover neural interfaces required for a bi-directional brain-machine interface, looking into requirements, challenges, and outlook



Donghwa Lee

POSTECH

“Era of AI in Materials Science”

This talk will discuss about the impact of artificial intelligence on the field of materials science, in how materials are discovered, designed, and optimized.

17:00-18:00

Halla (GF)

Chairs: Ju Hun Lee (Hanyang University),
Eun-Jin Jung (RIST)

18:00-19:00

Halla (GF)

Chairs: Ju Hun Lee (Hanyang University),
Eun-Jin Jung (RIST)

KEYNOTE SPEAKERS



Deep-Cryogenic Phase Change Memory

Hongsik Jeong

Ulsan National Institute of Science and Technology

02

Advanced Memory and Neuromorphic Materials & Device Applications

November 26

10:50-11:20

Halla AB

.....



Memristive Devices and Cossbar Arrays for Brain-Inspired Computing

Qiangfei Xia

University of Massachusetts Amherst

02

Advanced Memory and Neuromorphic Materials & Device Applications

November 26

15:00-15:30

Halla AB

.....



Biomimetic Polymer Electronics for Multi-Modal Interfacing with Biology

Sihong Wang

The University of Chicago

03

Sensors and Energy Harvesting for Smart Healthcare Devices

November 25

13:10-13:40

Landing A



Biomimetic Sensing Organs with Nanostructures

Zhiyong Fan

The Hong Kong University of Science and Technology

03

Sensors and Energy Harvesting for Smart Healthcare Devices

November 26

10:50-11:20

Landing A

.....



Epitaxial Growth of Transition Metal Dichalcogenides - An Enabling Technology for Large Area 2D Device Applications

Joan Redwing

Penn State University

04

Low-dimensional Materials and 2D van der Waals Heterostructures

November 25

09:40-10:10

Landing C

.....



3D Integration of 2D Materials

Saptarshi Das

Penn State University

04

Low-dimensional Materials and 2D van der Waals Heterostructures

November 26

09:00-09:30

Landing C

KEYNOTE SPEAKERS



Fostering Light Emission in Dynamic Materials for Emerging Displays

Andrew M Rappe

University of Pennsylvania

05

Emerging Materials for Metaverse Display

November 26

15:00-15:30

Olle



Approaches of Ultra-Low Loss Soft Magnetic Materials for Next-Generation Power Electronics

Satoshi Okamoto

Tohoku University

06

Magnetic Materials and Spintronics

November 25

09:40-10:10

Baengnok



Néel Tensor Torque in Polycrystalline Antiferromagnets

Chih-Huang Lai

National Tsing Hua University

06

Magnetic Materials and Spintronics

November 25

15:00-15:30

Baengnok



Anisotropic Anomalous Hall Effect of Conical Magnetic Anisotropy in NiCo₂O₄(001)

Hideto Yanagihara

University of Tsukuba

06

Magnetic Materials and Spintronics

November 26

15:00-15:30

Baengnok



Low-Cost and Long-Term Cathode Materials for Sodium-Ion Batteries

Xiaobo Ji

Central South University

07

Materials for Batteries and Energy storage systems

November 25

13:10-13:40

Udo



Interface Regulation Strategies of Na Metal Anodes

Yan Yu

University of Science and Technology of China

07

Materials for Batteries and Energy storage systems

November 25

15:00-15:30

Udo

KEYNOTE SPEAKERS



Development of High-Performance Quantum Dot Solar Cells

Sung-Yeon Jang

Ulsan National Institute of Science and Technology

08

Advances in Photovoltaic Materials and Devices

November 26

16:50-17:30

Youngju



Importance of Work Function Engineering in Photochemical and Electrocatalytic Reactions and Modeling Methods for Semiconductors

Heechae Choi

Xi'an Jiaotong-Liverpool University

09

Hydrogen Future and Its Economic and Environmental Consideration

November 25

09:40-10:10

Landing B



Zero-Emission Thermoelectric Power Generation and Refrigeration for Carbon Neutrality

Zhi-Gang Chen

Queensland University of Technology

10

Thermal Engineering Materials and Devices

November 26

09:00-09:30

Landing B



Cohherent Measurements of Non-Equilibrium Dynamics Using Time-Resolved X-ray Scattering: Watching the Disappearance and Emergence of Collective Atomic Motions

Sooheyong Lee

Korea Research Institute of Standards and Science

10

Thermal Engineering Materials and Devices

November 26

09:30-10:00

Landing B

.....



Advances and Challenges of Thermoelectric Power Generation: from Materials, Modules to Applications

Michihiro Ohta

National Institute of Advanced Industrial Science and Technology

10

Thermal Engineering Materials and Devices

November 26

10:00-10:30

Landing B

.....



Impact of Point Defects on Efficiency of Devices

Chris Van de Walle

University of California Santa Barbara

12

Advances in Computational Materials

November 26

10:50-11:20

Yeongsil

KEYNOTE SPEAKERS



First-Principles Statistical Mechanics of Battery Materials

Anton Van der Ven

University of California Santa Barbara

12

Advances in Computational Materials

November 27

14:10-14:40

Yeongsil



Composite Powder Development for Additive Manufacturing

Naoyuki Nomura

Tohoku University

13

Structural Materials for Sustainable Future

November 25

15:00-15:30

Halla



Micro- and Nanoengineered Biomaterials for Engineering and Controlling Biohybrid Soft Robots

Su Ryon Shin

Harvard Medical School/Brigham and Women's Hospital

14

Functional Nanostructured Materials for Healthcare Applications

November 25

13:10-13:40

Yeongsil



Structural Manipulation of Functional Materials with Atomic-Scale Resolution by In-Situ TEM

Xuedong Bai

Chinese Academy of Sciences

15

Advanced Characterizations for Functional Materials

November 25

10:10-10:40

Olle

INVITED SPEAKERS

01

Advanced Logic Semiconductors & Beyond CMOS Applications

Sung Yun Woo	Kyungpook National University, Korea
Hao Van Bui	Phenikaa University, Vietnam
Sanghyeon Choi	University of California, USA
Joon-Kyu Han	Sogang University, Korea
Jehyun Kim	Weizmann Institute of Science, Israel
Myung-Ho Bae	Korea Research Institute of Standards and Science, Korea
Jun Yoneda	Tokyo Institute of Technology, Japan
Seok-Kyun Son	Kyung Hee University, Korea
Kwang-Seong Choi	Electronics and Telecommunications Research Institute, Korea
Myung Jun Kim	Sungkyunkwan University, Korea
Lung-Hsing Hsu	NarLabs, Taiwan
Jeong-Gil Kim	Dong-A University, Korea
WenHsien Huang	NarLabs, Taiwan
Hoe-Min Kwak	Electronics and Telecommunications Research Institute, Korea
Chul-Ho Lee	Seoul National University, Korea
Barbaros Oezylmaz	National University of Singapore, Singapore
Sangyeon Pak	Hongik University, Korea
Gang Qiu	University of Minnesota, USA

02

Advanced Memory and Neuromorphic Materials & Device Applications

Akihito Sawa	National Institute of Advanced Industrial Science and Technology, Japan
Jianshi Tang	Tsinghua University, China
Yoon Ho Jang	Seoul National University, Korea
Hocheon Yoo	Gachon University, Korea
Joonki Suh	Ulsan National Institute of Science and Technology, Korea
Sanghoon Kim	University of Ulsan, Korea
Kyeong-Sik Min	Kookmin University, Korea
Doo Seok Jeong	Hanyang University, Korea
Yang Yang	Nanjing Tech University, China
Byung Chul Jang	Kyungpook National University, Korea
Sangbum Kim	Seoul National University, Korea
Taewook Nam	Sejong University, Korea
Woo-Jae Lee	Pukyong National University, Korea

03

Sensors and Energy Harvesting for Smart Healthcare Devices

Dong-Ha Kim
Unyong Jeong
Haixia Zhang
Bong Hoon Kim

Lucia Beccai
Canhui Yang
Jiheong Kang
Mikyung Shin
Zong-Hong Lin
Hyun-Cheol Song
Sang Min Won
Kenjiro Fukuda
Xinge Yu
Myung-Han Yoon
Naoji Matsuhisa
Ying-Chih Lai
Youn Soo Kim

Hanyang University ERICA, Korea
Pohang University of Science and Technology, Korea
Peking University, China
Daegu Gyeongbuk Institute of Science and Technology, Korea
Istituto Italiano di Tecnologia, Italy
Southern University of Science and Technology, China
Seoul National University, Korea
Sungkyunkwan University, Korea
National Taiwan University, Chinese Taipei
Korea Institute of Science and Technology, Korea
Sungkyunkwan University, Korea
RIKEN, Japan
City University of Hong Kong, Hong Kong (SAR of China)
Gwangju Institute of Science and Technology, Korea
The University of Tokyo, Japan
National Chung Hsing University, Taiwan
Pohang University of Science and Technology, Korea

04

Low-Dimensional Materials and 2D van der Waals Heterostructures

Vincent Tung
Hiroki Ago
Libo Gao
Seokjoon Yun
Gwan-Hyoung Lee
Johnny Ho
Yi Zheng
Jae-Hyun Lee
Jaehyung Yu
Heejun Yang
Yuan Liu
Hoon Hahn Yoon
Sanghoon Chae
Alex Henning
Kyung-Eun Byun
Yoonhoo Ha
Byung Hee Hong

The University of Tokyo, Japan
Kyushu University, Japan
Nanjing University, China
University of Ulsan, Korea
Seoul National University, Korea
City University of Hong Kong, Hong Kong (SAR of China)
Zhejiang University, China
Ajou University, Korea
Chung-Ang University, Korea
Korea Advanced Institute of Science and Technology, Korea
Hunan University, China
Gwangju Institute of Science and Technology, Korea
Nanyang Technological University, Singapore
AIXTRON, Germany
Samsung Advanced Institute of Technology, Korea
Samsung Advanced Institute of Technology, Korea
Seoul National University, Korea

05

Emerging
Materials for
Metaverse
Display

Bo Ram Lee	Sungkyunkwan University, Korea
Takayuki Chiba	Yamagata University, Japan
Jingbi You	Chinese Academy of Sciences, China
Moonsub Shim	University of Illinois at Urbana-Champaign, USA
Dae-Hyeong Kim	Seoul National University, Korea
Huaibin Shen	Henan University, China
Fengjia Fan	University of Science and Technology of China, China
Qiang Su	Great Bay University, China
Jaehyun Kim	Dongguk University, Korea
Chang-Lyoul Lee	Gwangju Institute of Science and Technology, Korea
Yong Hae Kim	Electronics and Telecommunications Research Institute, Korea
Min-Jae Choi	Dongguk University, Korea
Kwangdong Roh	Ewha Womans University, Korea
Yeongjun Lee	Korea Advanced Institute of Science and Technology, Korea
Desheng Kong	Nanjing University, China
Steve Park	Korea Advanced Institute of Science and Technology

06

Magnetic
Materials and
Spintronics

Yunseok Kim	Sungkyunkwan University, Korea
Hiroshi Tsukahara	Tohoku University, Japan
Kyyoul Yun	Gifu University, Japan
Kyusup Lee	Pukyong National University, Korea
Xiufeng Han	Chinese Academy of Sciences, China
Masaki Mizuguchi	Nagoya University, Japan
Jiyeon Kim	Ulsan National Institute of Science and Technology, Korea
Yoonseok Park	Kyung Hee University, Korea
Yusuke Hirayama	National Institute of Advanced Industrial Science and Technology, Japan
Soon-Jae Kwon	Green Strategic Materials Ltd, Korea
Kwangjae Park	National Institute of Advanced Industrial Science and Technology, Japan
Mi-Young Im	Lawrence Berkeley National Laboratory, USA
Yingying Wu	University of Florida, USA

07

Materials for Batteries and Energy Storage Systems

Patrick Joohyun Kim
Chanhoo Kim
Kyung-Wan Nam
Zhong-Shuai Wu
Jun Young Cheong
Young Soo Yun
Jongsoon Kim
Jang-Yeon Hwang
Jae Chul Kim
Haegyeom Kim
Heetaek Park

Kyungpook National University, Korea
Korea Institute of Industrial Technology, Korea
Dongguk University, Korea
Chinese Academy of Sciences, China
University of Glasgow, UK
Korea University, Korea
Sungkyunkwan University, Korea
Hanyang University, Korea
Stevens Institute of Technology, USA
Lawrence Berkeley National Laboratory, USA
Korea Electrotechnology Research Institute, Korea

08

Advances in Photovoltaic Materials and Devices

Han Young Woo
Yuxiang Li
Jeung-Hyun Jeong
Kanghoo Yim
Hao Xin
Shi-Joon Sung
Donghoe Kim
Richard Murdey
Byung-Wook Park
Hae Jung Son

Korea University, Korea
Xi'an University of Science and Technology, China
Korea Institute of Science and Technology, Korea
Korea Institute of Energy Research, Korea
Nanjing University of Posts and Telecommunications, China
Daegu Gyeongbuk Institute of Science and Technology, Korea
Korea University, Korea
Kyoto University, Japan
Ulsan National Institute of Science and Technology, Korea
Korea Institute of Science and Technology, Korea

09

Hydrogen Future and Its Economic and Environmental Consideration

Hye-Eun Lee
Hyung-Suk Oh
Kun Jiang
Youngkook Kwon
Yanwei Lum
Jinyeon Hwang
Jin Gu Kang
Jung Kyu Kim
Kyeong-Ho Kim
Sunghak Park
Chang Hyuck Choi
Hyunjung Park
Kiho Bae
Chan Woo Lee
Chengkai Xia
Joon Young Kim

Tokyo Institute of Technology, Japan
Korea Institute of Science and Technology, Korea
Shanghai Jiao Tong University, China
Ulsan National Institute of Science and Technology, Korea
National University of Singapore, Singapore
Korea Institute of Science and Technology, Korea
Korea Institute of Science and Technology, Korea
Sungkyunkwan University, Korea
Pukyong National University, Korea
Sungkyunkwan University, Korea
Pohang University of Science and Technology, Korea
Chosun University, Korea
Korea Institute of Energy Technology, Korea
Kookmin University, Korea
North University of China, China
NEEL Sciences, Inc., Korea

10

Thermal Engineering Materials and Devices

Hyunae Cha
Hiromichi Ohta
Byungki Ryu
Chongjian Zhou
Ki Soo Chang
Dong-Wook Oh
Jongseok Lee
Zhe Cheng

Korea Institute of Materials Science, Korea
Hokkaido University, Japan
Korea Electrotechnology Research Institute, Korea
Northwestern Polytechnical University, China
Korea Basic Science Institute, Korea
Chosun University, Korea
Gwangju Institute of Science and Technology, Korea
Peking University, China

11

Artificial Intelligence for Materials

Heather Kulik	Massachusetts Institute of Technology, USA
Kee-Sun Sohn	Sejong University, Korea
Byung Chul Yeo	Pukyong National University, Korea
Kenta Hongo	Japan Advanced Institute of Science and Technology, Japan
Seungwu Han	Seoul National University, Korea
Masanobu Nakayama	Nagoya Institute of Technology, Japan
Yuzhi Zhang	DP Technology, China
Joonhee Kang	Pusan National University, Korea
Milad Abolhasani	North Carolina State University, USA
Hyundo Choi	Samsung Advanced Institute of Technology, Korea
Donghwa Lee	Pohang University of Science and Technology, Korea
Sungwoo Kang	Korea Institute of Science and Technology, Korea

12

Advances in Computational Materials

Yu Kumagai	Tohoku University, Japan
Yeonghun Lee	Incheon National University, Korea
Minkyu Park	Virtual Lab, Inc., Korea
Xie Zhang	Northwestern Polytechnical University, China
Han Seul Kim	Chungbuk National University, Korea
Tao Cheng	Soochow University, China
Byung-Hyun Kim	Hanyang University ERICA, Korea
Jin Qian	Lawrence Berkeley National Laboratory, USA
Minho Kim	Kyung Hee University, Korea
Yoshitaka Tateyama	Tokyo Institute of Technology, Japan
Sung Beom Cho	Ajou University, Korea
Byunghoon Kim	Sungkyunkwan University, Korea

13

Structural Materials for Sustainable Future

Yakai Zhao	Agency for Science, Technology and Research (A*STAR), Singapore
Eunji Song	University of Michigan, USA
Hansol Jeon	Keimyung University, Korea
Chang-Lae Kim	Chosun University, Korea
Jeongho Han	Hanyang University, Korea
Se-Eun Shin	Sunchon National University, Korea
Hyokyung Sung	Kookmin University, Korea
Swee Leong Sing	National University of Singapore, Singapore
Haitao Zhang	Chinese Academy of Sciences, China
Yongho Sohn	University of Central Florida, USA

14

Functional Nanostructured Materials for Healthcare Applications

Seung Soo Oh	Pohang University of Science and Technology, Korea
Jungmok Seo	Yonsei University, Korea
Ming Kong	Ocean University of China, China
Donghee Son	Sungkyunkwan University, Korea
Seung-Kyun Kang	Seoul National University, Korea
Hojun Kim	Korea Institute of Science and Technology, Korea
Yi-Chen Li	Feng Chia University, Taiwan
Hyungsoon Im	Massachusetts General Hospital, USA
Eun-Kyung Lim	Korea Research Institute of Bioscience and Biotechnology, Korea
Sang Jin Lee	The University of Hong Kong, Hong Kong (SAR of China)
Hyejeong Seong	Korea Institute of Science and Technology, Korea

15

Advanced Characterizations for Functional Materials

Sungkyu Kim	Sejong University, Korea
Ryo Ishikawa	The University of Tokyo, Japan
Huan Wang	Peking University, China
Seongwoo Cho	University of Geneva, Switzerland
Konda Gokuldoss Pradeep	Indian Institute of Technology Madras, India
Chanwon Jung	Pukyong National University, Korea
So Youn Kim	Seoul National University, Korea
Zheng-Long Xu	The Hong Kong Polytechnic University, Hong Kong (SAR of China)
Seung-Ho Yu	Korea University, Korea
Fenggang Bian	Chinese Academy of Sciences, China

PRESENTATION GUIDELINES

Oral Session

- **Presentation Time**
 - **Keynote & Invited Presentation** 25 minutes presentation + 5 minutes Q&A
 - **Oral Presentation** 12 minutes presentation + 3 minutes Q&A

* The scheduled times may vary depending on the session, so be sure to check your individual presentation schedule.
- **Please arrive in the session room at least 15 minutes before the session.**
- **Submit your file to the staff of each session room before session starts.**
- **Presentation File**

Presentation file should be prepared in MS-PowerPoint format in English.

Please save embedded fonts within your presentation file or bring the font files along with the presentation file. Also, if your presentation file contains animations or movies, please bring the files along with the presentation file.

Make sure your presentation materials do not have compatibility issues beforehand.

Please check your presentation file in advance of your presentation to ensure your file works properly.

Aspect ratio of the screen is 16:9.
- **No Camera & No Record**

Please note that photo taking, and video recording are strictly prohibited for legal reasons, such as copyright and portrait rights.



Poster Session

Landing
Convention
Center Lobby

- **Poster authors should print, bring and post the posters at the designated spot.**
- **Presenters make sure to stand by their posters during the presentation time.**
- **Timetable**

Dates	Put-up	Presentation	Take-down
November 25 Monday	08:30 – 11:00	18:30 – 19:30 (P04, P07, P13, P14, P15)	Right after the presentation time ends
November 26 Tuesday	08:30 – 11:00	16:50 – 18:30 (P01, P03, P06, P09)	
November 27 Wednesday	08:30 – 11:00	13:10 – 14:10 (P02, P05, P08, P10, P11, P12)	

SATELLITE SESSION

November 25, 2024 (Monday)

Yeongsil (GF), Landing Convention Center, Jeju Shinhwa World, Korea

Time

Titles

Speakers

10:30-10:50

**Highly Dispersed Nanomaterials
in Polymer Matrix via Aerosol-Jet-
Based Multi-Material 3D Printing**

Yeonsik Choi
(Yonsei University)

10:50-11:10

**International Cooperations and
Experiences in Digital Materials
Science Research: Anecdotes of
My Journey in Science**

Aloysius Soon
(Yonsei University)

11:10-11:30

**On-Chip Electrochemistry
and Nanocatalysts**

Qiyuan He
(City University of
Hong Kong)

11:30-12:00

Q&A Session

Organizers:

Yeonsik Choi (Yonsei University)
Aloysius Soon (Yonsei University)



04 PRESENTATION SCHEDULE

- 
01. Advanced Logic Semiconductors & Beyond CMOS Applications
 02. Advanced Memory and Neuromorphic Materials & Device Applications
 03. Sensors and Energy Harvesting for Smart Healthcare Devices
 04. Low-Dimensional Materials and 2D van der Waals Heterostructures
 05. Emerging Materials for Metaverse Display
 06. Magnetic Materials and Spintronics
 07. Materials for Batteries and Energy Storage Systems
 08. Advances in Photovoltaic Materials and Devices
 09. Hydrogen Future and Its Economic and Environmental Consideration
 10. Thermal Engineering Materials and Devices
 11. Artificial Intelligence for Materials
 12. Advances in Computational Materials
 13. Structural Materials for Sustainable Future
 14. Functional Nanostructured Materials for Healthcare Applications
 15. Advanced Characterizations for Functional Materials

Advanced Logic Semiconductors & Beyond CMOS Applications

Oral Presentation

Advanced Processes and Materials for Future Devices (1)

November 25 | Youngju

CHAIR(S) Sangwan Kim (Sogang University), Sihyun Kim (Sogang University)

09:40-10:10
1-1379
INTEGRATION OF A GATED THYRISTOR WITH SPLIT-GATES AND BULK FINFETs ON A SILICON SUBSTRATE FOR HIGH-DENSITY COMPUTING UNITS

INVITED Sung Yun Woo
Kyungpook National University, Korea

10:10-10:40
1-1275
ATOMIC HYDROGEN AS A HIGHLY REACTIVE SPECIES FOR ATOMIC LAYER DEPOSITION OF METALLIC THIN FILMS

INVITED Huong Thi Thuy Ta, Ngoc Linh Nguyen, Hao Van Bui
Phenikaa University, Vietnam

10:40-11:10
1-0305
THREE-DIMENSIONAL STACKED MEMRISTIVE CROSSBAR ARRAYS FOR TIME PROCESSING APPLICATIONS

INVITED Sanghyeon Choi
University of California, USA

11:10-11:25
1-3469
DEMONSTRATION OF NEURON DEVICE USING CHARGE TRAP FLASH MEMORY

Jae Yeon Park, Jae Kyun Son, Dong Keun Lee, Sangwan Kim
Sogang University, Korea

11:25-11:40
1-2092
EFFECT OF GE CONCENTRATION ON THE INTERFACES OF 24 PERIOD EPITAXIAL SiGe/Si MULTILAYER

Seonwoong Jung, Dongmin Yoon, Dae-Hong Ko
Yonsei University, Korea

11:40-12:10
1-0302
SINGLE TRANSISTOR LATCH IN FLOATING BODY TRANSISTORS AND ITS APPLICATION IN NEXT-GENERATION COMPUTING

INVITED Joon-Kyu Han
Sogang University, Korea

Progress in Quantum Electronics

November 25 | Youngju

CHAIR(S) Jehyun Kim (Weizmann Institute)

13:10-13:40
1-0853
INVITED

Aharonov-Bohm Interference and Statistical Phase Jumps Evolution in Fractional Quantum Hall Fabry-Pérot Interferometers Based on Bi-Layer Graphene

Jehyun Kim¹, Himanshu Dev¹, Ravi Kumar¹, Alexey Ilin¹, André Haug¹, Vishal Bhardwaj¹, Changki Hong¹, Kenji Watanabe², Takashi Taniguchi², Ady Stern¹, Yuval Ronen¹

¹Weizmann Institute of Science, Israel

²National Institute for Materials Science, Japan

13:40-14:10
1-0543
INVITED

Manipulations of Single-Electron Wave Packet in Time-Energy Phase Space

Wanki Park¹, Min-Sik Kim^{2,3}, Bum-Kyu Kim³, Myung-Ho Bae³

¹Korea Advanced Institute of Science and Technology, Korea

²Jeonbuk National University, Korea

³Korea Research Institute of Standards and Science, Korea

14:10-14:40
1-0284
INVITED

Noise Cross-Correlations in Silicon Spin Qubit Systems

Jun Yoneda

Tokyo Institute of Technology, Japan

14:40-15:10
1-0206
INVITED

Quantum Acoustics: Deterministic Single-Photon Generator

Seok-Kyun Son

Kyung Hee University, Korea

3D Heterogeneous Integration & Advanced Packing Technology

November 25 | Youngju

CHAIR(S)

Myung Jun Kim (Sungkyunkwan University)

15:20-15:50

1-3195

INVITED

Chip-on-Wafer (CoW) Technology Utilizing Laser-Assisted Bonding with Compression (LABC)

Kwang-Seong Choi, Jiho Joo, Gwang-Mun Choi, Jungho Shin, Chanmi Lee, Ki-Seok Jang, Jin-Hyuk Oh, Ho-Gyeong Yun, Seok Hwan Moon, Ji Eun Jung, Gaeun Lee, Yong-Sung Eom

Electronics and Telecommunications Research Institute, Korea

15:50-16:20

1-2757

INVITED

Bottom-Up Filling of through Silicon Vias Using Cu Electrodeposition

Myung Jun Kim

Sungkyunkwan University, Korea

16:20-16:35

1-1804

Investigation of Wet Etching for Through-Glass Vias (TGVs) Using Ammonium Bifluoride Solutions

Youngho Park, Yunha Song, Wang Qing, Byungkwan Kwak, Sukhbaatar Bayaraa, Sanghwa Yoon, Bongyoung Yoo

Hanyang University, Korea

16:35-16:50

1-1796

Electrochemical Polishing in Citric Acid Bath with Low Concentrations of Phosphoric Acid in Redistribution Layer

Jaehwan Oh, Jinhyun Lee, Inseong Hwang, Fan Yang, Siyoon Yang, Sanghwa Yoon, Bongyoung Yoo

Hanyang University, Korea

16:50-17:05

1-1794

Enhancing Texture Control of Electroplated Copper for Hybrid Bonding Pads Through Additive Effects

Soohyun Jeon, Hyeonseok Kim, Jungjoon Park, Haneul Han, Sanghwa Yoon, Bongyoung Yoo

Hanyang University, Korea

Compound Semiconductors and Power Electronic Devices

November 26 | Youngju

CHAIR(S)

Hyung-Seok Lee (ETRI)

08:00-08:30

1-3310

INVITED

Recent Progress and Challenges in Fabrication of High Power AlGaIn/GaN HEMT Devices

Lung-Hsing Hsu, Ming-Hsuan Kao, Wen-Hsien Huang, Chang-Hong Shen
NarLabs, Chinese Taipei

08:30-09:00

1-0298

INVITED

High Breakdown Voltage and Low Current Dispersion in AlGaIn/GaN HEMT with High Quality AlN Buffer Layer

Jeong-Gil Kim
Dong-A University, Korea

09:00-09:30

1-3138

INVITED

Opportunities and Challenges in Fabrication of High-Frequency GaN HEMTs

WenHsien Huang, Ming-Hsuan Kao, Lung-Hsing Hsu, Chang-Hong Shen
NarLabs, Chinese Taipei

09:30-10:00

1-0486

INVITED

GaN Remote Epitaxy Using a Metal-Organic Chemical Vapor Deposition System and the Stability of 2D Materials

Hoe-Min Kwak
Electronics and Telecommunications Research Institute, Korea

10:00-10:15

1-0775

Process Design and Optimization for Implementing GaN Vertical Electron Transistors

Hyeon-Tak Kwak, Hyun-Woo Lee, Hoe-Min Kwak, Sung-Bum Bae,
Hyung-Seok Lee
Electronics and Telecommunications Research Institute, Korea

2D and Carbon-based Materials for Logic and Beyond CMOS Applications (1)

November 26 | Youngju

CHAIR(S)	Kiyoung Lee (Hongik University)
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10:25-10:55 1-3808	Vand der Waals Gate Stack Engineering for High-Performance and Low-Power 2D Electronics
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INVITED	<u>Chul-Ho Lee</u> <i>Seoul National University, Korea</i>
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10:55-11:25 1-3490	2D Amorphous Carbon as Ultra-Low-k Dielectric; Dry Transfer of CVD Graphene
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INVITED	<u>Barbaros Oezylmaz</u> <i>National University of Singapore, Singapore</i>
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11:25-11:55 1-2432	Copper Sulfide Electrode for 2D van der Waals Devices
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INVITED	<u>Sangyeon Pak</u> <i>Hongik University, Korea</i>
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11:55-12:25 1-1401	One-Dimensional van der Waals Tellurium for Ultra-Scaled CMOS and Quantum Applications
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INVITED	<u>Gang Qiu</u> <i>University of Minnesota, USA</i>
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Advanced Processes and Materials for Future Devices (2)

November 26 | Youngju

CHAIR(S)	Sihyun Kim (Sogang University)
15:00-15:15 1-3460	Dual-Channel MOSFET-Based Ternary-CMOS Inverter <u>Dong Keun Lee</u>, Hyunho Ahn, Sihyun Kim, Sangwan Kim Sogang University, Korea
15:15-15:30 1-2025	DFT-Based Investigation Of Epitaxial Silicon Growth Reactions From Chlorosilanes On Si(100) Substrates <u>Seokmin Oh</u>, Dongmin Yoon, Dae-Hong Ko Yonsei University, Korea
15:30-15:45 1-2024	Growth Characteristics of Group IV Epitaxy Using High-Order Silanes: Comparing Ultra-High Vacuum and Low-Pressure Processes <u>Dongmin Yoon</u>, Hyerin Shin, Seokmin Oh, Seonwoong Jung, Dae-Hong Ko Yonsei University, Korea
15:45-16:00 1-2022	Study on the Characteristics of Si_{1-x}Gex(:B) Incubation on SiO₂ for Low Temperature Selective Epitaxial Growth Using Ultra High Vacuum-Chemical Vapor Deposition <u>Hyerin Shin</u>, Dae-hong Ko Yonsei University, Korea
16:00-16:15 1-1789	A Study of the Additives for Enhanced Cu Void-Free Filling on Ru <u>Wonik Jang</u>, Soojin Kim, Jinmyeong Seo, Youjung Kim, Soobin Park, Sanghwa Yoon, Bongyoung Yoo Hanyang University, Korea
16:15-16:30 1-0693	Development of Ternary Logic Circuit Based on Transparent Synaptic Transistor <u>Chohyeon Park</u>^{1,2}, Jung Wook Lim^{1,2} ¹Electronics and Telecommunications Research Institute, Korea ²University of Science and Technology, Korea

2D and Carbon-based Materials for Logic and Beyond CMOS Applications (2)

November 26 | Baengnok

CHAIR(S)	Changhwan Choi (Hanyang University)
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16:50-17:05
1-3635

Synthesis and Characterization of Amorphous BN-Doped Carbon Layer

Vladimir Calvi¹, Sena Tömekçe², Richard Van Rijn³, Wilhelm Auwärter², Michele Buscema³, Matthew Barnes³, Irene Groot¹

¹Leiden University, The Netherlands

²Technical University of Munich, Germany

³Applied Nanolayers ANL, The Netherlands

17:05-17:20
1-3287

Device Characterization and Applications of 2D α -In₂Se₃ FETs

Minah Park, Jaewook Yoo, Hyeonjun Song, Hongseung Lee, Soyeon Kim, Seongbin Lim, Seohyeon Park, Sojin Jung, Yeong-Gwon Jeong, Hagyoul Bae

Jeonbuk National University, Korea

17:20-17:35
1-2726

Beyond CMOS Applications : MOCVD Growth and Fabrication of 2D TMDs Semiconductors

Taewan Kim^{1,2}

¹University of Seoul, Korea

²2D Epi, Inc, Korea

Poster Presentation | November 26

Advanced Processes and Materials for Future Devices

CHAIR(S)

Sihyun Kim (Sogang University)

- 1-0638** Physical Properties of Conductive Pastes for EMI Shielding Synthesized from Silver Powder Processed via Wet and Dry Methods
Hyun Jin Nam, Se-Hoon Park, Seonwoo Kim, Yubin Kim, Jein Ryu
Korea Electronics Technology Institute, Korea
- 1-0968** Enhanced Semiconductor Device Performance Using Green NO Precursor in PECVD
Yunhui Jang, Yeojin Jeong, Duy Phong Pham, Junsin Yi
Sungkyunkwan University, Korea
- 1-1130** High Performance Ternary and Binary Circuit Integration Using ZnO/Te Thin-Film
Kiyung Kim¹, Yongsu Lee², Byoung Hun Lee¹
¹Pohang University of Science and Technology, Korea
²Korea Atomic Energy Research Institute, Korea
- 1-1221** Improvement of Chucking Force Through Structural Changes in Electrostatic Chucks
Munseong Kim, Dongmyeong Baek, Sukeun Yoon, Jihoon Kim
Kongju National University, Korea
- 1-1258** Hypotaxial Growth of Group-IV Monochalcogenides
Jaehyeok Lee, Hangyel Kim, Donghoon Moon, Gwan-Hyoung Lee
Seoul National University, Korea
- 1-1626** Near-Field Optical Printing Using Elastomeric Photomasks for Sub-Diffraction Patterning on Non-Planar Substrate
Dongchul Seo, Wooyoung Shim
Yonsei University, Korea

- 1-1646** **1/f Noise Analysis in Ultra-Thin (sub-5 nm) ZnO nFETs**
Hae-Won Lee, Minjae Kim, Jae Hyeon Jun, Chanbin Lee, Kyuheon Kim,
 Byoung Hun Lee
Pohang University of Science and Technology, Korea
- 1-1826** **Optimization and Enhancement of Electrostatic Chucks Using 3D Printing and Finite Element Analysis**
Dongmyeong Baek, Munseong Kim, Sukeun Yoon, Jihoon Kim
Kongju National University, Korea
- 1-1831** **Production of Low Dielectric and Low Loss PTFE Substrates for High-Speed Communication Using 3D DLP Printing**
ChungHee Han, Munseong Kim, Sukeun Yoon, Jihoon Kim
Kongju National University, Korea
- 1-2079** **Formation of Source/Drain Using Nanosecond Laser Annealing for Si/SiGe Multilayers**
Hosun Jung, Dae-Hong Ko
Yonsei University, Korea
- 1-2360** **Effect of Temperature and Pressure on the Manufacturing Technology of Al₂O₃ Ceramic Plates via the SPS-HIP Process**
Taeg Woo Lee¹, Hyun-Su Kang¹, Jeong Rae Kim¹, Won Rae Kim¹, Gun Hee Kim¹, Kevin Go², Kyeng Baek Ryu², Hyung Giun Kim¹
¹Korea Institute of Industrial Technology, Korea
²DT ENG Inc., Korea
- 1-2930** **Quantitative Analysis of Electron Scattering in Metallic Ultra-Thin Films via Thermochemical and Crystallography Process Variations**
Joonho Moon¹, Hyeongjun Kim², Gayun Kim¹, Gawon Kim¹, Sooah Lee¹, Changhwan Choi², Kiyoun Lee¹
¹Hongik University, Korea
²Hanyang University, Korea
- 1-3477** **Impact of Flat-Band Voltage Shift in Ultra-Thin La₂O₃ Film for Multi-Vt Solution**
Sangkuk Han, Changhwan Choi, Hyun Jin Lim, Hyo Jin Ahn, Kisub Kim
Hanyang University, Korea

- 1-3492** **Impact of Yttrium Passivation on IGZO Channel Ferroelectric TFT Performance**
Ki Sub Kim, Hyun Jin Lim, Hyo Jin Ahn, Sang Kuk Han, Changhwan Choi
Hanyang University, Korea
- 1-3544** **Dry Development Process for Vertically Tailored Hybrid Multilayer Photoresist Toward High-NA EUV Lithography**
Ji-Hoo Seok¹, Jiwon Kim¹, Hyeonseok Ji¹, Jaehyuk Lee¹, Kwangsub Yoon^{1,2},
 Myung Mo Sung¹, Jinho Ahn¹
¹*Hanyang University, Korea*
²*Samsung Electronics Co., Ltd., Korea*

3D Heterogeneous Integration & Advanced Packing Technology

CHAIR(S) Sanghwa Yoon (Hanyang University ERICA)

- 1-0349** **Investigation of Internal Crack Formation in Lead-Free Solder Balls of BGA Packages Under Thermal Shock Conditions Using 3D Nano-CT and EBSD**
Eungryoung Kim, Hyunsoo Lim, Kwontae Cho, Jongwoo Kim, Taesup Choi, Jieun Kim
LG innotek, Korea
- 1-0575** **Three-Dimensional Pore Structure Analysis for Cu-Cu Bonding Interface**
Eun-Byeol Park¹, Min-Hyoung Jung¹, Young-Hoon Kim², Su Jae Kim³,
 Se-Young Jeong^{3,4}, Young-Min Kim¹
¹*Sungkyunkwan University, Korea*
²*Oak Ridge National Laboratory, USA*
³*Pusan National University, Korea*
⁴*Massachusetts General Hospital and Harvard Medical School, USA*
- 1-1156** **Development and Optimization of a Reflow Soldering Process Using a High Aspect Ratio Cu-pin Mounting Mask Printed with DLP 3D Printing for Semiconductor Packaging**
Yujin Kim, Gyeongyeong Lee, Frances Danielle Fernandez, Laudimer Tye Tan, Munseong Kim, Dongmyeong Baek, Sukeun Yoon, Jihoon Kim
Kongju National University, Korea

Compound Semiconductors and Power Electronic Devices

CHAIR(S)

Hyung-Seok Lee (ETRI)

1-0900

Refinement of Top-Down GaN Vertical Device Fabrication via TMAH Wet Etching Techniques

Hyun-Woo Lee^{1,2}, Soo-Young Moon^{1,2}, Hyeon-Tak Kwak², Hoe-Min Kwak², Sang-Mo Koo¹, Hyung-Seok Lee², Sung-Bum Bae²

¹Kwangwoon University, Korea

²Electronics and Telecommunications Research Institute, Korea

1-1228

High Breakdown Voltage, Low Specific on-Resistance GaN-on-GaN PiN Diodes with Low Contact Resistance on p-Type GaN for High Power Device Applications

Donghan Kim^{1,2}, Hongsik Park¹, Dong-Young Kim², Zin-Sig Kim², Sung-Bum Bae², Hyung-Seok Lee²

¹Kyungpook National University, Korea

²Electronics and Telecommunications Research Institute, Korea

1-1277

Influence of Oxygen Vacancies on the Photo-Response Characteristics of Aerosol-Deposited β -Ga₂O₃/4H-SiC Hetero Junction Diodes Using Solar-Blind Deep-UV Photodetectors

Ji-Soo Choi, Ji-Hyun Kim, Se-Rim Park, Hyun-Woo Lee, Seung-Hwan Chung, Sang-Mo Koo

Kwangwoon University, Korea

1-1322

Electrical Properties of p-Type β -Ga₂O₃ Films Grown by MOCVD

Se-Rim Park^{1,2}, Ji-Soo Choi¹, Seung-Hwan Chung¹, Hyun-Woo Lee¹, Zeyu Chi², Gaëlle Amiri², Ekaterine Chikoidze Chikoidze², Jean-Michel Chauveau², Sang-Mo Koo¹

¹Kwangwoon University, Korea

²Versailles St-Quentin-en-Yvelines University, France

1-1341

Influence of Oxygen Vacancy Variations on Ga₂O₃/SiC Heterojunction Diode Characteristics Grown by PLD

Seung Hwan Chung¹, Geunpil Kim^{2,3}, Hyun-Woo Lee¹, Se-Rim Park¹, Ji-Soo Choi¹, Jongbum Kim², Sang-Mo Koo¹

¹Kwangwoon University, Korea

²Korea Institute of Science and Technology, Korea

³Korea University, Korea

- 1-2018** **Doping Effect of Sn-Doped α -Ga₂O₃ Epitaxial Growth by Mist-CVD**
Jang Hyeok Park¹, You seung Rim¹, Jung Yeop Hong², Jung Hee Park²,
 Young Kyun Jung²
¹Sejong University, Korea
²Hyundai Motor, Korea
- 1-2115** **Study on the Improvement of Electrical Characteristics of AlGaIn/GaN High Electron Mobility Transistors (HEMTs) Through the Insertion of a High-Resistance GaN Layer**
Myung Sung Kim, Yoon Seok Kim, Seok Hyun Han, Ji Hun Lee
 Tech University of Korea, Korea
- 1-2598** **Electrical Performance of GaN PiN Diodes via RF-Sputtered NiO Integration**
Soo-Young Moon^{1,2}, Hyun-Woo Lee¹, Ye-Jin Kim¹, Seung-Hyun Park¹,
 Donghan Kim², Sung-Bum Bae², Sang-Mo Koo¹, Hyung Seok Lee²
¹Kwangwoon University, Korea
²Electronics and Telecommunications Research Institute, Korea
- 1-2739** **Influence of Post-Metal Annealing on AlN/SiC Heterojunction Diode with Different Metals**
Seung-Hyun Park, Hyun Woo Lee, Ji-Soo Choi, Seung-Hwan Chung,
 Se-Rim Park, Sang-Mo Koo
 Kwangwoon University, Korea
- 1-2894** **Pb-free Thin Film Structured High Temperature Solder for Power Device Packaging**
Sang Yeol Nam, Hyun Kim
 Gumi Electronics and Information Technology Research Institute, Korea
- 1-3556** **Enhanced Endurance and Leakage Properties of AlScN-Based Ferroelectric Capacitors with a Thin HfO₂ Interlayer**
Hyoung Jun Joo, Geonwook Yoo
 Soongsil University, Korea

2D and Carbon-based Materials for Logic and Beyond CMOS Applications

CHAIR(S) Kiyoun Lee (Hongik University)

1-0979 BEOL-Compatible ZnO-Te Anti-Ambipolar Switch for Energy-Efficient Applications

Jae Hyeon Jun, Minjae Kim, Hae-Won Lee, Chan Bin Lee, Kyuheon Kim, Byoung Hun Lee

Pohang University of Science and Technology, Korea

1-0984 Cryogenic Operation Characteristics of Tellurium pFETs

Minjae Kim, Kyuheon Kim, Jae Hyeon Jun, Hae-Won Lee, Byoung Hun Lee

Pohang University of Science and Technology, Korea

1-1001 Device Structure Optimization to Reduce the Hysteresis of Tellurium-Based Field-Effect Transistors

Kyuheon Kim, Minjae Kim, Hae-Won Lee, Byoung Hun Lee

Pohang University of Science and Technology, Korea

1-2854 Carbon-Nanotube-Embedded Metal Interconnect Beyond Copper for Future Nanodevices

Jiyeong Yun^{1,2}, Huiyun Jung², Bogeun Son², Seunggyu Hwang², Jaewon Park², Hongsik Park²

¹Gumi Electronics and Information Technology Research Institute, Korea

²Kyungpook National University, Korea

Advanced Memory and Neuromorphic Materials & Device Applications

Oral Presentation

Emerging Memory and Brain-inspired Systems

November 26 | Halla AB

CHAIR(S)

Tae-Sik Yoon (UNIST)

10:50-11:20

2-3538

KEYNOTE

Deep-Cryogenic Phase Change Memory

Sohui Yoon, Dong-Hyeok Lim, Namwook Hur, Beomsung Park, Joonki Suh,
Hongsik Jeong

Ulsan National Institute of Science and Technology, Korea

11:20-11:50

2-0746

INVITED

Memory and Neuromorphic Applications of Ferroelectric Tunnel Junctions

Akihito Sawa

National Institute of Advanced Industrial Science and Technology, Japan

11:50-12:20

2-0119

INVITED

Enhance Chip Connectivity and Functionality Through RRAM-Based Monolithic 3D Integration for Energy-Efficient Computing-in-Memory

Jianshi Tang

Tsinghua University, China

Materials and Devices for Computing-in-Memory Applications

November 26 | Halla AB

CHAIR(S)	Hong-Sub Lee (Kyunghee University)
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15:00-15:30	Memristive Devices and Cossbar Arrays for Brain-Inspired Computing
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2-1656	<u>Qiangfei Xia</u>
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KEYNOTE	<i>University of Massachusetts Amherst, USA</i>
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15:30-16:00	Graph Computing Using Memristive Crossbar Array
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2-0553	<u>Yoon Ho Jang</u> , Janguk Han, Cheol Seong Hwang
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INVITED	<i>Seoul National University, Korea</i>
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16:00-16:30	Emerging Semiconductors Meet New Applications: Security, Multi-Valued Computing, and Unconventional Electronics
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2-0476	<u>Hocheon Yoo</u>
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INVITED	<i>Gachon University, Korea</i>
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Emerging Memory and Brain-inspired Systems

November 26 | Halla AB

CHAIR(S) Hong-Sub Lee (Kyunghee University)

16:50-17:20
2-1517 Nonvolatile Chalcogenide Memory with Mix-and-Match Designs of Device Structure and Phase-Changing Medium

INVITED Joonki Suh

Ulsan National Institute of Science and Technology, Korea

17:20-17:50
2-3832 Limitation of the Spintronic Synaptic Devices and Suggestions
Sanghoon Kim

INVITED

University of Ulsan, Korea

17:50-18:05
2-1165 Nonvolatile Memory and Artificial Synaptic Characteristics in Thin-Film Transistors with Low-Temperature Atomic Layer Deposited ZnO Channel and HfO_{2-x} Gate Oxide by Oxygen Ion Exchange

Jimin Han, Boyoung Jeong, Taeyun Noh, Jae-Gwan Park, Younguk Kim, Tae-Sik Yoon

Ulsan National Institute of Science and Technology, Korea

18:05-18:20
2-1648 Demonstration of Logic Gates and Neuromorphic Synaptic Behaviors Using IGZO-Based Flash Memory

Eunpyo Park^{1,2}, Yooyeon Jo¹, Gichang Noh¹, Min Jee Kim¹, Dae Kyu Lee^{1,2}, Sangbum Kim², Yeonjoo Jeong¹, Joon Young Kwak³

¹Korea Institute of Science and Technology, Korea

²Seoul National University, Korea

³Ewha Womans University, Korea

Brain-inspired Systems and Advanced Tin Film Processing for Future Memory

November 27 | Halla

CHAIR(S) Tae-Sik Yoon (UNIST)

09:40-10:10
2-1473 Computing-in-Memory Techniques with Memristor and Memcapacitor Crossbars

INVITED Kyeong-Sik Min
Kookmin University, Korea

10:10-10:40
2-1440 Optimal Data Distribution in FeFET-Based Computing-in-Memory Macros

INVITED Doo Seok Jeong
Hanyang University, Korea

10:40-10:55
2-2152 Chiroptical Synaptic Perovskite Memristor as Reconfigurable Physical Unclonable Function

Ho Yeon Kim, Cheolmin Park
Yonsei University, Korea

10:55-10:25
2-2837 Improving Photoelectrochemical Performance of TiO₂ Nanowire Arrays by Designing Specific Core–Shell Interfaces

INVITED Yang Yang
Nanjing Tech University, China

11:25-11:55
2-1474 MoS₂-Based Nonvolatile Memory for High-Density In-Memory Computing Application

INVITED Byung Chul Jang
Kyungpook National University, Korea

11:55-12:10
2-3297 Study on Electrical Properties of Zn-Sn-O Thin Films with Varying Compositions via Supercycle Atomic Layer Deposition

Dong-Hyeon Lim, Ae-Rim Choi, Il-Kwon Oh
Ajou University, Korea

Emerging Memory and Brain-Inspired System

November 27 | Halla

CHAIR(S) Seyoung Kim (POSTECH)

14:10-14:40 **Neuromorphic Hardware with Phase Change Memory: Exploring**
2-3603 **Applications of Spiking Boltzmann Machines**

INVITED Sangbum Kim

Seoul National University, Korea

14:40-14:55 **Multi-Level-Cell Operation of Low-Thermal-Budget ($\leq 350^\circ\text{C}$)**
2-1707 **Ferroelectric $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$ IGZO Field-Effect Transistors**

Kyong Jae Kim, Eun Seo Jo, You Seung Rim

Sejong University, Korea

14:55-15:10 **Modulating Volatility Through Crystallinity Control in ECM-Based ZrO_2**
2-1643 **Memristor**

Dae Kyu Lee^{1,2}, Gichang Noh¹, Yooyeon Jo¹, Eunpyo Park^{1,2}, Min Jee Kim¹,
 Heerak Wi³, Hyun Jae Jang¹, Joon Young Kwak³

¹*Korea Institute of Science and Technology, Korea*

²*Seoul National University, Korea*

³*Ewha Womans University, Korea*

15:10-15:25 **Impact of Thermal Annealing on Interdiffusion and Electrical Properties**
2-3305 **of Ferroelectric Field-Effect Transistors with Interface of IGZO/HZO**

Hye-Joo Kang¹, Do-Hee Kim², Jong-Young Lee², Seung-Wook Ryu², Il-Kwon Oh¹

¹*Ajou University, Korea*

²*SK Hynix Inc., Korea*

15:25-15:40 **Study on the Thermal Crystallization Behaviors of $\text{In}_x\text{Sb}_y\text{Te}_z$ Phase Change**
2-2050 **Materials for Computing-in-Memory Applications**

Jinwoo Moon, Yonghun Sung, Dae-Hong Ko

Yonsei University, Korea

15:40-15:55 **Energy Efficient, High Performance Emerging Memory Device with**
2-1174 **$\text{Ag}/\text{VO}_x/\text{Pt}$ Structure by Ag Filament Formation as Unconventional**
Computing Elements

Jiyeon Ryu, Kitae Park, Tae-Sik Yoon

Ulsan National Institute of Science and Technology, Korea

15:55-16:10
2-0625

Analog Switching Memristor Based on Hexagonal Boron Nitride Grown on Gallium Nitride Substrate

Jaesub Song, Seokho Moon, Jinho Byun, Jiye Kim, Inyong Hwang, Changwook Ji, Seonghyeon Pak, Seyoung Kim, Jong Kyu Kim

Pohang University of Science and Technology, Korea

Advanced Thin Film Processing for Future Memory

November 27 | Halla

CHAIR(S)

Il-Kwon Oh (Ajou University)

16:30-16:45
2-0766

Low Temperature ($\leq 400^\circ\text{C}$) Crystallization in Ferroelectric Hafnium Zirconium Oxide via DUV Irradiation

Sangwoo Lee¹, Jun-Gyu Choi¹, Se Hyun Kim², Min Hyuk Park², Myung-Han Yoon¹

¹Gwangju Institute of Science and Technology, Korea

²Seoul National University, Korea

16:45-17:15
2-1123

Thermal Atomic Layer Etching of Molybdenum for Future Memory Interconnect

INVITED

Taewook Nam

Sejong University, Korea

17:15-17:45
2-1433

Atomic Layer Deposition Process and its Application for Semiconductor Field

INVITED

Woo-Jae Lee

Pukyong National University, Korea

17:45-18:00
2-3011

Study on TFT with Vertically Controlled Position of Ga_2O_3 Layers in InZnO Films for 3D DRAM Devices

Ae-Rim Choi¹, Il-Kwon Oh¹, Dong Hyun Lim¹, Do-Hee Kim², Seung-Wook Ryu²

¹Ajou University, Korea

²SK Hynix Inc., Korea

18:00-18:15
2-1673

HiPIMS and Bipolar HiPIMS Techniques for Low-Temperature Fabrication of Yttrium Oxide Thin Films for Future Memory Applications

Soeun Ahn, Jiwon Yoon, Seunghee Han, Seung-Heon Chris Baek

Korea Institute of Science and Technology, Korea

Poster Presentation | November 27

Emerging Memory (Ferroelectric memory, Phase Change Memory, Resistive Memory, etc.)

