

# NANO KOREA 2022

The 20th International Nanotech Symposium

July 6(Wed) - July 8(Fri), 2022 | KINTEX Exhibition Center I

## TS01. Nano Energy Harvesting

### Oral Presentation

Session Title	[TS01W1] Nano Energy Harvesting 1
Date & Time	July 6(Wed.), 2022 / 10:30~12:00
Place	Room 207
Session Chair(s)	Dukhyun Choi (Sungkyunkwan University)

[TS01W1\_O\_1] 10:30~10:45

#### **Triboresistive touch sensing**

Younghoon Lee<sup>1,2</sup>, Sungsoo Lim<sup>1</sup>, and Jeong-Yun Sun<sup>1</sup>  
(<sup>1</sup>Seoul National University, <sup>2</sup>MIT)

[TS01W1\_O\_2] 10:45~11:00

#### **A high-performance triboelectric nanogenerator with charge trapping layer for self-powered and touchless sensor applications**

Kumar Shrestha, Gagan Bahadur Pradhan, Trilochan Bhatta, Sanghyun Lee, and Jae Yeong Park  
(Kwangwoon University)

[TS01W1\_O\_3] 11:00~11:15

#### **Piezoelectric energy harvesting by a sloshing liquid tank**

Ki Jong Kim, Junyoung Kim, and Daegyoun Kim  
(KAIST)

[TS01W1\_O\_4] 11:15~11:30

#### **Ultrasound energy transfer system through contact electrification augmented by ferroelectrics**

Sunghoon Hur<sup>1</sup>, Hyunsoo Kim<sup>1,2</sup>, Chong-Yun Kang<sup>1,3</sup>, Jonghoon Jung<sup>2</sup>, and Hyun-Cheol Song<sup>1,4</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Inha University, <sup>3</sup>Korea University, <sup>4</sup>Sungkyunkwan University)

[TS01W1\_O\_5] 11:30~11:45

#### **High output performance of piezoelectric energy harvesters using epitaxial Pb(Zr,Ti)O<sub>3</sub> thin film grown on Si substrate**

Eun-Ji Kim<sup>1</sup>, Sang-Hyo Kweon<sup>2</sup>, Sahn Nahm<sup>1</sup>, Yukio Sato<sup>3</sup>, Goon Tan<sup>4</sup>, and Isaku Kanno<sup>2</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Kobe University, <sup>3</sup>Kyushu University, <sup>4</sup>Osaka Metropolitan University)

[TS01W1\_O\_6] 11:45~12:00

#### **Adjust the number of Sr<sub>2</sub>Nb<sub>3</sub>O<sub>10</sub> seed layers to adjust the artificial synaptic and self-rectifying resistive switching behavior of crystalline (Na<sub>1-x</sub>K<sub>x</sub>)NbO<sub>3</sub> thin film**

In-Su Kim and Sahn Nahm  
(Korea University)

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## Oral Presentation

Session Title	[TS01W2] Nano Energy Harvesting 2
Date & Time	July 6(Wed.), 2022 / 15:45~17:15
Place	Room 207
Session Chair(s)	Chungyeon Cho (Wonkwang University)

[TS01W2\_O\_1] 15:45~16:00

**Nanoporous ytterbium and nitrogen co-doping of mesoporous titania-carbon for self-cleanable green energy harvester**

Manmatha Mahato and Il-Kwon Oh  
(KAIST)

[TS01W2\_O\_2] 16:00~16:15

**Diffusion of Mg defects in Mg<sub>2</sub>X (X = Si, Sn): Hybrid density functional study**

Sungjin Park and Byungki Ryu  
(KERI)

[TS01W2\_O\_3] 16:15~16:30

**The ballistic diode for energy harvesting device based on graphene field-effect transistors**

Van Huy Nguyen, Minwook Kim, Sunil Kumar, Naila Nasir, Suleman Muhammad, Hyun Min Park, Sohee Lee, and Yongho Seo  
(Sejong University)

[TS01W2\_O\_4] 16:30~16:45

**First-principles study on the origin of tribo-negative nature of polytetrafluoroethylene**

Sera Jeon, Dabin Kim, SeongMin Kim, and Sang-Woo Kim  
(Sungkyunkwan University)

[TS01W2\_O\_5] 16:45~17:00

**Energy scavenging from the mechanical resource, and energy storage to high performing battery**

Dong-Myeong Shin  
(The University of Hong Kong)

[TS01W2\_O\_6] 17:00~17:15

**Control of oxygen vacancy concentration by annealing for high learning accuracy in Ta<sub>2</sub>O<sub>5</sub> memristor**

Bumjoo Kim, Hyun-Gyu Hwang, Yeon Pyoc, and Sahn Nahm  
(Korea University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS01T1] Nano Energy Harvesting 3</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.), 2022 / 10:30~12:00</b>
<b>Place</b>	<b>Room 207</b>
<b>Session Chair(s)</b>	<b>Dongwhi Choi (Kyung Hee University)</b>

**[TS01T1\_I\_1] Invited** **10:30~11:00**

**Scalable biocompatible piezoelectric materials and composites towards biomechanical energy harvesting**

Xudong Wang  
(*University of Wisconsin-Madison*)

**[TS01T1\_I\_2] Invited** **11:00~11:30**

**Material and device designs in biomimetic polymer electronics**

Sihong Wang  
(*The University of Chicago*)

**[TS01T1\_I\_3] Invited** **11:30~12:00**

**Self-powered medical devices and electrical stimulation therapy**

Zhou Li<sup>1,2</sup>  
(*<sup>1</sup>Beijing Institute of Nanoenergy and Nanosystems, <sup>2</sup>University of Chinese Academy of Sciences*)

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## Oral Presentation

Session Title	[TS01T2] Nano Energy Harvesting 4
Date & Time	July 7(Thu.), 2022 / 14:00~15:28
Place	Room 207
Session Chair(s)	Miso Kim (Sungkyunkwan University)

[TS01T2\_I\_1] Invited 14:00~14:30

**Outstanding piezoelectricity of crystalline  $\text{NaNbO}_3$  thin film grown at low temperatures for piezoelectric nanogenerator**

In-Su Kim, Jong-Un Woo, Bumjoo Kim, and Sahn Nahm  
(Korea University)

[TS01T2\_I\_2] Invited 14:30~15:00

**Rational design of carbon-based materials for flexible/or stretchable thermoelectric devices**

Heesuk Kim  
(KIST)

[TS01T2\_I\_3] Invited 15:00~15:30

**Nanocomposites and nanofibers for soft energy transducers**

Pooi See Lee  
(Nanyang Technological University)

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## Oral Presentation

Session Title	[TS01T3] Nano Energy Harvesting 5
Date & Time	July 7(Thu.), 2022 / 16:00~17:45
Place	Room 207
Session Chair(s)	Sangmin Lee (Chung-Ang University)

[TS01T3\_O\_1] 16:00~16:15

**Development of high-performance self-powered sensor based on anodic alumina for exhaled breath monitoring**

Kusum Sharma, Abisegapriyan K S, and Sang-Jae Kim  
(Jeju National University)

[TS01T3\_O\_2] 16:15~16:30

**Robotics object detection based on metal-organic framework (ZIF-67): A novel material for triboelectric nanogenerator**

Sugato Hajra and Hoe Joon Kim  
(DGIST)

[TS01T3\_O\_3] 16:30~16:45

**Graphene-flower doping effect in ZnO-based triboelectric nanogenerator**

Muhammad Saqib and Woo Young Kim  
(<sup>1</sup>Jeju National University)

[TS01T3\_O\_4] 16:45~17:00

**Hybrid photovoltaic-triboelectric nanogenerator with a moth-eye mimicking surface structure**

Dongheyon Yoo<sup>1</sup>, Seung-Chul Park<sup>2</sup>, Dongwhi Choi<sup>3</sup>, Hyuneui Lim<sup>2</sup>, and Dong Sung Kim<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>KIMM, <sup>3</sup>Kyung Hee University)

[TS01T3\_O\_5] 17:00~17:15

**Solution-processed, biodegradable collagen-based triboelectric nanogenerator**

Shenawar Ali Khan and Woo Young Kim  
(Jeju National University)

[TS01T3\_O\_6] 17:15~17:30

**Design of positively charged material in triboelectric nanogenerator with extremely high charge transfer efficiency**

Jin-Kyeom Kim, Jian Gao, and Jeong Min Baik  
(Sungkyunkwan University)

[TS01T3\_O\_7] 17:30~17:45

**Flexible and hybrid piezo-tribo hybrid nanogenerator using (xBCTyBST)/PVDF film as self powered system**

Prasanna APS, Monunith A, Nagamalleswara Rao Alluri, and Sang-Jae Kim  
(Jeju National University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS01F1] Nano Energy Harvesting 6</b>
<b>Date &amp; Time</b>	<b>July 8(Fri.), 2022 / 10:30~12:00</b>
<b>Place</b>	<b>Room 207</b>
<b>Session Chair(s)</b>	<b>Ju-Hyuck Lee (DGIST)</b>

**[TS01F1\_O\_1]** **10:30~10:45**

**Triboelectrification induced self-powered microbial inactivation with nanowire-enhanced localized electric field**

Young-Jun Kim and Sang-Woo Kim  
(*Sungkyunkwan University*)

**[TS01F1\_O\_2]** **10:45~11:00**

**Fabrication of triboelectric nanogenerator by silver nanoparticle-based ink for solar cell hybrid harvesting**

Busi Im<sup>1</sup>, Giho Kang<sup>1</sup>, Joonkyeong Moon<sup>1</sup>, Dae-hyun Cho<sup>2</sup>, and Doyoung Byun<sup>1</sup>  
(<sup>1</sup>*Sungkyunkwan University*, <sup>2</sup>*Gyeongsang National University*)

**[TS01F1\_O\_3]** **11:00~11:15**

**Nanoporous carbon decorated nanocomposite-based triboelectric nanogenerator for non-contact and self-powered sensors**

S M Sohel Rana, Md Salauddin, Sang Hyun Lee, Seong Hoon Jeong, and Jae Yeong Park  
(*Kwangwoon University*)

**[TS01F1\_O\_4]** **11:15~11:30**

**Design of the energy transmission system of triboelectric nanogenerator based on the biomechanical characteristics and its various applications**

Sumin Cho<sup>1</sup>, Sunmin Jang<sup>1</sup>, Yoonsang Ra<sup>1</sup>, Donghan Lee<sup>1</sup>, Dongik Kam<sup>1</sup>, Moonwoo La<sup>2</sup>, Sung Jea Park<sup>2</sup>, and Dongwhi Choi<sup>1</sup>  
(<sup>1</sup>*Kyung Hee University*, <sup>2</sup>*KOREATECH*)

**[TS01F1\_O\_5]** **11:30~11:45**

**Flow-induced impacting cylinder-based hybrid mode triboelectric nanogenerators for ocean energy harvesting**

Ji-Seok Kim and Il-Kwon Oh  
(*KAIST*)