CHAIR(S)

Hong-Sub Lee (Kyunghee University)

- 2-0695** Reducing Erasing Voltage in Organic Charge Trap Memory through Tuning Workfunction of Electrode
Woo-Seok Kim, Jin-Hyuk Kwon, Min-Hoi Kim
Hanbat National University, Korea
- 2-0947** Nonvolatile Antiferroelectric Capacitor Enabled by Defect Engineering for Low-Power and High-Endurance Memory
Hyun Woo Jeong, Yong Hyeon Cho, Min Hyuk Park
Seoul National University, Korea
- 2-1163** Interface-Engineered HfO_x Memristive Devices for Memristive Spiking Neural Network
Sung-Jae Park¹, Sangmin Lee¹, Jae Gwang Lim¹, Yeonjoo Jeong¹, Suyoun Lee¹, Jongkil Park¹, Gyu Weon Hwang¹, Kyeong-Seok Lee¹, Jong Keuk Park¹, Byeong-Kwon Ju², Inho Kim¹
¹*Korea Institute of Science and Technology, Korea*
²*Korea University, Korea*
- 2-1183** Non-Volatile Charge-Trap Flash Memory Characteristics with the ZnO Channel Layer and Low-Temperature Atomic Layer Deposited HfO_{2-x} Charge-Trap Layer
Taeyun Noh, Jimin Han, Boyoung Jeong, Jae-Gwan Park, Younguk Kim, Tae-Sik Yoon
Ulsan National Institute of Science and Technology, Korea
- 2-1188** Thin-Film Transistor with Oxygen-Deficient Tantalum Oxide Charge-Trap Layer and Indium-Gallium-Zinc Oxide Channel for Non-Volatile Charge-Trap Memory Application
Jae-Gwan Park, Jimin Han, Boyoung Jeong, Taeyun Noh, Younguk Kim, Tae-Sik Yoon
Ulsan National Institute of Science and Technology, Korea

- 2-1249** **Fabrication of Stacked Polymer Ferroelectric Memory Devices Using Solution Process**
Bon Seong Gu, Min-Hoi Kim
Hanbat National University, Korea
- 2-1257** **High Range Variation of Capacitance in a Variable Capacitor with a Stacked Structure of Switching Memristor and Capacitor**
Hui-Su Yang, Min-Hoi Kim
Hanbat National University, Korea
- 2-1261** **Structural Approach for Multi-Bit Non-Volatile Memory Utilizing Ferroelectric and Charge Trap**
Hayoung Kim, Min-Hoi Kim
Hanbat National University, Korea
- 2-1527** **First-Principles Study of the Photo-Assisted Ferroelectric Domain Control for In_2Se_3 Synaptic Device**
Wonze Jung^{1,2}, Seokju Kang¹, Kanghoon Yim², Young-Jun Yu¹
¹Chungnam National University, Korea
²Korea Institute of Energy Research, Korea
- 2-1735** **Tactile Ferroelectric Skin with Artificial Synaptic Behavior**
Jeongwon Shin, Kyuho Lee, Woojoong Kim, Seungjun Park, Cheolmin Park
Yonsei University, Korea
- 2-1740** **Retina-Inspired Structurally Tunable Synaptic Perovskite Nanocones**
Seungjun Park, Kyuho Lee, Woojoong Kim, Jeongwon Shin, Cheolmin Park
Yonsei University, Korea
- 2-2583** **Selector Only Memory Based on TiO_2 Fabricated by Photochemical Metal-Organic Deposition**
Yu Min Lee, Hong Sub Lee
Kyung Hee University, Korea
- 2-3211** **Enhancement of Characteristics of Hafnia-Based Ferroelectric DRAM Cell Capacitors with Imprint Effect**
Ji Min Lee¹, Hoseong Kim¹, Taewan Noh¹, Hyunjoo Hwang¹, Wonwoo Kho¹, Hyo-Bae Kim², Ji-Hoon Ahn², Seung-Eon Ahn¹
¹Tech University of Korea, Korea
²Hanyang University, Korea

- 2-3224** Study on Flash Memory Gate Structure Optimization via Charge Trapping Analysis of High-K Thin Films Deposited by Remote Plasma Atomic Layer Deposition
Hoseong Kim, Jimin Lee, Taewan Noh, Hyunjoo Hwang, Chanhee Lee, Hee Chul Lee, Seung-Eon Ahn
Tech University of Korea, Korea
- 2-3338** Improving Electrical Properties of Ferroelectric Tunnel Junction Memory Devices for Neuromorphic Computing Applications
Tae Wan Noh, Ji Min Lee, Hoeseong Kim, Hyunjoo Hwang, Wonwoo Kho, Seung-Eon Ahn
Tech University of Korea, Korea
- 2-3906** Enhanced Heating Approach for Shape-Memory Alloys Utilizing Carbon Nanotubes and Silver Paste
Jooyong Kim, Gyu Bin Lee
Soongsil University, Korea
- 2-3910** Analysis of Comfort and Support Performance in Textile Actuators for Smart Wearable Wrist Guards Using Shape Memory Alloy Fabrication
Jooyong Kim, Gyu Bin Lee
Soongsil University, Korea

Materials and Devices for Computing-in-Memory Applications

CHAIR(S) Tae-Sik Yoon (UNIST)

- 2-1073** Reconfigurable Logic-in-Memory (LIM) Device Using Complementary Floating Gate Field Effect Transistor
Uigwan Shin, Kiyung Kim, Junhyeok Choi, Byoung Hun Lee
Pohang University of Science and Technology, Korea
- 2-2578** Alkali Ion Memristors Through Strategic Bottom Electrode Control
Byeong Min Lim, Hong Sub Lee
Kyung Hee University, Korea

Advanced Thin Film Processing for Future Memory

CHAIR(S)

Il-Kwon Oh (Ajou University)

2-0468

Optimization Design for Stabilizing Temperature Sensing of Liquid-Controller

Young-Gi An, Jae-Seong Jeong

Korea Electronics Technology Institute, Korea

2-0877

High Performance of Atomic Layer Deposition Based Indium Tin Oxide Thin Film Transistor at Sub-5-nm Channel Thickness

Jaejoon Kim, Hyeong Seok Choi, Dong Hee Han, Hyun Woo Jeong, Se Hyun Kim, Min Hyuk Park

Seoul National University, Korea

2-0878

Annealing Free Atomic Layer Deposited InGaZnO_x Thin Film Transistor with 39.8 cm² V⁻¹ s⁻¹ High Field-Effect Mobility

Hyeong Seok Choi, Dong Hee Han, Hyun Woo Jeong, Jaejoon Kim, Min Hyuk Park

Seoul National University, Korea

2-0991

Characteristics of Anti-Ferroelectric ZrO₂ Treated with Continues Wave-Laser Scanning Annealing (CW-LSA)

Chan Bin Lee, Seung-Mo Kim, Minjae Kim, Byoung Hun Lee

Pohang University of Science and Technology, Korea

2-1021

Quantitative Analysis and Degradation Monitoring of H₂O₂-Based CMP Slurry Using Calibration as an Internal Standard

Eun Su Jung, Jinuk Yoo, Tae Min Choi, Hwa Rim Lee, Chae Yeon Lee, Dong Hyun Kim, Sung Gyu Pyo

Chung-Ang University, Korea

2-1412

Electrospun PVDF/TiO₂ Films as Dielectrics in Metal-Insulator-Semiconductor Capacitor

Tae Min Choi, Eun Su Jung, Jinuk Yoo, Hwa Rim Lee, Chae Yeon Lee, Dong Hyun Kim, Sung Gyu Pyo

Chung-Ang University, Korea

- 2-1941** **Chemical Mechanical Polishing (CMP) Characteristics of β -Ga₂O₃ in Alumina Slurry with Hydrogen Peroxide**
Seung-Min Lee, Seoyeon An, Mingi Choe, Nam-Hoon Kim
Chosun University, Korea
- 2-1946** **Anionic Surfactant-Effects of Alumina Abrasive Slurry on β -Ga₂O₃-Chemical Mechanical Planarization**
Mingi Choe, Seoyeon An, Seung-Min Lee, Nam-Hoon Kim
Chosun University, Korea
- 2-2053** **Electrochemiluminescence Tactile Visual Synapse Enabling Finger Rehabilitation**
Woojoong Kim, Kyuho Lee, Seungjun Park, Jeongwon Shin, Cheolmin Park
Yonsei University, Korea
- 2-2222** **Chemical Wet Etching of Boron Doped Si_{1-x}Ge_x Epitaxial Layers for Multi-Stacked Memory Device**
Joosung Kang, Dae-hong Ko
Yonsei University, Korea
- 2-3323** **Study on Electrical Properties of SiNx Films Grown by Plasma-Enhanced Atomic Layer Deposition Depending on Si Precursors**
Young-Jin Lim¹, Ngoc Le Trinh², Bonwook Gu², Han-Bo-Ram Lee², Il-Kwon Oh¹
¹Ajou University, Korea
²Incheon National University, Korea
- 2-3453** **A Flash Memory with High-k Dots Embedded Si₃N₄**
Seongho Lee, Changhwan Choi, Yunseo Lim, Sehyeon Choi, San Park
Hanyang University, Korea
- 2-3549** **Enhanced Contact Resistance Between ALD-Ru and W by Oxygen Removal Using Forming Gas Annealing**
Sung Jun Kim, Jun Hyeong Park, Hoi Yoon Jung, In-Sung Park, Young Wook Park, Jinho Ahn
Hanyang University, Korea

Brain-inspired Devices and Architecture

CHAIR(S)

Seyoung Kim (POSTECH)

- 2-0336** Halide-Perovskite Artificial Synapses with Synaptic Weight Modulation for Neuromorphic Computing and Luminous Artificial Neural Networks
Young Ran Park, Gunuk Wang
Korea University, Korea
- 2-1187** Gate-Injection Synaptic Transistors Based on 2D van der Waals Heterojunction with Band Offset
Wonseok Choi, Gwan-Hyoung Lee
Seoul National University, Korea
- 2-1916** An Artificial Multi-Modal Neuron with Associative Learning Capabilities: Acquisition, Extinction, and Spontaneous Recovery
Unhyeon Kang^{1,2}, Seungmin Oh^{1,2}, Jaewook Kim^{1,2}, Jinyeong Hwang^{1,2}, Jiin Bang^{1,3}, Younghyun Lee¹, Suyoun Lee^{1,3}
¹*Korea Institute of Science and Technology, Korea*
²*Seoul National University, Korea*
³*University of Science and Technology, Korea*
- 2-2032** Demonstration of an Energy-Efficient Using Solver Composed of Ovonic Threshold Switch (OTS)-Based Nano-Oscillators (OTSNOs)
Suyoun Lee, Jaewook Kim, Unhyeon Kang, Seungmin Oh, Jinyeong Hwang, Jiin Bang
Korea Institute of Science and Technology, Korea
- 2-2873** Achieving High Learning Accuracy with Multi-Terminal Spiking Neurosynaptic Networks Based on Floating-Gate Memristors
Wei Yihang, Woo Jong Yu
Sungkyunkwan University, Korea
- 2-3859** Circuit-Level Design of Memristor-Based Spiking Neural Networks with Improved Noise Tolerance
Jae Gwang Lim^{1,2}, Sung-Jae Park^{1,2}, Yeonjoo Jeong¹, Jaewook Kim¹, Suyoun Lee¹, Jongkil Park¹, Gyu Weon Hwang¹, Kyeong-Seok Lee¹, Seongsik Park¹, Byeong-Kwon Ju², Hyun Jae Jang¹, Jong Keuk Park¹, Inho Kim¹
¹*Korea Institute of Science and Technology, Korea*
²*Korea University, Korea*

Sensors and Energy Harvesting for Smart Healthcare Devices

Oral Presentation

Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (1)

November 25 | Landing A

CHAIR(S) Miso Kim (Sungkyunkwan University), Hanjun Ryu (Chung-Ang University)

09:40-10:10 Flash-Thermal Shock Synthesis of Advanced Catalysts

3-3778 Dong-Ha Kim

INVITED *Hanyang University ERICA, Korea*

10:10-10:40 Design to Secure Temporal Invariance of Triboelectric Sensing Signals

3-1287 Unyong Jeong, Woosung Cho

INVITED *Pohang University of Science and Technology, Korea*

10:40-11:10 Self-Powered Smart System Based on Triboelectric Nanogenerator

3-2867 Haixia Zhang

INVITED *Peking University, China*

11:10-11:25 Optimization of Plasticizer Composition for High-Performance PVC Gel
3-3626 Triboelectric Nanogenerators

Hyosik Park, Ju-Hyuck Lee

Daegu Gyeongbuk Institute of Science and Technology, Korea

11:25-11:40 Multistable Cylindrical Metamaterial-Enabled Ternary Logic Gates and
3-3565 Robust Mechanical Computing

Boxin Chen, Miso Kim

Sungkyunkwan University, Korea

11:40-11:55 Ultrasound-Driven Triboelectric Nanogenerator with Acoustic-
3-2831 Responsive On-Demand Dissolution

Dabin Kim, Sera Jeon, Sang-Woo Kim

Yonsei University, Korea

11:55-12:10
3-3151 **Comparison of Electrocaloric Effect in Bulk Ferroelectric Ceramics for Pyroelectric Energy Harvesting Applications**
Jeyeon Lee^{1,2}, Byeong-Kwon Ju², Sunghoon Hur^{1,3}
¹*Korea Institute of Science and Technology, Korea*
²*Korea University, Korea*
³*Kyung Hee University, Korea*

Wearable and Stretchable Devices for Body-Implantable and Healthcare Applications (1)

November 25 | Landing A

CHAIR(S) Dae-Hyeong Kim (Seoul National University),
Suk-Won Hwang (Korea University)

13:10-13:40
3-3814 **Biomimetic Polymer Electronics for Multi-Modal Interfacing with Biology**

KEYNOTE Sihong Wang
The University of Chicago, USA

13:40-13:55
3-2544 **Percutaneous Powering of Electronic Implants by Robust Triboelectric-Ultrasound Technology**

Iman M. Imani, Hyun-Cheol Song
Korea Institute of Science and Technology, Korea

13:55-14:25
3-3541 **Three-Dimensional (3D) Devices for Bio-Integrated/Inspired Electronics**
Bong Hoon Kim

INVITED *Daegu Gyeongbuk Institute of Science and Technology, Korea*

Flexible/Stretchable Materials for Wearable Electronics (1)

November 25 | Landing A

CHAIR(S) Hyunjung Yi (KIST), Jeong-Yun Sun (Seoul National University)

15:00-15:25
3-3506 3D Printed Architected and Porous Structures for a New Generation of Soft Sensors and Continuum Soft Actuators

INVITED Lucia Beccai¹, Seonggun Joe¹, Diana Cafiso¹, Ouriel Blich², Shlomo Magdassi²

¹*Istituto Italiano di Tecnologia, Italy*

²*Hebrew University of Jerusalem, Israel*

15:25-15:50
3-0160 Rationalizing Polyelectrolyte Elastomers for Drift-Free Ionotronic Sensing

INVITED Canhui Yang

Southern University of Science and Technology, China

15:50-16:15
3-2518 Material Solutions for the Realization of Stretchable Electronics

INVITED

Jiheong Kang

Korea Advanced Institute of Science and Technology, Korea

16:15-16:40
3-0205 Sutureless Bioelectronics Using Adhesive Hydrogel Biointerfaces

INVITED

Mikyung Shin

Sungkyunkwan University, Korea

Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (2)

November 25 | Landing A

CHAIR(S) Hong-Joon Yoon (Gachon University)

16:50-17:20
3-0245 Thermosensitive Self-Powered Smart Sensor for Material Identification in Robotic Applications

INVITED Zong-Hong Lin
National Taiwan University, Chinese Taipei

17:20-17:50
3-2213 Piezoelectric DC Power Generator Using a Sequential In-Phase Polarization Change

INVITED Hyun-Cheol Song^{1,2}
¹*Korea Institute of Science and Technology, Korea*
²*Sungkyunkwan University, Korea*

17:50-18:05
3-3248 Enhancing FOM of Mn-doped PMN-PT Piezoceramics via (001) Texturing and Oxygen Sintering for High-Power Applications

Dong-Gyu Lee¹, Sahn Nahm², Chong-Yun Kang¹, Hyun-Cheol Song¹
¹*Korea Institute of Science and Technology, Korea*
²*Korea University, Korea*

18:05-18:20
3-3572 Stretchable Piezoelectric Helical Coils Integrated with Conductive Polymer Electrodes for Machine Learning-Enabled Self-Powered Smart Healthcare Sensing

Yong Jun Choi, Jaewon Cho, Min Sun Choi, Miso Kim
Sungkyunkwan University, Korea

18:20-18:35
3-2849 Enhanced Piezoelectric Properties in Twisted Multilayer MoS₂ via Phase-Transition Growth on Nanoisland Flexible Ceramics

Fengyi Pang¹, Young-Jun Kim², Sang-Woo Kim¹
¹*Yonsei University, Korea*
²*Korea Research Institute of Chemical Technology, Korea*

Wearable and Stretchable Devices for Body-Implantable and Healthcare Applications (2)

November 26 | Landing A

CHAIR(S)

Dae-Hyeong Kim (Seoul National University),
Suk-Won Hwang (Korea University)

08:30-08:45

3-2122

Crack-Based Hyperpiezoresistive Sensors and Their Applications

Jae-Hwan Lee¹, Yoon-Nam Kim¹, Junsang Lee², Seung-Kyun Kang¹

¹Seoul National University, Korea

²Purdue University, USA

08:45-09:00

3-0700

Stretchable Passivation Layer Using Liquid Metal/Block Copolymer for High-Precision Ionic Temperature Sensor

Salma Faiz, Chansik Choi, Unyong Jeong

Pohang University of Science and Technology, Korea

09:00-09:30

3-0220

Composite Materials for Transient Electronics

Sang Min Won

INVITED

Sungkyunkwan University, Korea

09:30-10:00

3-0522

Ultrathin Organic Solar Cells for Energy Harvesting of Wearable Electronics

Kenjiro Fukuda¹, Takao Someya^{1,2}

¹RIKEN, Japan

²The University of Tokyo, Japan

10:00-10:30

3-1464

Intelligent Soft Electronics for Healthcare Monitoring and VR

Xinge Yu

INVITED

City University of Hong Kong, Hong Kong (SAR of China)

Soft, Wearable, and Neuromorphic Electronics for Human Interfacing (1)

November 26 | Landing A

CHAIR(S) Do Hwan Kim (Hanyang University),
Ying-Chih Lai (National Chung Hsing University)

10:50-11:20 **Biomimetic Sensing Organs with Nanostructures**

3-3901 Zhiyong Fan

KEYNOTE *The Hong Kong University of Science and Technology, Hong Kong (SAR of China)*

11:20-11:50 **Neuromorphic Electrochemical Diodes Based on Organic Mixed Ionic-Electronic Conductors**

3-3525 Myung-Han Yoon

INVITED *Gwangju Institute of Science and Technology, Korea*

11:50-12:20 **Skin-Conformable Sensors and Displays Using Stretchable Polymer Electronic Materials**

3-1638 Naoji Matsuhisa

INVITED *The University of Tokyo, Japan*

Flexible/Stretchable Materials for Wearable Electronics (2)

November 26 | Landing A

CHAIR(S) Hyunjung Yi (KIST)

15:00-15:15 **Self-Healing Ionic Conductive Hydrogel Capacitance Sensors for Human Motion Detection**

3-1033 Gyeongyeong Lee, Frances Danielle Fernandez, Jihoon Kim, Sukeun Yoon
Kongju National University, Korea

15:15-15:30 **Fabrication of Flexible Color Tunable Patterns Using Aerodynamically Focused Nanoparticle Deposition System**

3-1953 Minseok Kim, Jiseon Kim, Sungjun Choi, Taehyeob Im, Caroline Sunyong Lee
Hanyang University ERICA, Korea

Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (3)

November 26 | Landing A

CHAIR(S)

Hyun-Choel Song (KIST)

15:45-16:00

3-3629

Innovative Electrostatic Discharge Prevention System Utilizing Triboelectric Nanogenerators

Cheoljae Lee, Gerald Selasie Gbadam, Ju-Hyuck Lee

Daegu Gyeongbuk Institute of Science and Technology, Korea

16:00-16:15

3-2702

Bioresorbable Materials for Self-Powered, On-Demand Neural Interfaces

Dong-Min Lee, Sang-Woo Kim

Yonsei University, Korea

16:15-16:30

3-2155

Mn Based Double Perovskite/PVDF Nanofiber Mat-Based Self-Charging Piezo-Supercapacitor

Tupan Das, Manoranjan Kar

Indian Institute of Technology Patna, India

16:30-16:45

3-1963

A Biodegradable Silk-Based Energy-Generating Skin Enabling Dual-Mode Tactile Sensing

Shengyou Li, Cheolmin Park

Yonsei University, Korea

16:45-17:00

3-0144

Advancing Charge Density in Temperature-Dependent Metal–Organic Polyhedra-Based Triboelectric Nanogenerator

Swathi Ippili, Venkatraju Jella, Soon-Gil Yoon

Chungnam National University, Korea

Soft, Wearable, and Neuromorphic Electronics for Human Interfacing (2)

November 27 | Landing A

CHAIR(S)

Hyunhyub Ko (UNIST)

09:40-10:10

3-3464

INVITED

Untethered, Autonomously Self-Healable, and Self-Powered Actively-Perceiving and Energy-Harvesting Triboelectric Skins and Their Applications in Soft Robotics

Ying-Chih Lai

National Chung Hsing University, Taiwan

10:10-10:40

3-1577

INVITED

Biomimetic Hydrogels for Bioelectronics

Youn Soo Kim

Pohang University of Science and Technology, Korea

10:40-10:55

3-2893

An Artificial Sensory Neuron System Based on Ionic-Gated Synaptic Transistors with Suspended Porous Ion Gel

Yun Goo Ro, Dahun Lim, Cheolhong Park, Youngoh Lee, Young-Ryul Kim, Youngsu Lee, Jaejun Kim, Hyunhyub Ko

Ulsan National Institute of Science and Technology, Korea

10:55-11:10

3-1997

High-Performance and Super-Flexible Biomimetic Fiber Moisture Electricity Generators for Self-Powered Human Interaction

Guangtao Zan, Cheolmin Park

Yonsei University, Korea

11:10-11:25

3-0660

Simple-Architected Elastic Two-Terminal Touch Sensor with High Spatiotemporal Resolution

Junchen Luo, Joosung Oh, Unyong Jeong

Pohang University of Science and Technology, Korea

Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems (4)

November 27 | Landing A

CHAIR(S) Wooyoung Shim (Yonsei University)

14:10-14:25
3-3534 Enhanced Multimodal Acoustic Energy Harvesting in One-Dimensional Topological Phononic Crystal with Long Range Interactions

Xiaolei Tang^{1,2}, Miso Kim², Tianxue Ma³, Yue-Sheng Wang^{1,3}

¹Tianjin University, China

²Sungkyunkwan University, Korea

³Beijing Jiaotong University, China

14:25-14:40
3-3399 Ultrasound-Responsive Piezoelectric Nanofibrous Scaffold for Promoting Nerve Regeneration

Sera Jeon¹, Dabin Kim¹, Miso Kim², Sang-Woo Kim¹

¹Yonsei University, Korea

²Sungkyunkwan University, Korea

14:40-14:55
3-3114 Efficient Hybrid Energy Harvesting of Thermoelectric-Piezoelectric Generator Using Cantilever Vibration to Enhance Heat Dissipation

Byoungjin Yoon¹, Seung-Bum Kim¹, Hyun-Cheol Song¹, Wonjoon Choi², Sunghoon Hur¹

¹Korea Institute of Science and Technology, Korea

²Korea University, Korea

14:55-15:10
3-2522 An Ultrasensitive Laser-Induced Graphene Electrode-Based Triboelectric Sensor Utilizing Trapped Air as Effective Dielectric Layer

Tapas Kamilya, Jinhyoung Park

Korea University of Technology and Education, Korea

15:10-15:25
3-1698 Moisture-Enabled Energy Generation by Vertically Structured Polymer Aerogel on Water-Collecting Gel

Kaiying Zhao, Cheolmin Park

Yonsei University, Korea

15:25-15:40
3-0287

Ion-Impregnated Intermediate Layer for Enhancing Triboelectric Nanogenerator Performance

Dong Un Lim¹, Eun Jung Lee¹, Jung Kyu Jang¹, Su Yeon Lee^{1,2}, Tae-Ho Kim¹

¹Korea Research Institute of Chemical Technology, Korea

²University of Science and Technology, Korea

15:40-15:55
3-0155

2D-Layered MA₃Bi₂I₉ Perovskite for Nanogenerator and Storage Device Application

Venkatraju Jella, Swathi Ippili, Soon-Gil Yoon

Chungnam National University, Korea

Poster Presentation | November 26

Flexible/Stretchable Materials for Wearable Electronics

CHAIR(S)

Hyunjung Yi (KIST), Jeong-Yun Sun (Seoul National University)

3-0598 Coloring Local Pressure with Physically Coupled Thermochromic Panel and Pressure Sensor

Gyuwon Kim, Wooyoung Shim

Yonsei University, Korea

3-0665 Nanoporous Structure Aluminum Anodic Oxide Layer-Based Optical Biosensor for Detection of Troponin T

Sehyuk Yeom, Byoungho Kang, Jaesung Lee, Sanghoon Jung, Wanghoon Lee

Gumi Electronics and Information Technology Research Institute, Korea

3-1508 Study on Chemical Strengthening Conditions of UTG(Ultra Thin Glass) for Use as Flexible Display Cover Windows

Doyun Hwang

Gumi Electronics and Information Technology Research Institute, Korea

3-1618 Paper Roughness Control for Fabricating Capacitive Pressure Sensor

Bokyeong Kim, Wooyoung Shim

Yonsei University, Korea

3-2086 Photothermal Ionic Semiconducting Elastomer Diode Enabling Reconfigurable Logic Gate

Yeonji Kim, Cheolmin Park

Yonsei University, Korea

3-2586 Flexible Ion Computing Devices Based on Selective Control of Ion Dynamics

Jin-Young Jeong¹, Hyunjung Yi^{1,2}

¹Korea Institute of Science and Technology, Korea

²Yonsei University, Korea

- 3-2731** **Soft Heterogeneous Tactile Neuron Array for Spatiotemporal Spike Encoding of Stiffness Distribution**
Minseok Oh^{1,2}, Unhyeon Kang², Young-Chang Joo¹, Suyoun Lee², Hyunjung Yi^{2,3}
¹Seoul National University, Korea
²Korea Institute of Science and Technology, Korea
³Yonsei University, Korea
- 3-2784** **Ion Gel-Based Somatosensory Device with Diverse Neuronal Spiking Behaviors**
Hayeon Jeong^{1,2}, Unhyeon Kang², Suyoun Lee², Cheolmin Park¹, Hyunjung Yi^{1,2}
¹Yonsei University, Korea
²Korea Institute of Science and Technology, Korea
- 3-3184** **Deterministic Modulus Tuning of Elastomeric Substrates for Strain Isolation System**
Junwoo Yea¹, Jeongdae Ha¹, Dae Hwan Lee², Dohyun Kim³, Sungryong Kim³, Junwoo Lee³, Taiho Park³, Kyung-In Jang¹
¹Daegu Gyeongbuk Institute of Science and Technology, Korea
²Korea Atomic Energy Research Institute, Korea
³Pohang University of Science and Technology, Korea
- 3-3419** **Study on the Application of Flexible Carbon Fabric Sensors Using Staple Fibers**
Tae Won Ha, Dong-Su Kim, Young Baek Kim, Chil-Hyoung Lee
Korea Institute of Industrial Technology, Korea
- 3-3432** **Development of Stretchable Metal Thin-Film Electrodes Based on Polydimethylsiloxane (PDMS) for Biomedical and Wearable Applications**
Mincheol Kim, Soosang Chae
Korea University of Technology and Education, Korea
- 3-3647** **Textile-Embeddable Fibriform Organic Electrochemical Diodes for Wearable E-textile Circuits**
Kwang-Hun Choi^{1,2}, Ho Won Jang², Changsoon Choi¹, Jung Ah Lim^{1,3}
¹Korea Institute of Science and Technology, Korea
²Seoul National University, Korea
³University of Science and Technology, Korea

- 3-3664** **Adaptive Synaptic Phototransistor Inspired by Neuronal Excitability Regulation for Effective Image Segmentation**
Jong Ik Kwon, Jung Ah Lim, Changsoon Choi
Korea Institute of Science and Technology, Korea
- 3-3677** **Large-Area, Flexible Piezo-Ionic Pressure Sensor with Minimized Electrode Interconnections for Practical Human-Machine Interfaces Applications**
Juhui Kim^{1,2}, Kwang-Hun Choi^{1,2}, Wonkyeong Kang^{1,2}, Junghwan Byun¹, Ho Won Jang², Jung Ah Lim¹
¹*Korea Institute of Science and Technology, Korea*
²*Seoul National University, Korea*
- 3-3847** **Self-Healable Stretchable Semiconducting Film Based on Self-Healing Elastomer**
Hyongsuk Choo, Jin-Hong Park, Donghee Son
Sungkyunkwan University, Korea
- 3-3897** **Multi-Frequency Electrical Impedance Tomography-Based Wearable Multi-Functional Tactile Interface**
Jiwon Lee, Kyubeen Kim, Ki Jun Yu
Yonsei University, Korea

Piezoelectric, Triboelectric and Hybrid Energy Harvesting Materials and Systems

CHAIR(S) Sang-Woo Kim (Yonsei University), Miso Kim (Sungkyunkwan University)

- 3-0603** Power Generation Using Cation-selective Graphene Oxide Membrane
Seokmin Park, Wooyoung Shim
Yonsei University, Korea
- 3-0699** Enhanced Charge Generation in Triboelectric Nanogenerators via Combined Vertical and Sliding Motions
Jaehee Shin, Doohyun Han, Hyunui Hong, Sumin Lee, Jinhyoung Park
Korea University of Technology and Education, Korea
- 3-0738** Strongly Correlated Electron System NiWO_4 : A New Family of Materials for Triboelectrics Using Inherent Coulombic Repulsion
 Gi Hyeon Han, Sang Jeong Park, Hyun Min Park, Seung Yong Lee, Kyu Hyoung Lee
Yonsei University, Korea
- 3-0983** Chitosan and Phytic Acid Treated Cotton Fabric Based Single-Electrode Mode Triboelectric Nanogenerator for Safety Applications
Byeongjun Jeong, Hyeonggeun Kim, Ingyu Lee, Jeonggyu Seo, Swati Panda, Sugato Hajra, Hoe Joon Kim
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 3-1061** Enhanced Dielectric Properties and Triboelectric Performance of Ba-Substituted Single Crystal KTLO for Advanced Triboelectric Nanogenerators
Haeun Choa, Sol Han, Sang Jeong Park, Gi Hyeon Han, Kyu Hyoung Lee
Yonsei University, Korea
- 3-1650** Significantly Enhanced Reliability of Mg-Doped BaTiO_3 by Introducing Water-Soluble Mg-Precursor
Ga Young Lee¹, Gil-Geun Lee¹, Young Soo Lim¹, Seok-Hyun Yoon²
¹Pukyong National University, Korea
²Samsung Electro-Mechanics Co., Ltd., Korea

- 3-1690** **Control of Site-Occupancy of Ca in Solid-State Synthesis of $\text{Ba}_{1-x}\text{Ca}_x\text{TiO}_3$**
Min Ho Jang¹, Gil-Geun Lee¹, Young Soo Lim¹, Seok-Hyun Yoon²
¹Pukyong National University, Korea
²Samsung Electro-Mechanics Co., Ltd., Korea
- 3-1960** **Complementary Moisture-Induced and Triboelectric Energy Harvesting Using Resilient MXene/Organo-Ionic Hydrogel Foam**
Gwanho Kim, Cheolmin Park
Yonsei University, Korea
- 3-1970** **Moisture-Driven Energy Generator with Bi-Layer Asymmetrical Structure**
Minji Kwon, Kaiying Zhao, Gwanho Kim, Cheolmin Park
Yonsei University, Korea
- 3-2068** **Advancing Hydrophobic Properties of PDMS/P(VDF-TrFE) Coatings via Simple Spray Method**
Chae Lin Park^{1,2}, Ju Hyeon Kim¹, Eun Ho Sohn^{1,2}
¹Korea Research Institute of Chemical Technology, Korea
²University of Science and Technology, Korea
- 3-2485** **Strong, Super-Stretchability, High Performance Hydrogel by Re-Kosmotropic Effect Based Triboelectric Nanogenerator**
Luu Trung Thien, Dukhyun Choi
Sungkyunkwan University, Korea
- 3-2679** **Hybrid Structured Ultrasensitive Photo-Thermoelectric Ultrabroadband Image Sensors with Nanocarbon and Bismuth Composites**
Yuto Matsuzaki¹, Reiji Tadenuma¹, Yuto Aoshima¹, Minami Yamamoto¹, Leo Takai¹, Yukio Kawano^{1,2}, Kou Li¹
¹Chuo University, Japan
²National Institute of Informatics, Japan
- 3-2708** **Electronic Materials with Deformation-Induced Negative Triboelectric Properties**
Youngmin Byun, Donghyeon Kang, Sang-Woo Kim
Yonsei University, Korea

- 3-2719** **The Study on the Characteristics of Piezoelectric Harvesting Elements for Increase Efficiency**
Su-Ho Lee¹, Jae-Seong Ryoo¹, He-Rie Park¹, Byoung-Il Sa-gong², Nam-Ho Kim²
¹Dong-A University, Korea
²Pukyong National University, Korea
- 3-2817** **Ultrasound-Driven On-Demand Biodegradable Powering Solution for Electronics**
Wooseok Kang, Dong-Min Lee, Sang-Woo Kim
Yonsei University, Korea
- 3-2819** **Effective Disinfection in Portable Water Bottles Using Human-Induced Electrostatic Charges**
Min Jae Park¹, Young-Jun Kim², Sang-Woo Kim¹
¹Yonsei University, Korea
²Sungkyunkwan University, Korea
- 3-2862** **Ultrasound-Mediated Triboelectric Nanogenerator for Implantable Wireless Device**
Sunyoung Lim, Joohee Kim, Sung Soo Kwak
Korea Institute of Science and Technology, Korea
- 3-3039** **Electrospun P(VDF-TrFE) Nanofiber Membrane Based Triboelectric and Piezoelectric Nanogenerators for Energy Harvesting**
Yong-Bin Han, Hong-Joon Yoon
Gachon University, Korea
- 3-3041** **Metal Mesh Ultrasound TENG(MMUS-TENG): Enhanced Layered and Dual Electrode Structure for Optimal Energy Harvesting**
Ki-Yoon Park, Hong-Joon Yoon
Gachon University, Korea
- 3-3050** **Woven-Structured Textile-Based Triboelectric Nanogenerator for Human Motion Monitoring**
Hyeon-Ji Kim, Hong-Joon Yoon
Gachon University, Korea

- 3-3423** **Highly Efficient Acoustic Energy Transfer Technology for Triboelectric Generators via Metal-Liquid Coupling**
Jinsong Kim¹, Youngwook Chung², Sang-Woo Kim¹
¹Yonsei University, Korea
²Sungkyunkwan University, Korea
- 3-3557** **AI-Driven Multiscale Design of Mechanically Robust 3D-Printed Materials via Grayscale Digital Light Processing**
Jisoo Nam, Miso Kim
 Sungkyunkwan University, Korea
- 3-3577** **Self-Powered Acceleration Sensor for Distance Prediction via Triboelectrification**
Zhengbing Ding, Dukhyun Choi
 Sungkyunkwan University, Korea
- 3-3725** **Bioresorbable Electrotherapy System Using Triboelectric Nanogenerator**
Hyemin Lee, Seunghyuk Hong, Minji Choi, Jaeyeong Ye, Hanjun Ryu
 Chung-Ang University, Korea
- 3-3737** **Enhanced Performance of NdFeB-PMMA Composites Based Triboelectric Nanogenerator Using Magnetization**
Nhat Nam Hoang, Jae Won Lee
 Kangwon National University, Korea
- 3-3740** **High Durability Moisture Electric Generator with PSSA/PDDA Film**
Yeong Heum Moon, Yeong Jun Moon, Jae Won Lee
 Kangwon National University, Korea
- 3-3884** **Synergetic Design of Chemical Composition and Sintering Processes for Enhanced Performance of (K, Na)NbO₃-Based MLCC Ceramics**
Seong Uk Ju, Hyungyong Kim, Jaewon Cho, Miso Kim
 Sungkyunkwan University, Korea
- 3-3888** **Exploring the Potential of Digital Light Processing 3D Printing for Lead-Free (K, Na)NbO₃ Piezoelectric Ceramics**
Hyungyong Kim, Miso Kim
 Sungkyunkwan University, Korea

3-3893

**Recycling Strategies for Digital Light Processing 3D-Printed BaTiO₃
Ceramic Composites for Sustainable Performance**

Yun Kwag, Hyungyong Kim, Jisoo Nam, Miso Kim

Sungkyunkwan University, Korea

3-3904

**Design of Conductive Yarn Stitch Circuits and Power Loss Analysis for
Solar Wearable Energy Harvesting**

Gyu Bin Lee, Jooyong Kim

Soongsil University, Korea

Soft, Wearable, and Neuromorphic Electronics for Human Interfacing

CHAIR(S)

Youn Soo Kim (POSTECH), Myung-Han Yoon (GIST)

- 3-1929** Double-Layered Biodegradable and Stretchable Triboelectric Nanogenerator for High-Performance Wearable Applications
Yong-Jin Park, Min Sub Kwak, Yonggi Kim, Jae Joon Kim, Hyunhyub Ko
Ulsan National Institute of Science and Technology, Korea
- 3-1948** A Self-Powered, Highly Sensitive, and Frequency-Tunable Triboelectric Acoustic Sensor Inspired by the Human Cochlea
Hyejin Lee, Dong-Hee Kang, Yun Goo Ro, Min Sub Kwak, Jinyoung Kim, Geonyoung Jung, Jonghwa Park, Young-Ryul Kim, Jiin Lee, Hyunhyub Ko
Ulsan National Institute of Science and Technology, Korea
- 3-2071** Hydroelectric Power Generation from MXene-Based Nanochannel
Sangyun Na, Geonyoung Jung, Yoojin Chang, Hyunhyub Ko
Ulsan National Institute of Science and Technology, Korea
- 3-2728** Chemosensory Synaptic Transistor Based on Amine-Engineered Interpenetration Polymer Semiconductor for NO₂ Recognition
Elvis K. Boahen, Hyukmin Kweon, Hayoung Oh, Do Hwan Kim
Hanyang University, Korea
- 3-2880** Hybrid Ionic Polymer Actuator with Ion Transport-Accelerating Particle for Soft Robotics
Minjeong Kim, So Young Kim, Hanbin Choi, Do Hwan Kim
Hanyang University, Korea
- 3-2941** Ultrathin Ti₃C₂T_x MXene Film-Type Shape-Configurable Thermoacoustic Loudspeakers with Tunable Sound Directivity
Geonyoung Jung, Hyunhyub Ko
Ulsan National Institute of Science and Technology, Korea
- 3-2967** Phase-Separated Antifreezing Hydrogel Electrolytes for High-Performance Flexible Supercapacitors
Taehun Chung, Soyeon Park, Woosuk Kang, Sang-Mun Jung, Changshin Jo, Youn Soo Kim
Pohang University of Science and Technology, Korea