**[TS01F1\_O\_6]** **11:45~12:00**

**An arbitrary motion-driven hybrid ellipsoidal energy harvesting system for self-sustained wireless ocean environmental monitoring**

Trilochan Bhatta, Gagan Bahadur Pradhan, Kumar Shrestha, Sanghyun Lee, and Jae Yeong Park  
(*Kwangwoon University*)

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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS01B\_P\_01]

10:00~10:30

**Graphene oxide-based bionanocomposites having tunable and superior mechanical properties**

Hyeonho Cho<sup>1</sup>, Ahmad Shakil<sup>2</sup>, Andreas A. Polycarpou<sup>2</sup>, and Sunghan Kim<sup>1</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Texas A&M University)

[TS01B\_P\_02]

10:00~10:30

**BCST/PDMS hybrid film for the piezo-triboelectric nanogenerator and sustainable self-powered sensors**

Monunith A, Prasanna APS, Nagamalleswara Rao Alluri, and Sang-Jae Kim  
(Jeju National University)

[TS01B\_P\_03]

10:00~10:30

**Charge transfer accelerating strategy for improving sensitivity of droplet based triboelectric sensors via heterogeneous wettability**

Sunmin Jang<sup>1</sup>, Yoonsu Joung<sup>1</sup>, Hyeonsu Kim<sup>1</sup>, Sumin Cho<sup>1</sup>, Yoonsang Ra<sup>1</sup>, Dahoon Ahn<sup>2</sup>, Zong-Hong Lin<sup>3</sup>, and Dongwhi Choi<sup>1</sup>  
(<sup>1</sup>Kyung Hee University, <sup>2</sup>Seoul National University of Science and Technology, <sup>3</sup>National Tsing Hua University)

[TS01B\_P\_04]

10:00~10:30

**Energy harvesting and storage via contact electrification using cement-based conductive composite as a structural energy material**

Yoonsang Ra, Minchang Kim, Sunmin Jang, Sumin Cho, Dongjik Kam, and Dongwhi Choi  
(Kyung Hee University)

[TS01B\_P\_05]

10:00~10:30

**Sonication-dependent rheological behavior of MWCNT nanofluids with characteristic size-phase**

Jongsuk Lee<sup>1</sup>, Sejin Lee<sup>1</sup>, Chungyeon Cho<sup>2</sup>, and Sunghan Kim<sup>1</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Wonkwang University)

[TS01B\_P\_06]

10:00~10:30

**Synthesis of self-modified black BaTiO<sub>3-x</sub> nanoparticles and effect of oxygen vacancy for the expansion of piezocatalytic application**

Myeongjun Ji, Hee Yeon Jeon, Cheol-Hui Ryu, Jeong Hyun Kim, Mi-Jeong Park, and Young-In Lee  
(Seoul National University of Science and Technology)

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[TS01B\_P\_07]

10:00~10:30

**Flexoelectric-boosted piezoelectric flexible energy harvester using nanoscale BaTiO<sub>3</sub>@SrTiO<sub>3</sub> core-shell structure determined by multiscale simulation**

Hyunseung Kim<sup>1</sup>, Yeon-gyu Kim<sup>2</sup>, Sung Beom Cho<sup>3</sup>, Kwi-II Park<sup>2</sup>, and Chang Kyu Jeong<sup>1</sup>  
(<sup>1</sup>Jeonbuk National University, <sup>2</sup>Kyungpook National University, <sup>3</sup>KICET)

[TS01B\_P\_08]

10:00~10:30

**Scaling law of electrochemical thermopower in a model composite supercapacitor electrode**

Dongwoo Kang<sup>1</sup>, Jiwon Park<sup>1</sup>, Sangtae Kim<sup>2</sup>, and Dongwook Lee<sup>1</sup>  
(<sup>1</sup>Hongik University, <sup>2</sup>Hanyang University)

[TS01B\_P\_09]

10:00~10:30

**Patterned Au/Cu nanopore catalyst for intermediates confined tandem CO<sub>2</sub> reduction catalyst**

Yesol Kim and Hee-Tae Jung  
(KAIST)

[TS01B\_P\_10]

10:00~10:30

**Mass producible polymeric contact layer assisted triboelectric energy harvester based on the injection molding process**

Jiho Bang, Yoonsang Ra, Sunmin Jang, Sumin Cho, Donghan Lee, Dongik Kam, and Dongwhi Choi  
(Kyung Hee University)

[TS01B\_P\_11]

10:00~10:30

**Enhanced sensitivity of piezoresistive pressure sensor through mechanically guided geometry transformation**

Dongik Kam, Seungin Oh, Jin-Gyun Kim, and Dongwhi Choi  
(Kyung Hee University)

[TS01B\_P\_12]

10:00~10:30

**Self-powered force sensor with mechanically tunable performance**

Dayeon Jang, Dongik Kam, and Dongwhi Choi  
(Kyung Hee University)

[TS01B\_P\_13]

10:00~10:30

**Control of electrical properties of (K,Na,Ba)NbO<sub>3</sub> single crystal grown by seed-free solid state crystal growth method**

Il-Ryeol Yoo and Kyung-Hoon Cho  
(Kumoh National Institute of Technology)

[TS01B\_P\_14]

10:00~10:30

**Ultra-mechanosensitive self-powered tactile sensors based on visco-poroelastic ion pump**

Joo Sung Kim<sup>1</sup>, Hee Jae Hwang<sup>2</sup>, Dukhyun Choi<sup>2</sup>, and Do Hwan Kim<sup>1</sup>  
(<sup>1</sup>Hanyang University, <sup>2</sup>Sungkyunkwan University)



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[TS01B\_P\_15]

10:00~10:30

**Development of antibacterial film and cell stimulation platform using triboelectric nanogenerator**

Hai Anh Thi Le<sup>1</sup>, Habtamu Gebeyehu Menge<sup>1</sup>, Nghia Dinh Huynh<sup>2</sup>, Dukhyun Choi<sup>2</sup>, and Yong Tae Park<sup>1</sup>

(<sup>1</sup>Myongji University, <sup>2</sup>Sungkyunkwan University)

[TS01B\_P\_16]

10:00~10:30

**Layer-by-layer assembled polymeric films for nanogenerators**

Habtamu Gebeyehu Menge<sup>1</sup>, Sangmin Lee<sup>2</sup>, and Yong Tae Park<sup>1</sup>

(<sup>1</sup>Myongji University, <sup>2</sup>Chung-Ang University)

[TS01B\_P\_17]

10:00~10:30

**Quantitative analysis using image processing for intermetallics on the 3D printed SUS316L with boron**

Hyeon Jeong Park, Yoon Sun Lee, A Ra Jo, Young Rok Moon, Ho Jin Lee, Hye Jin Song, Soo Bin Han, and Dong Yong Park

(Korea Institute of Industrial Technology)

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## Poster Session 1

Date & Time July 6(Wed.), 2022 / 10:00~10:30

Place Exhibition Hall 5

[TS01W\_P\_01] 10:00~10:30

**Ambient humidity-driven fiber morphology engineering induced by phase separation for piezoelectric self-powered sensor**

Sooun Lee<sup>1</sup>, Dabin Kim<sup>2</sup>, Sangryun Lee<sup>3</sup>, Yong-Il Kim<sup>1</sup>, Sihyeon Kum<sup>2</sup>, Sang-Woo Kim<sup>2</sup>, Yunseok Kim<sup>2</sup>, Seunghwa Ryu<sup>4</sup>, and Miso Kim<sup>2</sup>

(<sup>1</sup>KRISS, <sup>2</sup>Sungkyunkwan University, <sup>3</sup>UC Berkeley, <sup>4</sup>KAIST)

[TS01W\_P\_02] 10:00~10:30

**Enhanced output power of thermoelectric generator with robust ion-injection system by triboelectric material**

Sun-Woo Kim, Jiyoung Park and Jeong Min Baik

(Sungkyunkwan University)

[TS01W\_P\_03] 10:00~10:30

**Dynamic balanced hybridization of TENG and EMG via Tesla turbine for effectively harvesting mechanical energy**

Nghia Dinh Huynh and Dukhyun Choi

(Sungkyunkwan University)

[TS01W\_P\_04] 10:00~10:30

**High performance triboelectric nanogenerators using butylated melamine formaldehyde as a highly positive and stable friction layer**

You-Sun Lee, Sung Soo Kwak, Seong Min Kim, and Sang-Woo Kim

(Sungkyunkwan University)

[TS01W\_P\_05] 10:00~10:30

**Self-adaptive mechanical design strategy of triboelectric-electromagnetic hybrid wind energy harvester for effective irregular wind energy harvesting and its demonstrations by operating wireless environmental monitoring and green hydrogen production**

Donghan Lee, Sumin Cho, Sunmin Jang, Yoonsang Ra, Yungeon Jang, Yeongcheol Yun, and Dongwhi Choi

(Kyung Hee University)

[TS01W\_P\_06] 10:00~10:30

**Efficient thermogalvanics based on TiO<sub>2</sub> anatase electrode**

Eunho Choi<sup>1</sup>, Dongwook Lee<sup>2</sup>, and Sangtae Kim<sup>1</sup>

(<sup>1</sup>Hanyang University, <sup>2</sup>Hongik University)

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[TS01W\_P\_07]

10:00~10:30

## Excellent piezoelectric properties of the <001>-textured KNNS-SZ thick films

Yeon-Gyeong Chae, Dae-Su Kim, Jae-Min Eum, Su-Hwan Go, Ho-Sung Shin, Hero Kim, Seok-June Chae, Sun-Woo Kim, Eun-Ji Kim, Jong-Un Woo, and Sahn Nahm  
(Korea University)

[TS01W\_P\_08]

10:00~10:30

## Simultaneous realization of high $d_{33}$ and large strain in (K,Na,Li) (Nb,Sb)O<sub>3</sub>-(Ca,Sr)ZrO<sub>3</sub> materials and their application in piezoelectric actuators

Hyeon-Min Yu<sup>1</sup>, Hero Kim<sup>1</sup>, Dae-Su Kim<sup>1</sup>, Seok-June Chae<sup>1</sup>, Su-Hwan Go<sup>1</sup>, Sun-Woo Kim<sup>1</sup>, Dong-Gyu Lee<sup>1</sup>, Hyun-Cheol Song<sup>1,2</sup>, Eun-Ji Kim<sup>1</sup>, Jae-Min Eum<sup>1</sup>, and Sahn Nahm<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Kyunghee University)

[TS01W\_P\_09]

10:00~10:30

## A study on the fabrication of anticounterfeiting stamps with bio-inspired structural color

Minh Nguyen Hoang  
(KIMM)

[TS01W\_P\_10]