- 3-2969** **Lignin/Zwitterionic Polymer-Based Multifunctional Hydrogel with Improved Adhesion by Tuning Mechanical Properties**
Jaewon Choi¹, Yiluo Hu¹, Asila Ahmed Mohammed Osman¹, Kang-Il Song², Dong Soo Hwang¹, Youn Soo Kim¹
¹Pohang University of Science and Technology, Korea
²Pukyong National University, Korea
- 3-2982** **Mechanotransduction via Piezo-Driven Ion Controllable Dynamics for Ion Communication Wireless Platform**
Jihong Kim¹, Haerim Kim², Won Hyuk Choi¹, Seungyoung Ahn², Do Hwan Kim¹
¹Hanyang University, Korea
²Korea Advanced Institute of Science and Technology, Korea
- 3-2996** **Skin-Conformable, Self-Powered Piezoelectric Sensors Based on Stretchable Piezoelectric Polymer**
Liren Wang¹, Peter Zalar², Yohei Azumai¹, Taizo Tominaga¹, Kanichi Doi¹, Naoji Matsuhisa¹
¹The University of Tokyo, Japan
²Holst Centre / TNO, USA
- 3-3096** **Ion-Trapping Semiconductor Network with Artificial Receptor for Enhanced Long-Term Plasticity**
Hayoung Lim, Hayoung Oh, Hyukmin Kweon, Do Hwan Kim
Hanyang University, Korea
- 3-3369** **Stretchable Integrated Ion-Driven Electronics Utilizing Scalable, Non-Destructive Patterning of Polymer Electrolyte**
Hayoung Oh¹, Hyukmin Kweon¹, Wanho Cho², Seungtae Kim³, Je-Yeon Jung³, Seunghan Kim⁴, Moon Sung Kang⁴, Won Bo Lee³, Bongsoo Kim², Do Hwan Kim¹
¹Hanyang University, Korea
²Ulsan National Institute of Science and Technology, Korea
³Seoul National University, Korea
⁴Sogang University, Korea
- 3-3405** **Development and Optimization of Bioresorbable Polyurethane Protective Layers for Glucose Sensors at Ambient Temperature**
Solbi Han, Junwoo Yea, Tae sang Yu, Kyung in Jang
Daegu Gyeongbuk Institute of Science and Technology, Korea

- 3-3713** Hybrid Sub-Nanometer Pt Clusters Decorated MXene with PEOdT:PSS as High-Efficiency Electrocatalyst Toward Hydrogen Evolution Reaction
Zuwang Wen, Da-Young Lee, Myung-Han Yoon
Gwangju Institute of Science and Technology, Korea
- 3-3714** Flexible and Semi-Transparent Organic Electrochemical Transistors Based on Ultra-Thin Hybrid Electrode
Minhu Huang, Il-Young Jo, Myung-Han Yoon
Gwangju Institute of Science and Technology, Korea
- 3-3718** Retina-Inspired RGB Color-Discriminable Photonic Synapse Transistor for Neuromorphic Vision System
Bum Ho Jeong, Jaewon Lee, Miju Ku, Jongmin Lee, Dohyung Kim, Young-Beom Kim, Hui Joon Park
Hanyang University, Korea

Wearable and Stretchable Devices for Body-Implantable and Healthcare Applications

CHAIR(S)	Suk-Won Hwang (Korea University)
3-0793	Pressure Sensor Using Transparent, Plasma Frequency-Tunable Conducting Polymer as an Organic Electrode <u>Jaehyeok Choi</u>, Taehoon Kim, Wooyoung Shim <i>Yonsei University, Korea</i>
3-1288	Advanced Health Monitoring Device with Single Crystal $K_{0.8}Ti_{1.73}Li_{0.27}O_4$ Film: Outstanding Performance of Humidity Sensing <u>Jeong Ho Lee</u>, Young Hwan Kim, Sol Han, Si Hoon Jeong, Jeong Yun Hwang, Kyu Hyoung Lee <i>Yonsei University, Korea</i>
3-1620	Three-Dimensional Touch Device with Two Terminal Electrodes <u>Youngjun Cho</u>, Taehoon Kim, Gwangmook Kim, Wooyoung Shim <i>Yonsei University, Korea</i>
3-1972	Bioengineered 3D Skin Models Using Patient-Derived Cells and Decellularized Extracellular Matrix for Clinical Applications <u>Raehui Kang</u>, Junmin Lee <i>Pohang University of Science and Technology, Korea</i>
3-2302	Voltammetric Detection of Anti-Biotic Drug on Graphene-Copper Oxide Modified Electrode <u>Pinky Sagor</u> <i>Banaras Hindu University, India</i>
3-2318	Development of an Amperometric Acetylcholine Biosensor <u>Jieun Son</u>, Kyung-In Jang <i>Daegu Gyeongbuk Institute of Science and Technology, Korea</i>
3-2379	Flexible Neural Probe with Mechanically Transient Insertion Shuttle for Long-Term Deep Brain Decoding in Non-Human Primates <u>Janghwan Jekal</u>, Saehyuck Oh, Kyung-In Jang <i>Daegu Gyeongbuk Institute of Science and Technology, Korea</i>

- 3-2671** **Stretchable, Self-Healing Conductors for Bioresorbable, Transient Electronics System**
Chan-Hwi Eom¹, Tae-Min Jang¹, Won Bae Han², Suk-Won Hwang¹
¹Korea University, Korea
²Georgia Institute of Technology, USA
- 3-2857** **Highly Stretchable, Biodegradable/Biocompatible Elastomer-Based Soft, Transient Electronics**
Sungkeun Han, Gwan-Jin Ko, Suk-Won Hwang
Korea University, Korea
- 3-2879** **Tellurium Nanomesh-Based Multifunctional Tactile Sensor for Intrinsically Stretchable Electronic Skin**
Jinsung Mok^{1,2}, Yoon A Lee^{1,2}, You Meng³, Jisang Ha^{1,2}, Johnny Ho³, Dae-Hyeong Kim^{1,2}
¹Institute for Basic Science, Korea
²Seoul National University, Korea
³City University of Hong Kong, Hong Kong (SAR of China)
- 3-2885** **Low-Impedance, High-Conductivity Conductive Hydrogels via In Situ Segregation of Au and Pt for Biosensing and Therapy Applications**
Hyein Jeong^{1,2}, Dae-Hyeong Kim^{1,2}
¹Institute for Basic Science, Korea
²Seoul National University, Korea
- 3-3036** **Biocompatible Elastomeric Composites for Encapsulation of Stretchable, Transient Electronics**
So Jeong Choi, Gwan-Jin Ko, Won Bae Han, Suk-Won Hwang
Korea University, Korea
- 3-3069** **A Wearable Glottal Vibratory Monitoring System for Medical Diagnosis of Vocal Cord Disorders**
Hyeokjun Lee, Saehyuck Oh, Kyung-In Jang
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 3-3074** **Wireless, Folded Electronic System for Simultaneous Physiological Monitoring and On-Demand Drug Delivery**
Hyeokjun Lee, Soojeong Song, Kyung-In Jang
Daegu Gyeongbuk Institute of Science and Technology, Korea

- 3-3261** **Continuous Glucose Monitoring System for Long-term Use Utilizing a Biodegradable Protective Layer**
Tae Sang Yu, Junwoo Yea, Sol Bi Han, Kyung-In Jang
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 3-3294** **Simulation Study on the Separation of Rigid Elements and Soft Skin-Contact Electrodes in Multi-Modal Electronic System with Drug Delivery via Folded Structure**
Soojeong Song, Hyeokjun Lee, Kyung-In Jang
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 3-3637** **Real-Time AI-Powered Mechano-Acoustic System for Diagnosing Respiratory Conditions and Multifunctional Classification**
Sang Uk Park, Sang Min Won
Sungkyunkwan University, Korea
- 3-3642** **Real-Time Motion Classification Powered by Deep Learning**
Hyun Bin Kim, Sang Min Won
Sungkyunkwan University, Korea
- 3-3729** **Micro-Patterned Wearable Devices to Reduce Skin Damage**
Su Eon Lee¹, Bom Lee², Min-Ho Park², Bong Hoon Kim¹
¹*Daegu Gyeongbuk Institute of Science and Technology, Korea*
²*Soongsil University, Korea*
- 3-3733** **Multifunctional Wearable Devices Based on Helical Liquid Crystalline MoS₂**
Jun Hyun Park¹, Jang Hwan Kim², Sang Ouk Kim², Bong Hoon Kim¹
¹*Daegu Gyeongbuk Institute of Science and Technology, Korea*
²*Korea Advanced Institute of Science and Technology, Korea*
- 3-3795** **A Wireless, Solar Powered, Optoelectronic Device for Spatial-Restriction Free Neuromodulation**
Jaejin Park, Ki Jun Yu
Yonsei University, Korea
- 3-3837** **Fully Implantable, Battery-Less System-on-Chip Device for Electrical Stimulation Nerve Treatment**
Junhyeong Baek, Kyowon Kang, Ki Jun Yu
Yonsei University, Korea

Low-dimensional Materials and 2D van der Waals Heterostructures

Oral Presentation

Synthesis and Integration of Low-Dimensional Materials and 2D vdW Heterostructures (1)

November 25 | Landing C

CHAIR(S) Hyeon-Jin Shin (GIST), Ki Kang Kim (Sungkyunkwan University)

09:40-10:10
4-3554 Epitaxial Growth of Transition Metal Dichalcogenides - An Enabling Technology for Large Area 2D Device Applications

KEYNOTE Joan Redwing
Penn State University, USA

10:10-10:40
4-3791 Orientated Lateral Growth of Two-Dimensional Materials on C-Plane Sapphire

INVITED Vincent Tung
The University of Tokyo, Japan

10:40-10:55
4-2944 Van der Waals Epitaxial Growth of SnS₂ on an Atomically Thin Mica Layer by Solution-Process

Chang-Won Choi^{1,2}, Hyein Hwang², Seung Hwae Heo³, Jae Sung Son², Si-Young Choi^{1,2}

¹*Institute for Basic Science, Korea*

²*Pohang University of Science and Technology, Korea*

³*Purdue University, USA*

10:55-11:10
4-1112

Wafer-Scale AA-Stacked Hexagonal Boron Nitride Grown on GaN Substrate

Seokho Moon¹, Francis Ngome Okello Odongo¹, Adrien Rousseau², Youngjae Kim³, Younjae Park⁴, Pierre Valvin², Kenji Watanabe⁵, Takashi Taniguchi⁵, Giorgia Fugallo⁶, Wilfried Desrat², Feng Ding⁷, Bernard Gil², Guillaume Cassaboïs², Si-Young Choi¹, Jong Kyu Kim¹

¹Pohang University of Science and Technology, Korea

²UMR5221 CNRS-Universite de Montpellier, France

³Daegu Gyeongbuk Institute of Science and Technology, Korea

⁴Ulsan National Institute of Science and Technology, Korea

⁵National Institute for Materials Science, Japan

⁶Universite de Nantes, France

⁷Shenzhen Institute of Advanced Technology, China

11:10-11:40
4-0986
INVITED

CVD Growth, Integration, and Electronic Applications of High-Quality 2D Materials for 2.5-Dimensional Materials Science

Hiroki Ago

Kyushu University, Japan

11:40-11:55
4-1119

Tellurium Based p-Type Material Growth for Electronic Device

Jin Young Park¹, Min Soo Moon², Ju Hwan Baek¹, Yonas Tsegaye Megra¹, Hoon Hahn Yoon¹, Dong-Ho Kang¹, Gang Hee Han², Hyeon-Jin Shin¹

¹Gwangju Institute of Science and Technology, Korea

²Incheon National University, Korea

11:55-12:10
4-0955

Synthesis of One-Dimensional Wire-, Tube-, and Coil-Shaped Nanostructures by Template-Assisted Electrodeposition

Eunjin Jeong, Yoo Sang Jeon, Jun Hwan Moon, Young Keun Kim

Korea University, Korea

Synthesis and Integration of Low-Dimensional Materials and 2D vdW Heterostructures (2)

November 25 | Landing C

CHAIR(S)

Ki Kang Kim (Sungkyunkwan University),
Changhyun Kim (Samsung Advanced Institute of Technology)

13:10-13:40

4-2250

Controllable Preparation of Wafer-Scale Two-Dimensional van der Waals Heterostructures

INVITED

Libo Gao

Nanjing University, China

13:40-14:10

4-0112

Bottom-Up Synthesis of 2D Materials for Future Electronics

Seokjoon Yun

University of Ulsan, Korea

14:10-14:25

4-1002

Carbon Incorporation in MOCVD-Grown hBN and its Optoelectronic Characteristics

Semi Im, Seokho Moon, Jong Kyu Kim

Pohang University of Science and Technology, Korea

14:25-14:40

4-2673

A New Bi-Terminated Layered Material Ni_2InBi_3

Jaemun Park¹, Beopgil Cho¹, Jiseop Oh^{2,3}, In-Ho Lee⁴, Keeseong Park¹

¹Daegu Gyeongbuk Institute of Science and Technology, Korea

²University of California, Berkeley, USA

³Sookmyung Women's University, Korea

⁴Korea Research Institute of Standards and Science, Korea

14:40-14:55

4-2603

Direct Probing of Chalcogen-Driven Atomic-Reconstruction in Thermodynamic Moiré Heterobilayer

Dong-Hwan Yang^{1,2}, Kyo-Won Lee^{1,2}, Chang-Soo Lee¹, Moon-Ho Jo^{1,2}, Si-Young Choi^{1,2}

¹Pohang University of Science and Technology, Korea

²Institute for Basic Science, Korea

Fundamental Properties and Nano-characterization of Low-dimensional Materials and 2D vdW Heterostructures (1)

November 25 | Landing C

CHAIR(S) Jangyup Son (KIST)

15:00-15:30 Novel Approach to Fabricate 2D Materials and Moiré Materials

4-1574 Gwan-Hyoung Lee

INVITED *Seoul National University, Korea*

15:30-16:00 Orientation-Engineered Two-Dimensional Bi₂O₂Se Semiconductors

4-3746 Johnny Ho

INVITED *City University of Hong Kong, Hong Kong (SAR of China)*

16:00-16:30 Widely-Tunable Magnetoelectric Coupling in van der Waals
4-0591 Multiferroics

INVITED Yi Zheng, Qi-feng Hu

Zhejiang University, China

16:30-16:45 Metallic 1T/1T' Phase TMD Nanosheets with Enhanced Chemisorption
4-3688 Sites for Ultrahigh-Efficiency Lead Removal

Liang Mei, Zhiyuan Zeng

City University of Hong Kong, Hong Kong (SAR of China)

Fundamental Properties and Nano-characterization of Low-dimensional Materials and 2D vdW Heterostructures (2)

November 25 | Landing C

CHAIR(S) Woo Jong Yu (Sungkyunkwan University)

16:50-17:20 **4-2631** Nondestructive Single-Atom-Thick Crystallographic Scanner for 2D Materials

INVITED Ji-Yun Moon¹, Jae-Hyun Lee²

¹Washington University, USA

²Ajou University, Korea

17:20-17:50 **4-0108** Mechanics of Two-Dimensional Materials in the Three-Dimensional Space

INVITED Jaehyung Yu

Chung-Ang University, Korea

17:50-18:05 **4-3699** On-Chip Investigation of 2D Electrocatalysts

Qiyuan He

City University of Hong Kong, Hong Kong (SAR of China)

Advanced Applications of Low-dimensional Materials and 2D vdW Heterostructures (1)

November 26 | Landing C

CHAIR(S)

Hyeon-Jin Shin (GIST), Woo Jong Yu (Sungkyunkwan University)

08:15-08:30

4-0920

InSe Ambipolar Transistors and their Conversion to Reconfigurable Unipolarity, Rectifications, and Breakdowns

Minsu Kim¹, Dongju Yeom¹, Yongwook Seok¹, Jungi Song¹, Hanbyeol Jang^{2,3}, Yi-Taek Choi^{2,3}, Yeonghyun Ko¹, Kayoung Lee¹

¹Korea Advanced Institute of Science and Technology, Korea

²Gwangju Institute of Science and Technology, Korea

³Samsung Semiconductor R&D Center, Korea

08:30-08:45

4-0871

Black Phosphorus Homojunction Multi-Valued Transistors

Youngkyu Ko¹, Dongju Yeom¹, Yeonghyeon Ko¹, Seokhun Jin¹, Heungsoon Im², Yongwook Seok¹, Hanbyeol Jang³, Kayoung Lee¹

¹Korea Advanced Institute of Science and Technology, Korea

²Gwangju Institute of Science and Technology, Korea

³Samsung Electronics Co., Ltd., Korea

08:45-09:00

4-2382

Exploring the Photophysical and Electrical Properties of Two-Dimensional Tungsten Diselenide (WSe₂) Films

Suyash Rai^{1,2}, Anchal Srivastava¹

¹Banaras Hindu University, India

²Korea Research Institute of Standards and Science, Korea

09:00-09:30

4-3800

KEYNOTE

3D Integration of 2D Materials

Saptarshi Das

Penn State University, USA

09:30-10:00

4-0705

INVITED

Energy Intelligent Computing Devices Based on 2D Materials

Heejun Yang

Korea Advanced Institute of Science and Technology, Korea

10:00-10:30

4-0331

INVITED

3D van der Waals Integration of 2D Electronics

Yuan Liu

Hunan University, China

Advanced Applications of Low-dimensional Materials and 2D vdW Heterostructures (2)

November 26 | Landing C

CHAIR(S)	Woo Jong Yu (Sungkyunkwan University), Ki Kang Kim (Sungkyunkwan University)
10:50-11:20 4-0828 INVITED	Single-Pixel Computational Spectrometers and Single-Photodetector Multi-Valued Logic Gates <u>Hoon Hahn Yoon</u> <i>Gwangju Institute of Science and Technology, Korea</i>
11:20-11:50 4-1409 INVITED	Novel 2D Materials Integrated SiN Waveguides for Chip-Based Nonlinear Photonics <u>Sanghoon Chae</u> <i>Nanyang Technological University, Singapore</i>
11:50-12:05 4-2166	Development of a High-Performance Tungsten Trioxide-Based Electrochemical Energy Storage System for Capturing Regenerative Braking Energy in Electric Vehicles <u>Swaminathan Rajavarman</u>¹, Pazhamalai Parthiban¹, Krishnamoorthy Karthikeyan^{1,2}, Krishnan Vignesh¹, Sang-Jae Kim¹ ¹Jeju National University, Korea ²CSIR- Advanced Materials and Processes Research Institute, India
12:05-12:20 4-3662	Intercalation in 2D TMDs and In-Situ Studies for Scalable Production and Water Decontamination <u>Zhiyuan Zeng</u> <i>City University of Hong Kong, Hong Kong (SAR of China)</i>
12:20-12:35 4-0619	Highly Photocatalytic Activity of Heterojunction Mode ZnO/WO₃ Fabricated on the rGO Matrix <u>Sagarika Sahoo</u>, Ryunkyeong Lee, Kee Sun Lee <i>Kongju National University, Korea</i>

Industrial Prospects of Low-dimensional Materials and 2D vdW Heterostructures (1)

November 26 | Landing C

CHAIR(S)

Changhyun Kim (Samsung Advanced Institute of Technology)

15:00-15:30

4-0392

INVITED

MOCVD of 2D Materials for 300 mm CMOS Integration

Sergej Pasko¹, Apostolia Manasi¹, Henry Medina Silva², Jan Mischke¹, Emre Yengel¹, Simonas Krotkus¹, Michael Heuken¹, Pierre Morin², Salim El Kazzi¹, Alex Henning¹

¹AIXTRON, Germany

²Imec, Belgium

15:30-16:00

4-1333

INVITED

Challenges and Progress in 2D Material Integration for Logic

Kyung-Eun Byun, Junyoung Kwon, Eun-Kyu Lee, Minsu Seol, Min Seok Yoo, Chang Hyun Kim

Samsung Advanced Institute of Technology, Korea

16:00-16:30

4-1078

INVITED

Multiscale DFT-TCAD Simulations for Optimizing Nanoscale Devices Based on Low-Dimension Materials

Yoonhoo Ha, Yeonchoo Cho, Eunkyu Lee, Kyung-Eun Byun

Samsung Advanced Institute of Technology, Korea

Industrial Prospects of Low-dimensional Materials and 2D vdW Heterostructures (2)

November 26 | Landing C

CHAIR(S) Jangyup Son (KIST)

16:50-17:20 Electrothermal Radiation from Multi-Layered Graphene: Black-body vs. Plasmon
4-3552

INVITED Byung Hee Hong
Seoul National University, Korea

17:20-17:35 Ultrathin and Deformable Graphene Etch Mask for Fabrication of 3D Microstructures
4-0345

Jiwoo Kim¹, Donghoon Moon¹, Hyunchul Kim², Arend M. Van der Zande², Gwan-Hyoung Lee¹

¹Seoul National University, Korea

²University of Illinois at Urbana-Champaign, USA

17:35-17:50 Reduced Graphene Oxide and α -Ga₂O₃ Schottky Contact for Solar-Blind UV Photodiodes
4-1164

Daeju Kim, Su Young Kim, Bhishma Pandit, Jaehee Cho

Jeonbuk National University, Korea

Poster Presentation | November 25

Synthesis and Integration of Low-Dimensional Materials and 2D vdW Heterostructures (3)

CHAIR(S)

Ki Kang Kim (Sungkyunkwan University), Hyeon-Jin Shin (GIST)

4-0641

Atomic Reconstruction of Transition Metal Dichalcogenides Hetero-Bilayers with Large Lattice Mismatch

Seong Chul Hong¹, Ji-Hwan Baek¹, Yuneong Chang¹, Hong M. Nguyen², Wongyu Park¹, Chaesung Lim¹, Changheon Kim¹, Hyeongseok Lee¹, Kenji Watanabe³, Takashi Taniguchi³, Jangyup Son⁴, Jeong Woo Han¹, Hyeonsik Cheong², Miyoung Kim¹, Gwan-Hyoung Lee¹

¹Seoul National University, Korea

²Sogang University, Korea

³National Institute for Materials Science, Japan

⁴Korea Institute of Science and Technology, Korea

4-0798

Direct Synthesis of Twisted WSe₂ Multilayers by B₂O₃-Assisted Chemical Vapor Deposition

Jinwoo Kim, Gwan-Hyoung Lee

Seoul National University, Korea

4-1060

Low Temperature MoS₂ Synthesis Using Plasma Enhanced Metal Organic Chemical Vapor Deposition

Hyun-Geun Oh, Donghoon Moon, Gaeun Moon, Gwan-Hyoung Lee

Seoul National University, Korea

4-1094

Atomic-Layer Substitution of Large-Area Transition Metal Dichalcogenides for Enhanced Hydrogen Evolution Reaction

Dong-Hyun Kim, Yunjo Jeong, Changheon Kim, Jangyup Son

Korea Institute of Science and Technology, Korea

4-1173

Growth of Wrinkle Free Crystalline Graphene at Low Temperature on Copper Using ICP-CVD

Changheon Kim¹, Gwan-Hyoung Lee², Jangyup Son¹

¹Korea Institute of Science and Technology, Korea

²Seoul National University, Korea

- 4-1264** **Growth of Large-Area High-Quality Multilayer Molybdenum Disulfide Film via Two-Step Growth Process**
Jae Woo Kim¹, Andrew Ben-Smith¹, Anthonio Enoch Elorm¹, Soo Min Kim², Ki Kang Kim¹
¹*Sungkyunkwan University, Korea*
²*Sookmyung Women's University, Korea*
- 4-1293** **Controllable In-Situ p-Type Substitutional Doping of MoS₂ Using MOCVD**
Sungyeon Kim, Jaeeun Kwon, Kyungmin Ko, Seonguk Yang, Joonki Suh
Ulsan National Institute of Science and Technology, Korea
- 4-1302** **Surface Reconstruction of Miscut Sapphire Substrate for the Epitaxial Growth of Large-Scale Single-Crystalline Transition Metal Dichalcogenides**
Swathi Krishna¹, Yejoo Kwon², Soo Min Kim², Ki Kang Kim¹
¹*Sungkyunkwan University, Korea*
²*Sookmyung Women's University, Korea*
- 4-1319** **High-Performance Electronic Devices Utilizing Layer-Dependent Electronic Properties of PtSe₂**
Yumin Shin, Donghoon Moon, Moon Chul Jeong, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1334** **Hypotaxial Growth of Highly Crystalline Antiferromagnetic Cr₂Se₃**
Chan Yeol Park¹, Donghoon Moon¹, Jimin Jang², Changgu Lee², Gwan-Hyoung Lee¹
¹*Seoul National University, Korea*
²*Sungkyunkwan University, Korea*
- 4-1338** **Large-Scale Fabrication of 2D Materials-Based Moiré Structures via Hypotaxy**
Donghoon Moon, Jinwoo Kim, Seong Chul Hong, Ji-Hwan Baek, Jiwoo Kim, Hyun-Geun Oh, Hyeongseok Lee, Gaeun Moon, Gwan-Hyoung Lee
Seoul National University, Korea

- 4-1353** Plasma Electron Etching (PE²) for Atomically Precise Layer-by-Layer Etching of Two-Dimensional Materials
Yunjo Jeong¹, Jong-Bae Park², Eunjin Choi¹, Dae Chul Kim², Young-Woo Kim², Sukang Bae¹, Jangyup Son¹
¹Korea Institute of Science and Technology, Korea
²National Fusion Research Institute, Korea
- 4-1365** Laterally Stitched 2D Metal-Semiconductor Junction with Low Contact Resistance Fabricated by Pd-to-PdTe₂ Transition
Jaewoong Joo, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1368** Hypotaxy of Transition Metal Dichalcogenides by Directly Grown Graphene
Gaeun Moon, Donghoon Moon, Jiwoo Kim, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1391** Wafer-Scale Growth of 3R-Stacked Transition Metal Dichalcogenide Films Through 3R Seed Template
Jundong Yeo, Donghoon Moon, Seong Chul Hong, Yoona Kim, Jinwoo Kim, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1396** Large-Scale Growth of In₂Se₃ with Phase Controllability
Jiwon Lee, Donghoon Moon, Jinwoo Kim, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1767** Growth of Hexagonal Boron Nitride on Graphene by Metal-Organic Chemical Vapor Deposition
Changwook Ji, Seokho Moon, Semi Im, Inyong Hwang, Jaesub Song, Seonghyeon Park, Jong Kyu Kim
Pohang University of Science and Technology, Korea

- 4-2545** **Wafer-Scale Synthesis of Highly Oriented 2D Topological Semimetal PtTe₂ via Tellurization**
Minhyuk Choi^{1,2}, Jeongtae Kim^{1,3}, Nurul Hasanah^{1,4}, Gyeongbo Kim⁵, Kibum Kang⁴, Seungwoo Song¹
¹Korea Research Institute of Standards and Science, Korea
²Hanyang University, Korea
³Chungnam National University, Korea
⁴Korea Advanced Institute of Science and Technology, Korea
⁵Yonsei University, Korea
- 4-3374** **Photo-Oxidative Crack Propagation in Transition Metal Dichalcogenides**
Andrew Ben-Smith, Young Hee Lee, Ki Kang Kim
Sungkyunkwan University, Korea
- 4-3653** **Surfactant-Free Ultrasonication-Assisted Synthesis of 2D Tellurium Based on Metastable 1T'-MoTe₂**
Junlei Qi, Cong Ma, Qiyuan He
City University of Hong Kong, Hong Kong (SAR of China)

Fundamental Properties and Nano-Characterization of Low-Dimensional Materials and 2D vdW Heterostructures (3)

CHAIR(S)

Jangyup Son (KIST)

- 4-0595** Large-Area Imprinting with Nano-Lithography Through Scanning Probe Microscopy
Jihoon Han, Wooyoung Shim
Yonsei University, Korea
- 4-0675** Multi-Functional Junction Devices Based on 2D van der Waals Materials
Jin Hyuk Choi, Ji Hoon Kang, Young Tack Lee
Inha University, Korea
- 4-0677** A Customized Circuit Fabricated with a Single Component Made Using Ga₂O₃ Channel, Au and EGaIn Electrodes
Gyeong Seop Kim, Ji Hoon Kang, Young Tack Lee
Inha University, Korea
- 4-0922** Plasma Treatment of Two-Dimensional Metal Oxide Semiconductors for Design of Tunable Nano-Electronic Junctions
Mohammad Karbalaee Akbari, Nasrin Siraj Lopa, Serge Zhuiykov
Ghent University, Belgium
- 4-1211** Modulation of Metal Work Functions by Quasi-van der Waals Recrystallization
Yuna Lee, Hayeong Sung, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1443** Formation of Lateral-Junction of Twisted and Zero-Twisted Transition Metal Dichalcogenide Heterobilayer via Atomic Reconstruction
Hyeongseok Lee, Ji-Hwan Baek, Seong Chul Hong, Dong Hoon Moon, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1606** Polymorphs of Two-Dimensional FeAs with High Anisotropy
Jongbum Won, Wooyoung Shim
Yonsei University, Korea

- 4-2716** The Study of Optical Quantum Transition of Semiconductor in Deformation Potential Phonon Interacting Qusi Two Dimensional System Under Two Circularly Oscillating Fields
Su-Ho Lee¹, He-Rie Park¹, Sang-Hyo Kim¹, Sek-Min Joo²
¹*Dong-A University, Korea*
²*Masan University, Korea*
- 4-3118** Effect of Electric Field on the Optical Properties and Localized Surface Plasmon Resonance of Fe₃O₄/Ag Magnetic Nanoparticles
Muhammad Riswan¹, Eri Widiyanto^{1,2}, Muhammad Arifin¹, Iman Santoso¹, Edi Suharyadi¹
¹*Universitas Gadjah Mada, Indonesia*
²*Universitas Singaperbangsa Karawang, Indonesia*
- 4-3404** Synthesis of Single Crystal VP₁₁ via Salt-Free Binary Metal Flux for High-Performance Photodetector
Byung Hoon Lee¹, Jiwon Kim¹, Soo Ho Choi², Young Hee Lee¹, Ki Kang Kim¹
¹*Sungkyunkwan University, Korea*
²*University of Illinois at Urbana-Champaign, USA*

Advanced Applications of Low-Dimensional Materials and 2D vdW Heterostructures (3)

CHAIR(S)

Woo Jong Yu (Sungkyunkwan University),
Changhyun Kim (Samsung Advanced Institute of Technology)

4-0646

Synergistic Catalytic Effects of MoS₂ and Carbon Nanomaterial Composite

Eunjin Choi^{1,2}, Soyeon Kim¹, Seongchan Cho¹, Sanghan Lee², Jangyup Son¹, Junyeon Hwang¹

¹Korea Institute of Science and Technology, Korea

²Gwangju Institute of Science and Technology, Korea

4-0666

Opto-Neuromorphic Computing by Photo Responses of Ferroelectric P(VDF-TrFE) Field-Effect Transistors

Min Jae Son, Ji-Hoon Kang, Young Tack Lee

Inha University, Korea

4-0680

Optical Properties of SnO₂/TiO₂ Coaxial Nanowires

Sangwoo Kim¹, Myung Sik Choi², Changhyun Jin³

¹Korea Institute of Industrial Technology, Korea

²Kyungpook National University, Korea

³Yonsei University, Korea

4-0683

Enhanced NO₂ Gas Sensing in Humid Environments Using Titanium-Based MOF-Coated SnO₂ Nanowires

Hyoun Woo Kim, Sungjoon Moon, Ka Yoon Shin, Wansik Oum, Eun Bi Kim, Seonwoo Jang

Hanyang University, Korea

4-0873

Graphene Origami with Controllable Foldability

Yoon Kim, Jiwoo Kim, Donghoon Moon, Gwan-Hyoung Lee

Seoul National University, Korea

4-0943

Fluorinated Graphene Transfer Technique for Monolithic 3D Integration

Hyunjun Kim¹, Huije Ryu², Hyun Woo Jeong¹, Jiwoo Kim¹, Donghoon Moon¹, Sangik Moon¹, Cheol Seong Hwang¹, Min Hyuk Park¹, Gwan-Hyoung Lee¹

¹Seoul National University, Korea

²Samsung Advanced Institute of Technology, Korea

- 4-1041** **Reconfigurable Two-Dimensional Floating Gate Field-Effect Transistors for Highly Integrated In-memory Computing**
June-Chul Shin^{1,2}, Taegyun Park¹, Dong Hoon Shin¹, Hyun-Young Choi¹,
Cheol Seong Hwang¹, Gwan-Hyoung Lee¹
¹Seoul National University, Korea
²Massachusetts Institute of Technology, USA
- 4-1100** **Flexible and Transparent Gold Network Electrodes on Fluorinated Graphene**
Yuna Lee¹, Eunji Ji², Minjung Kim², Gwan-Hyoung Lee¹
¹Seoul National University, Korea
²Yonsei University, Korea
- 4-1209** **Deterministic Formation of Conductive Filaments Through Crossed Grain Boundary of Sb₂O₃ for High Reliability of Memristors**
Byeongchan Kim, Hyun-Jun Kim, Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1237** **High Precision Albumin Sensing 2D TMDC-Based JFET Biosensors Featuring Modular Capacitive Elements**
Sesung Park, Ji Hoon Kang, Young Tack Lee
Inha University, Korea
- 4-1238** **Electrical Polarization Switching in 3R-WSe₂ Bilayer**
Ji-Hwan Baek, Seong Chul Hong, Jinwoo Kim, Hyeongseok Lee,
Gwan-Hyoung Lee
Seoul National University, Korea
- 4-1266** **Stable SWCNT-TiO₂ Hybrid Catalyst with High-Density SWCNT Networks for Hydrogen Evolution Reaction**
Minji Park^{1,2}, Eun-Jin Choi^{1,2}, Min Ji Im¹, Sugang Bae¹, Sanghan Lee²,
Sang Seok Lee¹, Jangyup Son¹
¹Korea Institute of Science and Technology, Korea
²Gwangju Institute of Science and Technology, Korea
- 4-1347** **Two-Dimensional Field-Effect Transistor Formed by Reduction of Sb₂O₃**
Donggon Yoo, Hyun-Jun Kim, Changheon Kim, Gwan-Hyoung Lee
Seoul National University, Korea

- 4-1377** **Vertically Aligned MoS₂ Devices with Sub-10 nm Channel and 1D Graphene Contacts**
Moonchul Jung, Kyungmin Yang, Donghoon Moon, Chan Yeol Park, Gwan Hyoung Lee
Seoul National University, Korea
- 4-2489** **Next-Generation Ferroelectric Devices Optimizing HZO and Graphene Hetero Structures**
Gyuri Choi
Sungkyunkwan University, Korea
- 4-2744** **Ag Ion Intercalation in h-BN/MoTe₂ Heterostructures for Nanochannel Memristor Development**
Junsun Son, Woojong Yu
Sungkyunkwan University, Korea
- 4-2808** **Develop of Uniform Ultramicropores 3D Graphene Structures Based on Eco-Friendly Cellulose for CO₂ Capture**
Jang Hee Kim, Taeyoung Park, Hyeon Ji Jeong, Kwang Hyun Park, Sung Ho Song
Kongju National University, Korea
- 4-2812** **Engineering 3D Graphene Nanostructured Active Materials Derived from Highly Porous Cellulose-Based Biomass Resource and Applying to Capacitors**
Taeyoung Park, Jang Hee Kim, Hyeon Ji Jeong, Kwang Hyun Park, Sung Ho Song
Kongju National University, Korea
- 4-2865** **Parallel Processing in Computer Vision: A Neuromorphic System Using Floating-Gate Memristors**
Hyungsuk Oh, Woo Jong Yu
Sungkyunkwan University, Korea
- 4-3037** **Au Nanoislands on Fluorinated Graphene for SERS**
Unhyeon Lee^{1,2}, Yuna Lee³, Subin Shin¹, Taegeon Lee², Yunjo Jeong¹, Changheon Kim^{1,3}, Gwan-Hyoung Lee³, Heesuk Rho², Jangyup Son¹
¹*Korea Institute of Science and Technology, Korea*
²*Jeonbuk National University, Korea*
³*Seoul National University, Korea*

- 4-3253** **Enhanced the Potential of Halloysite Nanotubes for Lithium-Ion Battery Anodes via Polypyrrole-Derived Carbon Coating**
Pestaria Sinaga, Ji Hong Kim, Sung-Hwan Bae
Kyungnam University, Korea
- 4-3466** **Study on Hydrophilic/Hydrophobic Conversion Mechanism on TiO_2 Surface via Graphene Transfer and its Application Potential**
Yunjin Kim, Soosang Chae
Korea University of Technology and Education, Korea
- 4-3670** **Metallic 1T Phase MoS_2 Nanosheets Covalently Functionalized with BBD Molecules for Enhanced Supercapacitor Performances**
Weikang Zheng, Zhiyuan Zeng
City University of Hong Kong, Hong Kong (SAR of China)
- 4-3671** **Vacancy Functionalized MoS_2 Nanolaminated Membranes for Efficient Sieving in Forward Osmosis**
Ting Ying, Zhiyuan Zeng
City University of Hong Kong, Hong Kong (SAR of China)
- 4-3895** **Tailoring Nanopores in Graphene and Graphene Oxide for Enhanced Hydrogen Gas Filtration**
Yongjun Shin¹, Kyungmin Yang¹, Eunji Ji², Dongchul Sung³, Suklyun Hong³, Jangyup Son⁴, Gwan-Hyoung Lee¹
¹*Seoul National University, Korea*
²*Yonsei University, Korea*
³*Sejong University, Korea*
⁴*Korea Institute of Science and Technology, Korea*
- 4-3911** **On-chip Microdevice Investigation of Electrocatalytic Ethanol Oxidation Reaction**
Lingzhi Wang, Kai Bao, Junlei Qi, Qiyan He
City University of Hong Kong, Hong Kong (SAR of China)

Emerging Materials for Metaverse Display

Oral Presentation

Halide Perovskite Materials and Devices

November 26 | Olle

CHAIR(S)

Jaehoon Lim (Sungkyunkwan University)

15:00-15:30

5-3101

KEYNOTE

Fostering Light Emission in Dynamic Materials for Emerging Displays

Farzaneh Jahanbakhshi¹, Aaliyah Khan¹, Jiahao Zhang¹, Zhenbang Dai²,
Andrew M Rappe¹¹University of Pennsylvania, USA²University of Texas at Austin, USA

15:30-16:00

5-2271

INVITED

Passivation Strategies for Mitigating Defect Challenges in Halide
Perovskite Light-Emitting DiodesBo Ram Lee

Sungkyunkwan University, Korea

16:00-16:30

5-2159

INVITED

Organic Host Blend Perovskite Nanocrystal for Highly Efficient Light-
Emitting DiodesTakayuki Chiba

Yamagata University, Japan

Emerging Technologies for Advanced Displays

November 26 | Olle

CHAIR(S) Bo Ram Lee (Sungkyunkwan University)

16:50-17:20 Efficient Blue Perovskite Light-Emitting Diodes

5-1725 Jingbi You

INVITED *Chinese Academy of Sciences, China*

17:20-17:50 Anisotropic Colloidal Quantum Dot Heterostructures

5-3912 Moonsub Shim

INVITED *University of Illinois at Urbana-Champaign, USA*

17:50-18:20 Flexible, Foldable, and Stretchable QLEDs

5-0176 Dae-Hyeong Kim^{1,2}

INVITED ¹*Seoul National University, Korea*

²*Institute for Basic Science, Korea*

18:20-18:35 Doped Inorganic Crystals for Advanced Lighting and Display

5-3694 Feng Wang

City University of Hong Kong, Hong Kong (SAR of China)

Quantum Dots for Advanced Display Technology

November 27 | Olle

CHAIR(S)	Yeongjun Lee (KAIST)
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09:40-10:10	High Stability QD-LED at High Brightness
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5-0168	<u>Huaibin Shen</u>
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INVITED	<i>Henan University, China</i>
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10:10-10:40	Dipole-Dipole-Interaction-Assisted Self-Assembly of Quantum Dots for Highly Efficient Light-Emitting Diodes
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5-0621	<u>Fengjia Fan</u>
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	<i>University of Science and Technology of China, China</i>
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10:40-11:10	Carrier Injection and Transport in Quantum Dot Light-Emitting Diodes
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5-0229	<u>Qiang Su</u>
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INVITED	<i>Great Bay University, China</i>
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11:10-11:40	Canceled
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5-0634	
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INVITED	
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11:40-12:10	Full-Color Quantum Dot Photodetector Arrays for Color-Selective Imaging and Biomedical Applications
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5-0517	<u>Jaehyun Kim</u>
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	<i>Dongguk University, Korea</i>
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Materials and Devices for Metaverse Display

November 27 | Olle

CHAIR(S) Min-Jae Choi (Dongguk University)

13:40-14:10
5-3823 Realization of Blue-Emissive Perovskite Nanocrystals Through In-Situ Fabrication and Post-Treatment

INVITED

Chang-Lyoul Lee^{1,2}

¹Advanced Photonics Research Institute, Korea

²Gwangju Institute of Science and Technology, Korea

14:10-14:40
5-0299 Complex Reflectivity Modulation for Holographic Metaverse Display

INVITED

Yong Hae Kim¹, Kyunghee Choi¹, Jaehyun Moon¹, Jong Heon Yang¹, Ji Hoon Choi¹,
Jae-Eun Pi¹, Chi-Sun Hwang¹, Jeong-Seon Yu², Jong-Heon Kim²

¹Electronics and Telecommunications Research Institute, Korea

²Chungnam National University, Korea

14:40-15:10
5-0618 Design of Precursors for Synthesis in InP Quantum Dots with High Quantum Yield and Tunable Emission Wavelength

INVITED

Min-Jae Choi

Dongguk University, Korea

15:10-15:40
5-0606 Towards Electrically Driven Coherent Light Emitters from Metal Halide Perovskites

INVITED

Kwangdong Roh

Ewha Womans University, Korea

Flexible and Stretchable Displays for Wearable Applications

November 27 | Olle

CHAIR(S)

Kwangdong Roh (Ewha Womans University)

16:30-16:45

5-1306

Size-Dependent Degradation via Sidewall Defects and Recombination Processes in InGaN-Based Micro LED

Jeonghyeon Park¹, Won Seok Cho¹, Jawon Kim¹, Chuljong Yoo², Buem Joon Kim², Junseok Jeong², Jong Kyu Kim¹

¹Pohang University of Science and Technology, Korea

²Samsung Display Co., Ltd., Korea

16:45-17:15

5-1424

Stretchable Organic Optoelectronic Devices for Real-Time Health Monitoring Wearable Systems

INVITED

Yeongjun Lee

Korea Advanced Institute of Science and Technology, Korea

17:15-17:45

5-0380

Intrinsically Stretchable Optoelectronic Materials for Wearable Display Devices

INVITED

Desheng Kong

Nanjing University, China

17:45-18:15

5-2364

Liquid Metal Particle-Based Stretchable Conductors for Wearable Devices

INVITED

Steve Park

Korea Advanced Institute of Science and Technology, Korea

Poster Presentation | November 27

Halide Perovskite Materials and Devices

CHAIR(S)

Tae-Woo Lee (Seoul National University), Soo Young Kim (Korea University)

- 5-0531** Enhancing Efficiency in Vacuum-Evaporated Perovskite Light Emitting Diodes Through an Artificial Multiple Quantum Well Structure
Yunna Kim, Byungha Shin
Korea Advanced Institute of Science and Technology, Korea
- 5-1012** Revealing the Role of Organic Ligands in Deep-Blue-Emitting Colloidal Europium Bromide Perovskite Nanocrystals
Jaeyeong Ha, Seongbeom Yeon, Jaehwan Lee, Hyungdoh Lee, Himchan Cho
Korea Advanced Institute of Science and Technology, Korea
- 5-1160** Fabrication of CsPbBr₃ Perovskite Light-Emitting Diodes with Inorganic ETLs via Direct Atomic Layer Deposition of ZnO
Min Ju Kim¹, Seong-Yong Cho¹, Ju Young Woo²
¹Hanyang University, Korea
²Korea Institute of Industrial Technology, Korea
- 5-1201** Highly Bright, Efficient Deep-Blue Perovskite Light-Emitting Diodes via Synergetic Solid-State Halide Exchange Method
Jun-Seo Lee, Himchan Cho
Korea Advanced Institute of Science and Technology, Korea
- 5-1206** Highly Bright and Efficient Perovskite Light-Emitting Diode by Interfacial Engineering on NiO_x Inorganic Hole Transport Layer with Low Turn-on Voltage
Hyungdoh Lee, Himchan Cho
Korea Advanced Institute of Science and Technology, Korea
- 5-1660** High Quantum Yield Red Emissive CsPbI₃ Quantum Dots Enhanced by Inorganic Shell Structures for Luminescence Applications
Jaemin Jeong, Soo Young Kim
Korea University, Korea