10:00~10:30

## Modification of Band structure for enhanced performance of triboelectric nanogenerator

Hyunmin Hong<sup>2</sup>, Hee Jae Hwang<sup>1</sup>, Dukhyun Choi<sup>1</sup>, and Kwun-Bum Chung<sup>2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Dongguk University)

[TS01W\_P\_11]

10:00~10:30

## Piezoelectric properties of biodegradable electrospun silk membrane and its application to piezoelectric motion detecting sensor

Changwan Sohn, Hyunseung Kim, Sungbin Lim, and Chang Kyu Jeong  
(Jeonbuk National University)

[TS01W\_P\_12]

10:00~10:30

## Polymeric conformation-dependent thermoelectric properties in polyelectrolyte multilayer thin films

You-young Byun and Chungyeon Cho  
(Wonkwang University)

[TS01W\_P\_13]

10:00~10:30

## High performance triboelectric nanogenerators via high dielectric constant CaCu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub> particle-induced internal polarization amplification

Hyeon Yeong Lee, Jihye Kim, and Sang-Woo Kim  
(Sungkyunkwan University)

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[TS01W\_P\_14]

10:00~10:30

**Direct current triboelectric nanogenerator using sustainable microdischarge generation caused by accumulation of triboelectric charge**

Sanghyun Cho, Hong-Joon Yoon, Minki Kang, and Sang-Woo Kim  
(*Sungkyunkwan University*)

[TS01W\_P\_15]

10:00~10:30

**Potential energy harvesting system using electromyography**

Donghee Lee and Woochul Nam  
(*Chung-Ang University*)

[TS01W\_P\_16]

10:00~10:30

**Interfacial polarization control using self-assembled monolayers for an improved triboelectric behavior**

Wook Kim<sup>1</sup>, Joon Hui Park<sup>2</sup>, You Seung Rim<sup>2</sup>, and Dukhyun Choi<sup>1</sup>  
(<sup>1</sup>*Sungkyunkwan University*, <sup>2</sup>*Sejong University*)

[TS01W\_P\_17]

10:00~10:30

**Zero-powered bioelectronics for tissue regeneration by body-mediated energy loss conversion system**

Sungwon Jung<sup>1</sup>, Hyungseok Yong<sup>2</sup>, Sangmin Lee<sup>2</sup>, and Jinkee Hong<sup>1</sup>  
(<sup>1</sup>*Yonsei University*, <sup>2</sup>*Chung-Ang University*)

[TS01W\_P\_18]

10:00~10:30

**Compact variable gravity compensator (CVGC) with a wider range of variable torque and energy-free variable mechanism**

Jehyeok Kim, Junyoung Moon, Jaewook Ryu, and Giuk Lee  
(*Chung-Ang University*)

[TS01W\_P\_19]

10:00~10:30

**Flexible wireless sensor based on cellulose nanofibers and ZnO nanorods**

Sangjun Hong, Ju Sanghyeon, Jungwan Lee, Byeongho Park, and Teahoon Park  
(*KIMS*)

[TS01W\_P\_20]

10:00~10:30

**Organic thermoelectric nanocomposites assembled by layer-by-layer spraying method**

You Young Byun, In Yong Lee, Seo Jin Kim, and Chungyeon Cho  
(*Wonkwang University*)

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[TS01W\_P\_21]

10:00~10:30

**Acoustic energy transfer enhanced by ferroelectric-based contact electrification through liquid and solid media**

Hyun-soo Kim<sup>1,2</sup>, Sung-Hoon Hur<sup>1</sup>, Dong-Gyu Lee<sup>1,3</sup>, Chong-Yun Kang<sup>1,3</sup>, and Hyun-Cheol Song<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Inha University, <sup>3</sup>Korea University)

[TS01W\_P\_22]

10:00~10:30

**Synthesis of LaFeO<sub>3</sub>@MoSe<sub>2</sub> from cyanometalate coordination polymers for efficient bifunctional electrocatalyst**

Sang Heon Kim, Hee Jun Kim, Chentian Cao, and Jeong Min Baik  
(Sungkyunkwan University)

[TS01W\_P\_23]

10:00~10:30

**Ferromagnetic NiO-Ti nanocomposites for effective energy harvesting and self-powered applications**

Aneeta Manjari Padhan<sup>1</sup>, Sugato Hajra<sup>1</sup>, Manisha Sahu<sup>1</sup>, Sanjib Nayak<sup>2</sup>, Hoe Joon Kim<sup>1</sup>, and Perumal Alagarsamy<sup>2</sup>  
(<sup>1</sup>GIST, <sup>2</sup>Indian Institute of Technology)

[TS01W\_P\_24]

10:00~10:30

**Study of the relationship between process parameters, volatility of Te, and physical properties in n-type Bi<sub>2</sub>Te<sub>3</sub>-based alloys for high-performance thermoelectric materials**

Sung-Jin Jung<sup>1</sup>, Sang-Soon Lim<sup>1</sup>, Byeong-Hyeon Lee<sup>1</sup>, Sung Ok Won<sup>1</sup>, Hyung-Ho Park<sup>2</sup>, Seong Keun Kim<sup>1</sup>, Jin-Sang Kim<sup>1</sup>, and Seung-Hyub Baek<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Yonsei University)

[TS01W\_P\_25]

10:00~10:30

**Piezoelectric behavior of nanostructured cements for impact monitoring sensors and energy harvesters**

Hyunjin Bae and Kyungwho Choi  
(Korea Aerospace University)

[TS01W\_P\_26]

10:00~10:30

**Nanostructure engineering of Cu electrocatalyst for the selective C<sub>2+</sub> hydrocarbons in electrochemical CO<sub>2</sub> reduction**

RS Kanase and SH Kang  
(Chonnam National University)

[TS01W\_P\_27]

10:00~10:30

**Significant increase in thermoelectric properties of the flexible module by using porous filler**

Joonchul Shin, Sung-Jin Jung, Hyun-Cheol Song, Chong-Yun Kang, and Jin-Sang Kim  
(KIST)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS01T\_P\_01]

10:00~10:30

### Correlation of EDLC capacitance of PET added pitch-based activated carbon

So Yeong Yang, Se Hyeon Shin, Gyeong Won Kwak, and Byong Chol Bai  
(Daejin University)

[TS01T\_P\_02]

10:00~10:30

### 3D-printed shape tunable nanocarbon cathode with hierarchical porous air pathway for Li-Air battery

Hyekyeong Jang, Minju Jeong, Byeongho Park, and Youngseok Oh  
(KIMS)

[TS01T\_P\_03]

10:00~10:30

### Semiconducting single-walled carbon nanotube aerogels for ppm-level gas detection

Byeongho Park, Teahoon Park, Moon-Kwang Um, and Youngseok Oh  
(KIMS)

[TS01T\_P\_04]

10:00~10:30

### N-doped graphene dots decorated bifunctional electrocatalyst for water splitting using $\text{La}_{0.5}\text{Sr}_{0.5}\text{CoO}_{3-\delta}$ / $\text{MoSe}_2$

Chen Tian Cao, Hee Jun Kim, Rahul Purbia, Sang Heon Kim, Yoo Seok Jeong, and Jeong Min Baik  
(Sungkyunkwan University)

[TS01T\_P\_05]

10:00~10:30

### AC/DC output pillar triboelectric nanogenerator with electron avalanche discharge by the charge transfer

Dongchang Kim, Jihoon Chung, and Sangmin Lee  
(Chung-Ang University)

[TS01T\_P\_06]

10:00~10:30

### Microplastic-based triboelectric nanogenerator with residual charge accumulation for current amplification

Seongeun Cho<sup>1</sup>, Banseok Kim<sup>2</sup>, Sangmin Lee<sup>2</sup>, and Jinkee Hong<sup>1</sup>  
(<sup>1</sup>Yonsei University, <sup>2</sup>Chung-Ang University)

[TS01T\_P\_07]

10:00~10:30

### Wearable self-driven sensors for detection of electrolyte loss during perspiration

Abisegapriyan K S, Nirmal Prashanth Maria Joseph Raj, and Sang-Jae Kim  
(Jeju National University)

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[TS01T\_P\_08]

10:00~10:30

## Molecular surface functionalization of tribo-materials for charge enhancement

Dimaral Aben<sup>1</sup>, Dong-Myeong Shin<sup>2</sup>, and Yoon-Hwae Hwang<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>The University of Hong Kong)

[TS01T\_P\_09]

10:00~10:30

## Enhancing mechanical lifespan and thermal stabilization of ball bearing triboelectric nanogenerator via semi-solid lubricant

Myunghwan Song and Sangmin Lee  
(Chung-Ang University)

[TS01T\_P\_10]

10:00~10:30

## Synthesis of porous and hollow microspheres composed of transition metal selenide/carbon and their performance evaluation for sodium-ion battery

Do Won Jeong and Jung Sang Cho  
(Chungbuk National University)

[TS01T\_P\_11]

10:00~10:30

## Self-powered dust cleaning system for solar panel using TENG driven by wind

Minsu Heo, Cheoljae Lee, and Ju-Hyuck Lee  
(DGIST)

[TS01T\_P\_12]

10:00~10:30

## Morphotropic phase boundary behavior for improved piezoelectric energy harvesting by relaxor ferroelectric

Sungbin Im, Hyunseung Kim, Changwan Sohn, and Chang Kyu Jeong  
(Jeonbuk National University)

[TS01T\_P\_13]

10:00~10:30

## Experimental study of contact electrification phenomena on a PVDF - metal interface

Yerkezhan Amangeldinova<sup>1</sup>, Dong-Myeong Shin<sup>2</sup>, and Yoon-Hwae Hwang<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>The University of Hong Kong)

[TS01T\_P\_14]

10:00~10:30

## Transparent and flexible triboelectric nanogenerator based on Parylene-MXene films

Tae-Eun Song<sup>1,2</sup>, Ji-Seok Kim<sup>1</sup>, Chi Won Ahn<sup>2</sup>, Yonghee Lee<sup>2</sup>, and Il-Kwon Oh<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>NNFC)

[TS01T\_P\_15]

10:00~10:30

## Cooling fan monitoring sensor with triboelectric nanogenerator

Hakjeong Kim and Dukhyun Choi  
(Sungkyunkwan University)

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[TS01T\_P\_16]

10:00~10:30

## Portable water-stick type triboelectric nanogenerator with enhanced current

Kyunghwan Cha and Sangmin Lee  
(Chung-ang University)

[TS01T\_P\_17]

10:00~10:30

## Biodegradable fluorinated thermoplastic polyurethane for enhanced performances of triboelectric nanogenerator

Hyeonsoo Joo, Sujeong Gwak, and Ju-Hyuck Lee  
(DGIST)

[TS01T\_P\_18]