- 5-1682** **Synthesizing Divalent Metal-Doped Perovskites via Ball Milling**
Heesung Yoon, Soo Young Kim
Korea University, Korea
- 5-1684** **Synthesis of Red-Emitting Iodine-Free Halide Perovskite for Vacuum Deposition Methods**
In Hyang Kim, Soo Young Kim
Korea University, Korea
- 5-1685** **Augmenting the Refractive Index of Cesium Lead Bromide Through the Incorporation of Molybdenum Disulfide as a Dopant for Optoelectronic Devices**
Bumsoo Kim, Soo Young Kim
Korea University, Korea
- 5-1717** **Enhanced Stability and High Photoluminescence in Mixed-Phase (0D-3D) Lead Halide Perovskite Nanocrystals**
Hyejin Choe, Soo Young Kim
Korea University, Korea
- 5-1945** **Effect of Oleylamine in Hot-Injection Method for Cs-Cu-X (X = Br, I) Ternary Microcrystal Growth**
Jung Hyeon Yoo, Seok Bin Kwon, Dae Ho Yoon
Sungkyunkwan University, Korea
- 5-2117** **Efficient Synthesis Method of CsPbBr₃/Al₂O₃ Composite Powders for Scalable Production: Augmented Green Emission and Thermal Stability**
Seokhun Kim¹, Jong-Min Oh², Sunghoon Kim¹
¹*Dong-Eui University, Korea*
²*Kwangwoon University, Korea*
- 5-2120** **Enhanced Luminescence and Thermal Stability of CsPbBr₃ Films via Solvent-Free Aerosol Deposition with Fumed Silica for Chip Scale White LED Package**
Ji-Woo Hong¹, Jun-Woo Lee², Jong-Min Oh², Sunghoon Kim¹
¹*Dong-Eui University, Korea*
²*Kwangwoon University, Korea*

Quantum Dots for Advanced Display Technology

CHAIR(S)

Jaehoon Lim (Sungkyunkwan University)

- 5-0427** **Synthesis of Red CdSe/ZnSeS QDs with High Quantum Yield and Extremely Narrow Full-Width at Half Maximum**
Byoung-ho Kang, Jaesung Lee, Sanghoon Jung, Sehyuk Yeom, Wanghoon Lee
Gumi Electronics and Information Technology Research Institute, Korea
- 5-0434** **Quantum Dot Light-Emitting Devices of Colloidal Quantum Dots Treated with Butylated Hydroxytoluene**
Jaesung Lee, Byoung-ho Kang, Sanghoon Jung, Sehyuk Yeom, Wanghoon Lee
Gumi Electronics and Information Technology Research Institute, Korea
- 5-0718** **Quantum Dot Photodetectors Fabricated with P-Type Ink for Reduced Dark Current**
Hong Gu Kang¹, Ju Young Woo², Seong-Yong Cho¹
¹*Hanyang University, Korea*
²*Korea Institute of Industrial Technology, Korea*
- 5-0905** **Uniform-, Giant-sized Green InP Quantum Dots and their Electroluminescence Performance**
 Heesun Yang, Donghyeok Shin, Hyun-Min Kim, Goo Min Park, Yuri Kim
Hongik University, Korea
- 5-0908** **Efficient Quantum Dots Light-Emitting Diodes based on PVP-Capped ZnO Nanoparticles as Electron Transport Layer**
Sanghoon Jung, Byoung-ho Kang, Jaesung Lee, Sehyuk Yeom, Wanghoon Lee
Gumi Electronics and Information Technology Research Institute, Korea
- 5-0912** **Enhanced Stability of Green-Emissive ZnSeTe Quantum Dots Through Al Doping into ZnS Shell**
 Heesun Yang, Yongwoo Kim, Yang-Hee Kim, Seunghyeok Ryu, Beom Gyu Kim
Hongik University, Korea

- 5-0915** **High-Performance Blue ZnSeTe Quantum Dot-Light-Emitting Diodes: Effects of Heterostructural Dimensions and Functionalization of Electron Transport Layer**
Heesun Yang, Yang-Hee Kim, Sin Won Choi, Hyungmin Yang, Seong Min Park, Changhoon Lee
Hongik University, Korea
- 5-1015** **Efficient Formation of Al-Doped ZnMgO Alloys via Atomic Layer Deposition for Electron Transport Layers in Quantum-Dot Light-Emitting Diodes**
Minseok Kim, Hyogeun Lee, Hyeonseung Ban, Seong-Yong Cho
Hanyang University ERICA, Korea
- 5-1026** **High-Resolution, Nondestructive Photolithography for Eco-Friendly Quantum Dot Films by Atomic Layer Deposition of ZnO**
Eun A Kim, Nuri Oh, Seong-Yong Cho
Hanyang University, Korea
- 5-1045** **Dual Spectrum Photodiode Based on Patterned Infrared Colloidal Quantum Dots**
JI Hyeon Woo¹, Hong Gu Kang¹, Joo Young Woo², Seong-Yong Cho¹
¹*Hanyang University, Korea*
²*Korea Institute of Industrial Technology, Korea*
- 5-1486** **Flow Chemistry for Rapid and Uniform Synthesis of Heavy Metal-Free InP Quantum Dots**
Hyein Kong, Namyong Gwak, Seungki Shin, Dongyun Kim, Nuri Oh
Hanyang University, Korea
- 5-1487** **Enhancing InAs Quantum Dot Photodetectors Through Halide Ligand Exchange Optimization**
Dongjoon Yeo, Nuri Oh, Seonchan Kim, Jaeyoung Seo
Hanyang University, Korea
- 5-1497** **Direct Patterning of QDs with Thiol Molecule Ligands**
Yunseo Lee, Seungki Shin, Nuri Oh
Hanyang University, Korea

5-1769 **3D Printing of Inorganic Nanomaterials by Photochemically Bonding Colloidal Nanocrystals**

Wangyu Liu, Hao Zhang

Tsinghua University, China

5-2102 **Efficient Top-Emitting QLEDs with TiO₂ Nanoparticles as an Electron Transport Layer**

Jaehyung Park, Kangsuk Yun, Jiwan Kim

Kyonggi University, Korea

Materials and Devices for Metaverse Display

CHAIR(S)

Himchan Cho (KAIST)

5-0613

Improvement of Purity and Mobility of Alq₃ Using Ionic Liquid for Enhanced OLED Device Performance

Chil-Hyoung Lee, Taewon Ha, Dae Yun Lim, Young Baek Kim

Korea Institute of Industrial Technology, Korea

5-1095

Electrical and Optical Properties of Laminated OLED Devices

Cheol-Hee Moon, Dong Heon Yoo

Hoseo University, Korea

5-1152

Optical Crosstalk Suppression of Micro Light-Emitting Diodes Using Nanorod Arrays

Hyeongtaek Lim¹, Hyerim Heo¹, Dong Yeong Kim², Jaehee Cho¹

¹*Jeonbuk National University, Korea*

²*Pukyong National University, Korea*

5-1482

Colloidal Synthesis of P-Type Zn₃As₂ Nanocrystals

Seongchan Kim, Jaeyoung Seo, Dongjoon Yeo, Jina Na, Sungwon Kim, Nuri Oh

Hanyang University, Korea

5-1918

Electrochemical Evaluation of the Mass Flow Rate and Type of Anode on the Anomalous Behavior of Fe-Ni Alloy Electroplating

Na Young Kang, Jae Ho Lee

Hongik University, Korea

5-3687

Interfacing Lanthanide Metal-Organic Frameworks With ZnO Nanowires For Alternating Current Electroluminescence

Xiaohe Wei¹, Fengjun Chun¹, Feihong Liu¹, Xin Zhang¹, Weilin Zheng¹, Yang Guo¹, Zhifeng Xing¹, Haiyan An², Dangyuan Lei¹, Yu Tang², Chun-Hua Yan², Feng Wang¹

¹*City University of Hong Kong, Hong Kong (SAR of China)*

²*Lanzhou University, China*

Flexible and Stretchable Displays for Wearable Applications

CHAIR(S)

Steve Park (KAIST), Moon Kee Choi (UNIST)

5-0864

Study of Transparent Conducting Oxides Through Structural, Optical, and Electrical Properties of SrRuO_3 Thin Film on PET Substrates

Hongseung Kim¹, Seung Woo Baek¹, Hyo Jin Bang¹, Ji-Hoon Ahn², Nak Won Jang¹

¹National Korea Maritime and Ocean University, Korea

²Hanyang University ERICA, Korea

5-1192

Direct Optical Lithography of Perovskite Composites Using Photocurable Polymer for High-Stability Color Conversion Layer

Sun Jae Park, Himchan Cho

Korea Advanced Institute of Science and Technology, Korea

5-1613

Molecular Printing Based Fast Switching Thermochromic Display

Taeyoung Kim, Wooyoung Shim

Yonsei University, Korea

5-2106

Organic Light-Emitting Diodes with IZO/Al/IZO Multilayer Electrode

Kyu-Mann Lee, Jong-Won Yun, Su-Hyeong Lee, Min-Su Kim, Kyo-Yun Ku

Korea University of Technology and Education, Korea

5-2107

Trimodal Interactive Display via Direct Capacitive Coupling in Wireless Stand-Alone Systems

Jioh Yoo, Jihye Jang, Guangyao Zan, Kaiying Zhao, Gwanho Kim, Hoyeon Kim, Shengyou Li, Yeonji Kim, Seungjun Park, Woojoong Kim, Minji Kwon, Jeongwon Shin, Cheolmin Park

Yonsei University, Korea

5-3427

Fabrication and Performance Optimization of IGZO Transistors via Solution Processing

Soosang Chae, Jihyeok Jeong

Korea University of Technology and Education, Korea

Oral Presentation

Advanced Soft Magnetic Materials for Next-Generation Mobility and Robotics

November 25 | Baengnok

CHAIR(S) Jae Won Jeong (KIMS)

09:40-10:10
6-3805

Approaches of Ultra-Low Loss Soft Magnetic Materials for Next-Generation Power Electronics

KEYNOTE Satoshi Okamoto
Tohoku University, Japan

10:10-10:40
6-0898

Local Probing of Eddy Current in Soft Magnetic Composites

INVITED Yunseok Kim
Sungkyunkwan University, Korea

10:40-11:10
6-0560

Physical Origin of Excess Loss due to Magnetostriction in Soft Magnetic Materials

INVITED Hiroshi Tsukahara^{1,2}, Haodong Huang³, Kiyonori Suzuki³, Kato Akira⁴, Kanta Ono², Satoshi Okamoto¹
¹*Tohoku University, Japan*
²*Osaka University, Japan*
³*Monash University, Australia*
⁴*Toyota Motor Corporation, Japan*

11:10-11:40
6-0203

Influence of Forming Pressure on Ultra-High Density Iron Dust Core for High Frequency Inductors

INVITED Kyyoul Yun
Gifu University, Japan

11:40-11:55
6-2636

Influence of Magnetic Anisotropy on the Rotor Core Properties of IPM Motor

Nam Hoon Goo
Pohang University of Science and Technology, Korea

11:55-12:10

6-1694

Optimizing Insulation Layers in Soft Magnetic Cores with Fe-6.5wt.%Si Using Dual-Nozzle MEX Printing in MIM Structure

Taehyeob Im¹, Minjong Kim¹, Jonghyeok Ahn¹, Kwiyoung Lee¹, Suyeon Kim², Juyong Kim³, Dongju Lee², Jai-Sung Lee¹, Jongryoul Kim¹, Caroline Sunyong Lee¹

¹Hanyang University ERICA, Korea

²Chungbuk National University, Korea

³Reprotech R&D center, Korea

Magnonics: Harnessing Spin Waves for Future Technology

November 25 | Baengnok

CHAIR(S)

Duck-Ho Kim (KIST)

13:20-13:50

6-2524

Excitation, Manipulation and Propagation of Antiferromagnetic Magnons in THz Regime

INVITED

Kyusup Lee¹, Hyunsoo Yang²

¹Pukyong National University, Korea

²National University of Singapore, Singapore

13:50-14:20

6-2797

Magnonics: Materials, Physics and Devices

Xiufeng Han

INVITED

Chinese Academy of Sciences, China

14:20-14:35

6-3437

Acoustically Driven Magnon-Phonon Coupling in an Epitaxially Grown Co₂FeSi Alloy

Kazuto Yamanoi¹, Shinya Yamada², Kohei Hamaya², Yukio Nozaki¹

¹Keio University, Japan

²Osaka University, Japan

14:35-14:50

6-1903

Spinwave Emission Originated by Magnetic Domain Wall Resonance

Ganghwi Kim, Dae-Han Jung, Suyeong Jeong, Ki-Suk Lee

Ulsan National Institute of Science and Technology, Korea

Innovative Spintronics Devices

November 25 | Baengnok

CHAIR(S)	Soong-Geun Je (Chonnam National University)
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15:00-15:30	Néel Tensor Torque in Polycrystalline Antiferromagnets
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6-2399	<u>Chih-Huang Lai</u>
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KEYNOTE	<i>National Tsing Hua University, Chinese Taipei</i>
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15:30-15:45	Spin-Orbit Torque Switching Device Using Proton-Induced Voltage Controlled Magnetic Anisotropy
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6-3220	
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Tae-Seong Ju^{1,2}, Seungmo Yang², Kyoung-Woong Moon², Sungkyun Park¹, Chanyong Hwang²

¹Pusan National University, Korea

²Korea Research Institute of Standards and Science, Korea

15:45-16:15	Control of Anomalous Nernst Effect in Nano-materials
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6-2912	<u>Masaki Mizuguchi</u>
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INVITED	<i>Nagoya University, Japan</i>
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16:15-16:30	Magnetic Glassy and Spintronic Characteristics of Bicontinuous Nanocomposite PtCoNiO Thin Film
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6-2661	
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Jae-Hyun Ha, Beopgil Cho, Tae-Hwan Kim, Jaemun Park, Keeseong Park, Jung-Il Hong

Daegu Gyeongbuk Institute of Science and Technology, Korea

Emerging Magnetic Materials for Inovative Robotics, Sensors, and Devices

November 25 | Baengnok

CHAIR(S) Ki-Suk Lee (UNIST)

16:50-17:20
6-0307 Digitizing Soft Actuator: Programmable Materials, Structure and Devices

INVITED Jiyun Kim

Ulsan National Institute of Science and Technology, Korea

17:20-17:50
6-1479 Magnetically Actuated Origami Robotics and Microsystems
Yoonseok Park

INVITED *Kyung Hee University, Korea*

17:50-18:05
6-3127 Detection of α -Amylase with Green-Synthesized Magnetic Nanotag Using Single and Dual Chip Configuration of Giant Magnetoresistance Sensor

Harlina Ardiyanti^{1,2}, Ni'matil Mabarroh¹, Nur Aji Wibowo³, Nurul Imani Istikomah¹, Mahardika Yoga Darmawan^{1,2}, Zurnansyah Zurnansyah¹, Yuliyani Dwi Prabowo¹, Moh. Adhib Ulil Absor¹, Edi Suharyadi¹

¹*Universitas Gadjah Mada, Indonesia*

²*Institut Teknologi Sumatera, Indonesia*

³*Universitas Kristen Satya Wacana, Indonesia*

18:05-18:20
6-3122 Detection of Bovine Serum Albumin Using Tunneling Magnetoresistance Chip-Based Biosensors with Green-Synthesized Fe₃O₄/Ag Magnetic Nanotag

Pinaka Elda Swastika^{1,2}, Harlina Ardiyanti^{1,3}, Zurnansyah Zurnansyah¹, Nurul Imani Istiqomah¹, Nur Aji Wibowo⁴, Edi Suharyadi¹

¹*Universitas Gadjah Mada, Indonesia*

²*Universitas Negeri Yogyakarta, Indonesia*

³*Institut Teknologi Sumatera, Indonesia*

⁴*Universitas Kristen Satya Wacana, Indonesia*

18:20-18:35
6-3088 Magnetocaloric Effect and Cooling Device
Fengxia Hu

Chinese Academy of Sciences, China

Hard Magnetic Materials for Sustainable Urban Mobility

November 26 | Baengnok

CHAIR(S)

Tae-Hoon Kim (KIMS)

08:00-08:30

6-1057

INVITED

Recent development of Sm-Fe Based Magnet from the Powder to Bulk

Yusuke Hirayama

National Institute of Advanced Industrial Science and Technology, Japan

08:30-09:00

6-3366

INVITED

Innovative Approach From Rare Earth Oxide to NdFeB Sintered Magnet with Shape-Freedom and Near-Zero Material-Loss: Synergistic Combination of Fine-Particle Chemical Synthesis and New Sintering Process (PressLess Process)

Soon-Jae Kwon

Green Strategic Materials Ltd, Korea

09:00-09:30

6-1091

INVITED

Investigation on Anisotropic Magnetic Behavior of Rare-Earth Alloy Fine Particles

Kwangjae Park, Yusuke Hirayama, Jian Wang

National Institute of Advanced Industrial Science and Technology, Japan

09:30-09:45

6-2009

Preparation, Structure, And Magnetic Properties Of Bulk MnBi Permanent Magnet

Ping-Zhan Si, Y. Song, Jihoon Park, Chul-Jin Choi

Korea Institute of Materials Science, Korea

09:45-10:00

6-0262

Fine-Tuning Nano-Scale Grain Boundary Modification for Enhanced Magnetic Properties in ThMn₁₂-Type Structure

Tian Hong Zhou, Jihoon Park

Korea Institute of Materials Science, Korea

10:00-10:15

6-2298

Microstructure and Magnetic Properties of 2:17-Type Sm-Co Permanent Magnets According to Heat Treatment Conditions

Seungil Park¹, Chaemin Seol¹, Sanghyeon Lee¹, Kyung-Hoon Bae², Tae-Hoon Kim¹

¹Chonnam National University, Korea

²R&D center of Star Group Co., Ltd., Korea

10:15-10:30

6-2297

Study on Microstructure and Magnetic Properties of Grain Boundary Diffusion Processed Nd-Fe-B Sintered Magnet

Seunghan Kim¹, Guyoung Min¹, Jihyeon An¹, Kyoung-Hoon Bae², Tae-Hoon Kim¹

¹Chonnam National University, Korea

²R&D center of Star Group Co. Ltd, Korea

Novel Spin-Textures for Advancements in Spintronics

November 26 | Baengnok

CHAIR(S)	Seungmo Yang (KRISS)
10:50-11:20 6-0831 INVITED	Control of Magnetic Skyrmions from Generation to Movement for Microelectronic Applications <u>Mi-Young Im</u> <i>Lawrence Berkeley National Laboratory, USA</i>
11:20-11:35 6-0282	Canceled
11:35-11:50 6-1899	Generation of Skyrmions from Magnetic Domain Wall Dynamics with Topological Changes <u>Suyeong Jeong</u>¹, Dae-Han Jung¹, Hee-Sung Han², Ganghwi Kim¹, Younggun Park¹, Sumi Lee¹, Ki-Suk Lee¹ ¹<i>Ulsan National Institute of Science and Technology, Korea</i> ²<i>Korea National University of Transportation, Korea</i>
11:50-12:05 6-1889	Manipulation of Topological 3D Magnetic Vortex in a Ferromagnetic Rectangular Disk <u>Myeonghwan Kang</u>¹, Sooseok Lee¹, Hee-Sung Han², Hye-Jin Ok¹, Ganghwi Kim¹, Suyeong Jeong¹, Young-Sang Yu³, Soong-Geun Je⁴, Weilun Chao⁵, Mi-Young Im⁵, Ki-Suk Lee¹ ¹<i>Ulsan National Institute of Science and Technology, Korea</i> ²<i>Korea National University of Transportation, Korea</i> ³<i>Chungbuk National University, Korea</i> ⁴<i>Chonnam National University, Korea</i> ⁵<i>Center for X-Ray Optics, USA</i>
12:05-12:20 6-3018	Reduction of Magnetic Skyrmion Diameter in Room-Temperature van der Waals Ferromagnet for Realizing Quantum Skyrmions <u>Hyo-Bin Ahn</u>¹, Seungmo Yang², Yubin Ji³, Mi-Young Im⁴, Kabjin Kim³, Changgu Lee¹, Chanyong Hwang² ¹<i>Sungkyunkwan University, Korea</i> ²<i>Korea Research Institute of Standards and Science, Korea</i> ³<i>Korea Advanced Institute of Science and Technology, Korea</i> ⁴<i>Lawrence Berkeley National Laboratory, USA</i>

Emerging Magnetism and 2D Magnetic Materials

November 26 | Baengnok

CHAIR(S) Kyusup Lee (Pukyong National University)

15:00-15:30
6-3809 Anisotropic Anomalous Hall Effect of Conical Magnetic Anisotropy in $\text{NiCo}_2\text{O}_4(001)$

KEYNOTE Hideto Yanagihara
University of Tsukuba, Japan

15:30-16:00
6-0297 2D van der Waals Magnetic Heterostructures: from Materials to Devices

INVITED Yingying Wu
University of Florida, USA

16:00-16:15
6-1824 Improving the Circularly Polarized Light Detection Through Phase Stabilization via Halogen Substitution in Chiral 2D Double Perovskites

Jeonghyun Park, Gyumin Jang, Hyungsoo Lee, Chan Uk Lee, Jaehyun Son, Junwoo Lee, Subin Moon, Jooho Moon
Yonsei University, Korea

16:15-16:30
6-1748 Facilitated Chirality Transfer in 2D Perovskites via Structural Isomer-Derived Halogen-Halogen Interaction

Jaehyun Son, Gyumin Jang, Hyungsoo Lee, Chan Uk Lee, Subin Moon, Junwoo Lee, Wooyong Jeong, Jeong Hyun Park, Jooho Moon
Yonsei University, Korea

Poster Presentation | November 26

Hard Magnets for Future Mobility and Robotics Applications

CHAIR(S)

Tae-Hoon Kim (KIMS)

6-1501

The Effects of LREE Based Grain Boundary Diffusion Sources on Manipulating Magnetic Impurities in Nd-Ce-Fe-B Permanent Magnets

Yoonhyung Keum^{1,2}, Seunghun Cha^{1,2}, Sangmin Park¹, Jaeyun Jeong¹, Jong-Soo Rhyee², Taek-Soo Kim¹, Dae-Kyeom Kim¹, Myungsuk Song¹

¹Korea Institute of Industrial Technology, Korea

²Kyung Hee University, Korea

6-1506

Influence of Annealing Temperature on Magnetic Properties of a Nd-Ce-Fe-B Magnet after Grain Boundary Diffusion with HREE-Cu-Al Alloy(HREE : Dy and Tb)

Seong Min Choi^{1,2}, Hyun Bin Joo¹, Se Rin Jeong¹, Seung Yeon Park¹, Kee Ahn Lee², Myungsuk Song¹, Kyoung Mook Lim¹

¹Korea Institute of Industrial Technology, Korea

²Inha University, Korea

6-1908

Fabrication of High-Performance HRE-Free Nd-Fe-B Sintered Magnets via GBDP Using Eutectic Refractory Metal Alloys and Pr70Cu15Al10Ga5

Seol-Mi Lee^{1,2}, Tae-Hoon Kim¹, Ganghwi Kim², Ki-Suk Lee², Sang-Hyub Lee³, Dong-Hwan Kim³, Jung-Goo Lee¹

¹Korea Institute of Materials Science, Korea

²Ulsan National Institute of Science and Technology, Korea

³Star Group Ind. CO., Ltd., Korea

6-2002

Dominant Factors in Coercivity Enhancement and Optimized Pr-Rich Shell Formation in Pr-Free and Pr-Containing Nd-Fe-B Sintered Magnets by Grain Boundary Diffusion Process Using Low-Melting Pr-Cu-Al-Ga Alloy

Sujin Lee¹, Ganghwi Kim², Ki-Suk Lee², Tae-Hoon Kim¹, Sang-Hyub Lee³, Dong-Hwan Kim³, Jung-Goo Lee¹

¹Korea Institute of Materials Science, Korea

²Ulsan National Institute of Science and Technology, Korea

³Star Group Ind. CO., Ltd., Korea

- 6-2163** **Design of High-Remanence Nd-Fe-B Hot-Pressed Magnets by Manipulating Coercivity of Hydrogenation-Disproportionation-Desorption-Recombination Treated Anisotropic Precursors**
Jae-Gyeong Yoo, Tae-Hoon Kim, Hee-Ryoung Cha, Sumin Kim, Jung-Goo Lee
Korea Institute of Materials Science, Korea
- 6-2238** **Microstructural Investigation of a Nanocrystalline Nd-Fe-B Magnet Prepared by Laser Powder Bed Fusion**
Hojeong Kim¹, Du-Rim Eo², Taesuk Jang³, Ye Ryeong Jang¹, Wooyoung Lee¹
¹*Yonsei University, Korea*
²*Korea Institute of Industrial Technology, Korea*
³*Sunmoon University, Korea*
- 6-2585** **Optimized Synthesis of Fine Nd₂Fe₁₄B Powder Using Fe-Nd Oxide via Unraveling the Reduction-Diffusion Reactions of Oxide Precursors**
Jeong Hyun Kim¹, Hee Yeon Jeon¹, Kyung-Shik Yoon¹, Hyeon Seong Kim¹, Tae-Hoon Kim², Young-In Lee¹
¹*Seoul National University of Science and Technology, Korea*
²*Korea Institute of Materials Science, Korea*
- 6-3207** **Effects of Grain Boundary Diffusion of Low Melting Alloys on Microstructure and Coercivity of Hot-Deformed (Nd,Ce)-Fe-B Magnets**
Ye Ryeong Jang, Wooyoung Lee
Yonsei University, Korea

Soft Magnets for Future Mobility and Robotics Applications

CHAIR(S)

Jae Won Jeong (KIMS)

- 6-1315** Structural Design in LSMO/Hexaferrite Multi-Layer for Improved Electromagnetic Wave Absorption Using HFSS Simulation
Jae-Hee Heo, Young-Min Kang
Korea National University of Transportation, Korea
- 6-2275** Tendency of Soft Magnetic Properties of FeCo-2V Electric Steels According to Heat Treatment Temperatures
Haein Yim, Harang Lee, Jihye Park, Hyunkyung Lee
Sookmyung Women's University, Korea
- 6-2391** Electromagnetic Wave-Absorbing FeCo-BN Nanocomposites Manufactured Using an Ultrasonically Atomized Aerosol Process
Young-Tae Kwon, Seung-Jae Jeong, Jae Won Jeong, Sangsun Yang
Korea Institute of Materials Science, Korea
- 6-2394** Magnetorheological Fluids of Chain-Like Links Composed with Soft Magnetic Metal Powders
Seung-Jae Jeong, Jae-Won Jeong, Sang-Sun Yang, Young-Tae Kwon
Korea Institute of Materials Science, Korea
- 6-2477** Fabrication and Evaluation of Fe-Co-Ti-Zr-B Melt-Spun Ribbons
Haein Yim, Yoojin Choi, Hyunkyung Lee
Sookmyung Women's University, Korea
- 6-2883** Effect of Nb on Crystallization Behavior and the Soft Magnetic Properties of $\text{Fe}_{82-x}\text{Si}_4\text{B}_{12}\text{Nb}_{1+x}\text{Cu}_1$ ($x=0-2$) Nanocrystalline Alloys
Hyun Ah Im^{1,2}, Subong An^{1,2}, Sangsun Yang¹, Jungwoo Lee², Jae Won Jeong¹
¹Korea Institute of Materials Science, Korea
²Pusan National University, Korea

6-2903

Optimizing Metalloid Content to Improve Soft Magnetic Properties and Reduce Surface Crystallization in High-Ms Fe-B-Si-C-Cu-Nb Alloys

Subong An¹, Hyun Ah Im¹, Yeong Gyun Nam², Ki-Bong Kim¹, Sangsun Yang¹, Jungwoo Lee³, Jaewon Jung¹

¹Korea Institute of Materials Science, Korea

²Korea Institute of Machinery and Materials, Korea

³Pusan National University, Korea

6-2908

Enhancement of Core Loss Characteristics in Bimodal Soft Magnetic Composites Using Uniform Particle Insulation Coating

Hea-Ran Kim^{1,2}, Yunseok Kim², Jae-Won Jeong¹

¹Korea Institute of Materials Science, Korea

²Sungkyunkwan University, Korea

Spintronic Materials and Devices

CHAIR(S)

Seungmo Yang (KRISS)

6-0714

Observation of Rashba Parameter in Bi_2Te_3 Film

Jeong Ung Ahn^{1,2}, Ki Hyuk Han^{1,2}, Seong Been Kim^{1,2}, Seongbeom Kim³, Eunsu Lee³, Gyu-Chul Yi³, Hyun Cheol Koo^{1,2}

¹Korea University, Korea

²Korea Institute of Science and Technology, Korea

³Seoul National University, Korea

6-1106

Enhancing the Energy Efficiency of Spin-Orbit Torque in Pt/W Multilayers by Controlling the Spin Hall Angle and Resistivity Through Pt and W Composition

Ji-Jwon Yoon, Hyun-Jun Lee, Ji-Hyeon Yoon, Si-Yeol Lee, Seung-Heon Chris Baek
Korea Institute of Science and Technology, Korea

6-2072

Anomalous Nernst Effect in Epitaxially Grown Mn_3Sn Thin Films

Asif Ullah, Dongchan Jeong, Siha Lee, Eunji Im, Wonyeong Choi, Nyun Jong Lee, Thanh Huong Thi Nguyen, Sanghoon Kim

University of Ulsan, Korea

6-3214

Giant Anisotropy of Magnetic Damping in an Epitaxial Cr/Fe Bilayer with the Absence of Magnetocrystalline Anisotropy

Thanh-Huong Thi Nguyen¹, Jungmin Park², Jae-Hyun Ha³, Soogil Lee⁴, Van Quang Nguyen⁵, Nyun Jong Lee¹, Jung-Il Hong³, Sanghoon Kim¹

¹University of Ulsan, Korea

²Korea Advanced Institute of Science and Technology, Korea

³Daegu Gyeongbuk Institute of Science and Technology, Korea

⁴Gachon University, Korea

⁵Korea Atomic Energy Research Institute, Korea

- 6-3266** **Highly Efficient Room Temperature Spin Orbit Torque Switching in PtTe₂/Fe₃GaTe₂ All-Van der Waals Heterostructure**
Sun Woo Kim^{1,2}, Seungmo Yang¹, Tae-Seong Ju¹, Yubin Ji³, Kab-Jin Kim³, Jisung Lee⁴, Seung-Young Park⁴, Kyoung-Woong Moon¹, Jongill Hong², Chanyong Hwang¹
¹Korea Research Institute of Standards and Science, Korea
²Yonsei University, Korea
³Korea Advanced Institute of Science and Technology, Korea
⁴Korea Basic Science Institute, Korea
- 6-3347** **Skyrmion Bag Multi-bit Logic Gates Based on Geometric Design**
Suyeong Jeong¹, Hee-Sung Han², Ganghwi Kim¹, Dae-Han Jung¹, Ki-Suk Lee¹
¹Ulsan National Institute of Science and Technology, Korea
²Korea National University of Transportation, Korea
- 6-3393** **Magnetization Switching of Multi-Level State in Synthetic Antiferromagnetic Structure**
Myeonghwan Kang, Sooseok Lee, Pyeong-Yeol Yu, Ki-Suk Lee
Ulsan National Institute of Science and Technology, Korea
- 6-3448** **Enhancement of SOT-Driven Switching Efficiency Through Reduced Mn Deficiency in the Interfacial Structure of Sputtered W/Mn₃Sn Epitaxial Thin Films**
Siha Lee¹, Subin Im^{1,2}, Donghyeon Lee¹, Siyul Lee¹, Wongyeong Choi¹, Asif Ullah¹, Eunji Im¹, Jinju Pi¹, Jongdo Kim¹, Changgu Lee², Thanh-Huong Thi Nguyen¹, Sanghoon Kim¹
¹University of Ulsan, Korea
²Sungkyunkwan University, Korea
- 6-3455** **Design of Low Power Skyrmion Gate**
Ganghwi Kim, Ki-Suk Lee
Ulsan National Institute of Science and Technology, Korea
- 6-3485** **Chiral Magnetic Nucleation of Synthetic Ferromagnet with Dual Energy Barrier Originating from Different Dzyaloshinskii-Moriya Interactions**
Seongbin Seo^{1,2}, Bob Vermeulen^{1,3}, Mohamed Ben Chroud^{1,3}, Siddharth Rao¹, Kurt Wostyn¹, Sebastien Couet¹, Van Dai Nguyen¹, Sanghoon Kim²
¹Interuniversitair Micro-Electronica Centrum (IMEC), Belgium
²University of Ulsan, Korea
³KU Leuven, Belgium

Materials for Batteries and Energy storage systems

Oral Presentation

Materials for Batteries and Energy Storage Systems (1)

November 25 | Udo

CHAIR(S)

Patrick Joohyun Kim (Kyungpook National University)

09:40-09:55

7-1563

Introduction to Solvent-Free Dry Cathode Fabrication using Nanoparticle Deposition System(NPDS) for the Application of Lithium-Ion Batteries

Jiseon Kim¹, Seoa Kim², Minseok Kim¹, Sungjun Choi¹, Kyungjung Kwon², Caroline Sunyong Lee¹

¹Hanyang University ERICA, Korea

²Sejong University, Korea

09:55-10:10

7-1601

Canceled

10:10-10:25

7-1081

Polyvinylpyrrolidone Modulated Copper Benzene Tricarboxylate MOFs Based Electrodes for Highly Stable Rechargeable Lithium Batteries

Laudimer Tye Tan, Syryll Maynard Olidan, ChungHee Han, Sukeun Yoon, Jihoon Kim

Kongju National University, Korea

10:25-10:40

7-1664

Elucidating the Dominant Role of Amorphous/Amorphous Heterostructure on Tailoring Built-In Electric Field for Lithium-Sulfur Batteries

Sumin Kim, Jeongyoub Lee, Young Sun Park, Hyungsoo Lee, Gyumin Jang, Juwon Yun, Subin Moon, Soobin Lee, Chang-Seop Jeong, Jooho Moon

Yonsei University, Korea

10:40-10:55

7-2761

3-D Interconnected Porous Cu Current Collector for Anode-Free Lithium-Metal Batteries

Suji Kim¹, Min Jae Lee², Won-Hee Ryu¹, Se Kwon Oh²

¹Sookmyung Women's University, Korea

²Korea Institute of Industrial Technology, Korea

10:55-11:25

7-2350

Homogeneous Li Deposition Induced by Organic Pigment Derived N-Rich Carbon for Stable Performance Li-Metal Batteries

Minsu Park, Sujeong Woo, Wootae Choi, Patrick Joohyun Kim

Kyungpook National University, Korea

11:25-11:55

7-0376

Polymer Chemistries for High-Energy-Density Aqueous Zinc-Ion Batteries

Chanhoon Kim

Korea Institute of Industrial Technology, Korea

Materials for Batteries and Energy Storage Systems (2)

November 25 | Udo

CHAIR(S) Byoungwoo Kang (POSTECH)

13:10-13:40 Low-Cost and Long-Term Cathode Materials for Sodium-Ion Batteries

7-2481 Xiaobo Ji

KEYNOTE *Central South University, China*

13:40-14:10 Revealing Structure-Property Correlations in Next-Generation Li-ion
7-0669 Battery Materials Using Synchrotron X-ray Analysis

INVITED Kyung-Wan Nam

Dongguk University, Korea

14:10-14:40 Microscale Electrochemical Energy Storage Devices

7-0493 Zhong-Shuai Wu

INVITED *Chinese Academy of Sciences, China*

Materials for Batteries and Energy Storage Systems (3)

November 25 | Udo

CHAIR(S) Yong-Mook Kang (Korea University)

15:00-15:30 Interface Regulation Strategies of Na Metal Anodes

7-3794 Yan Yu

KEYNOTE *University of Science and Technology of China, China*

15:30-16:00 Progress and Multifaceted Strategies to Consider for the Realization of
7-0608 Practical zinc-Ion Batteries

INVITED Jun Young Cheong

University of Glasgow, UK

16:00-16:30 Unveiling the High Potential of Hard Carbon Anodes for Lithium-Ion
7-1417 Batteries Through Comparative Analysis of Lithium and Sodium Ion
Storage Mechanisms

INVITED

Young Soo Yun

Korea University, Korea

Materials for Batteries and Energy Storage Systems (4)

November 25 | Udo

CHAIR(S)	Won-Hee Ryu (Sookmyung Women's University)
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17:20-17:50	High-Performance Cathode Materials for Na-Ion Batteries
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7-0178	<u>Jongsoon Kim</u>
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INVITED	<i>Sungkyunkwan University, Korea</i>
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17:50-18:20	Next-Generation Ion Battery: Development of High-Energy-Density Sodium-Ion Battery Cathode
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7-2105	<u>Jang-Yeon Hwang</u>
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INVITED	<i>Hanyang University, Korea</i>
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Materials for Batteries and Energy Storage Systems (5)

November 26 | Udo

CHAIR(S)

Jungdon Suk (KRICT)

08:30-08:45

7-1529

Local Structural Disorder of a Lithium Manganese Layered Cathode for its Reversible Phase Transition to Theoretical Capacity Limit

Suwon Lee¹, Yong-Mook Kang^{1,2}

¹Korea University, Korea

²Korea Institute of Science and Technology, Korea

08:45-09:00

7-1967

Size-Dependence of Promoting Diffusion-Controlled Reaction in Bi Anode for Reversible K-Ion Storage

Gilseob Kim, Yong-Mook Kang

Korea University, Korea

09:00-09:15

7-1580

Optimal Facet Assembly of Multi-Transition Metals Layered Cathodes Toward Superior Li-Ion Kinetics and Structural Stability

Jae-Bum Kim¹, Yong-Mook Kang^{1,2}

¹Korea University, Korea

²KU-KIST Graduate School of Converging Science and Technology, Korea

09:15-09:30

7-2649

Na_{3.5}(MnVFeTi)_{0.5}(PO₄)₃: A Multi-Transition-Metal-Ion NASICON-Type Cathode for Sodium-Ion Batteries

Soundharrajan Vaivapuri, Chunjoong Kim

Chungnam National University, Korea

09:30-10:00

7-0481

INVITED

Lithium Dendrite Suppression Enabled by Orientation-Controlled Polymer Fiber Structures for Anodeless Batteries

Jae Chul Kim

Stevens Institute of Technology, USA

10:00-10:30

7-0183

INVITED

High Energy and Long Cycle Life Solid-State Li Metal Batteries Through Materials Development and Their Integration

Haegyeom Kim

Lawrence Berkeley National Laboratory, USA

Materials for Batteries and Energy Storage Systems (6)

November 26 | Udo

CHAIR(S)

Haegyum Kim (Lawrence Berkeley National Laboratory)

10:50-11:20

7-0329

INVITED

Activating Reversible Carbonate Reactions in Nasicon Solid Electrolyte-Based Na-Air Battery via In-Situ Formed Catholyte

Heetaek Park¹, Byoungwoo Kang²

¹Korea Electrotechnology Research Institute, Korea

²Pohang University of Science and Technology, Korea

11:20-11:35

7-2913

Hybridization and Nanoarchitecture Engineering of Covalent Organic Nanosheets and Inorganic Nanosheets into Hollow Sphere Structures for Advanced Sodium-Ion Battery Anodes

Minseop Lee¹, Jin Kuen Park², Seung-Min Paek¹

¹Kyungpook National University, Korea

²Hankuk University of Foreign Studies, Korea

11:35-11:50

7-2013

Performance of a Boehmite Coated Separator for a Lithium Secondary Battery Depending on the Fine Powder or Agglomeration in the Powder

Ji-Hui Oh^{1,2}, Jin-Ae Kim^{1,2}, Yeon-Sook Lee², Yong-Nam Kim², Dong-Won Lee², Jong-Min Oh¹

¹Kwangwoon University, Korea

²Korea Testing Laboratory, Korea

11:50-12:05

7-2011

Controlled Structural Disorder Activates Mn Redox to Enhance the Reversibility of Li/Mn-rich Layered Cathodes

Dayeon Choi, Seongkoo Kang, Yong-Mook Kang

Korea University, Korea

Poster Presentation | November 25

Current State-of-the-art Lithium-Ion Batteries

CHAIR(S)

- 7-0152** **Confluence of ZnO and PTFE Binder for Efficient Energy Harvesting and Storage Devices**
Swathi Ippili¹, Venkatraju Jella¹, Subhashree Behera¹, Hyun-Suk Kim², Soon-Gil Yoon¹
¹Chungnam National University, Korea
²Dongguk University, Korea
- 7-0889** **Enhanced Durability and Capacity Retention of Lithium-Ion Batteries Using Ultrafine-Grained Commercial-Grade Aluminum Foil Electrodes**
Hee-Tae Jeong, Woo Jin Kim
 Hongik University, Korea
- 7-0921** **Enhancing the Electrochemical Performance of Sn-Zn Alloy Anode Foil for Lithium-Ion Batteries Through Microstructure Design via Accumulative Roll Bonding Technique**
Nguyen Ngoc Phi, Kim Won Jin
 Hongik University, Korea
- 7-1448** **A Study on Optimizing Morphology and Size of Ni-Rich (Ni_{0.9}Co_{0.05}Mn_{0.05})(OH)₂ Precursor by Controlling Impeller Speed in Co-Precipitation Reactor for High-Performance Cathode Material on Lithium-Ion Battery**
Byeong-Min Ahn¹, Hye-Won Jo^{1,2}, Seong-Ju Sim¹, Bong-Soo Jin¹, Hyun-Soo Kim¹, Yoon-Cheol Ha^{1,3}, Jung-Han Kim⁴, Jun-Ho Park^{1,3}
¹Korea Electrotechnology Research Institute, Korea
²Pusan National University, Korea
³University of Science and Technology, Korea
⁴Dong-A University, Korea

- 7-1453** **Current Trends of Eco-Friendly Recycling Approach for Spent Li(NixCoyMnz)O2 Layered Cathode Materials in Spent Lithium-Ion Batteries by Direct Recycling Process**
Ji-Woo Chae¹, Byeong-Min Ahn¹, Hyun-Soo Kim¹, Bong-Soo Jin¹, Seong-Ju Sim¹, Jun-Ho Park^{1,2}
¹Korea Electrotechnology Research Institute, Korea
²University of Science and Technology, Korea
- 7-1472** **An Analysis on Various Separation Processes for Direct Recycling of Cathode Material from Black Mass in Spent Lithium-Ion Battery**
Woo-Jin Kang^{1,2}, Byeong-Min Ahn¹, Seong-Ju Sim¹, Jong-Chan Park^{1,2}, Hyun-Soo Kim¹, Bong-Soo Jin¹, Jeong-Hee Choi^{1,2}, Jun-Ho Park^{1,2}
¹Korea Electrotechnology Research Institute, Korea
²University of Science and Technology, Korea
- 7-1843** **Reaction Kinetics in Lithium Secondary Batteries Analyzed by Open Circuit Voltage Transients**
Yu-Jeong Min, Heon-Cheol Shin
Pusan National University, Korea
- 7-1846** **Electrochemical Analysis of Lithium Plating on Graphite-Silicon Composite Anodes for Lithium-Ion Batteries**
Minkyu Park, Seong-Hyeok Ha, Jiung Jeong, Heon-Cheol Shin
Pusan National University, Korea
- 7-1850** **Estimation of the Internal Temperature Distribution of a Battery Using Electrochemical Methods**
Seong-Hyeok Ha, Heon-Cheol Shin
Pusan National University, Korea
- 7-1859** **Meso-Porous Nano/Micro Rods of Tin Oxides for Lithium Battery Anode**
Woo-Jin Lee, Yu-Jeong Min, Heon-Cheol Shin
Pusan National University, Korea

- 7-1975** Preparation of Plate-Type Boehmite Powder and Characterization of Boehmite-Coated PE Separator for Lithium-Ion Batteries
Jin-Ae Kim^{1,2}, Ji-Hui Oh^{1,2}, Yeon-Sook Lee¹, Yong-Nam Kim¹, Dong-Won Lee¹, Jong-Min Oh²
¹Korean Testing Laboratory, Korea
²Kwangwoon University, Korea
- 7-2217** An Organic Pigment Derived 3D Carbon Current Collector for Superior Electrochemical Kinetics and Reversibility in Lithium Metal Batteries
Sujeong Woo, Minsu Park, Wootae Choi, Patrick Joohyun Kim
 Kyungpook National University, Korea
- 7-2262** Surface Tuning of the Graphene-based Separator for Achieving Ultra-Stable Li-Metal Batteries
Wootae Choi, Min Su Park, Patrick Joohyun Kim
 Kyungpook National University, Korea
- 7-2352** Mitigating SEI Formation of Carbon-Based Current Collectors for Stable Lithium Metal Batteries
Yujin Lee, Wootae Choi, Patrick Joohyun Kim
 Kyungpook National University, Korea
- 7-2355** Effect of Temperature for Carbon Coating on NCM Powder by Hot Isostatic Pressing
Hyung Giun Kim¹, Hyun-Su Kang¹, Won Rae Kim¹, Gun Hee Kim¹, You Suk Cho², Jung Hwan Chun², Jae Jin Lee², Hyuk Su Han³, Taeg Woo Lee¹
¹Korea Institute of Industrial Technology, Korea
²ALTech Co.,Ltd., Korea
³Sungkyunkwan University, Korea
- 7-2357** Effect of the Differences Between Atmosphere and HIP Heat Treatment for the Properties of NCM Oxide
Hyun Su Kang¹, Won Rae Kim¹, Gun Hee Kim¹, You Suk Cho², Jung Hwan Chun², Jae Jin Lee², Hyuk Su Han³, Hyung Giun Kim¹, Taeg Woo Lee¹
¹Korea Institute of Industrial Technology, Korea
²ALTech Co., Ltd., Korea
³Sungkyunkwan University, Korea

- 7-2781** **Analysis of the Electrochemical Properties of Cathode Active Materials for Implementing High-Capacity Secondary Batteries**
Do Man Jeon
Gumi Electronics and Information Technology Research Institute, Korea
- 7-2917** **Phase Engineering of Lepidocrocite-Type Titanate/NiCo-LDH Hollow Heterostructured Electrode Materials for Enhanced Ion Transport and Pseudocapacitive Charge Storage**
Minseop Lee¹, Jae-Min Oh², Seung-Min Paek¹
¹*Kyungpook National University, Korea*
²*Dongguk University, Korea*
- 7-2992** **Improvement of Electrode Processability and Energy Density in LFP Batteries**
Yoo-Jong Park, Dong-Hwa Seo
Korea Advanced Institute of Science and Technology, Korea
- 7-3520** **Eco-Friendly Recycling of Lithium Hydroxide Through Self-Propagating High-Temperature Synthesis Process from Wasted Secondary Batteries**
Yongkwan Lee^{1,2}, Namhun Kwon^{1,2}, Mi Hye Lee¹, Jae Hong Shin¹, Jaejin Sim¹, Kyoung Tae Park¹
¹*Korea Institute of Industrial Technology, Korea*
²*Korea University, Korea*
- 7-3673** **Operando Characterization and Regulation of Lithium Initial Nucleation Dominated by Fluorine-Effect via In-Situ TEM**
Honglu Hu, Zhiyuan Zeng
City University of Hong Kong, Hong Kong (SAR of China)

Li-free Next Generation Batteries

CHAIR(S)	Won-Hee Ryu (Sookmyung Women's University)
7-1372	Enhancing Conductivity of TiO_2 Nanosheet as Anode Material for Li-Ion Batteries by Decorating Metal Nanoparticles on TiO_2 Nanosheets <u>Sol Han</u>, Jeong Yun Hwang, Soo Jee Do, Jong Hyun Lee, Hyun Min Park, Kyu Hyoung Lee <i>Yonsei University, Korea</i>
7-1602	Aluminium-Air Batteries Using Sparked Graphene Oxide Cathode with High Energy Density <u>Geonwoo Lim</u>, Wooyoung Shim <i>Yonsei University, Korea</i>
7-2231	Application of Ionic Liquids as Electrode Repair Material in Zinc-Bromine Flow Batteries <u>Yingjun Cai</u> <i>Chinese Academy of Sciences, China</i>
7-2745	Unveiling the Potential of Non-Precious 4d Transition Metal Dual Atom Catalysts across Groups 4 to 6 for High Performance Li-O_2 Breathing Batteries <u>Huiju Kim</u>, Won-Hee Ryu <i>Sookmyung Women's University, Korea</i>
7-2750	Aeroelectrolyte for Atmospheric Open Zinc-Air Cell Systems <u>Yoon Jeong Yoo</u>, Won-Hee Ryu <i>Sookmyung Women's University, Korea</i>
7-2753	A Surface Flattening and Interface Stabilizing Additive with Monovalent Polyanion Functional Groups for Longer Lifespan Lithium Metal Batteries <u>Chae Yeong Son</u>, Won-Hee Ryu <i>Sookmyung Women's University, Korea</i>
7-2755	Screening Strategy of Ideal Quinone-Based RMs for Direct Cathode Lithiation of Spent Li-Ion Batteries <u>Hyunju Yoon</u>, Suji Kim, Won-Hee Ryu <i>Sookmyung Women's University, Korea</i>

- 7-2765** **Highly Conductive and Durable WO_{3-x} Particles as Cathode Framework Stabilizing Additive for All-Solid-State Batteries**
Hyeon-Ju Song, Yoo-Jung Choi, Won-Hee Ryu
Sookmyung Women's University, Korea
- 7-2767** **Functional Group Control of Polarizable Molecular Dipoles as Interface Stabilizing Electrolyte Additive for Rapid Operative and Longer Lifespan Lithium Metal Batteries**
Chae Yeong Son, Won-Hee Ryu
Sookmyung Women's University, Korea
- 7-2771** **Non-Precious Metal Based Dual Atom Catalysts Loaded on N-Doped Carbon Nanotubes for High Performance Li-O²⁺ Batteries**
Yeji Lim, Yoon Jeong Yoo, Won-Hee Ryu
Sookmyung Women's University, Korea
- 7-2776** **Elucidating Redox Mediator-Assisted Relithiation Mechanisms for Direct Cathode Recycling of Spent Li-Ion Batteries**
Suji Kim, Hyun Ju Yoon, Won-Hee Ryu
Sookmyung Women's University, Korea
- 7-2778** **Robust and Efficient Catalyst from Heterogeneous Oxide Composite Nanofibers for High-Performance Li-CO₂ Batteries**
Huiju Kim¹, Dae-Kwon Boo², Ji-Won Jung², Won-Hee Ryu¹
¹*Sookmyung Women's University, Korea*
²*University of Ulsan, Korea*
- 7-2779** **Surface Stabilization of High-Nickel Cathodes via Solvent-Free Mechanofusion Process for Li-Ion Batteries**
Hyeon-Ju Song, Yoo-Jung Choi, Won-Hee Ryu
Sookmyung Women's University, Korea
- 7-2909** **Development of Directly Recycled Cathodes from Waste Batteries**
Jungeun Lee, Chanhon Kim
Korea Institute of Industrial Technology, Korea

- 7-3051** **High Performance NMC811 Cathode Fabrication Using Siloxane Binder**
Jun Kyu Park^{1,2}, Jin Joo², Jung-Keun Yoo¹
¹Korea Institute of Science and Technology, Korea
²Kyungpook National University, Korea
- 7-3055** **Two Strategies to Suppressing Dendrite in Sodium Metal Batteries Using Gel Polymer Electrolytes**
Da-Sol Kwon¹, Jimin Shim², Jung-Keun Yoo¹
¹Korea Institute of Science and Technology, Korea
²Seoul National University, Korea
- 7-3231** **Design of High-Concentration Slurry Based on Binder-CNT Dispersion Solution Applied in Thick Electrode Preparation for High-Energy-Density Lithium-Ion Batteries**
Woohyeon Shin, Jung-Keun Yoo
Korea Institute of Science and Technology, Korea
- 7-3315** **Application of Blending Binder for High Energy Density Lithium-Ion Batteries Based on Thermoplastic Polyurethane (TPU)**
Minsol Kim¹, Jung Keun Yoo¹, Jongsoon Kim²
¹Korea Institute of Science and Technology, Korea
²Sungkyunkwan University, Korea
- 7-3329** **Achieving Superior Electrochemical Performance and Dispersibility in Thick Dry Electrodes with Thermoplastic Binder-CNT Composite**
Min Jeong Kim¹, Jung Keun Yoo¹, Jang Yeon Hwang²
¹Korea Institute of Science and Technology, Korea
²Hanyang University, Korea
- 7-3390** **Improving Surface Stability of LiFePO₄ Lithium-Ion Batteries Through Formation of CEI Layer with TPU-Based Binder**
Jiny Lee¹, Jongsoon Kim², Jung-Keun Yoo¹
¹Korea Institute of Science and Technology, Korea
²Sungkyunkwan University, Korea
- 7-3750** **Inducing Reversible Oxygen Redox in Sodium Layered Oxide**
Young-Tak Choe, Seung-Ho Yu
Korea University, Korea

Emerging Solid-State Batteries and the Beyond

CHAIR(S)

Jungdon Suk (KRICT)

7-0894

Deformation Mechanism Maps of Pure Lithium: Their Application in Determining Stack Pressure for All-Solid-State Lithium-Ion Batteries

Hee-Tae Jeong, Woo Jin Kim

Hongik University, Korea

7-1455

A Study on Improved Ionic Conductivity of Size-Controlled Li₆PS₅Cl Solid Electrolyte for Cathode Composite in All-Solid-State Lithium Ion Battery

Hye-Won Jo^{1,2}, Byeong-Min Ahn¹, Jong-Chan Park^{1,3}, Heetaek Park¹, Jun-Ho Park^{1,3}

¹*Korea Electrotechnology Research Institute, Korea*

²*Pusan National University, Korea*

³*University of Science and Technology, Korea*

7-1468

Analysis of Impurity Influence in Lithium Sulfide for Performance Enhancement of Sulfide-Based Solid Electrolytes on All-Solid-State Batteries

Jong-Chan Park^{1,2}, Hye-Won Jo^{1,3}, Byeong-Min Ahn¹, Jun-Woo Park^{1,2}, Jeong-Hee Choi^{1,2}, Jun-Ho Park^{1,2}

¹*Korea Electrotechnology Research Institute, Korea*

²*University of Science and Technology, Korea*

³*Pusan National University, Korea*

7-1610

Enhanced Low Temperature Performance of Na-BASE Batteries with Bismuth Islands Layers on a β "-Alumina

Jihong Bae, Dana Jin, Wooyoung Shim

Yonsei University, Korea

7-1621

Reinforcement of Liquid Na/BASE Interface Through Sparked Reduced Graphene Oxide Sheet Incorporation

Sukwoo Kang, Wooyoung Shim

Yonsei University, Korea

- 7-1635** **Shape Reconfigurable Aluminum–Air Batteries with High Degree of Deformation**
Hong Choi, Jooho Moon, Wooyoung Shim
Yonsei University, Korea
- 7-2088** **A Study on Dry Electrode Manufacturing Processes for Commercializing Next-Generation Batteries**
Jieun Hong^{1,2}, Insung Hwang¹
¹*Korea Electrotechnology Research Institute, Korea*
²*Pusan National University, Korea*
- 7-3022** **Enhancing Stability and Performance in All-Solid-State Batteries Through Optimal Mixing process of Cathode Materials and Sulfide-Based Electrolytes**
Sehwa Cheon, Heetaek Park
Korea Electrotechnology Research Institute, Korea
- 7-3188** **Analyzing the Detrimental Impact of Residual Solvent in Sulfide All-Solid-State Batteries**
Hyeonjin Cho^{1,2}, Heetaek Park¹, Jeong-Hee Choi^{1,2}
¹*Korea Electrotechnology Research Institute, Korea*
²*University of Science and Technology, Korea*
- 7-3241** **Enhancing All-Solid-State Batteries (ASSBs) Through Advanced Cathode Electrode Design**
Dongjin Sim, Heetaek Park
Korea Electrotechnology Research Institute, Korea

Advances in Photovoltaic Materials and Devices

Oral Presentation

Advances in Photovoltaic Materials and Devices (1)

November 26 | Youngju

CHAIR(S)

Byung-Wook Park (UNIST)

16:50-17:25

8-3839

KEYNOTE

Development of High-Performance Quantum Dot Solar Cells

Sung-Yeon Jang

Ulsan National Institute of Science and Technology, Korea

17:25-17:50

8-0171

INVITED

n-Type Zwitterionic Cathode Interlayer for Efficient and Stable Perovskite Solar Cells

Han Young Woo

Korea University, Korea

17:50-18:15

8-0931

INVITED

Regio-Regular Narrow Bandgap Materials for Efficient Organic Solar Cells

Yuxiang Li

Xi'an University of Science and Technology, China

18:15-18:30

8-1912

A Novel Strategy for Enhancing Photovoltaic Performance Through Spin Alignment in Chiral Perovskite 2D/3D Heterostructures

Junwoo Lee, Jaehyun Son, Gyumin Jang, Chan Uk Lee, Wooyong Jung, Jeonghyun Park, Jooho Moon

Yonsei University, Korea

Advances in Photovoltaic Materials and Devices (2)

November 27 | Youngju

CHAIR(S) Jae Won Shim (Korea University)

09:40-10:10
8-2174 High Efficiency Bifacial Cu(In,Ga)Se₂ Solar Cells and Transparent Modules: Back Interface Control and Damage-Free Laser Scribing

INVITED Jeung-Hyun Jeong

Korea Institute of Science and Technology, Korea

10:10-10:40
8-0729 Optimizing Long-Term Stability in Advanced Solar Cells: A First-Principles Investigation of Interfaces

INVITED Kanghoon Yim¹, Wonze Jung^{1,2}, Suim Lim^{1,3}, Kihwan Kim¹, Sejin Ahn¹

¹Korea Institute of Energy Research, Korea

²Chungnam National University, Korea

³Sogang University, Korea

10:40-11:10
8-0490 Toward Highly Efficient Kesterite Solar Cell and Module

Hao Xin, Yuancai Gong, Chunxu Xiang, Mingjun Yuan, Xiangyu Pan

INVITED

Nanjing University of Posts and Telecommunications, China

11:10-11:40
8-0455 Interfacial Engineering of Co-Evaporated Sb₂Se₃ Solar Cells

Shi-Joon Sung, Van-Quy Hoang, Si-Nae Park, Jaebaek Lee, Kee-Jeong Yang, Jin-Kyu Kang, Dae-Hwan Kim

INVITED

Daegu Gyeongbuk Institute of Science and Technology, Korea

11:40-12:00
8-0688 High-Entropy Spinel Oxide: Synthesis and Photo-Responsivity of Mn_{0.68}Cr_{0.8}Rh_{0.64}Co_{0.87}O₄

Hyeon Ho Cho¹, Juhee Yang², Jong Kyu Kim¹, Myung Hwa Kim², Hak Ki Yu³

¹Pohang University of Science and Technology, Korea

²Ewha Womans University, Korea

³Ajou University, Korea

Advances in Photovoltaic Materials and Devices (3)

November 27 | Youngju

CHAIR(S) Kanghoon Yim (KIER)

14:10-14:40 Interface Study for Sn-Pb Mixed Perovskite Solar Cells

8-2387 Donghoe Kim

INVITED *Korea University, Korea*

14:40-15:10 Exploring the Challenges of Wide Bandgap Perovskite Solar Cells

8-2112 Richard Murdey, Ai Shimazaki, Wan Linbo, Aly Hesham, Ming Anh Truong,
Tomoya Nakamura, Atsushi Wakamiya

INVITED *Kyoto University, Japan*

15:10-15:40 Coin Side Effect in Degraded Lead Halide Perovskite Thin Films

8-0255 Byung-Wook Park, Sang Il Seok

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

15:40-16:00 Constructing Orderly Crystal Orientation with Bidirectional Coordinator
for High Efficiency and Stable Perovskite Solar Cells

8-2516 Jaehwi Lee, Jin Young Kim, Dong Suk Kim

Ulsan National Institute of Science and Technology, Korea

Advances in Photovoltaic Materials and Devices (4)

November 27 | Youngju

CHAIR(S) Donghoe Kim (Korea University)

16:30-17:00
8-1105 Development of Organic Materials and Devices for Large-Area and Mechanically Stable Polymer Photovoltaics

INVITED Hae Jung Son

Korea Institute of Science and Technology, Korea

17:00-17:20
8-2536 Optimizing FAPbI₃ Perovskite Solar Cells via Defect Passivation: The Role of DFT Simulations

Seong Chan Cho, Sang Uck Lee

Sungkyunkwan University, Korea

17:20-17:40
8-0564 Depth-Dependent Post-Treatment of Cesium Iodide for Efficient Perovskite Solar Cells

Pil Ju Park, Won Jin Jang, Soo Young Kim

Korea University, Korea

Poster Presentation | November 27

Inorganic Thin Film Solar Cells

CHAIR(S)

Jin Young Kim (UNIST), Jae Won Shim (Korea University)

8-0958 **Effects of Cs-Post Deposition Treatment for Low-Temperature Single Grading Cu(In,Ga)Se₂ Thin Film Solar Cells**

JuHee Lee, Seunghwan Ji, Yazi Wang, Byungha Shin

Korea Advanced Institute of Science and Technology, Korea

8-1531 **Comparison of AgBiS₂ Solar Cell Performance Depending on the Molecular Precursor Type**

Gahyeon Lee^{1,2}, Wook Hyun Kim¹, Kang-Pil Kim¹, Sungho Woo¹

¹Daegu Gyeongbuk Institute of Science and Technology, Korea

²Kyungpook National University, Korea

8-1537 **Efficient Sb₂S₃ Sensitized Solar Cells Using Nanowires-Zinc Oxide Composite Photoelectrodes**

Kang-Pil Kim, Wook Hyun Kim, Sungho Woo

Daegu Gyeongbuk Institute of Science and Technology, Korea

8-1539 **Effect of TiO₂ Surface Treatment on the Performance of Antimony Sulfide Solar Cells**

Sungho Woo, Kang-Pil Kim, Wook Hyun Kim

Daegu Gyeongbuk Institute of Science and Technology, Korea

8-1544 **Solution-Processed Colloidal Nanocrystal Solar Cells with Improved Long-Term Stability**

Wook Hyun Kim¹, Gahyeon Lee², Sungho Woo¹

¹Daegu Gyeongbuk Institute of Science and Technology, Korea

²Kyungpook National University, Korea

8-1549 **Highly Efficient AgBiS₂ Nanocrystal Solar Cells with Low-Temperature Annealed Cs₂CO₃ Interlayer**

Wook Hyun Kim¹, Gahyeon Lee², Sungho Woo¹

¹Daegu Gyeongbuk Institute of Science and Technology, Korea

²Kyungpook National University, Korea

- 8-1779** **Improvement Electrical and Optical Properties of Heterojunction Solar Cell by Using ITO DLARC**
Seok Jin Jang, Muhammad Quddamah Khokhar, Sangheon Park, Junsin Yi
Sungkyunkwan University, Korea
- 8-2005** **Influence of Silver Incorporation on CZTSe Absorber for Efficient Flexible Monolithic CZTSe/Perovskite Tandem Solar Cell**
Muhammad Rehan, Donghyeop Shin
Korea Institute of Energy Research, Korea
- 8-2558** **Study on Grain Size Improvement of CuInSe₂ Solar Cells Based on ITO Substrate**
Dong-Hwan Jeon, Ali Amanat, Shi-Joon Sung, Jae-Baek Lee, Dae-Hwan Kim
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 8-3255** **Efficiency Enhancement of InGaP/GaAs Double-junction Thin Film Solar Cell Using TiO₂ Nanotextured Surface**
Hyo Jin Kim, Gwang Yeol Park, Woo Yong Jeong
Korea Photonics Technology Institute, Korea

Halide Perovskite Solar Cells

CHAIR(S)

Jin Young Kim (UNIST), Jae Won Shim (Korea University)

8-0149

Self-Powered Light and Pressure Sensing with MAPbI₃-PVDF Composites

Venkatraju Jella, Swathi Ippili, Soon-Gil Yoon

Chungnam National University, Korea

8-0807

Influence of PEDOT: PSS Thickness on the Performance of Sn-Pb Perovskite Solar Cells

Seongju Park, Byungha Shin

Korea Advanced Institute of Science and Technology, Korea

8-1148

Efficient and Stable Stacked Structure Perovskite Solar Cells Combining 2D and 3D Thin Films

Won-Gyu Choi, Jae-Seong Jeong

Korea Electronics Technology Institute, Korea

8-2325

Enhancing Performance and Stability of Sn-Pb Perovskite Solar Cells with Oriented PCBM Layer via High-Temperature Annealing

Taehee Song, Jin Young Kim

Ulsan National Institute of Science and Technology, Korea

8-2640

Interface Engineering of Inverted Perovskite Solar Cells Using Mixed SAM as a Hole Transporting Layer

Jong Jin Mun¹, Rehan Muhammad², Hyeonwook Park³, Kihwan Kim², Sejin Ahn², Yongseok Jun¹, Donghyeop Shin²

¹*Korea University, Korea*

²*Korea Institute of Energy Research, Korea*

³*Korea Institute of Energy Technology, Korea*

8-2652

Development of Inorganic Perovskite CsPbI₃ with Heterojunction Engineering at the Buried Interface for Enhanced Stability and Performance

Syed Fawad Ali Shah, Donghyeop Shin, Inyoung Jeong, Inchan Hwang, Jihye Gwak, Kihwan Kim, Joo Hyung Park

Korea Institute of Energy Research, Korea

Organic and Hybrid Solar Cells

CHAIR(S)

Jin Young Kim (UNIST), Jae Won Shim (Korea University)

- 8-1535** **Effect of In-Situ Prepared Au Nanoparticles on the Device Properties of Organic/Si Hybrid Solar Cells**
Kang-Pil Kim, Wook Hyun Kim, Sungho Woo
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 8-2321** **Enhanced Stability and Efficiency Through Interconnecting Layer Engineering in Organic Tandem Solar Cells**
Jaehyeong Kim, Jin Young Kim
Ulsan National Institute of Science and Technology, Korea
- 8-2341** **Modulation of Interchain Packing Orientation by Varying a Branch Point of Alkyl Substituent: Molecular Dynamics Simulation and Electrical Properties**
Jeongmin Son, Jin Young Kim
Ulsan National Institute of Science and Technology, Korea
- 8-2517** **Demonstration of Organic-Based Photocathode Composed with CuSCN:PC70BM: New Promising Light Absorber for Photoelectrochemical Water Splitting Device**
Woojin Lee¹, Jin Hyun Kim², Michael Graetzel², Jin Young Kim¹
¹*Ulsan National Institute of Science and Technology, Korea*
²*École Polytechnique Fédérale de Lausanne, Switzerland*

Hydrogen Future and Its Economic and Environmental Consideration

Oral Presentation

Hydrogen Future and Its Economic and Environmental Consideration (1)

November 25 | Landing B

CHAIR(S)

Sung Eun Jerng (University of Suwon)

09:40-10:10

9-3827

KEYNOTE

Importance of Work Function Engineering in Photochemical and Electrocatalytic Reactions and Modeling Methods for Semiconductors

Heechae Choi

Xi'an Jiaotong-Liverpool University, China

10:10-10:40

9-1279

INVITED

Geo-Inspired Energy Solutions: Utilizing Submarine Hydrothermal Vent Chemistry for Energy Harvesting

Hye-Eun Lee

Tokyo Institute of Technology, Japan

10:40-10:55

9-3379

Electrochemical Degradation of Polytetrafluoroethylene (PTFE) Through Redox Mediator

Eunjun Lee, Eunji Lim, Yechan Jo, Kyoungsuk Jin

Korea University, Korea

10:55-11:10

9-3142

LaNi₅ Metal Hydride : A Catalyst for Liquid Organic Hydrogen Carrier

Sung Ju Han^{1,2}, Hyangsoo Jeong¹, Heung Nam Han², Jin-Yoo Suh¹

¹Korea Institute of Science and Technology, Korea

²Seoul National University, Korea

11:10-11:25

9-1753

Improving Stability and Elucidating the Degradation Mechanisms During Photoelectrochemical Reaction for Perovskite Photoelectrodes

Juwon Yun, Wooyong Jeong, Chang-Seop Jeong, Hyungsoo Lee, Young Sun Park, Junwoo Lee, Subin Moon, Sumin Kim, Jooho Moon

Yonsei University, Korea

11:25-11:40

9-1750

Boosting Spin-Dependent Overall Water Splitting with Chiral 2D Perovskite Through Crosslinking Strategy

Hyungsoo Lee, Chan Uk Lee, Chang-Seop Jeong, Gyumin Jang, Young Sun Park, Juwon Yun, Junwoo Lee, Jaehyun Son, Wooyong Jeong, Jooho Moon

Yonsei University, Korea

11:40-11:55

9-1744

Chiral Induced Spin selectivity and Lattice Oxygen Activation of Chiral Anion Intercalated NiFe LDH for Efficient Oxygen Evolution Reaction

Jun Hwan Kim, Jooho Moon, Hyungsoo Lee, Young Sun Park, Subin Moon, Soobin Lee

Yonsei University, Korea

Hydrogen Future and Its Economic and Environmental Consideration (2)

November 25 | Landing B

CHAIR(S)

Kyoungsuk Jin (Korea University)

13:10-13:40

9-3398

Developing Efficient and Stable Membrane Electrode Assembly for Electrochemical CO₂ Conversion

INVITED

Hyung-Suk Oh

Korea Institute of Science and Technology, Korea

13:40-14:10

9-0496

Resolving the Local Reaction Environment Effect on CO₂ Reduction: Insights from Spectroelectrochemistry

INVITED

Kun Jiang^{1,2}

¹Shanghai Jiao Tong University, China

²Fudan University, China

14:10-14:25

9-1667

Unassisted Photoelectrochemical Hydrogen Peroxide Production over MoOx-Supported Mo on Cu₃BiS₃ Photocathode

Subin Moon, Young Sun Park, Hyungsoo Lee, Wooyong Jeong, Jooho Moon

Yonsei University, Korea

Hydrogen Future and Its Economic and Environmental Consideration (3)

November 25 | Landing B

CHAIR(S)	Kyoungsuk Jin (Korea University)
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15:00-15:30

Interface Design for CO₂ Electrolysis

9-1568

Youngkook Kwon

INVITED

Ulsan National Institute of Science and Technology, Korea

15:30-16:00

Acidic Media Enables Oxygen-Tolerant Electrosynthesis of Multicarbon Products from Simulated Flue Gas

9-0193

Yanwei Lum

INVITED

National University of Singapore, Singapore

16:00-16:15

Photoelectrochemical Seawater Hydrogen Evolution on Pt-loaded GaN Nanowires

9-0266

Wan Jae Dong

Korea University, Korea

Hydrogen Future and Its Economic and Environmental Consideration (4)

November 25 | Landing B

CHAIR(S) Dae-Hyun Nam (Korea University)

16:50-17:20
9-1397 Design of Structural Architecture and Chemical Functionality for Carbonaceous Composites as Hydrogen Storage Materials

INVITED Jinyeon Hwang, Kiwan Jung
Korea Institute of Science and Technology, Korea

17:20-17:35
9-3736 Hydrogen Abs/Des Mechanism and Cycle Characteristic of Mg-Ni Composite by In-Situ Transmission Electron Microscopy

Han Jun Yu^{1,2}, Jee Hwan Bae¹, Young Min Kim³, Byeong Chan Seo³,
Kyu Hyung Lee², Dong Won Chun¹

¹*Korea Institute of Science and Technology, Korea*

²*Yonsei University, Korea*

³*Korea Institute of Materials Science, Korea*

17:35-17:50
9-3571 Hydrothermal Synthesis of 1T/2H MoSe₂ with Pt Decoration: Phase-Dependent HER Performance

Sun-Woo Kim, So Young Lee, Seon Woo Choi, Dong Han Seo

Korea Institute of Energy Technology, Korea

17:50-18:05
9-2313 Tunable Hydrogen Sensor with Sonication-Assisted Palladium Nanogaps in a Capacitive Structure

Sang-Kil Lee, Joonho Lee, Jiwoo Hong, Kyu Hyoung Lee, Wooyoung Lee

Yonsei University, Korea

Hydrogen Future and Its Economic and Environmental Consideration (5)

November 26 | Landing B

CHAIR(S) Uk Sim (KENTECH)

10:50-11:20
9-0657 Uncovering the Impact of Crystallinity on Oxygen Evolution Reaction of $\text{Co}_x\text{Fe}_{3-x}\text{O}_4$ Electrocatalysts

INVITED Minjeong Kim, Dongyup Shin, Sang Soo Han, [Jin Gu Kang](#)
Korea Institute of Science and Technology, Korea

11:20-11:35
9-1937 Local Coordination Effect on Regulating the Oxygen Reduction Reaction Pathways over Atomically Dispersed Pt Sites

[Baoxin Ni](#), Kun Jiang
Shanghai Jiao Tong University, China

Hydrogen Future and Its Economic and Environmental Consideration (6)

November 26 | Landing B

CHAIR(S) Dae-Hyun Nam (Korea University)

15:00-15:30
9-2305 Rational Nanopositioning of Advanced Materials for Future Energy Carrier

INVITED [Jung Kyu Kim](#)
Sungkyunkwan University, Korea

15:30-16:00
9-1009 Confinement Effects of Hollow Structured Pt-Rh Electrocatalysts Toward Efficient and Durable Ethanol Electrooxidation

INVITED [Kyeong-Ho Kim](#)
Pukyong National University, Korea

16:00-16:30
9-0422 Understanding Single H₂ Gas Bubble Evolution During Electrocatalytic Hydrogen Evolution Reaction

INVITED [Sunghak Park](#)
Sungkyunkwan University, Korea

Hydrogen Future and Its Economic and Environmental Consideration (7)

November 27 | Landing B

CHAIR(S) Kyoungsuk Jin (Korea University)

09:40-10:10 **Unexpected Co-catalytic Role of Supporting Metal Ions in Water**
9-0586 **Reduction to Hydrogen**

INVITED Chang Hyuck Choi

Pohang University of Science and Technology, Korea

10:10-10:40 **Lithiated Nanosized Silicon As High Capacity and Long Cycle Life**
9-0784 **Anode for All Solid-State Batteries**

INVITED Hyunjung Park, Sungbin Oh, Chanjoon Lim, Hee Tae Tak, Yechan Park

Chosun University, Korea

10:40-11:10 **Development of Direct Ammonia Solid Oxide Fuel Cells Toward**
9-3527 **Stability Improvement**

INVITED Kiho Bae

Korea Institute of Energy Technology, Korea

11:10-11:25 **Ambipolar Nature Accelerates Dual-Functionality on Ni/Ni₃N@NC**
9-1037 **for Simultaneous Hydrogen and Oxygen Evolution in Electrochemical**
Water Splitting System

Gnanaprakasam Janani, Subramani Surendran, Dae Jun Moon, Joon Young Kim,
 Yoongu Lim, Jinuk Choi, Uk Sim

Korea Institute of Energy Technology, Korea

Hydrogen Future and Its Economic and Environmental Consideration (8)

November 27 | Landing B

CHAIR(S)	Uk Sim (KENTECH)
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14:10-14:40 9-0140	Core-Shell Structured Mixed Metal Oxide Nanoclusters for Electrochemical Applications
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INVITED	<u>Chan Woo Lee</u> <i>Kookmin University, Korea</i>
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14:40-15:10 9-0208	Photoelectrochemical Energy Conversions Based on Surface Engineering Regulation of Semiconductor
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INVITED	<u>Chengkai Xia</u> <i>North University of China, China</i>
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15:10-15:25 9-1936	Promoting Interfacial Charge Separation of MnIn ₂ S ₄ /ZnTiO ₃ Heterojunction for Boosting CO ₂ Photoreduction Activity
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	<u>Plassidius Chengula</u> , Hazina Charles, Jiyeon Seo, Caroline Sunyong Lee <i>Hanyang University ERICA, Korea</i>
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Hydrogen Future and Its Economic and Environmental Consideration (9)

November 27 | Landing B

CHAIR(S) Uk Sim (KENTECH)

16:30-17:00
9-2666 Hydrogen Future: Discovery of a New Photocatalyst for Hydrogen Production Without Carbon Emission

INVITED Joon Young Kim¹, Il Goo Kim¹, Pil Do Jung¹, Dong Jin Lee¹, Yoongu Lim², Dae Jun Moon², Gyung Hwa Jeong², Uk Sim²

¹NEEL Sciences, Inc., Korea

²Korea Institute of Energy Technology, Korea

17:00-17:15
9-1927 Construction Bi₂S₃/SnTiO₂ Nanofibers Boosting Interfacial Charge Transfer to Enhance CO₂ Photoreduction to CH₃OH

Hazina Charles, Plassidius J. Chengula, Jiyeon Seo, Caroline Sunyong Lee

Hanyang University, Korea

17:15-17:30
9-0572 Dual Role of Metal-Chelating Ligands in the Fabrication of Nickel Single-Atom Catalysts for Electrochemical CO₂ Reduction

Jae Hak Kim, Soo Young Kim

Korea University, Korea

Poster Presentation | November 26

Future Hydrogen and Potential Hydrogen Carrier Production

CHAIR(S) Uk Sim (KENTECH)

- 9-0538** MoSSe/rGO Electrocatalysts for Nitrate Reduction Reaction and Oxygen Evolution Reaction
Hyojung Lim¹, Jinuk Choi¹, Gyoung Hwa Jeong¹, Subramani Surendran¹, Gnanaprakasam Janani¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea
- 9-0580** High-Performance Hydrogen Evolution Reaction by ReS₂/TiO₂ Hollow Microcones Generated on Ti Support through Microwave-Hydrothermal Consecutive Synthesis
Yoonsun Choi, Jongmin Lee, Chae-Eun Shim, Yeongseo Jin, Unyong Jeong
Pohang University of Science and Technology, Korea
- 9-0581** Highly Effective Iridium Catalysts Using Antimony-Doped Tin Oxide Support for PEM Water Electrolysis
Yungi Nam, Byungha Shin
Korea Advanced Institute of Science and Technology, Korea
- 9-0651** Electrochemical Ammonia Synthesis from Nitrate Using FCC-Based AlFeCoNiCu High Entropy Alloys
Jinuk Choi¹, Hyojung Lim¹, Gyoung Hwa Jeong¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea
- 9-0710** Epitaxial Growth of Molybdenum Disulfide on Three-Dimensional Structure
Na-Kyung Kwak¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea

- 9-0760** **Electrochemical Urea Production from Carbon Dioxide and Nitrate Using CuFe Catalysts Under Ambient Conditions**
Jinuk Choi¹, Tae-Yong An¹, Hyojung Lim¹, Chanmin Jo¹, Minseo Jeon¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea
- 9-0801** **CoNiCuRu on MWCNT Catalyst for Electrochemical Ammonia Synthesis from Nitrate Under Ambient Conditions**
Jinuk Choi¹, Gyoung Hwa Jeong¹, Hyojung Lim¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea
- 9-0804** **Center Atom of the Tetraalkyl-Type Ionic Liquids Can Affect the Lithium-Mediated Nitrogen Reduction Performance**
Jinwoo Chu, Sungbin Yang, Byungha Shin
Korea Advanced Institute of Science and Technology, Korea
- 9-0962** **Nitrogen-Rich Functionalized Carbon Wrapped on CoP/Ag: A Dynamic Multifunctional Electrocatalyst for Zinc-Air Battery Driven Water Splitting System**
Subramani Surendran¹, Janani Gnanaprakasam¹, Dong-Kyu Lee¹, Yoongu Lim¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea
- 9-0994** **Enhancing Oxygen Evolution Reaction Efficiency with Metal Cation Added Nickel-Cobalt Layered Double Hydroxides in Water Electrolysis**
Juhwang Kim, Gyoung Hwa Jeong, Gnanaprakasam Janani, Uk Sim
Korea Institute of Energy Technology, Korea
- 9-1049** **Efficient Ammonia-Assisted Water Electrolysis Using FeCoNiCuSn High-Entropy Catalysts for Hydrogen Production**
Minseo Jeon¹, Chanmin Jo¹, Gyoung Hwa Jeong¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea

- 9-1122** Utilizing the Wadsley-Roth Structures in TiNb₂O₇@C Microspheres for Efficient Electrochemical Nitrogen Reduction at Ambient Conditions
Subramani Surendran, Tae-Yong An, Yoongu Lim, Uk Sim
Korea Institute of Energy Technology, Korea
- 9-1241** Photo- and Electrochemical Black Titanium Dioxide (b-TiO₂) Nanoparticles for Enhanced Catalytic Applications via Microwave Method
Joohyun Kim¹, Na kyung Kwak¹, Gyoung Hwa Jeong^{1,2}, Uk Sim^{1,2}
¹*Korea Institute of Energy Technology, Korea*
²*NEEL Sciences, Inc., Korea*
- 9-1289** DFT Analysis of Bismuth Catalysts Investigating the Role of Dopants for Nitrogen and Nitrogen Oxides Reduction
Dong-Kyu Lee¹, Tae-Yong An¹, Yujin Jeong¹, Tae-Hoon Kim², Min-Cheol Kim³, Jung Kyu Kim³, Uk Sim¹
¹*Korea Institute of Energy Technology, Korea*
²*Chonnam National University, Korea*
³*Sungkyunkwan University, Korea*
- 9-1298** Efficient Ammonia Assisted Water Electrolysis Using NiCuP Catalyst for Green Hydrogen Production
Chanmin Jo¹, Minseo Jeon¹, Subramani Surendran¹, Dae Jun Moon¹, Joon Young Kim^{1,2}, Uk Sim^{1,2}
¹*Korea Institute of Energy Technology, Korea*
²*NEEL Sciences, Inc., Korea*
- 9-1308** Efficient Electrochemical Urea Electrolysis with NiCoFeVMn High-Entropy Catalyst for Hydrogen Generation
Chanmin Jo¹, Minseo Jeon¹, Jinuk Choi¹, Hyojung Lim¹, Gyoung Hwa Jeong¹, Uk Sim^{1,2}
¹*Korea Institute of Energy Technology, Korea*
²*NEEL Sciences, Inc., Korea*
- 9-1565** Highly Active Co-Fe-P Catalysts for Hydrogen Production via Ammonia Borane Hydrolysis
Se Kwon Oh
Korea Institute of Industrial Technology, Korea

- 9-1614** Nontypical Wulff-Shape Silicon Nanosheets Including High Catalytic Activity
Minwoo Lee, Wooyoung Shim
 Yonsei University, Korea
- 9-1734** Photoelectrochemical Performance of a Ternary $\text{WO}_3/\text{BiVO}_4/\text{NiCo}$ LDH Photoanode for High-Efficiency Water Oxidation
Dohyun Kim, Seong-Ho Baek
 Dankook University, Korea
- 9-1760** Boosting Water Dissociation and Hydrogen Production via Pyrrolic-N-Modified Ni Metal on N-Doped Carbon Nanoplate
Jiwon Kim, Hyung Wook Choi, Ui Young Lee, Hyuck Gu Choi, Dae Ho Yoon
 Sungkyunkwan University, Korea
- 9-1764** Synthesis of Lignin Derived Porous Carbon Sphere and Noble Metal Hybrid Material via Spray Drying Method as Oxygen Reduction Reaction Electrocatalysts
Hyuckgu Choi, Hyung Wook Choi, Jiwon Kim, Ui Young Lee, Dae Ho Yoon
 Sungkyunkwan University, Korea
- 9-1895** Designing N-Doped Carbon Encapsulation of Ni_3Fe Alloy Improved Catalytic Activity and Durability for Overall Water Splitting
Ui Young Lee, Hyung Wook Choi, Jiwon Kim, Hyuck Gu Choi, Dae Ho Yoon
 Sungkyunkwan University, Korea
- 9-2147** CuNi Derived from ZIF-8 for Electrochemical Ammonia Oxidation for Eco-Friendly Hydrogen Production
Chanmin Jo¹, Minseo Jeon¹, Gyoung Hwa Jeong¹, Uk Sim^{1,2}
¹Korea Institute of Energy Technology, Korea
²NEEL Sciences, Inc., Korea
- 9-2283** Interfacial Engineering of CuCo/CuCoO Mott-Schottky Electrocatalyst for High-Performance Sustainable Water Splitting Systems
Subramani Surendran, Gnanaprakasam Janani, Jinuk Choi, Uk Sim
 Korea Institute of Energy Technology, Korea

- 9-2286** **Efficient Electrochemical Ammonia Synthesis Over CuO/MgO Heterostructure Electrocatalysts via Nitrate Reduction Reaction**
Subramani Surendran, Gnanaprakasam Janani, Dong-Kyu Lee, Uk Sim
Korea Institute of Energy Technology, Korea
- 9-2291** **Synergistic Modulation in Cobalt@N-Doped Carbon Prepared by Plasma-Arc Discharge Process: Towards Sustained Rechargeable Zinc-Air Battery Driven Water Electrolyzer**
Gnanaprakasam Janani, Subramani Surendran, Dong-Kyu Lee, Uk Sim
Korea Institute of Energy Technology, Korea
- 9-2331** **Pt/NiFe LDH with a Large Surface Area: An Extremely Active and Durable Electrocatalyst for Ammonia Oxidation Reaction**
Jiwoo Lee, Ho Won Jang
Seoul National University, Korea
- 9-2415** **Enhanced Oxygen Evolution Reaction of 2-Dimensional Metal-Organic Frameworks with Tunable Nitrogen Functionalities by Ion Beam Sputtering**
Jeewon Bu, Woo Seok Cheon, Ho Won Jang
Seoul National University, Korea
- 9-2421** **Facile Solvothermal Synthesis of High-Entropy Alloy Nanoparticles for Water Electrolysis**
Jin Ho Seo, Ho Won Jang
Seoul National University, Korea
- 9-2492** **Bimetallic NiO/NiFe₂O₄ Heterostructures with Interfacial Effects for Boosting Electrochemical Water Splitting Applications**
Sebastian Cyril Jesudass¹, Subramani Surendran², Tae-Hoon Kim¹, Uk Sim²
¹Chonnam National University, Korea
²Korea Institute of Energy Technology, Korea
- 9-2494** **Defect Engineered Ternary Metal Spinel-Type Ni-Fe-Co Oxide as Bifunctional Electrocatalyst for Overall Electrochemical Water Splitting**
Sebastian Cyril Jesudass¹, Subramani Surendran², Tae-Hoon Kim¹, Uk Sim²
¹Chonnam National University, Korea
²Korea Institute of Energy Technology, Korea

- 9-2565** **Ni-Fe-Cr Electrocatalyst for Highly Efficient Oxygen and Hydrogen Evolution Reaction by Electrodeposition Technique**
Se-Kwon Oh
Korea Institute of Industrial Technology, Korea
- 9-2823** **Economical, Eco-Friendly and Easily Fabricated Nickel/ $\alpha(\beta)$ -Nickel(II) Hydroxide/Carbonized Wood Bifunctional Electrodes for High-Performance Water Splitting**
Hyeon Ji Jeong, Jang Hee Kim, Tae Young Park, Sung Ho Song, Kwang Hyun Park
Kongju National University, Korea
- 9-3012** **Low Onset-Potential Z-Scheme Ta₃N₅-Based Photoanode with Enhanced Light Harvesting and Charge Transport**
Hee Ryeong Kwon, Ho Won Jang
Seoul National University, Korea
- 9-3013** **Atomically Dispersed Molybdenum Atoms on Sulfur-Doped NiFe-LDH for Saline Water Electrolysis**
Jae Kwan Lee, Ho Won Jang
Seoul National University, Korea
- 9-3075** **Solar-Driven CO₂ Electrochemical Reduction to Formate with High Solar-to-Fuel Efficiency**
Lankamullage Hasini Amanda Wijewardena, Woo Seok Cheon, Ho Won Jang
Seoul National University, Korea
- 9-3344** **Sustainable Electrochemical Epoxidation of Olefins Using Metalloporphyrin Catalysts**
Sojin Kim, Dibya Yadav, Eunji Baek, Kyoungsuk Jin
Korea University, Korea
- 9-3345** **Electrochemical Epoxidation of Ethylene Coupled with Hydrogen Evolution**
Seohyun Kim, Sojin Kim, Kyoungsuk Jin
Korea University, Korea

- 9-3353** **Electrochemically Assisted Selective Amide Synthesis Using Nitrile Under Mild Conditions**
Avishek Roy, Kyoungsuk Jin
 Korea University, Korea
- 9-3817** **Redox Mediator-Mediated Electrochemical Polytetrafluoroethylene (PTFE) Degradation**
Eunji Lim, Eunjun Lee, Kyoungsuk Jin
 Korea University, Korea
- 9-3913** **Improving PEM Water Electrolyzers with Surface-Engineered 1T'-Phase WS₂ Nanosheets and Stabilized Ti₃C₂ MXene for Enhanced Performance and Cost-Efficiency**
 Bee Lyong Yang^{1,2}, Debabrata Chanda^{1,2}, Jae Ryong Kim^{1,2}, Shahbaz Ahmed^{1,2}, Gyeong Gyun Park^{1,2}, Jaechang Yang^{1,2}, Mallappa Mahanthappa^{1,2}, Soon-Yong Kweon³, Myung Seon Ryu⁴, Daewon Hong⁵, Gi-Sung Lee⁵
¹Kumoh National Institute of Technology, Korea
²GHS Co. Ltd., Korea
³Korea National University of Transportation, Korea
⁴Pheonix Tech Co., Ltd., Korea
⁵National Nanofab Center, Korea
- 9-3916** **Ultra-Low Loading Pt (0.25 mg cm⁻²) Based Catalyst with Ce and Ni Incorporation for Cost Effective Industrial AEM Water Electrolyzer and PVEC Device Applications**
 Shahbaz Ahmed^{1,2}, Bee Lyong Yang^{1,2}, Jae Ryong Kim^{1,2}, Debabrata Chanda^{1,2}, Gyeong Gyun Park^{1,2}, Mallappa Mahanthappa^{1,2}, Jaechang Yang^{1,2}, Myung Seon Ryu³, Gi-Sung Lee⁴, Daewon Hong⁴, Soon-Yong Kweon⁵
¹Kumoh National Institute of Technology, Korea
²GHS Co. Ltd., Korea
³Pheonix Tech Co., Ltd., Korea
⁴National Nanofab Center, Korea
⁵Korea National University of Transportation, Korea

9-3917

Chromium-Doped Nickel Cobalt Selenide: A High-Performance Electrocatalyst for Efficient Water Splitting

Jaeryong Kim^{1,2}, Mallappa Mahanthappa^{1,2}, Gyeong Gyun Park^{1,2},
Jaechang Yang^{1,2}, Chanda Debabrata¹, Shahbaz Ahmed^{1,2}, Myung Seon Ryu³,
Gi-Sung Lee⁴, Daewon Hong⁴, Soon-Yong Kweon⁵, Bee Lyong Yang^{1,2}

¹Kumoh National Institute of Technology, Korea

²GHS Co. Ltd., Korea

³Phoenix Tech Co., Ltd., Korea

⁴National NanoFab Center, Korea

⁵Korea National University of Transportation, Korea

Advanced Materials for Hydrogen Storage and Transportation

CHAIR(S) Dong Han Seo (KENTECH)