10:00~10:30

## Atomic layer modulation of multicomponent thin films through combination of experimental and theoretical approaches

Mingyu Lee<sup>1</sup>, Chi Thang Nguyen<sup>1</sup>, Bonwook Gu<sup>1</sup>, Taehoon Cheon<sup>2,3</sup>, Jeongwoo Park<sup>4</sup>, Mohammad Rizwan Khan<sup>1</sup>, Soo-Hyun Kim<sup>2</sup>, Bonggeun Shong<sup>4</sup>, and Han-Bo-Ram Lee<sup>1</sup>  
(<sup>1</sup>Incheon National University, <sup>2</sup>Yeungnam University, <sup>3</sup>DGIST, <sup>4</sup>Hongik University)

[TS01T\_P\_19]

10:00~10:30

## Understanding about surface reaction of atomic layer deposition using monte carlo simulation

Bonwook Gu, Trinh Ngoc Le, Chi Thang Nguyen, Sumaira Yasmeen, Younho Kang, and Han-Bo-Ram Lee  
(Incheon National University)

[TS01T\_P\_20]

10:00~10:30

## Structural, magnetic and magnetocaloric studies of ball milled Fe<sub>100-x</sub>T<sub>x</sub> (T=Ni and Mn) alloy

Mohit K. Sharma, Seok-Hwan Huh, Akshay Kumar, Naveen Yadav, Kavita Kumari, Minji Shin, Sujeong Park, and Bon Heun Koo  
(Changwon National University)

[TS01T\_P\_21]

10:00~10:30

## Stretchable graphene electrode triboelectric nanogenerator with PVC-gel

Mingyu Kim, Hyosik Park, and Ju-Hyuck Lee  
(DGIST)

[TS01T\_P\_22]

10:00~10:30

## MoO<sub>x</sub> nanorod/N-doped carbon composite hollow microsphere synthesis and application as anode material for lithium secondary battery

Jang Min Choi and Jung Sang Cho  
(Chungbuk National University)



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[TS01T\_P\_23]

10:00~10:30

**Synthesis of MoSe<sub>2</sub>/carbon composite porous microspheres coated with nitrogen-doped carbon layer and their application as sodium ion battery anode material**

Kun Woo Baek and Jung Sang Cho  
(*Chungbuk National University*)

[TS01T\_P\_24]

10:00~10:30

**Selective wavelength absorption and enhanced thermal conductivity for solar desalination**

Yoo Seok Jeong<sup>1</sup>, Murli Manohar<sup>1</sup>, Hee Jun Kim<sup>1</sup>, Anitha Tarugu<sup>1</sup>, Geonho Kwak<sup>2</sup>, Hak Ki Yu<sup>2</sup>, and Jeong Min Baik<sup>1</sup>  
(<sup>1</sup>*Sungkyunkwan University*, <sup>2</sup>*Ajou University*)

[TS01T\_P\_25]

10:00~10:30

**Triboelectric effect of surface morphology controlled laser induced graphene**

Kwang-Hun Choi<sup>1</sup>, Jin-Woo An<sup>2</sup>, Min Ji Jeon<sup>2</sup>, Sukang Bae<sup>1</sup>, and Seoung-Ki Lee<sup>2</sup>  
(<sup>1</sup>*KIST*, <sup>2</sup>*Pusan National University*)

[TS01T\_P\_26]

10:00~10:30

**Structural insights into the phase-separation behavior of La<sub>1.4-x</sub>Sm<sub>x</sub>Sr<sub>1.6</sub>Mn<sub>2</sub>O<sub>7</sub> layered perovskites to probe their complex magnetic and magnetocaloric properties**

Akshay Kumar, Seok-Hwan Huh, Mohit K. Sharma, Naveen Yadav, Kavita Kumari, Minji Shin, Sujeong Park, and Bon Heun Koo  
(*Changwon National University*)

[TS01T\_P\_27]

10:00~10:30

**Biomimetic shark-skin inspired anti-biofouling triboelectric nanogenerators**

Cheol Jae Lee<sup>1</sup>, Sang Min Han<sup>2</sup>, Ju Hun Lee<sup>2</sup>, and Ju Hyuck Lee<sup>1</sup>  
(<sup>1</sup>*DGIST*, <sup>2</sup>*Hanyang University*)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS01F\_P\_01]

10:00~10:30

**Design of a power generation module for electromagnetic energy harvesting based on the vibration of railway vehicles**

Hyeeun Yun and Dahoon Ahn  
(Seoul National University of Science and Technology)

[TS01F\_P\_02]

10:00~10:30

**Design an oval-shaped hybrid energy harvester consisting of piezoelectric and electromagnetic generators based on vibration.**

Inwoo Oh<sup>1,2</sup>, Sunghoon Hur<sup>2</sup>, Hyun-Cheol Song<sup>2</sup>, and Chong-yun Kang<sup>1,2</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>KIST)

[TS01F\_P\_03]

10:00~10:30

**Rolling sheet-type triboelectric nanogenerator**

Banseok Kim and Sangmin Lee  
(Chung-Ang University)

[TS01F\_P\_04]

10:00~10:30

**Stretchable high-loading MOFs triboelectrification layer for triboelectric nanogenerator**

Hyunjoon Yoo, Manmatha Mahato, Ji-Seok Kim, and Il-kwon Oh  
(KAIST)

[TS01F\_P\_05]

10:00~10:30

**Incident angle independent single-layer phase gradient mmWave metasurface for energy-harvesting applications**

Wonwoo Lee, Semin Jo, and Hojin Lee  
(Soongsil University)

[TS01F\_P\_06]

10:00~10:30

**A charge trapping effect within the 1T-MoS<sub>2</sub> QDs interfacial layer for enhanced triboelectric nanogenerators**

Swapnil Shital Nardekar, Karthikeyan Krishnamoorthy, Sindhuja Manoharan, Parthiban Pazhamalai, and Sang-Jae Kim  
(Jeju National University)

[TS01F\_P\_07]

10:00~10:30

**Patch-type energy focusing metasurface for bioimplantable devices**

Semin Jo, Wonwoo Lee, and Hojin Lee  
(Soongsil University)

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[TS01F\_P\_08]

10:00~10:30

**Controlling triboelectric nanogenerators with mechanical conversion and transmission systems**

Nghia Dinh Huynh, Thien Trung Luu, and Dukhyun Choi  
(*Sungkyunkwan University*)

[TS01F\_P\_09]

10:00~10:30

**Fe<sup>3+</sup> ion-mediated catechol polymer hydrogels inspired by mussel cuticles**

Ji Hyun Ryu  
(*Wonkwang University*)

[TS01F\_P\_10]

10:00~10:30

**Modulation of muscles by rotational triboelectric nanogenerator**

Minseok Kang, Heejae Shin, and Sanghoon Lee  
(*DGIST*)

[TS01F\_P\_11]

10:00~10:30

**Stackable disk-shaped triboelectric nanogenerator utilizing wind power from omnidirectional wind**

Joonseok Lee and Sangmin Lee  
(*Chung-ang University*)

[TS01F\_P\_12]

10:00~10:30

**Highly durable triboelectric bicycle tire as self-powered traffic light and tire pressure sensor**

Jin-ho Son, Deokjae Heo, and Sangmin Lee  
(*Chung-ang University*)

[TS01F\_P\_13]

10:00~10:30

**The rational design of porous and conductive membrane for energy generation and water purification**

Ji-Soo Jang and Hyun-Cheol Song  
(*KIST*)

[TS01F\_P\_14]

10:00~10:30

**Mechano-sensitive electrochemiluminescence skin based on piezo-ionic effect with visco-poroelastic materials**

Hanbin Choi<sup>1</sup>, Jong Ik Lee<sup>2</sup>, Joo Sung Kim<sup>1</sup>, Moon Sung Kang<sup>2</sup>, and Do Hwan Kim<sup>1</sup>  
(<sup>1</sup>*Hanyang University*, <sup>2</sup>*Sogang University*)

[TS01F\_P\_15]

10:00~10:30

**Enhanced thermoelectric performance of carbon nanotube incorporated cement composites**

Nayeong Park and Kyungwho Choi  
(*Korea Aerospace University*)

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[TS01F\_P\_16]

10:00~10:30

## Three-dimensional printing of piezoelectric materials for flexible energy harvester application

Sang-Mi Chang<sup>1,2</sup>, Sunghoon Hur<sup>2</sup>, Hyun-Cheol Song<sup>2</sup>, and Chong-Yun Kang<sup>1,2</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>KIST)

[TS01F\_P\_17]

10:00~10:30

## Advantageous utilization of triboelectric effect based electric signal generation during power transmission

Yoonsang Ra and Dongwhi Choi  
(Kyung Hee University)

[TS01F\_P\_18]

10:00~10:30

## Strain-controlled piezotronics effects in nano-level MoS<sub>2</sub> thin films

Peddathimula Puneetha<sup>1</sup>, Won Young Jang<sup>1</sup>, Dongseob Kim<sup>2</sup>, and Jaesool Shim<sup>1</sup>  
(<sup>1</sup>Yeungnam University, <sup>2</sup>KITECH)

[TS01F\_P\_19]

10:00~10:30

## Hand-driven gyroscopic hybrid energy harvester for recharging portable devices

Jihoon Chung<sup>1</sup>, Hyungseok Yong<sup>1</sup>, Sangmin Lee<sup>1</sup>, and Dongseob Kim<sup>2</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>KITECH)

[TS01F\_P\_20]

10:00~10:30

## High-frequency responsive triboelectric tactile sensor with nylon/PTFE layer for morse code recognition

Yujin Seong, Sangmin Lee, Sohee Kim, Jaewon Jang, Jiwan Hong, and Wanjun Park  
(Hanyang University)

[TS01F\_P\_21]

10:00~10:30

## Elastic spiral triboelectric nanogenerator for portable electronics

Banseok Kim<sup>1</sup>, Jaemin Jo<sup>2</sup>, Sangmin Lee<sup>1</sup>, Dongseob Kim<sup>2</sup>, and Bonwook Koo<sup>2</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>KITECH)

[TS01F\_P\_22]

10:00~10:30

## Indirect exchange interaction in magnetic trilayer studied by X-ray ferromagnetic resonance

Changsoo Kim<sup>1</sup>, Wondong Kim<sup>1</sup>, Wonchang Choi<sup>2</sup>, Kyung-Woong Moon<sup>1</sup>, Hyunjoong Kim<sup>1</sup>, Kyoungmo An<sup>1</sup>, Hoyoung Kim<sup>3</sup>, Younghak Kim<sup>3</sup>, Byoungkyou Park<sup>3</sup>, Jung-ill Hong<sup>2</sup>, Jaeyoung Kim<sup>3</sup>, Z. Q. Qiu<sup>4</sup>, and Chanyong Hwang<sup>1</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>DGIST, <sup>3</sup>Pohang Accelerator Laboratory, <sup>4</sup>University of California at Berkeley)

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[TS01F\_P\_23]

10:00~10:30

**Optimization of SnO<sub>2</sub>-based H<sub>2</sub>S gas sensor performance according to annealing effects**

Dong Geon Jung, Soon Young Jung, Hee Kyung An, and Daewoong Jung  
(KITECH)