9-2725 Crystallinity Controlled Plasma Assisted Nanofabrication of IrO₂ Nanoparticles on 3D Graphene Surfaces for High Performing Oxygen Evolution Reaction Catalyst

So Young Lee, Sun-Woo Kim, Ali Abouelanwar, Seonwoo Choi, Dong Han Seo
Korea Institute of Energy Technology, Korea

9-3621 Electrodeposited Single-Atom Coupled with CoFe Layered Double Hydroxides for Enhanced Oxygen Evolution

Jaehyun Kim, Ho Won Jang
Seoul National University, Korea

Next-Generation Hydrogen Utilization

CHAIR(S) Kyoungsuk Jin (Korea University)

9-1117 Efficient Electrocatalytic Activity of Titanium Nitride Towards Electroreduction of Nitrate-to-Ammonia

Subramani Surendran, Muhammad Salman, Gnanaprakasam Janani, Hyojung Lim, Jinuk Choi, Uk Sim
Korea Institute of Energy Technology, Korea

9-1128 Structural Engineering of FeNi@N-C Nanoparticles for Boosting Ammonia Oxidation Reaction

Subramani Surendran, Gnanaprakasam Janani, Chanmin Jo, Uk Sim
Korea Institute of Energy Technology, Korea

9-2292 In-Situ Integration of Co-Active Sites in MnO@C Composite for Zinc-Air Battery-Driven Water Splitting

Gnanaprakasam Janani, Dong-Kyu Lee, Subramani Surendran, Uk Sim
Korea Institute of Energy Technology, Korea

Materials and System for the Future of Hydrogen Mobility

CHAIR(S)

Sung Eun Jerng (University of Suwon)

9-0720

High-Performance Aqueous Zinc Battery with Halide-Intercalated MXene as Cathode

Yoongu Lim¹, Jihun Yoo¹, Gyoung Hwa Jeong¹, Joon Young Kim¹, Dae Jun Moon¹, Uk Sim^{1,2}

¹Korea Institute of Energy Technology, Korea

²NEEL Sciences, Inc., Korea

9-0726

Improved Cycling Performance of Aqueous Zinc-Iodine Batteries with Transition Metal-Zeolite-Embedded Carbon Nanofibers

Yoongu Lim¹, Jihun Yoo¹, Gyoung Hwa Jeong¹, Joon Young Kim¹, Dae Jun Moon¹, Uk Sim^{1,2}

¹Korea Institute of Energy Technology, Korea

²NEEL Sciences, Inc., Korea

9-0734

Enhancing Aqueous Zinc-Iodine Battery Performance with Sustainable Biomass-Derived Carbon

Yoongu Lim¹, Jihun Yoo¹, Gyoung Hwa Jeong¹, Joon Young Kim¹, Dae Jun Moon¹, Uk Sim^{1,2}

¹Korea Institute of Energy Technology, Korea

²NEEL Sciences, Inc., Korea

9-1217

Enhancing Stability and Efficiency of Zn-I₂ Batteries Using Single-Atom Catalysts on Carbon

Jihun Yoo¹, Yoongu Lim¹, Gyoung Hwa Jeong¹, Joon Young Kim¹, Dae Jun Moon¹, Uk Sim^{1,2}

¹Korea Institute of Energy Technology, Korea

²NEEL Sciences, Inc., Korea

CO₂ Electrolysis for Sustainable Chemical Manufacturing

CHAIR(S)

Dae-Hyun Nam (Korea University)

- 9-1327** Plasmonic Nanodomains on Two-Dimensional (2D) Surface Oxide of Liquid Metal Nanoparticles: A Versatile Platform for Synergistic Photo-Sonochemical Room-Temperature CO₂ Conversion
Mohammad Karbalaee Akbari, Juho Kim, Jiyun Kim, Mireu Park, Pureum Kim, Serge Zhuikov
Ghent University, Belgium
- 9-1661** Pt Single Atoms Anchored CsPbBr₃/g-C₃N₄ Heterojunction for Photocatalytic CO₂ Reduction
Sungwook Park, Soo Young Kim
Korea University, Korea
- 9-1669** Dry photodegradation of Volatile Organic Compounds (VOCs) Using MoS₂/TiO₂ Heterostructure Under Visible High Irradiation
Jiyeon Seo, Plassidius J. Chengula, Hazina Charles, Taehyeob Im, Caroline Sunyong Lee
Hanyang University ERICA, Korea
- 9-1681** Molecularly Dispersed CoPc on Ultrathin Copper Nanowire for Ethylene Production by Electrochemical CO₂ Conversion
Suwon Rhi, Soo Young Kim
Korea University, Korea
- 9-3027** High-Performance Cu Single-Atom Catalysts (SACs) for Solar Panel-Integrated Carbon Dioxide Reduction Systems
Chaewon Seong¹, Jiwon Heo¹, Pratik Mane¹, Vishal Burungale¹, Hyojung Bae², Jun-Seok Ha¹
¹Chonnam National University, Korea
²Korea Photonics Technology Institute, Korea
- 9-3104** Enhanced CO₂ Electroreduction via Gas Diffusion Electrodes Incorporating Metal-Organic Frameworks
Jungsu Eo¹, Woosuck Kwon¹, Dae-Hyun Nam²
¹Daegu Gyeongbuk Institute of Science and Technology, Korea
²Korea University, Korea

9-3107

Molecularly Enhanced CO₂ Capture Promotes High-Rate Ethylene Conversion by CO₂ ElectrolysisTaemin Lee¹, Jougyoun Kim¹, Youngu Lee¹, Dae-Hyun Nam²¹Daegu Gyeongbuk Institute of Science and Technology, Korea²Korea University, Korea

9-3176

Optimizing Electrodeposition Parameters for Enhanced Electrochemical CO₂ Reduction on Cu-Based ElectrodesJiwon Heo¹, Chaewon Seong¹, Hyojung Bae², Vishal Burungale¹, Pratik Mane¹, Jun-Seok Ha¹¹Chonnam National University, Korea²Korea Photonics Technology Institute, Korea

Thermal Engineering Materials and Devices

Oral Presentation

Thermal Engineering Materials and Devices (1) : Plenary

November 26 | Landing B

CHAIR(S)

Su Dong Park (KERI)

09:00-09:30

10-3865

Zero-Emission Thermoelectric Power Generation and Refrigeration for Carbon Neutrality

KEYNOTE

[Zhi-Gang Chen](#)*Queensland University of Technology, Australia*

09:30-10:00

10-3852

Coherent Measurements of Non-Equilibrium Dynamics Using Time-Resolved X-ray Scattering: Watching the Disappearance and Emergence of Collective Atomic Motions

KEYNOTE

[Soohevyong Lee](#)*Korea Research Institute of Standards and Science, Korea*

10:00-10:30

10-3819

Advances and Challenges of Thermoelectric Power Generation: from Materials, Modules to Applications

KEYNOTE

[Michihiro Ohta](#)*National Institute of Advanced Industrial Science and Technology, Japan*

Thermal Engineering Materials and Devices (2)

November 26 | Udo

CHAIR(S) Woochul Kim (Yonsei University)

15:00-15:30 **Enhanced Thermal Conductivity Using Segregated Thermal Pathway in**
10-2256 **Ceramic/Polymer Composites**

INVITED Hyunae Cha, Young Kook Moon, Jong-Jin Choi, Byung-Dong Hahn,
 Cheol-Woo Ahn
Korea Institute of Materials Science, Korea

15:30-16:00 **Development of Oxide-Based Solid-State Electrochemical Thermal**
10-2267 **Transistors**

INVITED Hiromichi Ohta
Hokkaido University, Japan

Thermal Engineering Materials and Devices (3)

November 26 | Udo

CHAIR(S) In Chung (Seoul National University)

16:50-17:20 **Thermoelectric Device Physics: Bridging the Performance Gap Between**
10-3665 **Materials and Modules**

INVITED Byungki Ryu, Jaywan Chung, SuDong Park
Korea Electrotechnology Research Institute, Korea

17:20-17:50 **Canceled**
10-0843

INVITED

17:50-18:20 **Flexible Thermoelectric Devices for Accelerating Wound Healing**

10-0500 Chongjian Zhou
Northwestern Polytechnical University, China

INVITED

Thermal Engineering Materials and Devices (4)

November 27 | Udo

CHAIR(S) Hyejin Jang (Seoul National University)

09:40-10:10
10-0292
INVITED
Micro-Thermography and Applications
Ki Soo Chang, Dong Uk Kim, Chan Bae Jeong, Ilkyu Han, Dongmok Kim
Korea Basic Science Institute, Korea

10:10-10:40
10-0534
INVITED
Steady-State Thermorefectance (SSTR) Method for Measuring Thermal Conductivity of Liquids
Dong-Wook Oh, Ho-Sung Kim
Chosun University, Korea

10:40-11:10
10-0615
INVITED
Nano-Sheet Spectral Heat Phonon Devices
Dogyeom Jeong¹, Terumasa Tadano², Jongseok Lee¹
¹Gwangju Institute of Science and Technology, Korea
²National Institute for Materials Science, Japan

11:10-11:40
10-2260
INVITED
Thermal Boundary Resistances in Electronics
Zhe Cheng
Peking University, China

11:40-11:55
10-2407
Large Thermal Conductivity Reduction of Electrochemically Reduced Cerium Oxide – A Good Candidate Active Material for Solid-State Thermal Transistors
Ahrong Jeong¹, Zhiping Bian¹, Mitsuki Yoshimura¹, Hyeonjun Kong¹, Jason Tam², Bin Feng², Yuichi Ikuhara², Yusaku Magari¹, Takashi Endo¹, Yasutaka Matsuo¹, Hiromichi Ohta¹
¹Hokkaido University, Japan
²The University of Tokyo, Japan

11:55-12:10
10-3362
AI Estimation of Active Materials for Solid-State Thermal Transistors - How to Select Good Active Materials with Large Thermal Conductivity Switching Width -
Noriko Otani¹, Hiromichi Ohta²
¹Tokyo City University, Japan
²Hokkaido University, Japan

Thermal Engineering Materials and Devices (5)

November 27 | Udo

CHAIR(S)

Min-Wook Oh (Hanbat National University)

14:25-14:40

10-2413

Efficient Doping Strategies to Enhance Power Factor of Large-Area MoS₂ Without Charged Impurities

Sooyeon Moon^{1,2}, Hyejin Jang¹, Kyungjune Cho³, Seungjun Chung²

¹Seoul National University, Korea

²Korea University, Korea

³Korea Institute of Science and Technology, Korea

14:40-14:55

10-1886

Fabricating Flexible Spin Seebeck Device Using the Yttrium Iron Garnet

Hye-Jin Ok, Ki-Suk Lee

Ulsan National Institute of Science and Technology, Korea

14:55-15:10

10-3199

Inkjet-Doped Carbon Nanotube Yarn-Based Thermoelectric Generators for Self-Powered Wearable Electronics

Kyung Tae Park¹, Young Shik Cho², Taehoon Kim¹, Heesuk Kim²

¹Korea Institute of Materials Science, Korea

²Korea Institute of Science and Technology, Korea

15:10-15:25

10-0649

Accelerated Discovery of High Entropy Thermoelectric Alloys via Active Learning

Hanhwi Jang¹, Wooseok Lee², Hwa-Jung Kim³, Sohyang Cha³, Hosun Shin³, Min-Wook Oh⁴, YongJoo Kim⁵, Yeon Sik Jung¹

¹Korea Advanced Institute of Science and Technology, Korea

²Seoul National University, Korea

³Korea Research Institute of Standards and Science, Korea

⁴Hanbat National University, Korea

⁵Korea University, Korea

15:25-15:40

10-0707

Tuning the Thermoelectric and Magnetic Properties of ZrFe_{0.4}Ni_{0.6}Sb Double Half-Heusler Materials Through Cobalt Doping

Joseph Ngugi Kahiu, Samuel Kimani Kihoi, Hyunji Kim, Innocent Thato Marekwa, Dong Hyun Shin, Ho Seong Lee

Kyungpook National University, Korea

15:40-15:55
10-1125

Canceled

15:55-16:10
10-2132

Rational Design Rule for Thermoelectric Materials: A Case Study Using Zinc Oxide

Myungwoo Choi, Seokwoo Jeon
Korea University, Korea

Thermal Engineering Materials and Devices (6)

November 27 | Udo

CHAIR(S)

Hosun Shin (KRISS)

16:30-16:45
10-3720

Unlocking the Full Potential of Thermoelectric MgAgSb by Unravelling the Interrelation of Phase Constitution and Transport Properties

Johannes De Boor, Amandine Duparchy, Frederic Kreps, Eckhard Mueller
German Aerospace Center, Germany

16:45-17:00
10-3163

Exploring the Role of Structural Disorder in Measuring Charge Carrier Concentration in Organic Thermoelectric Materials

Sunwoo Cho, Jeong Han Song, Juhyung Park, Jeehyun Jeong, Jeonghun Kwak
Seoul National University, Korea

17:00-17:15
10-3781

Heat Exchanger Design Optimization for Reliable Thermoelectric Generation (TEG) Systems

Minjik Kim, Juyoung Lee, Ikjin Lee
Korea Advanced Institute of Science and Technology, Korea

Poster Presentation | November 27

High-Potential Thermoelectric Materials and Processing

CHAIR(S)

Hyun-Sik Kim (University of Seoul)

- 10-0131** Phase Transition and Thermoelectric Performance of $\text{Ni}_x\text{Cu}_{12-x}\text{Sb}_4\text{Se}_{13}$
Sang Jun Park, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0135** Thermoelectric Properties of Double Doped Permingeatite $\text{Cu}_3\text{Sb}_{1-x}\text{Ge}_x\text{Se}_{4-y}\text{S}_y$ Prepared Using Mechanical Alloying and Hot Pressing
 Yu Rim Lee, Sang Jun Park, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0139** Pribramite CuSbSe_2 : Solid-State Synthesis and Thermoelectric Properties
 Min Ji Choi, Sang Jun Park, Il-Ho Kim
Korea National University of Transportation, Korea
- 10-0590** Reduced Lattice Thermal Conductivity via Mn Precipitates in SnTe Thermoelectric Materials
Donghyun Shin, Hyunji Kim, Samuel Kimani Kihoi, Joseph Ngugi Kahiu, Jin Ah Shin, Ho Seong Lee
Kyungpook National University, Korea
- 10-0629** Thermal Stability and Mechanical Properties of Nano-Structured Bi-Sb-Te Materials for Thermoelectric Generation
Yongmin Kang, Jaeuk Lee, Jinseok Lee, Hyungeui Lee
LG Innotek, Korea
- 10-0866** Enhanced Thermoelectric Transport Properties of Al-Doped Zinc Oxide via Morphology Control
Chul Oh Park, Ji Hee Pi, Ga Yeong Koo, Ki Wook Bae, Kyu Hyoung Lee
Yonsei University, Korea
- 10-1231** Effect of Ag Doping on the Thermoelectric Performances of Low-Dimensional $\text{K}_{0.8}\text{Ti}_{1.73}\text{Li}_{0.27}\text{O}_4$
Jeong Yun Hwang, Ji Hee Pi, Kyu Hyoung Lee
Yonsei University, Korea

- 10-1495** **Improvement of Thermal Properties of BaTiO₃ Through Oxygen Vacancy Control via Phenolic Resin**
Changhui Jeong, Hyunsik Kim
University of Seoul, Korea
- 10-1677** **High-Performance Thermoelectric GeTe Materials for Sustainable Energy Applications**
Cheng-Lung Chen
National Chung Hsing University, Chinese Taipei
- 10-1986** **Exploring SrSb₂-SrBi₂ Alloys as a Novel Thermoelectric Material**
Kangkeon Lee¹, Hanhwi Jang¹, Yeon Sik Jung¹, Min-Wook Oh²
¹Korea Advanced Institute of Science and Technology, Korea
²Hanbat National University, Korea
- 10-2346** **Enhanced Thermoelectric Performance of Shallow Pb-Doped Sb₂Te₃ Polycrystalline Alloys for Power Generation in Midtemperature Range**
Gwanhyeong Lee, Hyungyu Cho, Hyunsik Kim, Sangil Kim
University of Seoul, Korea
- 10-2368** **Enhanced Thermoelectric Power Factor in Carrier-Type-Controlled Platinum Diselenide Nanosheets by Molecular Charge Transfer Doping**
Seonhye Youn¹, Jeongmin Kim², Wooyoung Lee¹
¹Yonsei University, Korea
²Daegu Gyeongbuk Institute of Science and Technology, Korea
- 10-2576** **Electrical and Thermal Transport Properties of Cr₂Se₃-Cr₂Te₃ Solid-Solution Alloy System and Estimation of Optimal Thermoelectric Properties**
Hyungyu Cho, Okmin Park, Hyunsik Kim, Sangil Kim
University of Seoul, Korea
- 10-2688** **Point Defect and Microstructure Engineering for Optimization of Electrical Properties of p- and n-Type (Bi,Sb)₂Te₃ Compounds via Hot Isostatic Pressing**
Seungki Jo, Jeong Min Park, Kyung Tae Kim
Korea Institute of Materials Science, Korea

- 10-3028** Pilot-Scale Synthesis and Characterization of Thermoelectric Properties for Industrial Compatible Manufacturing Process
Sung Hoon Park
Hylium Industries, Korea
- 10-3743** Investigation of Thermoelectric Properties of $\text{YbFe}_3\text{NiSb}_{11.5}\text{Sn}_{0.5}$ with Controlled Yb Filler
Min Seok Jeong^{1,2}, Woo Hyun Nam², Jung Young Cho², Kyoung-Seok Moon¹
¹Gyeongsang National University, Korea
²Korea Institute of Ceramic Engineering and Technology, Korea
- 10-3770** Enhanced Thermoelectric Performance of ZnSb Through Sn-doping
Jeong Min Lee, Sung Hyun Kang, Weon Ho Shin
Kwangwoon University, Korea
- 10-3773** Enhanced Thermal Properties of ZnSb through Cu Substitution over a Range of Temperatures
Sung Hyun Kang, Jeong Min Lee, Weon Ho Shin
Kwangwoon University, Korea
- 10-3786** Thermoelectric Properties of Mn-Doped ZnSbs Fabricated Without Sintering Process
 Zheng Dao Jin¹, Ji Hee Pi², Ok Min Park³, Kyu Hyoung Lee², Sang-Il Kim³,
Hee Jung Park¹
¹Dankook University, Korea
²Yonsei University, Korea
³University of Seoul, Korea

New Thermal Functional Materials

CHAIR(S)

Woochul Kim (Yonsei University)

- 10-0498** Thermal and Mechanical Properties of Copper/Graphite Flake Composites Fabricated by Spark Plasma Sintering
Jongtae Kim, Dong Hwan Kim, Seok-Hwan Chung
Daegu Gyeongbuk Institute of Science and Technology, Korea
- 10-0887** Stray-Field-Induced Transverse Thermopower in Aligned Permanent Magnet/Nernst Material Composites
Jangwoo Ha, Jinho Park, Hyungyu Jin
Pohang University of Science and Technology, Korea
- 10-2639** Study for Surface Treatment of FeCrAl as Heater Elements
Woo-Chul Jung, Jae-Kyo Yang, Yun-Ho Jin
Institute for Advanced Engineering, Korea
- 10-3227** The Effects of Compositional Changes on the Crystal Structure and Crystal Lattice Distortion in $A_2B_2O_7$ High-Entropy Ceramics, and Their Impact on Mechanical and Thermal Properties
Soo Hyun Kim, Min Jun Kim, Sung-Hwan Bae
Kyungnam University, Korea
- 10-3691** Sensitive Luminescence Thermometry Through Excitation Intensity Ratio in Eu-Doped $BaTiO_3$
Zhifeng Xing¹, Hao Suo², Fengjun Chun¹, Xiaohu Wei¹, Feng Wang¹
¹City University of Hong Kong, Hong Kong (SAR of China)
²Hebei University, China

Thermoelectric Modules and Systems (for Cooling and Power Generation)

CHAIR(S) Hyung Eui Lee (LG Innotek), Min-Wook Oh (Hanbat National University)

- 10-0277** **Leg Design of a Standard Thermoelectric Module for Increased Thermal Resistance and Durability**
Eun A Koo¹, Han Hwi Jang², Min Wook Oh³, Su Dong Park⁴, Sang Hyun Park¹
¹Korea Institute of Energy Research, Korea
²Korea Advanced Institute of Science and Technology, Korea
³Hanbat National University, Korea
⁴Korea Electrotechnology Research Institute, Korea
- 10-1540** **A Study on Optimization of Heat Dissipation Characteristics of Heat Sinks for LED Lighting for Floor Traffic**
Doyun Hwang¹, Gilyoun Kim²
¹Gumi Electronics and Information Technology Research Institute, Korea
²LUXTEC, Korea
- 10-3394** **Observing High-Efficiency Spin Seebeck Effect in Polycrystalline Bulk- $\text{Y}_3\text{Fe}_5\text{O}_{12}$ with Different Annealing Process**
Hye-Jin Ok, Ki-Suk Lee
 Ulsan National Institute of Science and Technology, Korea
- 10-3755** **Cost-Effective Power Generation Through Insulator-Inserted Thermoelectric Devices**
Yae Eun Park, Jae Sung Son
 Pohang University of Science and Technology, Korea
- 10-3760** **Sequential 3D Printing of Functionally Graded Thermoelectric Materials for Improved Power Generation**
Hyunjin Han, Seong Eun Yang, Jae Sung Son
 Pohang University of Science and Technology, Korea
- 10-3765** **Solution Processed AgCuS/Cu₂S Thermoelectric Thin Films**
Hyein Hwang, Jae Sung Son
 Pohang University of Science and Technology, Korea

Thermoelectric and Thermal-Electrical Property Evaluation Techniques

CHAIR(S)

Hyejin Jang (Seoul National University), Hosun Shin (KRISS)

- 10-1388** **Analysis of Thermal Interface Resistance Inside Thermoelectric Devices by Using Impedance Spectroscopy**
Hyeon-Beom Kim¹, Jong Ho Park², Byungki Ryu², Su Dong Park², Hyejin Jang¹
¹*Seoul National University, Korea*
²*Korea Electrotechnology Research Institute, Korea*
- 10-1492** **Understanding the Role of Additional Cu Intercalation in Electronic and Thermal Properties of p-Type Cu₂₉Te₂-Incorporated Bi_{0.5}Sb_{1.5}Te₃ thermoelectric alloys**
Hyunjin Park, Hyun-Sik Kim
University of Seoul, Korea
- 10-1515** **The Mechanism Behind the High zT of SnSe₂ Added SnSe at High Temperatures**
Junsu Kim¹, Seong-Mee Hwang¹, Hyunjin Park¹, Yinglu Tang², Chae Woo Ryu³, Heesun Yang³, Weon Ho Shin⁴, Hyun-Sik Kim¹
¹*University of Seoul, Korea*
²*Delft University of Technology, The Netherlands*
³*Hongik University, Korea*
⁴*Kwangwoon University, Korea*
- 10-1553** **The Mechanisms of the Chiral-Phonon-Activated Spin Seebeck Effect in Low-Dimensional Chiral Perovskites**
Wonsik Lee¹, Jeongwook An¹, Sang Hyun Nam², Jinkyu Lee², Young-Hoon Kim², Hyejin Jang¹
¹*Seoul National University, Korea*
²*Hanyang University, Korea*
- 10-1772** **Thermal Transport Properties of Ni-Containing High-Entropy Alloys**
Byungjun Kang, Dongwhan Kim, Chan Park, Eun Soo Park, Hyejin Jang
Seoul National University, Korea

10-3215 **Enhanced Energy Conversion Efficiency of 3D-Printed Thermoelectric Generators in Vertical Direction**

Woojin Kim¹, Seongkwon Hwang², Seungjun Chung¹

¹*Korea University, Korea*

²*Korea Institute of Science and Technology, Korea*

10-3302 **Comprehensive Investigation of Correlation Between Thermal Conductivity and Density of Carbon Nanotube Films**

Minseouk Choi^{1,2}, Kyung Tae Park¹, Hyejin Jang², Taehoon Kim¹

¹*Korea Institute of Materials Science, Korea*

²*Seoul National University, Korea*

Oral Presentation

Text and Image Processing for Materials Science

November 25 | Eorimok

CHAIR(S)

Jihan Kim (KAIST)

09:40-10:10

11-0238

INVITED

Discovery of Metallorganic Design Rules with Natural Language Processing and Machine Learning

Gianmarco Terrones, Matt Rivera, Akash Ball, Changhwan Oh, Shuwen Yue, Heather Kulik*Massachusetts Institute of Technology, USA*

10:10-10:40

11-0439

INVITED

Deep Learning for Symmetry Classification for Inorganic Compounds

Kee-Sun Sohn, Seonghwan Kim, Byung Do Lee*Sejong University, Korea*

10:40-11:10

11-0215

INVITED

Artificial Intelligence for Identification of Crystallographic Surfaces in Atomic Resolution Images

Byung Chul Yeo*Pukyong National University, Korea*

11:10-11:40

11-2178

INVITED

Data-Driven Materials Exploration Combined with Ab Initio Simulations

Kenta Hongo*Japan Advanced Institute of Science and Technology, Japan*

Integration of Simulation and Machine Learning for Accelerated Materials Modeling (1)

November 25 | Eorimok

CHAIR(S) Dong-Hwa Seo (KAIST)

13:10-13:40 Pretrained Universal Machine Learning Potential

11-1469 Seungwu Han

INVITED *Seoul National University, Korea*

13:40-14:10 Neural Network Potential Molecular Dynamics Studies on Reactions at the Electrode/Electrolyte Interface for Battery Materials

11-0252 Masanobu Nakayama

INVITED *Nagoya Institute of Technology, Japan*

14:10-14:25 Spatio-Temporal Characterization of Water Diffusion Anomalies in Saline Solutions Using Machine Learning Force Field

11-1651 Ji Woong Yu

Korea Institute for Advanced Study, Korea

14:25-14:40 Solvation Structure of Organotin Complexes in Protic and Polar Aprotic Solvents: A Multi-Scale Simulation Approach

11-0314 Minyoung Ha

Samsung Advanced Institute of Technology, Korea

Integration of Simulation and Machine Learning for Accelerated Materials Modeling (2)

November 25 | Eorimok

CHAIR(S) Sungwoo Kang (KIST)

15:00-15:30 AI-Assisted Materials Design: From Multi-Scale to Pre-Trained Models,
11-3922 to Computational-Experimental Closed Loops

INVITED Yuzhi Zhang¹, Linfeng Zhang^{1,2}

¹DP Technology, China

²AI for Science Institute, China

15:30-15:45 Crystal Structure Prediction for Corner-Sharing Topology Using
11-3236 Machine Learning Potentials: An Application to Exploration of Oxide
Solid Electrolytes

Seungwoo Hwang¹, Jiho Lee¹, Sungwoo Kang², Seungwu Han¹

¹Seoul National University, Korea

²Korea Institute of Science and Technology, Korea

15:45-16:00 Atomic-Scale Insights into Polarization Mechanism in HfO₂
11-2532 Ferroelectrics Using Multi-Phase Machine Learning Potential

Hyu Gyeong Shin, Jun Hyeong Gu, Eun Ho Kim, Hyeon Kim, Donghwa Lee

Pohang University of Science and Technology, Korea

16:05-16:15 Advanced Reactive Molecular Dynamics Using Machine Learning
11-1678 Interatomic Potential: Supercritical Water Oxidation of Acetic Acid.

Jae Hyun Ryu¹, Ji Woong Yu², Soohye Kim¹, Minwoo Kim¹, Tae Jun Yoon¹,
Won Bo Lee¹

¹Seoul National University, Korea

²Korea Institute for Advanced Study, Korea

16:15-16:30 Multimodal Training for Developing Accurate High-Fidelity Machine
11-1330 Learning Interatomic Potentials

Jaesun Kim¹, Jisu Kim¹, Seungwu Han^{1,2}

¹Seoul National University, Korea

²Korea Institute for Advanced Study, Korea

Integration of Simulation and Machine Learning for Accelerated Materials Modeling (3)

November 25 | Eorimok

CHAIR(S)	Byung Chul Yeo (Pukyong National University)
16:50-17:20 11-0271 INVITED	Understanding Material Properties Based on Machine Learning Potentials <u>Joonhee Kang</u> <i>Pusan National University, Korea</i>
17:20-17:35 11-2922	Multiscale Design for Semiconductor Manufacturing Process Using Computational Science and Artificial Intelligence <u>Byungjo Kim</u> <i>Ulsan National Institute of Science and Technology, Korea</i>
17:35-17:50 11-2466	Integrated Computational Materials Engineering and Machine Learning for Fire-Resistant Steels Design <u>Kyoungdoc Kim</u> <i>Pohang University of Science and Technology, Korea</i>
17:50-18:05 11-3135	Lithium Localization by Anions in Argyrodite Solid Electrolytes from Machine-Learning-Based Simulations <u>Hyun-Jae Lee</u>¹, Hyeonjung Kim², Sungyoung Ji², Kyuri Choi², Ho Choi², Woosang Lim², Byungju Lee¹ ¹Korea Institute of Science and Technology, Korea ²POSCO HOLDINGS, Korea
18:05-18:20 11-2711	Predicting Solidus and Liquidus Points of Alloys for Additive Manufacturing: A Machine Learning Approach <u>Jaemin Wang</u>, Sang-Ho Oh, Hyeonseok Kwon, Hyoung Seop Kim, Byeong-Joo Lee <i>Pohang University of Science and Technology, Korea</i>
18:20-18:35 11-0361	LSTM Deep Learning Driven Battery Emulator <u>Kanato Oka</u>¹, Naoto Tanibata¹, Hayami Takeda¹, Masanobu Nakayama¹, Syuto Noguchi¹, Masayuki Karasuyama¹, Yoshiya Fujiwara², Takuhiro Miyuki² ¹Nagoya Institute of Technology, Japan ²Consortium for Lithium Ion Battery Technology and Evaluation Center (LIBTEC), Japan

Automated/Autonomous Experiments

November 26 | Eorimok

CHAIR(S)

YongJoo Kim (Korea University)

08:30-09:00

11-0241

INVITED

Precision Synthesis and Accelerated Optimization of Colloidal Quantum Dots with Self-Driving Fluidic Labs

Milad Abolhasani

North Carolina State University, USA

09:00-09:30

11-1358

INVITED

AI-Driven Robotic Platform for Automated Multi-Step Synthesis of Organic Molecules

Hyundo Choi

Samsung Advanced Institute of Technology, Korea

09:30-09:45

11-1070

Balancing the Activity and Stability of Ternary OER Catalysts Using AI and Automated Electrochemical Measurement System

Daeho Kim¹, Sang Kyu Kwak², Donghun Kim¹, Sang Soo Han¹

¹*Korea Institute of Science and Technology, Korea*

²*Korea University, Korea*

09:45-10:00

11-3383

Enhancing Experimental Research Through Automation: Advances in Perovskite Solar Cells and Catalyst Synthesis

Jino Im, Beom-Soo Kim, Su-Hyun Yoo, Yong Tae Kim, Nam Joong Jeon, Hyunju Chang, Jungho Shin, Yea-Lee Lee

Korea Research Institute of Chemical Technology, Korea

10:00-10:15

11-1053

Fully Automated Nanoparticle Washing Module Using Computer Vision

Heeseung Lee^{1,2}, Donghun Kim¹, Sang Soo Han¹

¹*Korea Institute of Science and Technology, Korea*

²*Korea University, Korea*

10:15-10:30

11-0526

Autonomous Laboratory for Bespoke Nanoparticle Synthesis and Chemical Knowledge Discovery

Hyuk Jun Yoo^{1,2}, Nayeon Kim^{1,2}, Heeseung Lee^{1,2}, Daeho Kim^{1,2}, Leslie ching ow Tjong³, Hyobin Nam¹, Chansoo Kim¹, Seung Young Lee¹, Kwan-Young Lee², Donghun Kim¹, Sang Soo Han¹

¹*Korea Institute of Science and Technology, Korea*

²*Korea University, Korea*

³*Samsung Electronics Co., Ltd., Korea*

Data-Driven Materials Discovery (1)

November 26 | Eorimok

CHAIR(S) Donghun Kim (KIST)

10:50-11:20 Material Design by Combining AI and Computational Materials Science

11-1270 Donghwa Lee

INVITED Pohang University of Science and Technology, Korea

11:20-11:50 Crystal Structure Prediction using Machine-Learned Potentials: From
11-2976 Descriptor-Based Models to Universal Potentials

INVITED Sungwoo Kang

Korea Institute of Science and Technology, Korea

11:50-12:05 Understanding H₂ Adsorption Behavior in Ni-Based Metal-Organic
11-2607 Frameworks with Machine Learning Potential-Based Grand Canonical
Monte Carlo Simulations

Dong Yun Shin, Jung-Hoon Lee

Korea Institute of Science and Technology, Korea

12:05-12:20 Elucidating the Effect of Support Oxide on Ammonia Decomposition
11-2937 Reaction Dynamics of MgO-Supported Ru Catalyst

Jungwoo Choi, Donghun Kim

Korea Institute of Science and Technology, Korea

Data-Driven Materials Discovery (2)

November 26 | Eorimok

CHAIR(S)

YongJoo Kim (Korea University)

15:00-15:15

11-2240

Optimizing CO₂ Diffusion in Diamine-Functionalized Metal-Organic Frameworks: Accurate and Efficient Molecular Dynamics Simulations with Machine-Learning Potentials

Joharimanitra Randrianandraina, Jung-Hoon Lee

Korea Institute of Science and Technology, Korea

15:15-15:30

11-3154

Diffusion Models for Designing High-Entropy Alloys with Targeted Mechanical Properties

Bumsoo Park, Jaejung Park, Seungchul Lee

Korea Advanced Institute of Science and Technology, Korea

15:30-15:45

11-1342

Predicting NMR Chemical Shifts with Graph Neural Networks

Dong-Wook Lee¹, Seon Ju Park², Heungjo An³, Sung Mun Lee⁴

¹*Technology Innovation Institute, United Arab Emirates*

²*Korea Basic Science Institute, Korea*

³*Kumoh National Institute of Technology, Korea*

⁴*Khalifa University, United Arab Emirates*

15:45-16:00

11-2424

Inverse Design of Organic Mixtures Using First-Principles Calculations Mediated Bayesian Optimization

Eun Ho Kim, Jun Hyeong Gu, Kyung-Yeon Doh, Donghwa Lee

Pohang University of Science and Technology, Korea

16:00-16:15

11-2435

Structural Design Strategies of Organic Cathodes for Sustainable Li-Ion Batteries Using Graph-Based Explainable AI

Jun Hyeong Gu, Eun Ho Kim, Hyo Gyeong Shin, Hyeon Kim, Donghwa Lee

Pohang University of Science and Technology, Korea

16:15-16:30

11-2427

Automatic Research Trend Analysis Using Keywords from Bibliographic Text Data

Hyeon Kim, Seong Hun Kim, Jaesun Kim, Eun Ho Kim, Jun Hyeong Gu, Donghwa Lee

Pohang University of Science and Technology, Korea

Data-Driven Materials Discovery (3)

November 26 | Eorimok

CHAIR(S)

Sang Soo Han (KIST)

16:50-17:05

11-3077

Designing High-Strength Alloys with Combined TWIP and TRIP Mechanisms Using Machine Learning and First-Principles Calculations

Seon-Gyu Kim, Kyung-Yeon Doh, Shin Hyun Kim, Changhun Kim, Donghwa Lee
Pohang University of Science and Technology, Korea

17:05-17:20

11-3367

Transfer Learning Approach for Identifying High-Entropy Nickel Manganese Cathode with High Energy Density and Structural Stability

Jaejung Park¹, Jinyoung Jeong², Bumsoo Park¹, Kyoungmin Min², Seungchul Lee¹
¹Korea Advanced Institute of Science and Technology, Korea
²Soongsil University, Korea

17:20-17:35

11-1107

Predicting Elemental Segregation Energy to Quantify Nanocrystalline Stability via Machine Learning

Ho Lee, Sangtae Kim
Hanyang University, Korea

17:35-17:50

11-0971

Evaluating the Absorption Efficiency and Biphasic Formation Performance of CO₂ with Amine Absorbent via NNP Based Atomistic Simulation

Hyeonwoo Kim, Sangtae Kim
Hanyang University, Korea

17:50-18:05

11-1882

A Data-Driven Bayesian Optimization Approach for Designing High Entropy Alloys with Optimal Mechanical Properties

Aamir Malik, Ho Jin Ryu
Korea Advanced Institute of Science and Technology, Korea

18:05-18:20

11-0312

Accelerated Discovery of EUV-Active Functional Groups via Pre-Trained Graph Neural Networks and Bayesian Active Learning

Minyoung Ha
Samsung Advanced Institute of Technology, Korea

18:20-18:35

11-1013

AI Based Exploration on Synthesizable Space for Autonomous Laboratory

Nayeon Kim¹, Hyuk Jun Yoo^{1,2}, Donghun Kim¹, Sang Soo Han¹
¹Korea Institute of Science and Technology, Korea
²Korea University, Korea

Poster Presentation | November 27

Text and Image Processing for Materials Science

CHAIR(S) Jihan Kim (KAIST)

- 11-0495** Sparse Cross-Sectioning-Based Deep Learning Electron Tomography of Porous Carbon Supports in Proton Exchange Membrane Fuel Cells
Yerin Jeon, Sang-Hyeok Yang, Young-Min Kim
Sungkyunkwan University, Korea
- 11-1134** Scale-Transformative Microstructure Generation Using Conditional Generative Adversarial Network (c-GAN) with Atomic Force Microscopy Image
Benediktus Madika, Aditi Saha, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea
- 11-1168** MaTableGPT: GPT-Based Table Data Extractor from Materials Science Literature
Gyeong Hoon Yi¹, Jiwoo Choi¹, Kihoon Bang¹, Seok Su Sohn², Sang Soo Han¹, Donghun Kim¹
¹*Korea Institute of Science and Technology, Korea*
²*Korea University, Korea*
- 11-1285** Implementing LLM Chain of Thought Techniques for Efficient Data Extraction from Material Science Literature
Daegun Lee¹, Seok Su Sohn², Donghun Kim¹
¹*Korea Institute of Science and Technology, Korea*
²*Korea University, Korea*
- 11-2763** Text-to-Battery Recipe: A Language Modeling-Based Protocol for Automatic Battery Recipe Extraction and Retrieval
Daeun Lee^{1,2}, Hiroshi Mizuseki^{1,2}, Jaewoong Choi¹, Byungju Lee¹
¹*Korea Institute of Science and Technology, Korea*
²*University of Science and Technology, Korea*
- 11-2870** Parameter Extraction and Large Data Analysis to Design Efficient Perovskite Solar Cells Through Large Language Model
Eun Ha Shin, Sang Woo Park, Jong Su Chae, Seong Ho Choi, Ki-Ha Hong
Hanbat National University, Korea

- 11-3259** **Advanced Methodologies for Automated Data Extraction Using a Prominent Large Language Model: Building a Comprehensive Database of Nickel-Based Single-Crystal Superalloys**
Sejin Park¹, Jaeun Cheon¹, Youngbeum Song², Daewoong Kim², Kisub Cho¹
¹*Kookmin University, Korea*
²*Agency for Defense Development, Korea*
- 11-3341** **CatRE: A Transformer-Based Relation Extraction Model for Water Splitting Catalysis Literature**
Jiwoo Choi, Gyeong Hoon Yi, Donghun Kim
Korea Institute of Science and Technology, Korea

Automated/Autonomous Experiments

CHAIR(S)	Byung Chul Yeo (Pukyong National University)
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11-2675	Electrolyte Formulation Optimization by Using Laboratory Automation
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Hyun-Gi Lee, Dong-Hwa Seo

Korea Advanced Institute of Science and Technology, Korea

11-2986	Reliability Test of Surface Mount Devices for Autonomous Service Robots
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Hyun Kim, Sang Yeol Nam, Jiyeong Yun

Gumi Electronics and Information Technology Research Institute, Korea

Data-Driven Materials Discovery

CHAIR(S)	Byung Chul Yeo (Pukyong National University)
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11-2609	Screening of Fluorinated Electrolytes for High-Voltage Lithium-Ion Batteries
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Jaekyeong Han, Dong-Hwa Seo

Korea Advanced Institute of Science and Technology, Korea

11-2877	Advanced Graph Neural Network Frameworks for the Discovery of Lead-Free Halide Perovskite Solar Cells
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Sang Woo Park, Ki-Ha Hong

Hanbat National University, Korea

Integration of Simulation and Machine Learning for Accelerated Materials Modeling

CHAIR(S) Byung Chul Yeo (Pukyong National University)

- 11-1687** Understanding the Unconventional Hydration Phenomena of Aluminum Ion Using Machine Learning Force Field
Minwoo Kim¹, Seungtae Kim¹, Ji Woong Yu², Won Bo Lee¹
¹Seoul National University, Korea
²Korea Institute for Advanced Study, Korea
- 11-2899** Atomistic Simulations of Cu-Sn Alloys Using a Deep Neural Network Potential
Jea Hur, Won Seok Ko
 Inha University, Korea
- 11-3319** A Comparative Study of Diffusion Model and Direct Search Method in Crystal Structure Prediction
Haekwan Jeon, Jisu Jung, Seungwoo Hwang, Jiho Lee, Seungwu Han
 Seoul National University, Korea
- 11-3334** Development of Machine Learning Potentials for a-IGZO Defect System
Hyunsung Cho¹, Youngho Kang², Seungwu Han^{1,3}
¹Seoul National University, Korea
²Incheon National University, Korea
³Korea Institute for Advanced Study, Korea
- 11-3483** Investigating Oxygen Vacancy Dynamics in Ferroelectric HfO₂ Films Using DFT and Machine-Learned Interatomic Potentials
Hyo Kim, Hyo Gyeong Shin, Seong Hun Kim, Donghwa Lee
 Pohang University of Science and Technology, Korea

Oral Presentation

Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications (1)

November 26 | Yeongsil

CHAIR(S)

Kanghoon Yim (KIER), Su-Hyun Yoo (KRICT)

08:00-08:15
12-1132

Universal Small Polaron Formation in Chemical Doping of MoS_2 from First Principles

Soungmin Bae, Ibuki Miyamoto, Shin Kiyohara, Yu Kumagai
Tohoku University, Japan

08:15-08:30
12-2590

First-Principles Investigation on Effective n-Type Doping Strategies for Si_2Te_3

Youngeun Park, June Ho Lee, Jaeseon Kim, Donghwa Lee
Pohang University of Science and Technology, Korea

08:30-08:45
12-1019

The p-Type Doping of Bulk TeO_2 : A First-Principles Point Defect Study

Thi Ngoc Huyen Vu, Soungmin Bae, Rafael Costa-Amaral, Yu Kumagai
Tohoku University, Japan

08:45-09:00
12-1313

Computational Exploration of Perovskite-Inspired ABX_3 Structures for Novel Inorganic Solar Harvesting Materials

Wonzeo Jung^{1,2}, Suim Lim^{1,3}, Kihwan Kim¹, Joo Hyung Park¹, Kanghoon Yim¹
¹*Korea Institute of Energy Research, Korea*
²*Chungnam National University, Korea*
³*Sogang University, Korea*

09:00-09:30
12-0118

Accurate Calculations for Point Defects in Non-Metallic Materials and Their Applications

INVITED

Yu Kumagai
Tohoku University, Japan

- 09:30-10:00**
12-0381
INVITED
Topological Insulators and Semimetals for Electronics
Yeonghun Lee
Incheon National University, Korea
- 10:00-10:30**
12-3180
INVITED
A Revolution in Scientific Research : An Innovative Blend of Simulation, Machine learning and Cloud-Based Technology
Minkyu Park
Virtual Lab, Inc., Korea

Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications (2)

November 26 | Yeongsil

CHAIR(S) Jung-Hoon Lee (KIST)

- 10:50-11:20**
12-3830
KEYNOTE
Impact of Point Defects on Efficiency of Devices
Chris Van de Walle
University of California Santa Barbara, USA
- 11:20-11:50**
12-0275
INVITED
The Interface Is the Device: An Example in TiO₂ Photocatalyst
Qiu-Shi Huang¹, Su-Huai Wei¹, Xie Zhang²
¹*Beijing Computational Science Research Center, China*
²*Northwestern Polytechnical University, China*
- 11:50-12:20**
12-3109
INVITED
Computational Design on Multi-Ion Controllable Metal Halide Ionic Structure for Selective Short- and Long-Term Memorable Synaptic Devices
Han Seul Kim
Chungbuk National University, Korea

Computational Catalyst Design for Green Energy (1)

November 26 | Yeongsil

CHAIR(S) Joonhee Kang (Pusan National University)

15:00-15:30 Modeling of Electrochemical Interface and Interphase: Multiscale
12-1197 Simulation and Machine Learning

INVITED Tao Cheng
Soochow University, China

15:30-16:00 Computational Materials Design of High-Performance Electrocatalysts
12-0463 for Sustainable Water Electrolysis Technology

INVITED Byung-Hyun Kim
Hanyang University ERICA, Korea

16:00-16:15 Synergistic Effects of AuNPs and TiO_x Films on ORR Activity

12-2858 Kihyun Shin
Hanbat National University, Korea

16:15-16:30 Machine-Learning Driven Exploration of Catalytic Reaction Networks

12-0820 Hyunwook Jung¹, Sina Stocker¹, Karsten Reuter¹, Johannes T. Margraf^{1,2}