[TS01F\_P\_24]

10:00~10:30

**Development of high-efficiency TiO<sub>2</sub>-based photocatalyst for CO<sub>2</sub> reduction through surface modificatio**

Yuntae Ha, JinBeom Kwon, Heekyung An, and Daewoong Jung  
(KITECH)

[TS01F\_P\_25]

10:00~10:30

**Development of natural dye-based colorimetric sensor system for hazardous gas detecting**

Bohee Maeng, Dong Hyuk Jeong, Sungbeen Cho, Hee Kyung An, and Daewoong Jung  
(KITECH)

[TS01F\_P\_26]

10:00~10:30

**Bio-waste composites for cost-effective self-powered breathing patterns monitoring: An insight into energy harvesting and storage properties**

Manisha Sahu, Sugato Hajra, and Hoe Joon Kim  
(DGIST)

[TS01F\_P\_27]

10:00~10:30

**Optical waveguide structure design of Non-dispersive Infrared (NDIR) CO<sub>2</sub> gas sensor for high-sensitivity**

Jiyoung Yoon, Heekyung An, and Daewoon Jung  
(KITECH)

[TS01F\_P\_28]

10:00~10:30

**Design of a self-adaptive hybrid wind energy harvester for effective wind energy harvesting in a wide range of wind speed**

Donghan Lee, Sumin Cho, Yungeon Jang, Donggeun Oh, and Dongwhi Choi  
(Kyung Hee University)

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## TS02. Nanotechnology for Solar and Hydrogen Energy

### Oral Presentation

Session Title	[TS02W1] Nanotechnology for Solar and Hydrogen Energy 1
Date & Time	July 6(Wed.), 2022 / 10:30~11:45
Place	Room 206
Session Chair(s)	Youn Jeong Jang (Hanyang University)

[TS02W1\_I\_1] Invited 10:30~11:00

#### Efficient and stable all-perovskite tandem solar cells and modules

Hairen Tan  
(Nanjing University)

[TS02W1\_O\_2] 11:00~11:15

#### Heterostructure of polyoxometalate/zinc-iron-oxide nanoplates as an outstanding bifunctional electrocatalyst for the hydrogen and oxygen evolution reaction

Jagadis Gautam<sup>1,2,3</sup>, Karthik Kannan<sup>1</sup>, Mikiyas Mekete Meshesha<sup>1</sup>, Jang Seok Gwon<sup>1</sup>, Debabrata Chanda<sup>1</sup>, Im Byeol<sup>1</sup>, Bipeen Dahal<sup>4</sup>, Subhangi Subedi<sup>5</sup>, Lubin Ni<sup>2</sup>, Yongge Wei<sup>2,3</sup>, and Bee Lyong Yang<sup>1</sup>

(<sup>1</sup>Kumoh National Institute of Technology, <sup>2</sup>Yangzhou University, <sup>3</sup>Tsinghua University, <sup>4</sup>Tribhuvan University, <sup>5</sup>Tri-Chandra Multiple Campus)

[TS02W1\_O\_3] 11:15~11:30

#### Synthesis of nano-coral tungsten carbide/carbon fibers as efficient catalysts for hydrogen evolution reaction

Tuan Van Nguyen<sup>1</sup>, Sang Hyun Ahn<sup>1</sup>, and Soo Young Kim<sup>2</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Korea University)

[TS02W1\_O\_4] 11:30~11:45

#### Plasma engineering for 2D nanomaterial synthesis

Hyunho Seok<sup>1</sup>, Hyeong-U Kim<sup>2</sup>, and Taesung Kim<sup>1,2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>KIMM)

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## Oral Presentation

Session Title	[TS02W2] Nanotechnology for Solar and Hydrogen Energy 2
Date & Time	July 6(Wed.), 2022 / 15:45~17:30
Place	Room 206
Session Chair(s)	Ji-Hyun Jang (UNIST)

[TS02W2\_I\_1] Invited 15:45~16:15

**Bulky organic molecules-based interface engineering for efficient and stable perovskite solar cells**

Kai Zhu  
(National Renewable Energy Laboratory)

[TS02W2\_I\_2] Invited 16:15~16:45

**Towards a stable and efficient semi transparent perovskite solar cell**

Lydia Helena Wong  
(Nanyang Technological University)

[TS02W2\_O\_3] 16:45~17:00

**Photocatalytic and electrocatalytic hydrogen production performance of hydrothermally synthesized mixed metal oxide composites**

Karthik Kannan<sup>1</sup>, V. Navakoteswara Rao<sup>2</sup>, Debabrata Chanda<sup>1</sup>, Jagadis Gautam<sup>1</sup>, Mikiyas Mekete Meshesha<sup>1</sup>, Im Beyol Im<sup>1</sup>, Jang Seok Gwon<sup>1</sup>, Jun-Mo Yang<sup>1</sup>, BeeLyong Yang<sup>1</sup>  
(<sup>1</sup>Kumoh National Institute of Technology, <sup>2</sup>National Nanofab Center)

[TS02W2\_O\_4] 17:00~17:15

**Hydrogel protection strategy for stable photoelectrochemical water splitting**

Jeiwan Tan, Byungjun Kang, Hyungsuk Lee, and Jooho Moon  
(Yonsei University)

[TS02W2\_O\_5] 17:15~17:30

**Room temperature N and S co-doped graphene on MoO<sub>x</sub> thin film as an electrocatalyst to enhance hydrogen evolution reaction activity and stability**

Kubra Aydin<sup>1</sup>, Seongwon Woo<sup>1</sup>, Chisung Ahn<sup>2</sup>, Byungkwon Lim<sup>1</sup>, and Taesung Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>KITECH)

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## Oral Presentation

Session Title	[TS02T1] Nanotechnology for Solar and Hydrogen Energy 3
Date & Time	July 7(Thu.), 2022 / 10:30~11:45
Place	Room 206
Session Chair(s)	Sang Hyun Ahn (Chung-Ang University)

[TS02T1\_I\_1] Invited 10:30~11:00

### Three-phase boundary engineering to enhance photocatalytic ammonia production

Cho Hee Lee and Youn Jeong Jang  
(Hanyang University)

[TS02T1\_O\_2] 11:00~11:15

### Heterostructure material through combining the properties of 2D $Ti_3C_2$ MXene with the vertical orientation growth of NiFeS nanosheets to achieve superior electrocatalytic materials for overall water splitting

Debabrata Chanda<sup>1</sup>, Karthik Kannan<sup>1</sup>, Jagadis Gautam<sup>1</sup>, V. Navakoteswara Rao<sup>2</sup>, Mikiyas Mekete Meshesha<sup>1</sup>, Jun-Mo Yang<sup>2</sup>, Jang Seok Gwon<sup>1</sup>, and Bee Lyong Yang<sup>1</sup>  
(<sup>1</sup>Kumoh National Institute of Technology, <sup>2</sup>NNFC)

[TS02T1\_O\_3] 11:15~11:30

### Boron doping on MXene for enhancement of hydrogen evolution reaction

Mahider Asmare Tekalgne<sup>1</sup>, Sang Hyun Ahn<sup>1</sup>, and Soo Young Kim<sup>2</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Korea University)

[TS02T1\_O\_4] 11:30~11:45

### Tailoring binding abilities by incorporating oxophilic transition metals on 3D nanostructured Ni arrays for accelerated alkaline hydrogen evolution reaction

Jaerim Kim and Jong Kyu Kim  
(POSTECH)



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## Oral Presentation

Session Title	[TS02T2] Nanotechnology for Solar and Hydrogen Energy 4
Date & Time	July 7(Thu.), 2022 / 14:00~15:15
Place	Room 206
Session Chair(s)	Uk Sim (KENTECH)

[TS02T2\_I\_1] Invited 14:00~14:30

### Perovskite-type photocatalysts and their application in water splitting

Takashi Hisatomi<sup>1,2</sup>  
(<sup>1</sup>Shinshu University, <sup>2</sup>JST)

[TS02T2\_O\_2] 14:30~14:45

### Synthesis of Ni/NiO/C hollow structure as an efficient electrocatalyst for hydrogen evolution reaction in alkaline solution

Ha Huu Do<sup>1</sup>, Sang Hyun Ahn<sup>1</sup>, and Soo Young Kim<sup>2</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Korea University)

[TS02T2\_O\_3] 14:45~15:00

### Atomically dispersed Ni-Co and nanoalloys decorated nitrogen doped carbon nanotubes as a highly-efficient bifunctional electrocatalyst towards overall water splitting

Paramasivam Balasubramanian, Hasmat Khan, and Se-Hun Kwon  
(Pusan National University)

[TS02T2\_O\_4] 15:00~15:15

### Ru-doped Co<sub>3</sub>O<sub>4</sub> nanoparticles as highly efficient and stable electrocatalyst for chlorine evolution reaction

Won Il Choi, Seungwoo Choi, Mani Balamurugan, Sunghak Park, and Ki Tae Nam  
(Seoul National University)

# NANO KOREA 2022

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## Oral Presentation

Session Title	[TS02T3] Nanotechnology for Solar and Hydrogen Energy 5
Date & Time	July 7(Thu.), 2022 / 16:00~17:15
Place	Room 206
Session Chair(s)	Soo Young Kim (Korea University)

[TS02T3\_I\_1] Invited 16:00~16:30

**Engineering atomic structure of electrocatalysts by cation exchange**

Tao Ling  
(Tianjin University)

[TS02T3\_O\_2] 16:30~16:45

**Physicochemical engineering of anti-solvents via perovskite precipitation control for enhanced photosensitive activation**

Byung Gi Kim, Woongsik Jang, Ji Hyun Lim, and Dong Hwan Wang  
(Chung-Ang University)

[TS02T3\_O\_3] 16:45~17:00

**The efficient search method for high entropy/multicomponent catalysts using machine learning**

Jaehyoung Lim<sup>1</sup>, Dong-Kyu Lee<sup>1</sup>, Min-Cheol Kim<sup>2</sup>, and Uk Sim<sup>1</sup>  
(<sup>1</sup>KENTECH, <sup>2</sup>Sungkyunkwan University)

[TS02T3\_O\_4] 17:00~17:15

**Surface and interface engineered WO<sub>3</sub>/BiVO<sub>4</sub> heterojunction photoanode for photoelectrochemical water oxidation**

Hasmat Khan, Min-Ji Kim, Ji-Hu Baek, Hyun-Jae Woo, and Se-Hun Kwon  
(Pusan National University)

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## Oral Presentation

Session Title	[TS02F1] Nanotechnology for Solar and Hydrogen Energy 6
Date & Time	July 8(Fri.), 2022 / 10:30~11:45
Place	206
Session Chair(s)	Se Hun Kwon (Pusan National University)

[TS02F1\_I\_1] Invited 10:30~11:00

### Unassisted water splitting via co-doping of hematite

Ji-Hyun Jang  
(UNIST)