¹Fritz-Haber-Institute of the Max Planck Society, Germany

²University of Bayreuth, Germany

Computational Catalyst Design for Green Energy (2)

November 26 | Yeongsil

CHAIR(S)	Kihyun Shin (Hanbat National University)
16:40-17:10 12-1405 INVITED	Digital Twin & Real-Space KS-DFT <u>Jin Qian</u> <i>Lawrence Berkeley National Laboratory, USA</i>
17:10-17:40 12-0354 INVITED	Current Challenges in Theoretical Studies on Energy Materials Based on Density Functional Theory <u>Minho Kim</u> <i>Kyung Hee University, Korea</i>
17:40-17:55 12-0558	Paradox of Thiourea: A False-Positive and Promoter for Electrochemical Ammonia Synthesis <u>Min-Cheol Kim</u> <i>Sookmyung Women's University, Korea</i>
17:55-18:10 12-2766	Study on Multifunctional Metal Oxide Nanocomposite Bandage for Application in Bone Regeneration: A First-Principles Study <u>Pritam Das</u> ¹ , Yu-Chan Kim ² , Pil-Ryung Cha ¹ ¹ <i>Kookmin University, Korea</i> ² <i>Korea Institute of Science and Technology, Korea</i>
18:10-18:25 12-2697	Role of B-Site Dopants on Oxygen Evolution Reaction for PrBaFe ₂ O _{5+δ} Using Density Functional Theory Calculations <u>Siyeong Park</u> , Yonghun Shin, Suyun Chae, Eunji Ahn, Donghwa Lee <i>Pohang University of Science and Technology, Korea</i>

Computational Modeling of Energy Storage Materials (1)

November 27 | Yeongsil

CHAIR(S)

Byunghoon Kim (Sungkyunkwan University), Hyo-Sun Jang (KIMS)

09:40-10:10

12-2973

INVITED

Interface Chemistry and Ion Transport in Solid-State Battery Materials by Advanced DFT-Based Calculations

Yoshitaka Tateyama^{1,2}

¹Tokyo Institute of Technology, Japan

²National Institute for Materials Science, Japan

10:10-10:40

12-0950

INVITED

Computational Modeling on Hydrovoltaic Energy Harvesting and Recharging System

Sung Beom Cho

Ajou University, Korea

10:40-10:55

12-3279

Understanding the Electrodeposition in Aqueous Zn Ion Batteries Through Phase-Field Modelling

Mohan Dasari¹, Arijit Roy², Sandeep Sugathan¹, John Hong¹, Pil-Ryung Cha¹

¹Kookmin University, Korea

²University of Michigan, USA

10:55-11:10

12-2203

Electric Double Layer in Ionic Liquids: A Result of Interplay Between Coupling Effects and Phase Demixing

Yeong Kyu Lee¹, Jun Beom Cho², Yong Kyu Lee², Won Bo Lee², Yong Seok Jho³

¹Korea Institute for Advanced Study, Korea

²Seoul National University, Korea

³Gyeongsang National University, Korea

11:10-11:25

12-3376

Application of Pretrained Machine Learning Potential to Solid Electrolytes

Jiho Lee¹, Seungwoo Hwang¹, Youngho Kang², Seungwu Han¹

¹Seoul National University, Korea

²Incheon National University, Korea

11:25-11:40

12-0356

Neural Network Potential Driven Molecular Dynamics Studies on Oxide Ion Conductivity in Melilite-Type Materials

Koyama Tsubasa¹, Tanibata Naoto¹, Takeda Hayami¹, Nakayama Masanobu¹, Steffen Grieshammer², Judith Schütt³

¹Nagoya Institute of Technology, Japan

²University of Applied Sciences Münster, Germany

³RWTH Aachen University, Germany

11:40-11:55

12-0233

Elucidating Diffusion Properties of Amorphous LPS Solid Electrolytes

Chihun Kim¹, Yong-Mook Kang¹, Byungju Lee²

¹Korea University, Korea

²Korea Institute of Science and Technology, Korea

11:55-12:05

12-3193

Computational Framework for Solidification Microstructure Prediction of Advanced Casting Processes: A Phase-Field Approach

Dong-Uk Kim, Pil-Ryung Cha

Kookmin University, Korea

Computational Modeling of Energy Storage Materials (2)

November 27 | Yeongsil

CHAIR(S) Byungju Lee (KIST), Sung Beom Cho (Ajou University)

14:10-14:40 First-Principles Statistical Mechanics of Battery Materials

12-2519 Anton Van der Ven

KEYNOTE *University of California Santa Barbara, USA*

14:40-15:10 A Theoretical Framework for Understanding Voltage Hysteresis in Li-
12-0113 Excess Electrodes

INVITED Byunghoon Kim

Sungkyunkwan University, Korea

15:10-15:25 Effect of Open Metal Sites on Methane Adsorption in Metal-Organic
12-2016 Framework HKUST-1

Hyo-Sun Jang¹, Byung-Hyun Kim², Hee Jung Lee¹, Jae-Hyung Cho¹

¹*Korea Institute of Materials Science, Korea*

²*Hanyang University ERICA, Korea*

15:25-15:40 Computational Insights into Full Fluorosulfonyl Electrolyte for
12-2136 Enhanced Lithium Metal Battery Performance

Minhee Park, Jun Beom Cho, Eunyeong Jung, Daehong Kim, Won Bo Lee

Seoul National University, Korea

15:40-15:55 The Impact of Local Strain on Redox Mechanisms and Structural
12-2307 Degradation in Li-Excess Manganese Cathodes

Mu Geun Son¹, Hyeonji Shin¹, Hoje Chun², Joonhee Kang¹

¹*Pusan National University, Korea*

²*Massachusetts Institute of Technology, USA*

15:55-16:10 Accelerating Property Prediction of Liquid Electrolytes via Pretrained
12-1144 Machine Learning Potential

Jinmu You¹, Suyeon Ju¹, Gijin Kim¹, Seungwu Han^{1,2}

¹*Seoul National University, Korea*

²*Korea Institute for Advanced Study, Korea*

Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications/Computational Catalyst Design for Green Energy

November 27 | Yeongsil

CHAIR(S)

Min-Cheol Kim (Sookmyung Women's University),
Hyeyoung Shin (Chungnam National University)

16:30-16:45

12-2042

The Influence of Polar Phase Fraction and Crystalline Texture on the Ferroelectric Properties of $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$ Thin Films: A Phase Field Study Coupled with Active Learning

Sandeep Sugathan¹, Krishnamohan Thekkepat², Ki-Sub Cho¹, Jiyoung Kim³, Pil-Ryung Cha¹

¹Kookmin University, Korea

²Korea Institute of Science and Technology, Korea

³The University of Texas at Dallas, USA

16:45-17:00

12-2127

Detecting the Unusual Bonding Phenomena that Power Functional Materials Using Chemical Bond Analysis

Jan Hempelmann^{1,2}

¹Tokyo Institute of Technology, Japan

²RWTH Aachen University, Germany

17:00-17:15

12-1035

First-Principles Investigation of Point Defects in Two-Dimensional $\beta\text{-TeO}_2$

Rafael Costa-Amaral, Soungmin Bae, Vu Thi Ngoc Huyen, Yu Kumagai

Tohoku University, Japan

17:15-17:30

12-2551

The Effect of B-Site Element on Proton Conductivity in $\text{ABO}_{2.5}$ (A=Sr) Brownmillerite Structures: A First-Principles Study

Suyun Chae, Yonghun Shin, Eunji Ahn, Donghwa Lee

Pohang University of Science and Technology, Korea

17:30-17:45

12-2712

First-Principles Study of Proton Conductivity in Hexagonal Perovskite $\text{Ba}_5\text{R}_2\text{Al}_2\text{ZrO}_{13}$ (R=Gd-Lu) for Protonic Ceramic Electrolysis Cells

Eunji Ahn, Yonghun Shin, Suyun Chae, Siyeong Park, Donghwa Lee

Pohang University of Science and Technology, Korea

17:45-18:00

12-1309

Influence of Dielectric Environments in Modulating the Electronic States of QDs through Ligand Exchange

Hyeri Yoo^{1,2}, Tae Hwan Park², Gyeong Won Seo^{1,2}, Soo Young Kim¹, Gyu Weon Hwang², Sangtae Kim³

¹Korea University, Korea

²Korea Institute of Science and Technology, Korea

³Hanyang University, Korea

18:00-18:15

12-2541

Machine Learning – Assisted Prediction of Catalytic Activity for Alloy Nanoparticle in Hydrogen Evolution Reaction

Manh Hung Ngo, Sang Uck Lee

Sungkyunkwan University, Korea

18:15-18:30

12-2888

Theoretical Investigations into the Electrocatalytic Performance of Positively Curved Carbon Allotropes

Jun Ho Seok, Sang Uck Lee

Sungkyunkwan University, Korea

Poster Presentation | November 27

Computational Modeling of Energy Storage Materials

CHAIR(S)

Byungju Lee (KIST)

- 12-0442** Revealing the Electric Double Layer Structure with Constant Bulk Electrolyte Concentration Simulation
Minho M. Kim, Seung-Jae Shin, Hyungjun Kim
Korea Advanced Institute of Science and Technology, Korea
- 12-0882** Density Functional Study on the Effect of Frenkel Defect in Ni-Fe Layered Double Hydroxide for Efficient Oxygen Evolution Reaction
Min Jae Kang, Minho Kim
Kyung Hee University, Korea
- 12-1478** Theoretical Study on the Extraordinary Cycling Performance of $\text{Mo}(\text{S},\text{Se})_2$ Decorated LIB Anode
Moonwon Lee^{1,2}, Hana Yoon¹, Kanghoon Yim¹
¹*Korea Institute of Energy Research, Korea*
²*Chungnam National University, Korea*
- 12-1712** Effect of Polymer on Ion Dynamics in Polymer Electrolytes: A Molecular Dynamics Simulation Study
Je-Yeon Jung¹, Seungtae Kim¹, Hayoung Oh², Hyukmin Kweon², Do Hwan Kim², Won Bo Lee¹
¹*Seoul National University, Korea*
²*Hanyang University, Korea*
- 12-1718** Optimizing Drying Conditions for Battery Separator Slurry Through Coarse-Grained Molecular Dynamics Simulation and Structural Analysis
Eunyeong Jung¹, Anseong Park¹, Won Bo Lee¹, Jonggeol Na²
¹*Seoul National University, Korea*
²*Ewha Womans University, Korea*
- 12-1807** Effects of High-Valence Cations on Li Dynamics of Cubic Spinel-Type Chloride Solid Electrolytes
Taegon Jeon, Sung Chul Jung
Pukyong National University, Korea

12-2403 **Density Functional Theory Study on the Influence of Solute Elements on the Efficiency of Mg₂Ni Hydrogen Storage Alloys**

Min-Seok Yoon, Won-Seok Ko

Inha University, Korea

12-2408 **Nanocomposite Engineering of Heterogeneous Mn-Based Cation-Disordered Cathodes for Low-Cost Lithium-Ion Batteries**

Dong-Hwa Seo

Korea Advanced Institute of Science and Technology, Korea

12-2411 **Highly Active-Material-Concentrated Cathodes of Nickel and Cobalt-Free Cation-Disordered Rock-Salts for Li-Ion Batteries**

Dong-Hwa Seo

Korea Advanced Institute of Science and Technology, Korea

12-2443 **Revealing Interfacial Superionic Conduction Mechanisms of New Halide Nanocomposite Solid Electrolytes for All-Solid-State Batteries**

Jae-Seung Kim¹, Hiram Kwak², Daseul Han³, Kyung-Wan Nam³, Yoon Seok Jung², Dong-Hwa Seo¹

¹*Korea Advanced Institute of Science and Technology, Korea*

²*Yonsei University, Korea*

³*Dongguk University, Korea*

12-2447 **Revealing On-Demand Molecular Traps Effects of Electrostatic Covalent Organic Frameworks for High-Energy Li Metal Battery Electrodes**

Jae-Seung Kim¹, Sodam Park², Kyeong-Seok Oh², Sang-Young Lee², Dong-Hwa Seo¹

¹*Korea Advanced Institute of Science and Technology, Korea*

²*Yonsei University, Korea*

- 12-2463** **Understanding Ambivalent Role of the Mn Content in Mn-Based Cation-Disordered Rock-Salts for Next-Generation Lithium-Ion Batteries**
Dae-Hyung Lee^{1,2}, Eunryeol Lee², Stéphanie Bessette³, Sang-Wook Park^{1,2}, Nicolas Brodusch³, Gregory Lazaris³, Hojoon Kim^{1,2}, Rahul Malik⁴, Raynald Gauvin³, Jinhyuk Lee³, Dong-Hwa Seo¹
¹Korea Advanced Institute of Science and Technology, Korea
²Ulsan National Institute of Science and Technology, Korea
³McGill University, Canada
⁴Natural Resources Canada, Canada
- 12-2624** **Cycling Protocol for Mn-Based Disordered Rock-Salt Li-Ion Cathodes for Improved Cycling Stability**
Sang-Wook Park, Dong-Hwa Seo
Korea Advanced Institute of Science and Technology, Korea
- 12-2644** **Regulating Li ion Migration Pathway Through Structural Distortion in Monoclinic Halide Solid Electrolytes**
Seung-Hui Ham, Dong-Hwa Seo
Korea Advanced Institute of Science and Technology, Korea
- 12-2788** **First-Principles Calculation Study on Lithium-Ion Conduction Mechanisms in Halide Solid Electrolytes**
Chang-Dae Lee, Dong-Hwa Seo
Korea Advanced Institute of Science and Technology, Korea
- 12-2934** **Simulation of General Shape Precipitate Using Phase-Field Model Incorporating Interfacial Energy Anisotropy**
Hwijae Cho, Hyung-Uk Jang, Dong-Uk Kim, Pil-Ryung Cha
Kookmin University, Korea
- 12-3064** **Solidification Simulation of Aluminum Alloys: Controlling Beta Phase Formation with Phase-Field Simulation**
Hyung-Uk Jang, Pil Ryung Cha, Dong-Uk Kim, Hwi Jae Cho
Kookmin University, Korea

- 12-3281** **First-Principles Study Exploring the Influence of Structural Vibrational Entropy on Thermally Regenerative Electrochemical Systems**
You-Yeob Song¹, Ahreum Choi², Seok Woo Lee³, Hyun-Wook Lee², Dong-Hwa Seo¹
¹Korea Advanced Institute of Science and Technology, Korea
²Ulsan National Institute of Science and Technology, Korea
³Nanyang Technological University, Singapore
- 12-3300** **Computational Study of Prussian Blue Analogues as a New Type of Sodium Solid Electrolytes for All-Solid-State Batteries**
You-Yeob Song¹, Taewon Kim², Sang Hyeok Ahn², Hyun-Wook Lee², Dong-Hwa Seo¹
¹Korea Advanced Institute of Science and Technology, Korea
²Ulsan National Institute of Science and Technology, Korea
- 12-3704** **Facile Decoupling of Lithium from Ether Oxygen for High Conductivity and Lithium Transference Number Polymer Electrolyte: The Role of Oxygen Density**
Bochun Liang^{1,2}, Tairan Wang¹, Shendong Tan², Xinyao Ma¹, Tingzheng Hou², Jun Fan¹
¹City University of Hong Kong, Hong Kong (SAR of China)
²Tsinghua University, China

Computational Modeling of Semiconductors for (Opto)Electronic and Energy Applications

CHAIR(S)

Yeonghun Lee (Incheon National University)

- 12-0451** First-Principles Study on Hydrogen Behaviors in Si Grain Boundaries
Ibuki Miyamoto, Shin Kiyohara, Soungmin Bae, Yu Kumagai
Tohoku University, Japan
- 12-0460** Prediction of Oxygen Vacancy Formation Energies Using Crystal Graph Convolutional Neural Network
Chisa Shibui, Shin Kiyohara, Yu Kumagai
Tohoku University, Japan
- 12-1363** Nuclear Projection Dynamics for Electron Transfer Analysis
Yoonsang Son, Hyungjun Kim
Korea Advanced Institute of Science and Technology, Korea
- 12-1596** Point Defects and Carrier Generation in $\text{La}_2\text{SnO}_2\text{S}_3$ from First Principles
Teruya Nagafuji¹, Tomoya Gake¹, Soungmin Bae², Akira Takahashi¹, Fumiyasu Oba¹
¹*Tokyo Institute of Technology, Japan*
²*Tohoku University, Japan*
- 12-2162** Optical Property Dataset of Inorganic Phosphor
Seunghun Jang
Korea Research Institute of Chemical Technology, Korea
- 12-3264** Integrated Multi-Particle Finite Element and Phase Field Model for Solid-State Sintering of Pressed Powder Compacts
Kiyeon Kim¹, Sandeep Sugathan¹, Mohan Dasari¹, Hossein Ghorbani-Menghgari², Ji Hoon Kim², Hyunjoo Choi¹, Pil-Ryung Cha¹
¹*Kookmin University, Korea*
²*Pusan National University, Korea*

Computational Catalyst Design for Green Energy

CHAIR(S) Hyeyoung Shin (Chungnam National University)

- 12-0366** Theoretical Understanding on the Interfacial Engineering of Electro-And Photocatalysts with Support Materials for Enhanced Hydroxide-Mediated Oxidation of Water and Benzene
Youngha Kweon, Minho Kim
Kyung Hee University, Korea
- 12-0371** Glycerol Oxidation Reaction of High-Entropy Alloy Made with Co, Fe, Mn, Ni, Mo: DFT Calculation
Seong-Uk Bang, Minho Kim
Kyung Hee University, Korea
- 12-0788** Theoretical Approaches to Enhancing CO₂ Photoreduction Selectivity via Single-Atom (Fe, Cu) Catalysts on TiO₂
Sanghoon Kim, Minho Kim
Kyung Hee University, Korea
- 12-0990** Coupling of Langmuir Adsorption Model and Compressible Fluctuating Hydrodynamics for Multispecies Gas Mixtures
Hyun Tae Jung¹, Hyungjun Kim¹, Changho Kim²
¹Korea Advanced Institute of Science and Technology, Korea
²University of California, USA
- 12-0996** Density Functional Study on Iridium-Based Electrocatalyst for an Active and Stable Oxygen Evolution Reaction in Acidic Media
Heejung Kwon, Minho Kim
Kyung Hee University, Korea
- 12-1101** Theoretical Study on the Crucial Role of Metal Coordination Number in Optimizing Electrocatalyst Activity of Defective 2D Ru Nanosheets
Sung Jae Kwon, Minho Kim
Kyung Hee University, Korea

- 12-1246** **Theoretical Insights into Enhanced Water Oxidation Reaction Activity from Bimetallic Fe,Ni-azolate Metal-Organic Frameworks**
Jaewoo Jeong¹, Hyeyoung Shin², Hyungjun Kim¹
¹Korea Advanced Institute of Science and Technology, Korea
²Chungnam National University, Korea
- 12-1491** **First-Principles Study of 1-Hexene/n-Hexane Selectivity on Surface-Activated Silver Nanoparticles**
Suim Lim, Kanghoon Yim, Jung Hyun Lee
 Korea Institute of Energy Research, Korea
- 12-3159** **Modulating Adsorption Energy by Tuning Shell Thickness in Core-Shell Nanoparticle for PEMFC**
Yiyun Yang, Yunjeong Jang, Seokho Lee, Seohee Jang, Yeonwoo Do, Kihyun Shin
 Hanbat National University, Korea
- 12-3166** **The Impact of Pt Nanoparticle Size Variation on Oxygen Reduction Reaction Performance**
Seokho Lee, Yiyun Yang, Yeonwoo Do, Yunjeong Jang, Seohee Jang, Kihyun Shin
 Hanbat National University, Korea
- 12-3171** **Adsorption Energy Control and Structural Optimization of Pd-Based Catalysts for Fuel Cells on (100)**
Yeonwoo Do, Yiyun Yang, Yunjeong Jang, Seokho Lee, Seohee Jang, Kihyun Shin
 Hanbat National University, Korea
- 12-3172** **Toward Peak of Volcano Plot for ORR via Core-Shell Driven Strain Effect**
Yunjeong Jang, Yiyun Yang, Yeonwoo Do, Seohee Jang, Seokho Lee, Kihyun Shin
 Hanbat National University, Korea
- 12-3174** **Enhancing the Catalytic Performance of Pt-Based Nanoparticles Through Element Substitution and Adsorption Energy Optimization**
Seohee Jang, Yeonwoo Do, Yiyun Yang, Yunjeong Jang, Seokho Lee, Kihyun Shin
 Hanbat National University, Korea

- 12-3269** **Phase Field Study on the Nitriding of Fe-N**
Ye-Lim Kim¹, Dasari Mohan¹, Arijit Roy², Cha Pil-Ryung¹
¹*Kookmin University, Korea*
²*University of Michigan, USA*
- 12-3363** **First Principle Study of HER Activity Under Electrochemical Conditions: Competitive Adsorption Model for Solution Phase**
Jihoon Son, Hyeyoung Shin
Chungnam National University, Korea
- 12-3695** **Be Careful when Designing Catalysts – Divergent Activity Shifts in Sn-Based Catalysts for Electrochemical CO₂ Reduction Under Different pH: Single Atom vs. Polyatomic Structures**
Yuhang Wang¹, Jun Fan¹, Hao Li²
¹*City University of Hong Kong, Hong Kong (SAR of China)*
²*Tohoku University, Japan*

Oral Presentation

Nanomechanics for Advanced Structural Materials (1)

November 25 | Halla

CHAIR(S)

Hansol Jeon (Keimyung University)

09:40-09:55

13-0411

Correlating Magnetic Properties and Microstructure in Silicon Steels

So-Hyeon Lee¹, Jiheon Jeon¹, Seong hyeon Yoo², Jae Hyeon Koh², Chun Ku Kang², Ju-Young Kim¹¹Ulsan National Institute of Science and Technology, Korea²Hyundai Steel R&D center, Korea

09:55-10:10

13-0413

Structural Optimization of Minimally Invasive Electronics with Self-Deployability Based on the Mechanical Analysis

Su-Min Kim¹, Gyeong-Seok Hwang¹, Jae-Young Bae², Seung-Kyun Kang², Ju-Young Kim¹¹Ulsan National Institute of Science and Technology, Korea²Seoul National University, Korea

10:10-10:25

13-0393

Multi-Dyad Encapsulation with Alternating Organic and Inorganic Layers for Bioresorbable Electronics

Hyeonji Yoo, Gyeong-Seok Hwang, Ju-Young Kim

Ulsan National Institute of Science and Technology, Korea

10:25-10:40

13-0663

High-Performance Ceramic Catalyst Filters with Textured Waveguides for Efficient Removal of Volatile Organic Compounds

Jawon Kim¹, Jeonghyeon Park¹, Min Seok Koo², Won Seok Cho¹, Seokho Moon¹, Inyong Hwang¹, Jaerim Kim¹, Jae Yong Park¹, Dong Jin Ham², Hyun Chul Lee², Jong Kyu Kim¹¹Pohang University of Science and Technology, Korea²Samsung Advanced Institute of Technology, Korea

10:40-10:55

13-0402

Enhancement of Ultra-Cryogenic Impact Toughness in 9% Nickel Steels Through Intercortical Annealing Heat Treatments

Younghoon Kim¹, So-Hyeon Lee¹, Minho Park², Hyunbo Shim², Hyeongsu So², Ju-Young Kim¹

¹Ulsan National Institute of Science and Technology, Korea

²Hyundai Steel R&D Center, Korea

10:55-11:10

13-1644

Nanoarchitected Metal Matrix Composites: Exploiting Extrinsic Size Effects for High Mechanical Strength

Gwangmin Bae¹, Dong Gyu Kang², Changui Ahn³, Daeho Kim², Hyeon Gyun Nam², Gayea Hyun⁴, Dongchan Jang², Seung Min Han², Seokwoo Jeon¹

¹Korea University, Korea

²Korea Advanced Institute of Science and Technology, Korea

³Korea Institute of Ceramic Engineering and Technology, Korea

⁴University of California San Diego, USA

11:10-11:25

13-0742

Poly Urethane Based Flexible Radiative Cooling Cover Sheet

Tae Yoon Lee, Hangyu Lim, Heon Lee, Young Keun Kim

Korea University, Korea

11:25-11:50

13-0374

Utilizing Small-Scale Mechanical Tests in Studying the Hydrogen Embrittlement of Additively Manufactured Alloys

Yakai Zhao

Agency for Science, Technology and Research (ASTAR), Singapore

INVITED

Nanomechanics for Advanced Structural Materials (2)

November 25 | Halla

CHAIR(S) Eun-Chae Jeon (University of Ulsan)

13:10-13:35
13-0838 Investigation of Grain Boundary Effect on the Strain Hardening of Mg-4Al Using In Situ Tensile Testing in SEM and High Resolution EBSD

INVITED Eunji Song, Mohsen Taheri Andani, Amit Misra
University of Michigan, USA

13:35-14:00
13-0259 Hierarchical-Structural Effect on Mechanical Properties of Nanoporous Gold Under Electrochemical Environment

INVITED Hansol Jeon
Keimyung University, Korea

14:00-14:25
13-0582 Micro/Nano Fabricated Advanced Structures: Enhancing Flexibility, Durability, and Self-Healing Capabilities

INVITED Chang-Lae Kim
Chosun University, Korea

High-Performance Metallic Materials for Sustainable Future (1)

November 25 | Halla

CHAIR(S) Hyunjoo Choi (Kookmin University)

15:00-15:30
13-2084 Composite Powder Development for Additive Manufacturing

KEYNOTE Naoyuki Nomura, Weiwei Zhou, Zhenxing Zhou
Tohoku University, Japan

15:30-15:55
13-0340 Developing Martensitic Steels for Cryogenic Liquefied Gas Environments

INVITED Jeongho Han¹, Hyun Wook Lee¹, Hyo Joo Han¹, Min-Ho Park², Hyeong-Sub So²
¹*Hanyang University, Korea*
²*Hyundai Steel, Korea*

15:55-16:20
13-0173 The Effect of Thermomechanical Treatment on the Electrodeposited Invar Alloy for Fine Metal Mask(FMM)

INVITED Se-Eun Shin
Sunchon National University, Korea

High-Performance Metallic Materials for Sustainable Future (2)

November 25 | Halla

CHAIR(S)	Hyokyung Sung (Kookmin University)
16:50-17:05 13-1801	Microstructure Dependent Electric-Assisted Deformation Behaviour of Pure Copper <u>Jai Tiwari</u>, Minwoo Park, Heung Nam Han <i>Seoul National University, Korea</i>
17:05-17:20 13-0858	Sustainable Development of Aluminum Alloys via Melt Thermal Treatment <u>Saif Kayani</u>, Sang-Ik Lee, Yoon-Ho Lee, Kwangjun Euh, Young-Hee Cho <i>Korea Institute of Materials Science, Korea</i>
17:20-17:35 13-1573	Adjusting the Framework Functional via Phosphorus-Doped Fe-NC Catalyst: Enhancing Oxygen Reduction Reaction Efficiency for Aluminum-Flexible Air Batteries <u>Perumalsamy Muthukumar</u>, Sangjae Kim <i>Jeju National University, Korea</i>
17:35-17:50 13-3146	Green Synthesis of CoFe₂O₄/rGO Magnetic Nanocomposites Utilizing Leaf Extracts for Photodegradation of Rhodamine B <u>Dyah Ayu Larasati</u>¹, Deska Lismawenning Puspitarum^{1,2}, Nurul Imani Istiqomah¹, Zurnansyah Zurnansyah¹, Larrisa Jestha Mahardhika¹, Putri Dwi Jayanti¹, Hafil Perdana Kusumah¹, Nugraheni Puspita Rini¹, Daiki Oshima³, Takeshi Kato³, Juliasih Partini¹, Edi Suharyadi¹ ¹Universitas Gadjah Mada, Indonesia ²Institut Teknologi Sumatera, Indonesia ³Nagoya University, Japan
17:50-18:05 13-0385	The Influence of Nb on Grain Growth in Ferritic/Martensitic Heat-Resistant Steels <u>Bong Cheon Park</u>¹, Sung-Dae Kim², Ih-ho Park¹, Jae Hoon Jang¹, Namhyun Kang³ ¹Korea Institute of Materials Science, Korea ²Pukyong National University, Korea ³Pusan National University, Korea
18:05-18:20 13-2548	Study on Impact of Plasma Power on Impurity Control on Molybdenum Compound Thin Film Deposited by Atomic Layer Deposition Using Liquid Precursor <u>So Young Kim</u>, Dae-Hong Ko <i>Yonsei University, Korea</i>

Additive Manufacturing for Sustainable Future

November 26 | Halla AB

CHAIR(S)	Kyung Tae Kim (KIMS)
08:00-08:15 13-1878	All Inkjet-Printed Flexible See-Through Heaters Based on Ag Micro-Mesh Pattern Han-Jung Kim, Junhee Kim, Jeongmin Park, Seyong Park, Yoonkap Kim <i>Gumi Electronics and Information Technology Research Institute, Korea</i>
08:15-08:30 13-2556	Ink-Based 3D Printing and Thermoelectric Properties of Edge-Oxidized Graphene Incorporated n-Type Bi₂Te₃ Jinhee Bae, Seungki Jo, Soo-Ho Jung, Kyung Tae Kim <i>Korea Institute of Materials Science, Korea</i>
08:30-08:45 13-2245	Plasma Enabled Synthesis of TiO₂ with Oxygen Vacancies Infused with Biosilica for Direct Photodegradation of Emerging Organic Pollutants from Semiconductor Wastewaters Ali Abouelanwar, Dong Han Seo, Sunwoo Kim, Soyoung Lee <i>Korea Institute of Energy Technology, Korea</i>
08:45-09:10 13-0823 INVITED	Mechanisms of High Temperature Strengthening and Degradation in LPBF-Produced Inconel 718 Alloys Hyokyung Sung¹, Sangryul Ha², Saif Haider Kayani³, Juyeon Han¹, Hyunjoo Choi¹, Jung Gi Kim⁴, Won-Seok Ko⁵, Jae Bok Seol⁴ ¹<i>Kookmin University, Korea</i> ²<i>Myongji University, Korea</i> ³<i>Korea Institute of Materials Science, Pakistan</i> ⁴<i>Gyeongsang National University, Korea</i> ⁵<i>Inha University, Korea</i>
09:10-09:35 13-1411 INVITED	Rapid Prototyping of Materials Using Directed Energy Deposition Swee Leong Sing <i>National University of Singapore, Singapore</i>
09:35-10:00 13-0756 INVITED	Multiscale Modulation of Ionogel Composite Electrolytes and Their Structure-Performance Relationship Haitao Zhang <i>Chinese Academy of Sciences, China</i>
10:00-10:25 13-0122 INVITED	New Alloy Development Need in Realizing the Design for Additive Manufacturing Yongho Sohn <i>University of Central Florida, USA</i>

Poster Presentation | November 25

Nanomechanics for Advanced Structural Materials

CHAIR(S)

Ju-Young Kim (UNIST), Eun-Ji Gwak (KIMM)

13-0406 Surface Residual Stress of H-Beam Processed by Quenching and Self-Tempering Using Pile-Up Height by Instrumented Indentation Test

So-Hyeon Lee¹, Myunghwan Byun², Ju-Young Kim¹

¹Ulsan National Institute of Science and Technology, Korea

²Keimyung University, Korea

13-0410 Analysis of Tensile and Compressive Deformation Behavior and Mechanical Properties of Nanoporous Gold Depending on Ligament Sizes

Younghoon Kim¹, Hansol Jeon², Myunghwan Byun², Ju-Young Kim¹

¹Ulsan National Institute of Science and Technology, Korea

²Keimyung University, Korea

13-0860 Microstructure, Mechanical Properties and Thermal Conductivity of Al-RE-xSi Alloy

Hyeon-Taek Son¹, Yong-Ho Kim¹, Hyo-Sang Yoo¹, Byeong-Kwon Lee¹, En-Chan Go¹, Seong-Ho Lee², Kyu-Seok Lee¹

¹Korea Institute of Industrial Technology, Korea

²Korea Institute of Lighting Technology, Korea

13-0963 Effect of Fine Precipitates on the Electrical Conductivity and Mechanical Properties of Aluminum Alloy with Magnesium Addition

Hyo-Sang Yoo, Yong-Ho Kim, Byeong-Kwon Lee, Eun-Chan Ko, Cheol-Woo Kim, Hyeon-Taek Son

Korea Institute of Industrial Technology, Korea

13-1213 Quantitative Evaluation of Brittleness at Extreme Surfaces of Helium Ion Irradiation and Temperature in Fe-9Cr Alloy as Structural Material for Nuclear Fusion Reactors

Hoe-Yeon Jeong, Ah-Reum Cho, Minji Park, Yeon Kyeong Park, Giseung Shin, Jinhyeon Kim, Jung Gu Lee, Eun-Chae Jeon

University of Ulsan, Korea

- 13-1267** **Effect of Fine Precipitates on the Microstructure and Mechanical Properties of Lightweight Magnesium Alloy with Rare Earth Addition**
Yong-Ho Kim, Hyo-Sang Yoo, Byeong-Kwon Lee, Eun-Chan Ko, Hyeon-Taek Son
Korea Institute of Industrial Technology, Korea
- 13-1348** **Surface Defects-Controlled Material for Improved Photocatalytic Activity: Single Crystal of Black $K_{0.8}Ti_{1.73}Li_{0.27}O_4$**
Ji Hee Pi, Chul Oh Park, Jeong Yun Hwang, Kyu Hyoung Lee
Yonsei University, Korea
- 13-1430** **Effect of Bi Content on Microstructure and Mechanical Properties of Mg-Li Alloy**
Byeong-Kwon Lee^{1,2}, Eun-Chan Ko^{1,2}, Yong-Ho Kim¹, Hyo-Sang Yoo¹, Hyeon-Taek Son¹, Sung-Kil Hong²
¹*Korea Institute of Industrial Technology, Korea*
²*Chonnam National University, Korea*
- 13-1434** **Study on the Microstructure, Mechanical Properties and Electrical Conductivity of the Addition of Rare Earth to Al-Si Alloys**
Eun-Chan Ko^{1,2}, Byeong-Kwon Lee^{1,2}, Yong-Ho Kim¹, Hyo-Sang Yoo¹, Hyeon-Taek Son¹, Tae-Hoon Kim²
¹*Korea Institute of Industrial Technology, Korea*
²*Chonnam National University, Korea*
- 13-1592** **Research on Transparent Anti-Static Coating and Properties Using Slot Die Coating Method**
Sung Eun Park, Samsoo Kim
Gumi Electronics and Information Technology Research Institute, Korea
- 13-1632** **Nanomaterial Assembly Through Nano-Cymatic Control**
Wooyoung Shim, Minwoo Lee, Gyuhyeon Cho
Yonsei University, Korea
- 13-2118** **Efficient Oscillation and Optical Gain Enhancement Through Fabry-Perot Cavity Formation in a Green Laser Structure Grown on a (0001) Plane GaN Substrate**
Changjun Oh, Yoon Seok Kim
Tech University of Korea, Korea

- 13-2461** **Quantitative Adhesion Analysis of Thin Films with Extremely High Adhesion Strength Using Nanoscratch Test**
YeonKyeong Park¹, Taewon Park¹, Joo-Yun Jung², Dae-Geun Choi², Jun-Hyuk Choi², Eun-chae Jeon¹
¹University of Ulsan, Korea
²Korea Institute of Machinery and Materials, Korea
- 13-2465** **Analysis of Bending Reliability Characteristics Based on Reversible and Irreversible Cracks in Nanofilms**
Minji Park¹, Jinhyeon Kim¹, Hoe-Yeon Jeong¹, Yeon Kyeong Park¹, Giseung Shin¹, Ah-Reum Cho¹, Dong-Gyu Kim¹, Jaeun Park², Youngho Jin², Soon-Yong Kwon², Jung Gu Lee¹, Eun-Chae Jeon¹
¹University of Ulsan, Korea
²Ulsan National Institute of Science and Technology, Korea
- 13-2478** **Durable Electrochromic Device for Use as an Electronic Component Sensor**
Jae Soung Park, Sang Yeol Nam
Gumi Electronics and Information Technology Research Institute, Korea
- 13-2999** **Analysis of Machining Behavior Depending on Tool Conditions during Manufacturing Micro Hole on Single Crystalline Silicon Electrode**
Hwa-Sub Lee^{1,2}, Doo-Sun Choi², Jun Sae Han^{1,2}, Eun-Ji Gwak^{1,2}
¹University of Science and Technology, Korea
²Korea Institute of Machinery and Materials, Korea
- 13-3092** **Additive Manufacturing of A356 Aluminum Alloy Incorporating Oxygen Atoms**
Juyeon Han¹, Soomin Kim¹, Somin Lee¹, Zhenxing Zhou², Soomin Lee¹, Weiwei Zhou², Naoyuki Nomura², Hyunjoo Choi¹
¹Kookmin University, Korea
²Tohoku University, Japan
- 13-3237** **Effect of PAN-Nano Sphere Size on the Photocatalytic Performance of Carbon-Doped TiO₂ Porous Materials**
Ji Won Kim, Dong Eun Kim, Soo-Hyun Kim, Pestaria Sinaga, Sung-Hwan Bae
Kyungnam University, Korea
- 13-3283** **Preparation of Composite Granulated Powders for Additive Manufacturing Using Spray Drying**
Dong Young Yun, Psetaria Sinaga, Sung-Hwan Bae
Kyungnam University, Korea

High-Performance Metallic Materials for Sustainable Future

CHAIR(S)

Seok Su Sohn (Korea University)

13-0505

A Study on the Effect of Thermo-Mechanical Process Condition on Mechanical Properties in High Mg Added Al Alloy

Seung Hyun Koo, Sunki Kim

NICELMS Co., Ltd., Korea

13-0510

A Study on the Extrusion Process Condition on the Microstructural Behavior and Weldline in Commercial Purity Al Rotary Type Extruded Product

Sunki Kim¹, Youngkyun Kim², Sangmin Yoon², Seongho Ha³, Miran Noh¹, Seunghyun Koo¹

¹*NICELMS Co., Ltd., Korea*

²*Institute for Advanced Engineering, Korea*

³*Korea Institute of Industrial Technology, Korea*

13-0547

A Study on the Effect of Thermo-Mechanical Process Condition on Annealing and Recrystallization Behavior in Pure Al

Sunki Kim¹, Youngkyun Kim², Sangmin Yoon², Seongho Ha³, Miran Noh¹, Seunghyun Koo¹

¹*NICELMS Co., Ltd., Korea*

²*Institute for Advanced Engineering, Korea*

³*Korea Institute of Industrial Technology, Korea*

13-0722

Development of Fe₃O₄-Au Porous Core-Satellite Nanocomposites for Photocatalytic Wastewater Treatment

Yeonbeom Kim, Young Keun Kim, Thomas Myeongseok Koo, Hong En Fu, Jun Hwan Moon, Eunsoo Oh

Korea University, Korea

13-0744

Electrochemically Synthesized Au-, Pt-FePO₄ Multiyolk-Shell Nanocoils via One-Step Process for Superior Photocatalytic Efficiency

Young Jun Jang¹, Jun Hwan Moon¹, Eunsoo Oh¹, Thomas Myeongseok Koo¹, Hong En Fu¹, Min Jun Ko², Yoo Sang Jeon¹, Young Keun Kim¹

¹*Korea University, Korea*

²*Northwestern University, USA*

- 13-0861** **Dislocation-Assisted Localized Corrosion Behavior of Intermetallic Particles in Al Alloys**
Saif Kayani, Young-Hee Cho, Heon-Young Ha, Jung-Moo Lee
Korea Institute of Materials Science, Korea
- 13-1599** **A Study on the Properties of Artificial Graphite Blocks Manufactured by Extrusion Molding Process**
Samsoo Kim, Min Soo Kim
Gumi Electronics and Information Technology Research Institute, Korea
- 13-1630** **Antireflective Absorber Based on Laminated Aluminum Sheet Construction**
Jihun Yeom, Teahoon Kim, Wooyoung Shim
Yonsei University, Korea
- 13-1702** **Study on Effect of Etched Surface Morphology on Bonding Strength of Metal and Polymer Resin Composites Manufactured by Injection Molding Method**
Muchang Sung^{1,2}, Bongyoung Yoo¹
¹*Hanyang University, Korea*
²*Plastal Inc, Korea*
- 13-2255** **Research on Novel Precipitates in Al-Cu Alloys with Lanthanum or Strontium Enhancements Created Through Machine Learning Derived from the OQMD**
Seoyeon Jeon¹, Suwon Park¹, AhYeon Cho¹, Sehoon Kim², YongJoo Kim³, Hyunjoo Choi¹
¹*Kookmin University, Korea*
²*Korea Automotive Technology Institute, Korea*
³*Korea University, Korea*
- 13-3439** **A Study on Particle Size Control of WC Fabrication by SHS Process by Green Compact Pressure Conditions from Recycled WO₃**
Gee Hyuk Lee^{1,2}, Yong Kwan Lee^{1,3}, Yong Yeon You^{1,3}, Mi Hye Lee¹, Kyoung Tae Park¹, Jae Jin Sim¹
¹*Korea Institute of Industrial Technology, Korea*
²*Inha University, Korea*
³*Korea University, Korea*

- 13-3472** Study on the Heat Treatment Conditions of Die Steel for Hot Extrusion of High Strength Aluminum Alloy
Young-Chul Shin
Korea Institute of Industrial Technology, Korea
- 13-3484** Studying the Influence of Reductant and Carbon Content on Silicon Carbide Synthesis from Rice Husk via Self-propagating High-Temperature Synthesis (SHS) Process
Yong Yeon You^{1,2}, Yong Kwan Lee^{1,2}, Gee Hyuk Lee^{1,3}, Sung Gue Heo¹, Kyoung Tae Park¹, Jae Jin Sim¹
¹*Korea Institute of Industrial Technology, Korea*
²*Korea University, Korea*
³*Inha University, Korea*
- 13-3501** Analysis of Strengthening Capability by Work Hardening of Al-Mg Alloy with High Mg Content
Young-Chul Shin, Seong-Ho Ha, Tae-Yeong So
Korea Institute of Industrial Technology, Korea
- 13-3578** Characterization of Oxide Growth in Al-Mg Alloys with Different Mg Contents at Elevated Temperatures Using Electron Back-scatter Diffraction
Seong-Ho Ha, Tae-Yeong So, Bong-Hwan Kim, Young-Ok Yoon, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea
- 13-3580** Influence of Si-Based Phase Fraction on Oxidation Resistance of Al-Mg-Si Alloys During Remelting
Seong-Ho Ha, Tae-Yeong So, Bong-Hwan Kim, Young-Ok Yoon, Hyun-Kyu Lim, Shae K. Kim
Korea Institute of Industrial Technology, Korea
- 13-3583** Influence of Grain Refiner on Intergranular Oxidation of Al-Mg Alloys at Elevated Temperatures
Tae-Yeong So, Seong-Ho Ha, Dongearn Kim
Korea Institute of Industrial Technology, Korea

- 13-3588** **Forming Behaviors of Al-Ti Alloys with Different Amounts of Ti by Biaxial Alternate Forging**
Tae-Yeong So, Seong-Ho Ha, Young-Chul Shin, Dongearn Kim
Korea Institute of Industrial Technology, Korea
- 13-3593** **Effects of Si and Mn on Precipitation of Fe-Intermetallic Compounds in Al-Fe Based Alloy Melts**
Seong-Ho Ha¹, Tae-Yeong So¹, Sang-Min Yoon², Young-Kyun Kim²
¹*Korea Institute of Industrial Technology, Korea*
²*Institute for Advanced Engineering, Korea*
- 13-3595** **Reaction Behaviors Between Silica and Al-Mg Alloy Melts with Different Mg Contents**
Seong-Ho Ha¹, Tae-Yeong So¹, Sang-Min Yoon², Young-Kyun Kim²
¹*Korea Institute of Industrial Technology, Korea*
²*Institute for Advanced Engineering, Korea*
- 13-3597** **Formation and Morphological Change of Si Phase During Directional Solidification of Al-Si Alloys Containing a Trace of Sr**
Seong-Ho Ha¹, Tae-Yeong So¹, Young-Kyun Kim², Sang-Min Yoon²
¹*Korea Institute of Industrial Technology, Korea*
²*Institute for Advanced Engineering, Korea*
- 13-3599** **Investigating Formation and Growth of Fe-Intermetallic Compounds in Directional Solidification of Al-Si-Fe Alloys**
Seong-Ho Ha¹, Tae-Yeong So¹, Young-Kyun Kim², Sang-Min Yoon²
¹*Korea Institute of Industrial Technology, Korea*
²*Institute for Advanced Engineering, Korea*
- 13-3604** **Intergranular Oxidation of Al-Cu-Mg Alloys with Different Fractions of Al₂CuMg Phase at Elevated Temperatures**
Seong-Ho Ha¹, Tae-Yeong So¹, Seung Hyun Koo², Sunki Kim²
¹*Korea Institute of Industrial Technology, Korea*
²*Nice LMS, Korea*