[TS02F1\_O\_2] 11:00~11:15

### An efficient one-pot synthetic route to carbon-coated metal/metal oxide nanowires in improving the electrocatalytic performance for hydrogen evolution reaction

So Yeon Yun, Xiaoyan Jin, and Seong-Ju Hwang  
(Yonsei University)

[TS02F1\_O\_3] 11:15~11:30

### Electrochemical ammonia oxidation of Ni<sub>2</sub>P@N-C electrocatalyst for boosting eco-friendly hydrogen production

Chanmin Jo<sup>1</sup>, Subramani Surendran<sup>1</sup>, Taeyong An<sup>1</sup>, Yoongu Lim<sup>2</sup>, Joon Young Kim<sup>1</sup>, and Uk Sim<sup>1,2</sup>  
(<sup>1</sup>KENTECH, <sup>2</sup>NEEL Sciences, INC)

[TS02F1\_O\_4] 11:30~11:45

### Electrochemical carboxylation on liquid CO<sub>2</sub> for the production of furfural-derived chemical feedstocks

Gyeong Do Park and Ki Tae Nam  
(Seoul National University)

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## Oral Presentation

Session Title	[TS02F2] Nanotechnology for Solar and Hydrogen Energy 7
Date & Time	July 8(Fri.), 2022 / 14:00~15:15
Place	206
Session Chair(s)	Ho Won Jang (Seoul National University)

[TS02F2\_I\_1] Invited 14:00~14:30

### Perovskite/silicon tandem solar cells

Stefaan De Wolf  
(KAUST)

[TS02F2\_O\_2] 14:30~14:45

### Low-cost semiconductor materials for photoelectrochemical water splitting

Wooseok Yang  
(Sungkyunkwan University)

[TS02F2\_O\_3] 14:45~15:00

### Shockley-queisser limit and plasmonic metamaterials for tandem solar cells

Kwangjin Kim, Dongjae Baek, and Seungwoo Lee  
(Korea University)

[TS02F2\_O\_4] 15:00~15:15

### Electrochemical synthesis of value-added furfural derivatives using carbon dioxide

Moo Young Lee, Jun Ho Jang, and Ki Tae Nam  
(Seoul National University)

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## Oral Presentation

Session Title	[TS02F3] Nanotechnology for Solar and Hydrogen Energy 8
Date & Time	July 8(Fri.), 2022 / 16:00~17:00
Place	206
Session Chair(s)	Jung Kyu Kim (Sungkyunkwan University)

[TS02F3\_I\_1] Invited 16:00~16:30

### Metal oxide nanomaterials for perovskite solar cells

Seong Sik Shin  
(KRICT)

[TS02F3\_O\_2] 16:30~16:45

### Beneficial effects of multilayered conductive nanosheet in optimizing the energy functionalities of nanohybrids

Nam Hee Kwon, Xiaoyan Jin, and Seong-Ju Hwang  
(Yonsei University)

[TS02F3\_O\_3] 16:45~17:00

### Ray-optical analysis for tandem solar cells with a luminescent solar concentrator

Dongjae Baek<sup>1</sup>, Shin Hyung Lee<sup>2</sup>, Kwangjin Kim<sup>1</sup>, Sung-Min Lee<sup>2,3</sup>, and Seungwoo Lee<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Kookmin University, <sup>3</sup>Terasaki Institute for Biomedical Innovation)

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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS02B\_P\_01]

10:00~10:30

**Bimetallic Cu with high density of step-sites via graphene growth for selective CO<sub>2</sub> reduction**

Gukbo Kim<sup>1</sup>, Ju Ye Kim<sup>1,2</sup>, and Hee-Tae Jung<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Brown University)

[TS02B\_P\_02]

10:00~10:30

**Core-shell NiCu electrocatalysts with enhanced stability toward ammonia oxidation**

Sol A Lee and Ho Won Jang  
(Seoul National University)

[TS02B\_P\_03]

10:00~10:30

**Holey 2D metal nitride nanosheets as efficient conductive hybridization matrices for metal electrocatalysts**

Xiaoyan Jin and Seong-Ju Hwang  
(Yonsei University)

[TS02B\_P\_04]

10:00~10:30

**Study of promoted Ru-La<sub>0.5</sub>Ce<sub>0.5</sub>O<sub>1.75</sub> for NH<sub>3</sub> Synthesis**

Hizkia Manuel Vieri<sup>1,2</sup>, Arash Badakhsh<sup>1</sup>, and Sun Hee Choi<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST)

[TS02B\_P\_05]

10:00~10:30

**CO<sub>2</sub> conversion using electroless deposited Cu<sub>x</sub>O<sub>1-x</sub> catalyst**

Gaeun Park<sup>1</sup>, Hyunki Kim<sup>1</sup>, and Sang Hyun Ahn<sup>1</sup>  
(Chung-Ang University)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS02W\_P\_01]

10:00~10:30

**Nano size eccentric core@shell structure Au@Cu<sub>2</sub>Se as electrocatalyst for nitrogen reduction reaction**

Yujin Jeong<sup>1</sup>, Dohun Kim<sup>2</sup>, Mi-kyung Han<sup>2</sup>, and Uk Sim<sup>1,3</sup>  
(<sup>1</sup>KENTECH, <sup>2</sup>Chonnam National University)

[TS02W\_P\_02]

10:00~10:30

**Effects of metallic substances on anisotropic crystal growth of Sb<sub>2</sub>S<sub>3</sub> semiconducting compounds**

Mao Zhang, Wonjung Park, Yeojin Kang, Dayoung Yoo, and Dongyun Lee  
(Pusan National University)

[TS02W\_P\_03]

10:00~10:30

**Effects of low-dimensional Cu<sub>2</sub>S nanostructures on the physical properties of Sb<sub>2</sub>S<sub>3</sub> semiconducting compounds**

Wonjung Park, Yeojin Kang, Mao Zhang, Dayoung Yoo, and Dongyun Lee  
(Pusan National University)

[TS02W\_P\_04]

10:00~10:30

**Highly efficient quantum dot hybrid solar cell using organic transport layer**

Jihyung Lee, Sungjun Cho, and Jung-Yong Lee  
(KAIST)

[TS02W\_P\_05]

10:00~10:30

**Integration of a novel co-catalyst with nanostructured photocathode for stable solar H<sub>2</sub> generation**

Maheswari Arunachalam and Soon Hyung Kang  
(Chonnam National University)

[TS02W\_P\_06]

10:00~10:30

**Synthesis of photocatalysts based on nanocomposites of ZnO-Graphene oxide foams for efficient water-splitting**

Jun Du Jin, Ye Won Hwang, Seung Chan Jung, and Jae-Hee Han  
(Gachon University)

[TS02W\_P\_07]

10:00~10:30

**Fabrication of nanocomposites of semiconducting SWNT-TiO<sub>2</sub> nanoparticles for investigation of efficient photocatalytic behaviors in water splitting process**

Se Jin Park, Mihn Kim, Hong-Seok Kim, and Jae-Hee Han  
(Gachon University)

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[TS02W\_P\_08]

10:00~10:30

**Facile synthesis of PtRuO<sub>2</sub>/C catalyst by galvanic replacement to achieve enhanced hydrogen oxidation reaction and carbon monoxide resistance**

Dong Wook Lee, Daeil Choi, and Sung Jong Yoo  
(KIST)

[TS02W\_P\_09]

10:00~10:30

**Growth of TiO<sub>2</sub> nanoparticles onto graphene oxide foams for efficient water-splitting photocatalysts**

Ye Won Hwang, Ye-Eun Kim, Jun Du Jin, Seung Chan Jung, and Jae-Hee Han  
(Gachon University)

[TS02W\_P\_10]

10:00~10:30

**Fabrication of 2D halide perovskite photovoltaics**

Jong Keon Won, Hong-Seok Kim, and Jae-Hee Han  
(Gachon University)

[TS02W\_P\_11]

10:00~10:30

**Surface-tailored medium entropy alloys as radically low overpotential oxygen evolution electrocatalysts**

Hoonkee Park and Ho Won Jang  
(Seoul National University)

[TS02W\_P\_12]

10:00~10:30

**Photovoltaic-driven CO<sub>2</sub> electrochemical reduction to formate with high solar-to-fuel efficiency**

Woo Seok Cheon<sup>1</sup> and Ho Won Jang<sup>2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Seoul National University)

[TS02W\_P\_13]

10:00~10:30

**SiO<sub>x</sub>-coated CsPbBr<sub>3</sub> perovskite quantum dot-decorated WO<sub>3</sub> photoanode for boosting solar water splitting**

Yuankai Li and Jung Kyu Kim  
(Sungkyunkwan University)

[TS02W\_P\_14]

10:00~10:30

**Ag-CdS yolk-shell nanostructures for efficient plasmonic energy transfer and photocatalytic hydrogen generation**

Hayoon Jung, Youngjoo Whang, and Sang Woo Han  
(KAIST)

[TS02W\_P\_15]

10:00~10:30

**Nanocrystalline/amorphous metal phosphate overlayer for boosting water splitting**

Chengkai Xia and Jung Kyu Kim  
(Sungkyunkwan University)



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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS02T\_P\_01]

10:00~10:30

### **Cu-based electrocatalysts for CO<sub>2</sub> reduction reaction**

Seokwoo Choe and Youn Jeong Jang  
(Hanyang University)

[TS02T\_P\_02]

10:00~10:30

### **Bifunctional nanoparticle nickel phosphides catalyst for efficient photo-assisted water splitting**

Phuong Thi Pham, Duong Nguyen Nguyen, and Jung Kyu Kim  
(Sungkyunkwan University)

[TS02T\_P\_03]

10:00~10:30

### **Fabrication of TiO<sub>2</sub> Quantum Dots/ultra-thin graphite-like C<sub>3</sub>N<sub>4</sub> nanosheets for enhanced photocatalytic activity under solar light**

Sang-Yun Jung, Tae-Lin Kim, A.N. Kadam, and Sang-Wha Lee  
(Gachon University)

[TS02T\_P\_04]

10:00~10:30

### **PDA/ZnO polymer/inorganic hybrid photoanodes for efficient photo electrochemical water splitting**

Nursalim Akhmetzhanov, Soo Kyung Cho, and Yoon-Hwae Hwang  
(Pusan National University)

[TS02T\_P\_05]

10:00~10:30

### **Evaluating the promising effects of electrochemical reduction treatment in CuWO<sub>4</sub> water splitting photoanode**

Cuong Phu Thi Kim, Chengkai Xia, Wontae Hong, and Jung Kuy Kim  
(Sungkyunkwan University)

[TS02T\_P\_06]

10:00~10:30

### **Boosted Photoelectrochemical Water Splitting by BiVO<sub>4</sub> Nanodots on In<sub>2</sub>O<sub>3</sub> Nanorods**

Jin Wook Yang and Ho Won Jang  
(Seoul National University)

[TS02T\_P\_07]

10:00~10:30

### **Defect engineered TiO<sub>2</sub> for the photocatalytic nitrogen reduction reaction**

Hyeran Lee, Chohee Lee, and Youn Jeong Jang  
(Hanyang University)

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[TS02T\_P\_08]

10:00~10:30

**Oxide/halide/oxide architecture for high performance semi-transparent perovskite solar cells**

Min Ju Jeong, Jun Hyeok Lee, and Jun Hong Noh  
(Korea University)

[TS02T\_P\_09]

10:00~10:30

**Ti-based MXene sheets as efficient catalysts for electrochemical nitrate reduction to ammonia**

Yong Hyun Moon and Youn Jeong Jang  
(Hanyang University)

[TS02T\_P\_10]

10:00~10:30

**Nanorod-type  $\text{Co}_{3-x}\text{Mn}_x\text{O}_4$  nanostructure for the oxygen evolution reaction in alkaline media**

Hye-ji Sim<sup>1,2</sup>, Kyoung Ryeol Park<sup>1</sup>, Hee-il Nam<sup>1,3</sup>, Pyeong Kang Yoo<sup>1</sup>, Jung-Rae Kim<sup>2</sup>, and Dong-Ha Lim<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Pusan National University, <sup>3</sup>Inje University)

[TS02T\_P\_11]

10:00~10:30

**Optoelectronic synaptic device using copper-phthalocyanine (CuPc) and para-sexiphenyl (p-6P) heterojunction and its operation under solar-stimulation**

Hyongsuk Choo and Jin-Hong Park  
(Sungkyunkwan University)

[TS02T\_P\_12]

10:00~10:30

**Efficient charge transport pathways of  $\text{Ta}_3\text{N}_5$  photoanode for photoelectrochemical water splitting**

Hee Ryeong Kwon and Ho Won Jang  
(Seoul National University)

[TS02T\_P\_13]

10:00~10:30

**Ru based catalysts by solid state method for ammonia decomposition to hydrogen production**

Seong Chan Lee, Junhyeok Lee, Jae Hyung Choi, and Dong-Ha Lim  
(KITECH)

[TS02T\_P\_14]

10:00~10:30

**Fabrication and characteristics evaluation of thick film perovskite solar cells by continuously transferring films to interconnect grains in out of plane direction.**

Soyeon Kim, Seungmin Lee, and Jun Hong Noh  
(Korea University)

[TS02T\_P\_15]

10:00~10:30

**Design and synthesis of highly active and stable  $\text{Sb-SnO}_2@\text{RuO}_x$  heterostructured OER catalyst for renewable hydrogen generation**

Ji-Hu Baek<sup>1</sup>, Su-Young Park<sup>1</sup>, Jung-Won An<sup>1</sup>, Susanta Bera<sup>2</sup>, and Se-Hun Kwon<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>DIFFER)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS02F\_P\_01]

10:00~10:30

**Analysis of photoluminescence of halide perovskite films with different measurement protocols**

Hyeonah Cho, Seungmin Lee, and Jun Hong Noh  
(Korea University)

[TS02F\_P\_02]

10:00~10:30

**Atomically dispersed dual-atom anchored on nitrogen-doped carbon matrix for oxygen evolution reaction**

Jaehyun Kim and Ho won Jang  
(Seoul National University)

[TS02F\_P\_03]

10:00~10:30

**Controlled growth of heavy pnictogen chalcogenides for lead-free solar cell applications**

Yong Chan Choi and Kang-Won Jung  
(DGIST)

[TS02F\_P\_04]

10:00~10:30

**Effects of electron transport layers on the growth of antimony chalcogenides for lead-free solar cell applications**

Kang-Won Jung and Yong Chan Cho  
(DGIST)

[TS02F\_P\_05]

10:00~10:30

**Anion exchange membrane water electrolysis with electrochemically activated Ni@Ni(OH)<sub>2</sub> electrode**

Wenwu Guo and Sang Hyun Ahn  
(Chung-Ang University)

[TS02F\_P\_06]

10:00~10:30

**Development of trimetallic AuCuIn cathode for gaseous CO<sub>2</sub> electrolysis system**

Junhyeong Kim and Sang Hyun Ahn  
(Chung-Ang University)

[TS02F\_P\_07]

10:00~10:30

**Highly efficient iridium-nickel catalysts based on porous nanotube template**

Yungi Nam<sup>1</sup>, Daehan Kim<sup>1</sup>, Jinwoo Chu<sup>1</sup>, Na-Yeon Park<sup>2</sup>, Tae Gun Kim<sup>3</sup>, Kyung Joong Kim<sup>3</sup>, Soo-Hyun Kim<sup>2</sup>, and Byungha Shin<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Yeungnam University, <sup>3</sup>KRISS)

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[TS02F\_P\_08]

10:00~10:30

**Tunnel oxide passivated contact on silicon photoelectrode for tandem photoelectrochemical water-splitting devices**

Choongman Moon<sup>1</sup>, Filipe Mesquita Alves Martinho<sup>2</sup>, Jihoon Jung<sup>1</sup>, and Byungha Shin<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Technical University of Denmark)

[TS02F\_P\_09]

10:00~10:30

**Enhancing electrochemical nitrogen reduction by controlling surface charge on the gold nanoparticles**

Sungbin Yang and Byungha Shin  
(KAIST)

[TS02F\_P\_10]

10:00~10:30

**Facile synthesis of Ni-Co/Al<sub>2</sub>O<sub>3</sub> and Ni-Ce/ Al<sub>2</sub>O<sub>3</sub> nanocatalyst and their performances for dry reforming of methane**

Chaheon Kim<sup>1,2</sup> and Heeyeon Kim<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>Yonsei University)

[TS02F\_P\_11]

10:00~10:30

**Electrochemical CO<sub>2</sub> reduction toward CO in high proton concentration for redox-neutral CO<sub>2</sub> conversion**

Hyunjae Kim, Jun Ho Jang, Kyu Min Lee, and Ki Tae Nam  
(Seoul National University)

[TS02F\_P\_12]

10:00~10:30

**Solution-processed synthesis-in-place method of hematite nanorods for selective ethanol and acetone sensors**

Soo Min Lee and Ho Won Jang  
(Seoul National University)

[TS02F\_P\_13]

10:00~10:30

**Single atom catalysts for selective electrochemical reduction of CO<sub>2</sub>**

Soo Min Lee and Ho Won Jang  
(Seoul National University)

[TS02F\_P\_14]

10:00~10:30

**Tailored band offsets in Fe<sub>2</sub>O<sub>3</sub> overlayer to enhance the photoelectrochemical oxygen evolution reaction**

Min-Ju Choi and Ho Won Jang  
(Seoul National University)

[TS02F\_P\_15]

10:00~10:30

**Photocatalytic CO<sub>2</sub> reduction by CdSe nanocrystal**

Yeji Lee<sup>1</sup>, Seo Young Kim<sup>2</sup>, Jiwoong Yang<sup>2</sup>, and Youn Jeong Jang<sup>1</sup>  
(<sup>1</sup>Hanyang University, <sup>2</sup>DGIST)

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## TS03. Nanotechnology for the Next Generation Energy Storage

### Oral Presentation

<b>Session Title</b>	[TS03W1] Nanotechnology for the Next Generation Energy Storage 1
<b>Date &amp; Time</b>	July 6(Wed.), 2022 / 10:30~12:00
<b>Place</b>	Room 205
<b>Session Chair(s)</b>	Hyung-Seok Kim (KIST)

[TS03W1\_I\_1] Invited 10:30~11:00

**Stabilization of Li plating and stripping interfaces by designing three-dimensional current collector configurations for anode-free lithium batteries**

Jae Chul Kim  
(Stevens Institute of Technology)

[TS03W1\_O\_2] 11:00~11:15

**Recent development status of sulfide based all solid-state battery**

Woo-Suk Cho, Kyung-Soo Kim, and Ji-Sang Yu  
(KETI)

[TS03W1\_I\_3] Invited 11:15~11:45

**A tear-based electrochemical system to supply power for a smart contact lens**

Seok Woo Lee  
(Nanyang Technological University)

[TS03W1\_O\_4] 11:45~12:00

**Origami-based scale structure for stretchable energy storage**

Myoung-Ho Kim<sup>1</sup>, Minsub Oh<sup>1</sup>, Bongkyun Jang<sup>1</sup>, Hoo-Jeong Lee<sup>2</sup>, and Seungmin Hyun<sup>1</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>Sungkyunkwan University)

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## Oral Presentation

Session Title	[TS03W2] Nanotechnology for the Next Generation Energy Storage 2
Date & Time	July 6(Wed.), 2022 / 15:45~17:45
Place	Room 205
Session Chair(s)	Jun-Woo Park (KERI)

[TS03W2\_I\_1] Invited 15:45~16:15

### Nanofabrication of Li<sub>2</sub>S/C composites and their battery application

Masayoshi Watanabe  
(Yokohama National University)

[TS03W2\_O\_2] 16:15~16:30

### A novel design of $\pi$ - $\pi^*$ transitions donor-acceptor polymer for flexible electrochromic Zn-ion batteries

Tae Gwang Yun<sup>2</sup>, Jiyoung Lee<sup>1</sup>, Han Seul Kim<sup>3</sup>, Jun Young Cheong<sup>4</sup>, and Il-Doo Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Myongji University, <sup>3</sup>KISTI, <sup>4</sup>University of Bayreuth)

[TS03W2\_O\_3] 16:30~16:45

### Hierarchical zincophilic mesoporous TiO<sub>2</sub> layer anode toward high capacity and long cycle life aqueous zinc-ion batteries

Nibagani Naresh<sup>1,2</sup>, Suyoon Eom<sup>1</sup>, Su Hwan Jeong<sup>1</sup>, So Hyeon Park<sup>1</sup>, Sang Jun Lee<sup>1</sup>, Jonghee Park<sup>1</sup>, Joo-Hyung Kim<sup>1</sup>, and Young Hwa Jung<sup>2</sup>  
(<sup>1</sup>Gyeongsang National University, <sup>2</sup>ohang Accelerator Laboratory)

[TS03W2\_I\_4] Invited 16:45~17:15

### Lithium metal-based next generation rechargeable batteries with high power/energy density

Soojin Park  
(POSTECH)

[TS03W2\_O\_5] 17:15~17:30

### Phase transformation mechanism and stress evolution in Sn anode during lithiation

Hyeon Gyun Nam and Seung Min Han  
(KAIST)

[TS03W2\_O\_6] 17:30~17:45

### Fabrication of a 3D porous anode electrode for lithium ion secondary battery using dry transfer and laser processing

Hyungcheoul Shim<sup>1,2</sup>, Chau Van Tran<sup>3</sup>, Seungmin Hyun<sup>1,2</sup>, and Jung Bin In<sup>3</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST, <sup>3</sup>Chung-Ang University)