Additive Manufacturing for Sustainable Future

CHAIR(S)	Kee-Ahn Lee (Inha University), Kyung Tae Kim (KIMS)
13-1720	Design and Characterization of a 3D Printed Microheater for Wearable Devices Using Simulation <u>Se Yong Park</u>, Han-Jung Kim, Jun Hee Kim, Yoonkap Kim <i>Gumi Electronics and Information Technology Research Institute, Korea</i>
13-1785	Eco-Friendly Transparent Flexible Heater/Electrode Fabricated by Additive Manufacturing Methods <u>Han-Jung Kim</u>, Yoonkap Kim <i>Gumi Electronics and Information Technology Research Institute, Korea</i>
13-1821	Interfacial Engineering for Enhancing Adhesion Between Electrode and Substrate in 3D-Printed Electronics <u>Junhee Kim</u>, Jungmin Park, Se Yong Park, Yohan Ko, Sungeun Park, Yoonkap Kim, Han-Jung Kim <i>Gumi Electronics and Information Technology Research Institute, Korea</i>
13-2600	Fabrication, Microstructure and Tensile Property of 2GPa Class D2 Tool Steel by Using Metal-Materials Extrusion Additive Manufacturing and Post-Heat Treatment <u>Kee-Ahn Lee</u>, Min-Su Jeon, So-Yeon Park, Yong-Hoon Cho <i>Inha University, Korea</i>

Functional Nanostructured Materials for Healthcare Applications

Oral Presentation

Functional Nanostructured Materials for Healthcare Applications (1)

November 25 | Yeongsil

CHAIR(S) Junmin Lee (POSTECH)

13:10-13:40
14-3854
Micro- and Nanoengineered Biomaterials for Engineering and Controlling Biohybrid Soft Robots

KEYNOTE Su Ryon Shin
Harvard Medical School/Brigham and Women's Hospital, USA

13:40-14:05
14-1512
Molecular Recognition-Guided Modification of Non-Engineered Proteins at Specific Sites

INVITED Seung Soo Oh
Pohang University of Science and Technology, Korea

14:05-14:30
14-0655
Polymeric Biomaterials for Next-Generation Soft Electronics

INVITED Jungmok Seo
Yonsei University, Korea

14:30-14:55
14-0327
Design of Self-Adaptive Microneedles for Transdermal Therapy

INVITED Ming Kong
Ocean University of China, China

Functional Nanostructured Materials for Healthcare Applications (2)

November 25 | Yeongsil

CHAIR(S)	Jahyun Koo (Korea University)
15:05-15:30 14-0141 INVITED	Self-Healing, Stretchable, and Tissue-Adhesive Materials for Stable Bioelectronics <u>Donghee Son</u> <i>Sungkyunkwan University, Korea</i>
15:30-15:55 14-0164 INVITED	The Next Generation of Biodegradable Electronics for a Minimally Invasive Brain Interface <u>Seung-Kyun Kang</u> <i>Seoul National University, Korea</i>
15:55-16:20 14-0289 INVITED	Structural Engineering of Lipid Assemblies for Biomedical Applications Harin Jin, Jongeon Park, Seunghwan Bang, Jaechul Park, <u>Hojun Kim</u> <i>Korea Institute of Science and Technology, Korea</i>
16:20-16:45 14-2251 INVITED	A Conductive Biointerface and Machine Learning Technology Integrated Platform for Peripheral Neural Cell Culture Applications <u>Yi-Chen Li</u> <i>Feng Chia University, Chinese Taipei</i>

Functional Nanostructured Materials for Healthcare Applications (3)

November 25 | Yeongsil

CHAIR(S)	Junmin Lee (POSTECH)
16:55-17:20 14-1588 INVITED	Plasmon-Enhanced Multiplexed Biosensing for Next-Generation Molecular Cancer Diagnosis <u>Hyungsoon Im</u> ^{1,2} ¹ <i>Massachusetts General Hospital, USA</i> ² <i>Harvard Medical School, USA</i>
17:20-17:45 14-3825 INVITED	Advanced Exosome-Based In Vitro Diagnostic Platforms Utilizing Isothermal Amplification Technology <u>Eun-Kyung Lim</u> <i>Korea Research Institute of Bioscience and Biotechnology, Korea</i>

Functional Nanostructured Materials for Healthcare Applications (4)

November 26 | Halla C

CHAIR(S) Ho Sang Jung (KIMS), Jung Heon Lee (Sungkyunkwan University)

15:00-15:25
14-2062 High-Density Mesenchymal Stem Cells-Laden Rapidly Degradable Core/Shell Microgels for Cartilage Tissue Regeneration

INVITED Sang Jin Lee

The University of Hong Kong, Hong Kong (SAR of China)

15:25-15:50
14-1558 Functional Polymers and Nanostructures for Capturing and Detecting Target Biomolecules

INVITED Hyejeong Seong

Korea Institute of Science and Technology, Korea

15:50-16:05
14-3708 Molecular Dynamics Simulation Study of Nanoslit Sequencing Based on Two-Dimensional Materials

Jun Fan

City University of Hong Kong, Hong Kong (SAR of China)

16:05-16:20
14-2207 Modeling of ECM-Mimicking System Using Elongated Iron-Based Magnetic Nanomaterials For Modulating Immune Response Mechanism

Nayeon Kang, Sunhong Min, Hyunsik Hong, Heemin Kang

Korea University, Korea

16:20-16:35
14-3131 Specific Absorption Rate and Cytotoxicity of Green Synthesized Fe₃O₄-MSN/Ag Nanocomposites for Magnetic Hyperthermia Application

Mahardika Yoga Darmawan^{1,2}, Marhan Ebit Saputra¹, Leni Rumiyanthi^{1,3}, Nurul Imani Istiqomah¹, Ari Dwi Nugraheni¹, Edi Suharyadi¹

¹Universitas Gadjah Mada, Indonesia

²Institut Teknologi Sumatera, Indonesia

³Universitas Lampung, Indonesia

Functional Nanostructured Materials for Healthcare Applications (5)

November 26 | Halla C

CHAIR(S)

Ho Sang Jung (KIMS), Jung Heon Lee (Sungkyunkwan University)

16:50-17:05

14-1870

Polymer-Free Side-Patched Gold Nanorods Synthesized via Salt-Assisted Anisotropic Structural Tuning of Silica Shells

Min Jeong Kim, Yunchul Kim, Chae Yeon Lee, Jennifer Kezia Soegijopranto, Youmin Shim, Jung Heon Lee

Sungkyunkwan University, Korea

17:05-17:20

14-2656

Fully Biodegradable and Strain-Sensitive Crack-Based Flexible Sensor

Jae-Hwan Lee, Jae-Young Bae, Seung-Kyun Kang

Seoul National University, Korea

17:20-17:35

14-2616

A Bioadhesive Semiconducting Hydrogel-Elastomer Nanomembrane for Bioelectronics

Hyunjin Jung¹, Daeyeon Lee², Bongsoo Kim², Donghee Son¹

¹*Sungkyunkwan University, Korea*

²*Ulsan National Institute of Science and Technology, Korea*

17:35-17:50

14-2614

Strain-Adaptive and Adhesive Bioelectronics for Universal Tissue Interfacing

Sungjun Yoon, Heyrim Lee, Sumin Kim, Mikyung Shin, Donghee Son

Sungkyunkwan University, Korea

17:50-18:05

14-1383

Homogeneous Bimetallic AuPd Nanocatalysts Decorated TiO₂ Nanohelices for Selective Toluene Gas Sensor

Hyeonwoong Hwang, Hanseo Bae, Bongwon Kim, Jongkyu Kim, Sei Kwang Hahn

Pohang University of Science and Technology, Korea

Poster Presentation | November 25

Biomaterials for Nano/Micro-Physiological Systems

CHAIR(S)

Junmin Lee (POSTECH)

- | | |
|----------------|---|
| 14-1755 | <p>Pseudo-3D Topological Alignments Regulate Mechanotransduction and Maturation of Smooth Muscle Cells</p> <p><u>Yeji Lee</u>, Jihyeon Song, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |
| 14-1757 | <p>Advanced Drug Screening Platform Utilizing Capillary and Artery Models Based on Tumor-Vessel Interactions</p> <p><u>Jihyeon Song</u>, Yeji Lee, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |
| 14-1828 | <p>Bi-Directional Cyclic Mechanical Stimulation Regulates Metastatic Behavior and Apoptosis in Melanoma Cells via Mechanotransduction Pathways</p> <p><u>Taehoon Lee</u>, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |
| 14-1838 | <p>Cyclic Mechanical Stimulus Regulates Mechanotransduction of Smooth- and Skeletal-Muscle Cells</p> <p><u>Geonwoo Kim</u>, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |
| 14-1839 | <p>Biofabricated 3D Platform for Angiogenesis Screening Using Patient-Derived Tumor Spheroids and HUVEC Co-Culture in GelMA-Fibrin Gels</p> <p><u>Suyeon Shin</u>, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |
| 14-1844 | <p>Constructing Electrical Interface of Plants Using Arrowhead Substrate-Free Hydrogel Microneedle</p> <p><u>Geonho Lee</u>, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |
| 14-1860 | <p>Modeling Tumor-Immune Interactions Using Hybrid Spheroids and Microfluidic Platforms for Studying Tumor-Associated Macrophage Polarization in Melanoma</p> <p><u>Junki Seo</u>, Junmin Lee</p> <p><i>Pohang University of Science and Technology, Korea</i></p> |

- 14-1922** **3D Bioprinted Gradient Scaffolds for Integrated Soft -Hard Tissue Interface Regeneration**
Yurim Choi, Junmin Lee
Pohang University of Science and Technology, Korea
- 14-1995** **Development of a Bone-on-a-Chip System to Evaluate the Bone Regeneration Efficiency of 3D Printed Scaffolds with Varying TPMS Geometries**
Donggyu Kim, Junmin Lee
Pohang University of Science and Technology, Korea
- 14-2171** **Genetic Algorithm-Inspired Morphological Characterization of Nanomaterials Using Electron Microscopy Image Analysis**
Youmin Shim, Yunchul Kim, Byongsang Lee, Jung Heon Lee
Sungkyunkwan University, Korea
- 14-2202** **M13 Bacteriophage-Based Scaffold for Bone Regeneration via Piezoelectricity**
Sang Min Lee, Ju Hun Lee
Hanyang University, Korea
- 14-2209** **Engineering Surface Structure of Nanomaterials Enable Ligand Trapping for Macrophage Modulation**
Chowon Kim, Heemin Kang
Korea University, Korea
- 14-2234** **Reversible Manipulation of the Hierarchical Ligand Anisotropy for Macrophage Regulation**
Kanghyeon Kim, Heemin Kang, Yuri Kim
Korea University, Korea
- 14-3881** **Photoacoustic Spectroscopy for Quantifying Oxygen in Biological Models**
Paulina Abrica-González^{1,2}, Norberto Alarcón-Herrera², Armando Yavazul Sanchez-Gonzalez¹, Regina Landaverde-Hernández¹, José Abraham Balderas-López¹, Sandra Gómez-Arroyo²
¹*Instituto Politécnico Nacional, Mexico*
²*Universidad Nacional Autónoma de México, Mexico*

Functional Nanomaterials for Advanced In Vitro Diagnostics (IVD)

CHAIR(S)

Ho Sang Jung (KIMS)

- 14-1765** Synthesis of Nitrogen-Doped Graphene Quantum Dots Using Waste Graphite Anode Scrap
Geon Jong Yoo, Jung Hyeon Yoo, Seok Bin Kwon, Dae Ho Yoon
Sungkyunkwan University, Korea
- 14-1814** Machine Learning-Assisted Ultra-Sensitive 3D Plasmonic Sensor for Multiplex Hazardous Molecule Detection
Hyojeong Seo, Ho Sang Jung
Korea Institute of Materials Science, Korea
- 14-1815** Label-Free Detection and Early Diagnosis of Arthritis Using 3D Plasmonic Paper-Based SERS Sensors
Bo You Heo, Ho Sang Jung
Korea Institute of Materials Science, Korea
- 14-1816** 3D Plasmonic Paper-Based SERS Sensor for Label-Free Saliva Sensing and Machine Learning-Assisted Lung Cancer Diagnosis
Vo Thi Nhat Linh, Ho Sang Jung
Korea Institute of Materials Science, Korea
- 14-1837** Gold Nanoparticles Embedded Hydrogel as a Wearable Patch SERS Sensor for Label-Free Molecular Detection
Se Jin Choi, Ho Sang Jung
Korea Institute of Materials Science, Korea
- 14-1991** Facile and Rapid Colorimetric Detection of Carbaryl Using Nitrite-Conjugated Gold Nanoparticles to Ensure Environmental and Consumer Safety
Sang Yun Jeong, Hui Hun Cho, Do Hyun Jeong, Ye Jin Cho, Jun Hyuk Heo, Jung Heon Lee
Sungkyunkwan University, Korea

- 14-2036** DNA Wrapped CNT Sensor for Small Nucleic Acid Detection with Introducing Short Complementary Sequence
Junhyuck Chang, Shrute Kannappan, Priyannth Ramasami Sundharbaabu, Jun Hyuk Heo, Kyeong Kyu Kim, Jung Heon Lee
Sungkyunkwan University, Korea
- 14-2111** Ultrasensitive nSLAM System for Genomic Biomarker Detection
Sunyeoung Na, Ju Hun Lee
Hanyang University, Korea
- 14-2332** SERS Machine Learning-Assisted 3D Au Nanolaminate Sponge for Urine-Based Multiple Cancer Diagnosis
Muhammad Shalahuddin, Ho Sang Jung
Korea Institute of Materials Science, Korea
- 14-2373** Detection of Microplastics Using Machine Learning-Assisted Paper-Based 3D Plasmonic Gold Nanopocket SERS Sensor
Junyoung Kim, Ho Sang Jung
Korea Institute of Materials Science, Korea
- 14-2376** Plasmonic Needle-Based SERS Sensor for Label-Free Colorectal Cancer Diagnosis
Kang Seok Jo, Ho Sang Jung
Korea Institute of Materials Science, Korea

Human/Nanomaterials Interface for Precision Healthcare Applications

CHAIR(S)

Jahyun Koo (Korea University)

- 14-1777** **Omnidirectionally Stretchable, Biodegradable Mesh Electrode with Re-Entrant Structure**
Jaewon Kim, Kyung Su Kim, Jahyun Koo
Korea University, Korea
- 14-1865** **Advanced Multilayered Biodegradable Wireless Sensors for Precise, Portable and High-Sensitivity Intracranial Pressure Monitoring**
Minki Hong, Seunghun Han, Sehwan Park, Sumin Kim, Jahyun Koo
Korea University, Korea
- 14-1909** **Chain-Like One-Dimensional Assembly of Mesoporous Silica Nanoparticles: An Approach to Improve Hydrogel Adhesion**
Jennifer Kezia Soegijopranto, Min Jeong Kim, Yunchul Kim, Byoungsang Lee, Chae Yeon Lee, Hyewon Song, Hyunlee Kim, Jung Heon Lee
Sungkyunkwan University, Korea
- 14-1920** **Geometrical Optimization of Biodegradable Fringe Field Sensors for Enhanced Sensitivity and Functionality**
Sehwan Park, Minki Hong, Seunghun Han, Jahyun Koo
Korea University, Korea
- 14-1954** **End-to-End Pipeline for Genomic DNA Visualization Under Electron Microscopy Using Nanoparticle-Tagged Peptides and Artificial Intelligence Enhanced Image Analysis**
Priyannth Ramasami Sundharbaabu¹, Junhyuck Chang¹, Yunchul Kim¹, Youmin Shim¹, Byoungsang Lee¹, Chanyoung Noh², Sujung Heo², Shrute Kannappan¹, Sanghee Shim³, Kwang-il Lim⁴, Kyubong Jo², Jung Heon Lee¹
¹*Sungkyunkwan University, Korea*
²*Sogang University, Korea*
³*Korea University, Korea*
⁴*Sookmyung Women's University, Korea*
- 14-2028** **Advanced Synthesis, Characterization, and Mechanical Properties of Whitlockite Substituted with 3d Orbital Transition Metals**
Jina Bae, Cheolhyun Park, Davin Shin, Jun Hyuk Heo, Jung Heon Lee
Sungkyunkwan University, Korea

- 14-2043** **Biodegradable Gel Electrolyte for Bioresorbable and Implantable Biomedical Devices**
Giheon Kim, Jaewon Kim, Yerim Lee, Sunmin Bae, Jahyun Koo
Korea University, Korea
- 14-2058** **Non-Invasive Cell Quantification Using Achromatic Colorimetric Sensor and Machine Learning-Assisted Image Analysis**
Yunchul Kim, Jung Heon Lee, Byoungsang Lee
Sungkyunkwan University, Korea
- 14-2141** **Enhancing Bone Tissue Regeneration by Bone Mimicking Nanoporous Hydroxyapatite Scaffolds**
Junseok Kim, Dai-Hwan Kim, Jung Heon Lee
Sungkyunkwan University, Korea
- 14-2310** **Osteogenic Functions of Human Stem Cells Modulated by Calcium Ion-Containing Ti Oxide Surface in Clinical Oral Implants**
Jinwoo Park
Kyungpook National University, Korea
- 14-2641** **Mass Transfer-Printable Biodegradable Electronics**
 Seung-Min Lee, Woo-Jin Lee, Seung-Kyun Kang
Seoul National University, Korea
- 14-3416** **Thermoluminescence Study of Samarium - Doped Calcium Dialuminate for Radiation Dosimetry in the Food Preserving Application**
Mahesha K Hegde¹, R Arun Kumar¹, Sejal Chandana², Debashish Sen²
¹National Institute of Technology Andhra Pradesh, India
²Inter University Accelerator Centre, India

Advanced Characterizations for Functional Materials

Oral Presentation

Advanced Characterizations for Functional Materials (1)

November 25 | Olle

CHAIR(S)

Jong Min Yuk (KAIST)

10:10-10:40

15-3787

Structural Manipulation of Functional Materials with Atomic-Scale Resolution by In-Situ TEM

KEYNOTE

Xuedong Bai

Chinese Academy of Sciences, China

10:40-10:55

15-3491

Atomic-Scale Investigation of the Mechanism for Giant Electric Field-Induced Strain in BaTiO₃ Single Crystals

Chullee Lee¹, Yeon-Seo Nam¹, Chang Min Baek², Jungho Ryu², Si-Young Choi^{1,3}

¹Pohang University of Science and Technology, Korea

²Yeungnam University, Korea

³Institute for Basic Science, Korea

10:55-11:10

15-3358

Real-Time TEM Analysis of Lithiophilic Coatings on Ni Using a Lithium Injection Probe for Lithium Metal Batteries

Yu-Jeong Yang, So-Yeon Kim, Si-Young Choi

Pohang University of Science and Technology, Korea

11:10-11:40

15-1566

Defect Control in Remote Heteroepitaxy Using Low-Dimensional Materials

Sungkyu Kim

Sejong University, Korea

11:40-11:55

15-3327

Structural Evolution of Enhanced Thermal Stability in Dual-Doped High-Nickel Cathodes

So-Yeon Kim, Yu-Jeong Yang, Si-Young Choi

Pohang University of Science and Technology, Korea

11:55-12:10

15-3203

**Domain Orientated Nanoparticle Exsolution in Defect Engineered
Stannate Perovskite**

Yeon-Seo Nam¹, Hyeji Sim¹, Yujeong Lee², Daseob Yoon¹, Junwoo Son²,
Si-Young Choi^{1,3}

¹*Pohang University of Science and Technology, Korea*

²*Seoul National University, Korea*

³*Institute for Basic Science, Korea*

Advanced Characterizations for Functional Materials (2)

November 25 | Olle

CHAIR(S) Sungkyu Kim (Sejong University)

13:10-13:40 High Spatiotemporal Resolution STEM Imaging

15-0537 Ryo Ishikawa

INVITED *The University of Tokyo, Japan*

13:40-13:55 Atomic Structural Dynamics of Ferroelastic Switching in Ferroelectric
15-3189 HfO_2 Freestanding Membrane Under Corona Poling

Kyoung-June Go¹, Min-Su Kim¹, Kyoungjun Lee², Jun Hee Lee³, Seung Chul Chae²,
Si-Young Choi^{1,4}

¹Pohang University of Science and Technology, Korea

²Seoul National University, Korea

³Ulsan National Institute of Science and Technology, Korea

⁴Institute for Basic Science, Korea

13:55-14:10 Observing Ice I Nanocrystal Polymorphs Through Cryo-TEM

15-3175 Ji Su Park¹, Namgyu Noh¹, Jungjae Park¹, Yusra Qureshi¹, Sung Kang², Yoon Huh²,
Jongmin Yuk¹

¹Korea Advanced Institute of Science and Technology, Korea

²Research Institute of Industrial Science and Technology, Korea

14:10-14:25 Crystal Orientation-Dependent Oxygen Evolution Activity in IrO_2

15-2801 Gahee Noh¹, Hyungwoo Lee², Tae Gyu Yun³, Sung-Yoon Chung³,
Chang-Beom Eom⁴, Minseok Choi², Si-Young Choi^{1,5}

¹Pohang University of Science and Technology, Korea

²Inha University, Korea

³Korea Advanced Institute of Science and Technology, Korea

⁴University of Wisconsin-Madison, USA

⁵Institute for Basic Science, Korea

14:25-14:40 Investigation of Factors to be Considered due to Differences Between
15-2705 Ex-Situ and In-Situ TEM Analysis

Kyu-Jin Jo, Juhong Park, Jongyun Won, Cheol-Woong Yang

Sungkyunkwan University, Korea

14:40-14:50 Analyzing Atomical Defect of Thermodynamic Factors at MoS_2 Mirror
15-3008 Twin Boundary Transition

Sung-Hyuk Her, Dong-Hwan Yang, Heonsu Ahn, Moon-Ho Jo, Si-Young Choi

Pohang University of Science and Technology, Korea

Advanced Characterizations for Functional Materials (3)

November 25 | Olle

CHAIR(S)

Siyoung Choi (POSTECH)

15:00-15:30

15-0126

INVITED

Transient Process of Biomolecules-in-Action Imaged by Liquid-Phase TEM

Huan Wang

Peking University, China

15:30-15:45

15-2594

Ultrafast Metal-Insulator Transition by Isovolumetric Cation Dimerization in Vanadium Dioxide

Hyegi Sim¹, Yunkyu Park^{1,2}, Seong-Won Lee³, Won-Woo Park⁴, Jaejin Hwang⁵, Pyeong Kang Hur¹, Yujeong Lee³, Dong Kyu Lee³, Kyung Song⁶, Jaekwang Lee⁵, Oh-Hoon Kwon⁴, Junwoo Son³, Si-Young Choi^{1,7}

¹Pohang University of Science and Technology, Korea

²Oak Ridge National Laboratory, USA

³Seoul National University, Korea

⁴Ulsan National Institute of Science and Technology, Korea

⁵Pusan National University, Korea

⁶Korea Institute of Materials Science, Korea

⁷Institute for Basic Science, Korea

15:45-16:00

15-2561

Interfacial Moiré Charge Localization in Twisted Bilayer of Freestanding Oxides

Min-Su Kim¹, Kyoungjun Lee², Ryo Ishikawa³, Kyung Song⁴, Naafis Ahnaf Shahed⁵, Ki-Tae Eom², Mark S. Rzchowski², Evgeny Y. Tsymbal⁵, Teruyasu Mizoguchi³, Chang-Beom Eom², Si-Young Choi^{1,6}

¹Pohang University of Science and Technology, Korea

²University of Wisconsin-Madison, USA

³The University of Tokyo, Japan

⁴Korea Institute of Materials Science, Korea

⁵University of Nebraska-Lincoln, USA

⁶Institute for Basic Science, Korea

16:00-16:15

15-2252

Enhancing Li Transport of High-Voltage $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ Cathode in Solid State Battery via Superior LiNbO_3 Coating on Sluggish {111} Facets

Jeong-Min Kim¹, Min Seok Kim², Si Jin Sung², Ji Seul Gi², Sun Sook Lee², Sungho Choi², Si-Young Choi^{1,3}

¹Pohang University of Science and Technology, Korea

²Korea Research Institute of Chemical Technology, Korea

³Institute for Basic Science, Korea

16:15-16:30

15-2110

Study on $\text{CaCu}_3\text{Ti}_4\text{O}_{12}/\text{NaCl}$ Humidity Sensor Employing Aerosol Deposition Process

Yuan-Bo Zhang, Jun-Woo Lee, Jwa-Bin Jeon, Won-Il Ahn, Weon-Ho Shin, Sang-Mo Koo, Jong-Min Oh

Kwangwoon University, Korea

Advanced Characterizations for Functional Materials (4)

November 25 | Olle

CHAIR(S)

Siyoung Choi (POSTECH)

16:50-17:05

15-2097

Ultra-High Breakdown Field of Ga_2O_3 Film via Novel Aerosol Deposition Method

Jun-Woo Lee, Jwa-Bin Jeon, Ki-Seop Lee, Sang-Mo Koo, Won Ho Shin, Jong-Min Oh
Kwangwoon University, Korea

17:05-17:20

15-0512

Direct Observation of Electromigration in a Cu Thin Line by In Situ Multi-Modal STEM

Min-Hyoung Jung¹, Hu Young Jeong², Young-Min Kim¹

¹*Sungkyunkwan University, Korea*

²*Ulsan National Institute of Science and Technology, Korea*

17:20-17:35

15-2456

Enhancing Thermoelectric Performance of Ta, Sb Added NbCoSn Half-Heusler with the Atomic-Scale Microstructure Analysis

Donghyeon Chae, Pyuck-Pa Choi

Korea Advanced Institute of Science and Technology, Korea

17:35-17:50

15-2064

Muti-Scale Microscopic Analysis of Grain Boundary Engineered Nb-Alloyed Nd-Fe-B Permanent Magnets

Sadhasivam Murali, Flory Christopher, Vijayaragavan G, Pradeep K G

Indian Institute of Technology Madras, India

17:50-18:05

15-0970

Grain Boundary Decorated Bi Enables Robust Yttrium Tellurides from Microstructural Degradation in Humid Environment

Kyuseon Jang¹, Jamil Ur Rahman², Chanwon Jung³, Kornelius Nielsch², Christina Scheu⁴, Ran He², Siyuan Zhang⁴, Pyuck-Pa Choi¹

¹*Korea Advanced Institute of Science and Technology, Korea*

²*IFW Dresden, Germany*

³*Pukyong National University, Korea*

⁴*Max Planck Institute for Sustainable Materials, Germany*

Advanced Characterizations for Functional Materials (5)

November 26 | Olle

CHAIR(S) Pyuck-Pa Choi (KAIST)

08:30-09:00 Nanoscale Flexoelectric Control of Tribology in Ferroelectrics

15-1253 Seongwoo Cho

INVITED *University of Geneva, Switzerland*

09:00-09:30 Correlative Microscopic Analysis of Grain Boundary Engineered Nd-Fe-B Magnets

15-0854 Konda Gokuldoss Pradeep

Indian Institute of Technology Madras, India

09:30-10:00 Exploring the Structure-Property Relationship in Functional Materials Using Atom Probe Tomography

15-0382 Chanwon Jung

Pukyong National University, Korea

10:00-10:30 Small Angle Neutron Scattering Study in Polymer Nanocomposites

15-0835 Tae Yeon Kong, So Youn Kim

INVITED *Seoul National University, Korea*

Advanced Characterizations for Functional Materials (6)

November 26 | Olle

CHAIR(S) Hyeongmin Jin (Chungnam National University)

10:50-11:20 Intercalation-Type Cathodes for Calcium Rechargeable Batteries

15-0477 Zheng-Long Xu

INVITED *The Hong Kong Polytechnic University, Hong Kong (SAR of China)*

11:20-11:50 Designing Electrode Materials for Rechargeable Batteries: Insights from Advanced Analyses of Reaction Mechanisms

15-0390 Seung-Ho Yu

INVITED *Korea University, Korea*

11:50-12:20 Small Angle X ray Scattering at Shanghai Synchrotron Radiation Facility : From 1D to 3D and From Single-Technique to Multi-Technique

15-0210 Fenggang Bian

INVITED *Chinese Academy of Sciences, China*

Poster Presentation | November 25

Multi-Dimensional Imaging Based in TEM Technique

CHAIR(S)

Siyoung Choi (POSTECH)

- 15-0497** Direct Mapping of Ionomer Distribution on Porous Carbon Supports by Machine Learning EELS Clustering
Daehee Yang, Young-Min Kim
Sungkyunkwan University, Korea
- 15-0570** Machine Learning-Assisted Electron Energy Loss Spectroscopy Mapping for Silicon-Based Anode Materials of Lithium-Ion Batteries
Yuseong Heo¹, Young-Hoon Kim², Taewon Min³, Min-Hyoung Jung¹, Hu Young Jeong⁴, Jae-Hyun Shim⁵, Jaekwang Lee⁶, Young-Min Kim¹
¹*Sungkyunkwan University, Korea*
²*Oak Ridge National Laboratory, USA*
³*SK Hynix Inc., Korea*
⁴*Ulsan National Institute of Science and Technology, Korea*
⁵*Dongshin University, Korea*
⁶*Pusan National University, Korea*
- 15-1139** First-Principles Studies of the Effect of Oxygen Vacancy in Oxide-Based Li-Ion Battery
Jaejin Hwang, Jaekwang Lee
Pusan National University, Korea
- 15-1977** CuS/P@MWCNT Composite as High Capacity and High Rate Anode for Sodium-Ion Batteries
Jacob Choe, Chaeyoung Hwang, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-1981** Unveiling the Working Mechanism of NASICON-Type Composite Cathode for Sodium-Ion Battery
Junpyo Hur, Jacob Choe, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-2226** Strain-Induced Ferroelectric Phase Transition in SrFe₁₂O₁₉
Seungjae Hwang, Jaekwang Lee
Pusan National University, Korea

- 15-2296** **Visualizing Heterogeneous Protein Conformations with Multi-Tilt Nanoparticle-Aided Cryo-Electron Microscopy Sampling**
Yeeun Kim, Changin Kim, Sang Jin Lee, So Ri Yun, Jungkweon Choi,
 Seong Ok Kim, Yongsoo Yang, Hyotcherl Ihee
Korea Advanced Institute of Science and Technology, Korea
- 15-2452** **Stabilizing Sodium-Excess Phase of $\text{Na}_3\text{V}_2(\text{PO}_4)_2\text{F}_3$ Through New Applications of Bayesian Optimization**
Sanghyeon Park^{1,2}, Chan-Woo Lee², Jong Min Yuk¹
¹*Korea Advanced Institute of Science and Technology, Korea*
²*Korea Institute of Energy Research, Korea*
- 15-2469** **Defect-Mediated Stabilization of HfO_2**
Yeongrok Jin, Jaekwang Lee
Pusan National University, Korea
- 15-2550** **Advanced Synthesis Strategies for High-Capacity Prussian White Cathodes in Sodium-Ion Batteries**
Jae Eun Joo, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-2692** **Analysis of Ionic Conductivity Enhancement of Layered Sodium Solid Electrolyte Through Trivalent Cation Substitution**
Junki Lee, Jacob Choe, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-2878** **Direct Observation of High-Crystalline Bi Nanoparticles at Interface Under TEM Beam Irradiation**
Han Beom Jeong, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-2946** **Revealing Etching Mechanism of Mo by Using In-Situ Liquid Phase TEM**
Sanghyeon Ji, Jacob Choe, Jeongmin Kim, Sanghyeon Park, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-2955** **Enhanced Sodium-Ion Battery Performance with Iron-Doped Sodium Vanadium Phosphate and Fluorophosphate Cathodes**
Muhammad Mohsin Khan, Junpyo Hur, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea

- 15-2958** **Copper Incorporated Phase Evolution Of Transition Metal Sulfide Anodes**
Jacob Choe, Junpyo Hur, Jong Min Yuk
Korea Advanced Institute of Science and Technology, Korea
- 15-3031** **Direct Imaging of Co-CUK-1 Framework with H₂O Guests**
Kyo-Won Lee^{1,2}, Dong-Hwan Yang^{1,2}, Si-Young Choi^{1,2}
¹*Pohang University of Science and Technology, Korea*
²*Institute for Basic Science, Korea*
- 15-3474** **Analyzing the Impact of Crystal Orientation on RuO₂ Oxygen Evolution Activity Through Surface Observations**
Seong-Sik Kim¹, Gahee Noh¹, Yurim Hong¹, Owen Ericksen², In Su Lee¹, Chang-Beom Eom², Si-Young Choi^{1,3}
¹*Pohang University of Science and Technology, Korea*
²*University of Wisconsin-Madison, USA*
³*Institute for Basic Science, Korea*

Advanced SPM and APT Analysis

CHAIR(S)

Pyuck-Pa Choi (KAIST)

- 15-0654** **High-Throughput Scanning Probe Microscopy Using Elastomeric Tip Array Without Cantilever**
Donghoon Oh, Wooyoung Shim
Yonsei University, Korea
- 15-2397** **Infrared and Raman Spectroscopy of Hafnium Dioxide Polymorphs**
Seongmun Kim, Jaekwang Lee
Pusan National University, Korea
- 15-2622** **3D Imaging of Conductive Filament of TiO₂ Using CAFM Tomography**
Kunwoo Park, Chaewon Gong, Sunghwan Park, Sang-Hee Ko Park, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea
- 15-2627** **Predicting Gravimetric Capacity of Battery Materials Using Descriptors-Based GAT Model**
Chaeyul Kang, Benediktus Madika, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea
- 15-2684** **Analysis of Resistive Switching Behavior and Related Oxygen Vacancy Modulation in TiO₂ Thin Films via AFM**
Chaewon Gong, Sunghwan Park, Sang-Hee Ko Park, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea
- 15-2693** **Measurement of Normalized Ion Concentration from Electrochemical Strain Microscopy Image via Machine Learning**
Seunghwan Ryu, Benediktus Madika, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea
- 15-2836** **Nanoscale Analysis of Lithium Metal Anodes Using Atomic Force Microscopy: Towards Degradation Mechanism**
Seonggon Han, Seonghyun Kim, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea
- 15-3443** **Analysis of Si-SiGe Interfacial Bonding Strength Variability via Surface Bonding Modifications Using AFM and Raman Spectroscopy**
 Tae Min Choi, Jinuk Yoo, Eun Su Jung, Hwa Rim Lee, Sung Gyu Pyo
Chung-Ang University, Korea

Advanced X-ray and Neutron Analysis

CHAIR(S)

Hyeong Min Jin (Chungnam National University), Hyungsub Kim (KAERI)

- 15-1584** **A Study on the Properties of Artificial Graphite Blocks Through the Improvement of Formability**
Samsoo Kim, Do Yun Hwang, Sung Eun Park
Gumi Electronics and Information Technology Research Institute, Korea
- 15-2223** **Anharmonic Effects on Phonon Dispersion**
Kwanhong Park, Jaekwang Lee
Pusan National University, Korea
- 15-2472** **Pore Measurement Using Scattering Analysis Technology**
Hyeonggeun Ryu, Ji Sung Park, Hyeongmin Jin
Chungnam National University, Korea
- 15-3060** **Nano-Structural Analysis of Thin-Film Batteries Using Transmission Small Angle X-ray Scattering**
Jin Man Kim, Hyeong Min Jin
Chungnam National University, Korea
- 15-3110** **GI-SAXS Analysis Toward High-Performance Nanocatalyst Based on Block Copolymer Nanopatterning**
Jisoo Lim, Hyeong Min Jin
Chungnam National University, Korea



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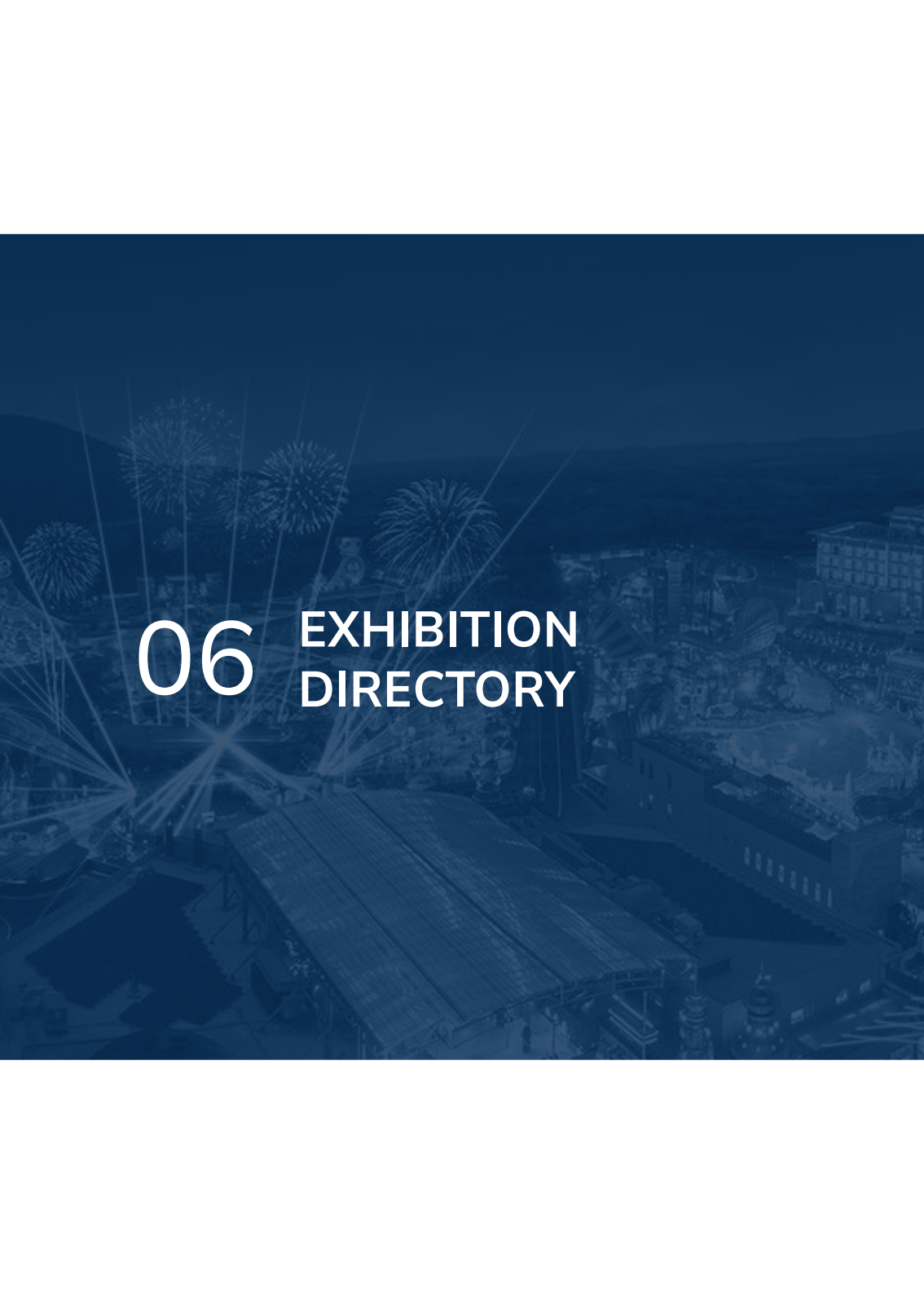
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An aerial night photograph of a city, likely Las Vegas, featuring a large convention center with a corrugated metal roof in the foreground. The city is illuminated by numerous bright laser beams and several large, exploding fireworks in the dark sky. The background shows a cityscape with various buildings and structures.

06 EXHIBITION DIRECTORY

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- 1 Korea Institute of Science of Technology
- 2 Center for Semiconductor Technology Convergence (CSTC)
- 3 Woowon Technology Co., Ltd.
- 4 Korea Vacuum Tech Co., Ltd.
- 5 NEXTRON

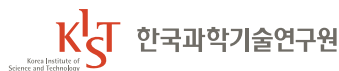
Lobby B

Landing
A

Landing
B

Landing
C

Korea Institute of Science of Technology



Organization Name	Korea Institute of Science of Technology
Address	5, Hwarangno14gil, Seongbuk-gu, Seoul
Representative	Sang-Rok Oh
Contact Person	Juhyuk Park / Research Support Department, Post-silicon Semiconductor Institute
Telephone	+82-2-958-6042
Fax	-
E-mail	Jh041@kist.re.kr
Website	https://kist.re.kr/ko/index.do

Established in 1966 as Korea's first government-funded research institute, the Korea Institute of Science and Technology (KIST) was a powerful first step toward entering the country in science and technology, and was the driving force that made today's Republic of Korea possible. As of July 2024, about 3,000 people are focusing on research and development to lead science and technology with a budget of about 400 billion won.

After the new president takes office in 2024, we will establish a mission-oriented research institute to establish a convergent research environment that cooperates without boundaries with industry, academia, and research institutes, and strive to foster an entrepreneurial spirit in all members so that KIST's research results can be more valuable in the industry. there is.

Post-silicon Semiconductor Institute was established on January 1, 2004 and will celebrate its 10th anniversary in 2025. In 2024, the organization was reorganized into Center for Semiconductor Technology and Center for Quantum Technology, and the goal is to lead the future industry by playing a game-changing role with semiconductor and quantum technologies that are 10 years ahead of the curve.

Center for Semiconductor Technology's goal is to develop and commercialize a new type of Random Process Unit (RPU) that increases computing power by more than 1,000 times and reduces power consumption by 1/100.

Center for Quantum Technology aims to realize large-scale quantum computers through the development of Quantum process Unit (QPUs) and distributed quantum computing.

Center for Semiconductor Technology Convergence (CSTC)



Organization Name	Center for Semiconductor Technology Convergence (CSTC)
Address	410, FAB2, 80, Jigok-ro 127beon-gil, Nam-gu, Pohang-si, Gyeongsangbuk-do
Representative	Prof. Byoung Hun Lee / Director
Contact Person	CSTC Admin team
Telephone	+82-54-279-5024
Fax	+82-54-279-5029
E-mail	cstcdesk@postech.ac.kr
Website	cstc-postech.org

The Center for Semiconductor Technology Convergence (CSTC) strives to pursue challenging research to realize innovative future semiconductor technologies and to link the results to startups and industry-academia cooperation.

CSTC has established a cleanroom with a Class 1000 standard and 34 process equipment, currently providing stable shared equipment utilization services. Additionally, thanks to the support of MOE R&D project, it is preparing to install 9 new equipment units for two-dimensional material research.

Furthermore, CSTC is conducting process training for pre-employment candidates and current employees with the goal of fostering on-site semiconductor infrastructure personnel. It offers both theoretical education on the eight core semiconductor processes and hands-on practice, along with customized educational programs tailored to individual companies.

Main Projects

On-site engineer training using semiconductor infrastructure based on industrial demand Program (Supported by KIAT, MOTIE)

Infrastructure advancement project (Supported by KBSI, MOE)

For more details, please visit cstc-postech.org.

Woowon Technology Co., Ltd.



Organization Name	Woowon Technology Co., Ltd.
Address	19F Parkview Tower, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do
Representative	Dr. Hwan Won Oh
Contact Person	Bertha Chu
Telephone	+82-31-783-4770
Fax	+82-31-783-4773
E-mail	berthachu@wwtech.co.kr
Website	www.wwtech.co.kr

"Woowon Technology Co., Ltd", established in 1990, is a Representative and Distributor for major foreign equipment suppliers. Our highly experienced sales and support teams provide world-class support that is focused on delighting both our principals and customers. The headquarters is located in Bundang-gu, Seongnam-si and we have a second offices in Hwasung-si and Icheon-si ensuring fast and effective operations.

We import and supply capital equipment, subsystems, and components from more than thirty manufacturers based all over the world. We understand the unique company culture and local language to enable us to provide effective Equipment Sales, Logistics, Tool Installation, Start-up, Process Support, and Warranty Service.

Our strong established network and highly capable team enable the early market introduction of cutting-edge technologies for our principals. Every day we leverage our over thirty years of high technology experience to satisfy the needs of our customers.

Korea Vacuum Tech Co., Ltd.



Organization Name	Korea Vacuum Tech Co., Ltd.
Address	200, Goyang-ro 117 Beon-Gil, Wolgot-Myun, Gimpo-City, Gyeonggi-do
Representative	Hyung Chul Woo
Contact Person	Seung Woo Woo
Telephone	+82-31-987-6320
Fax	+82-31-987-9149
E-mail	Koreavac@koreavac.com
Website	www.koreavac.com

Korea Vacuum Tech Co., Ltd. is a company that specializes in and develops R&D and production related to vacuum systems.

Since the establishment of the company in 1979, we have been developing and supplying vacuum equipment required in cutting-edge industries such as semiconductors, displays, and secondary batteries together with universities and research institutes around the world. We are striving to develop vacuum-related systems throughout the domestic industry, to be utilized in unexplored fields such as cluster systems, quantum computers and advanced technologies such as perovskite.

With the goal of manufacturing faster and more convenient equipment, we strive to be a pioneer in vacuum technology. We hope to be a valued partner in each industry.



NEXTRON



Organization Name	NEXTRON
Address	Suite 609, V1 Tower, 273-20 Gaejwa-Ro, Geumejeong-Gu, Busan
Representative	Hakbeom Moon
Contact Person	Soyeon Kim
Telephone	+82-51-512-6770
Fax	+82-51-512-6737
E-mail	sales@nextron.co.kr
Website	www.microprobesystem.com

Micro Probe System is suitable to measure and analyze the Electrical & Optical properties of the materials under various environmental conditions; Temperature, Vacuum, Humidity, Gas flow, Irradiation of light, and X-ray. The inner volume of MPS is less than 100cc. It's possible to control the test condition quickly and easily. The most interesting is the probing method. The manual type probe makes an electrical contact on the sample holding it on the stage at the same time.

ENGE

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November 24 – 27, 2024
Jeju Shinhwa World, Jeju, Korea

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