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## Oral Presentation

Session Title	[TS03T1] Nanotechnology for the Next Generation Energy Storage 3
Date & Time	July 7(Thu.), 2022 / 10:30~11:45
Place	Room 205
Session Chair(s)	Hana Yoon (KIER)

[TS03T1\_I\_1] Invited 10:30~11:00

### Carbon nanostructures for energy storage applications

Bingqing Wei  
(University of Delaware)

[TS03T1\_O\_2] 11:00~11:15

### Micro-pseudocapacitor fabrication by laser-induced graphene formation on wood

Young-Ryeul Kim, Han Ku Nam, Le Dinh Truong Son, Dongwook Yang, Younggeun Lee, and Young-Jin Kim  
(KAIST)

[TS03T1\_O\_3] 11:15~11:30

### Bimetal organic framework embedded on $Ti_3C_2T_x$ MXene bifunctional electrocatalyst for lithium-oxygen batteries

Sanghee Nam<sup>1</sup>, Yury Gogotsi<sup>2</sup>, and Il-Kwon Oh<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Drexel University)

[TS03T1\_O\_4] 11:30~11:45

### Direct-laser-conversion of Kevlar textile to laser-induced-graphene for realizing flexible fabric energy storages and sensors

Dongwook Yang<sup>1</sup>, Le Dinh Truong Son<sup>1</sup>, Han Ku Nam<sup>1</sup>, Younggeun Lee<sup>1</sup>, Young-Ryeul Kim<sup>1</sup>, Soonkeun Kwon<sup>2</sup>, Seungmin Hyun<sup>2</sup>, and Young-Jin Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>KIMM)

# NANO KOREA 2022

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## Oral Presentation

Session Title

[TS03T2] Nanotechnology for the Next Generation Energy Storage  
4

Date & Time

July 7(Thu.), 2022 / 14:00~15:45

Place

Room 205

Session Chair(s)

Jungdon Suk (KRICT)

[TS03T2\_I\_1] Invited

14:00~14:30

### Direct laser writing of Laser-Induced-Graphene (LIG) electronics

Young-Jin Kim, Le Dinh Truong Son<sup>1</sup>, Han Ku Nam<sup>1</sup>, Dongwook Yang<sup>1</sup>, Younggeun Lee<sup>1</sup>, Young-Ryeul Kim<sup>1</sup>, Soonkeun Kwon<sup>2</sup>, Seungmin Hyun<sup>2</sup>, and Young-Jin Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>KIMM)

[TS03T2\_O\_2]

14:30~14:45

### Pseudocapacitive nanoparticles encapsulated in graphitic carbon produced by laser-scribing of metal-organic frameworks

Do Van Lam<sup>1</sup>, Jae-Hyun Kim<sup>1,2</sup>, Hyunuk Kim<sup>2,3</sup>, and Seung-Mo Lee<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST, <sup>3</sup>KIER)

[TS03T2\_O\_3]

14:45~15:00

### Dual-functional porous carbon textile decorated with VC/V<sub>2</sub>O<sub>3-x</sub> heterostructures for high-performance flexible Li-S full batteries

Viet Phuong Nguyen<sup>1,2</sup>, Il Hwan Kim<sup>2</sup>, Hyung Cheoul Shim<sup>1,2</sup>, Ji Su Park<sup>3</sup>, Jong Min Yuk<sup>3</sup>, Jae-Hyun Kim<sup>1,2</sup>, and Seung-Mo Lee<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIMM, <sup>3</sup>KAIST)

[TS03T2\_I\_4] Invited

15:00~15:30

### Nanotechnology for the Hanwha defense's energy storage system

Seung-Hyun Son, Ki-Hwan Ju, and Won-Gu Kang  
(Hanwha Defense)

[TS03T2\_O\_5]

15:30~15:45

### Leaf-derived porous carbon synthesized by carbothermic reduction

Uyen Nhat Trieu Nguyen<sup>1,2</sup>, Do Van Lam<sup>1</sup>, Hyung Cheoul Shim<sup>1</sup>, and Seung-Mo Lee<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST)



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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS03B\_P\_01]

10:00~10:30

### Controlled dendrite formation in Li metal battery by Au dot nanopatterns

Minki Kim<sup>1</sup>, Woo-Bin Jung<sup>2</sup>, Oh B. Chae<sup>3</sup>, Mihye Wu<sup>1,4</sup>, and Hee-tae Jung<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Harvard University, <sup>3</sup>University of Rhode Island, <sup>4</sup>KRICT)

[TS03B\_P\_02]

10:00~10:30

### Hollow Ti<sub>3</sub>C<sub>2</sub> MXene/carbon nanofibers as an advanced anode material for lithium-ion batteries

Darae Seo<sup>1,2</sup>, Mee-Ree Kim<sup>1,3</sup>, Jin Kyu Song<sup>1</sup>, Eunji Kim<sup>1</sup>, Jaseung Koo<sup>2</sup>, Ki-Chul Kim<sup>3</sup>, Hee Han<sup>1</sup>, Yonghee Lee<sup>1</sup>, and Chi Won Ahn<sup>1</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>Chungnam National University, <sup>3</sup>Mokwon University)

[TS03B\_P\_03]

10:00~10:30

### Fabrication of 3D porous current collectors in LIBs utilizing microwave assisted chemical - physical dual etching technique

Seon Woo Kang, Yong han Kim, and Tae Gwang Yun  
(Myongji University)

[TS03B\_P\_04]

10:00~10:30

### Synergistic effect of bilayer transition metal dichalcogenides heterostructures in potassium ion batteries.

Chae Hyeon Lee and Seoin Back  
(Sogang University)

[TS03B\_P\_05]

10:00~10:30

### Understanding intragranular cracking mechanism of Ni-rich layered cathode materials during fast charging

Eunmi Jo, Minji Jo, Seung Min Kim, and Wonyoung Chang  
(KIST)

[TS03B\_P\_06]

10:00~10:30

### Light-triggered autonomous shape-reconfigurable and locomotive supercapacitors for soft robotic power sources

Kwon-Hyung Lee<sup>1</sup>, Jisoo Jeon<sup>2</sup>, Woongbi Cho<sup>2</sup>, Sang-Woo Kim<sup>1</sup>, Hyunseok Moon<sup>3</sup>, Jeong Jae Wie<sup>2</sup>, and Sang-Young Lee<sup>3</sup>  
(<sup>1</sup>UNIST, <sup>2</sup>Inha University, <sup>3</sup>Yonsei University)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS03W\_P\_01]

10:00~10:30

**MoS<sub>2</sub>-graphene composite with 1T/2H dual phase of MoS<sub>2</sub> and lit application for lithium ion battery**

Kyu Yeon Jang<sup>1,2</sup>, Yeong A Lee<sup>1,3</sup>, and Hana Yoon<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>UST, <sup>3</sup>Chungnam National University)

[TS03W\_P\_02]

10:00~10:30

**Nitrate additive-chelate block copolymer micelles enable stable lithium metal batteries in universal carbonate electrolytes**

Jung-In Lee<sup>1</sup>, Sungjin Cho<sup>1</sup>, Tai Thai Vu<sup>2</sup>, Sujin Kim<sup>1</sup>, Sunmin Ryu<sup>1</sup>, Janghyuk Moon<sup>2</sup>, and Soojin Park<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>Chung-Ang University)

[TS03W\_P\_03]

10:00~10:30

**Attachable micropseudocapacitors based on highly swollen femtosecond-laser-induced-graphene**

Yeong A Lee<sup>1,2</sup>, Kyu Yeon Jang<sup>1,3</sup>, Jaeseop Yoo<sup>1,2</sup>, Kyubock Lee<sup>2</sup>, Seungchul Kim<sup>4</sup>, Young-Jin Kim<sup>5</sup> and Hana Yoon<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>Chungnam National University, <sup>3</sup>UST, <sup>4</sup>Pusan National University, <sup>5</sup>KAIST)

[TS03W\_P\_04]

10:00~10:30

**Ion-selective and chemical-protective interphase for highly durable zinc metal anode**

Sangyeop Lee, Gyujin Song, and Soojin Park  
(POSTECH)

[TS03W\_P\_05]

10:00~10:30

**Improve the lithium-ion batteries charge properties by etching Al-Si**

Chaeyeong Nam, Wongyu Lee, and Sinho Choi  
(KIER)

[TS03W\_P\_06]

10:00~10:30

**First-principles investigation on charging/discharging behaviors of 2D layered electrodes for Al-ion battery**

Kanghoon Yim<sup>1</sup>, Rizky Tamarany<sup>2</sup>, and Hana Yoon<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>Synopsys Korea Inc.)

[TS03W\_P\_07]

10:00~10:30

**AlF<sub>3</sub> nanorods-coated separator for improved safety of lithium-ion batteries**

Sang-Jun Oh and Sinho Choi  
(KIER)

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[TS03W\_P\_08]

10:00~10:30

**Utilization of copper oxide nanoparticles as nucleation seed for dendrite-free zinc polyiodide flow batteries**

Jin Seong Cha<sup>1,2</sup>, Jae Ik Lee<sup>1,3</sup>, Noh Uk Seo<sup>1,3</sup>, and Jung Hoon Yang<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>Korea University, <sup>3</sup>Yonsei University)

[TS03W\_P\_09]

10:00~10:30

**An oxide-based hybrid solid state battery with improved interface resistance by gel polymer electrolyte**

Hyeju Shin and Tae-Hee Kim  
(KIER)

[TS03W\_P\_10]

10:00~10:30

**Hollow sphere Al<sub>2</sub>O<sub>3</sub> nanoparticles coated on polypropylene separator to improve ion conductivity for lithium ion batteries**

Hyeong Seok Shim, Jeong Hwan Seol, and Tae Hee Kim  
(KIER)

[TS03W\_P\_11]

10:00~10:30

**Measurement of composite resistivity and interface resistance using multi-probe system in lithium ion batteries**

Seongwook Heo, Sang Hyun Lee, and Tae-Hee Kim  
(KIER)

[TS03W\_P\_12]

10:00~10:30

**Three methods for application of data from a volumetric method to the kissinger equation to obtain activation energy**

Young Jun Kwak and Myoung Youp Song  
(Jeonbuk National University)

[TS03W\_P\_13]

10:00~10:30

**Three-layer structured garnet dominative composite solid electrolyte for all-solid state batteries**

Wooyoung Lee, Joonsoo Kim, Jiheung Yu, Daeil Kim, and Boyun Jang  
(KIER)

[TS03W\_P\_14]

10:00~10:30

**Synthesis of high voltage, cobalt-free cathode for all-solid-state battery**

Jongmin Lee, Joonsoo Kim, Daeil Kim, Taewoo Kim, and Boyun Jang  
(KIER)

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[TS03W\_P\_15]

10:00~10:30

**Development of self-degradable binder using pH-responsive polymer for transient primary-battery.**

Hyunho Ha, Hye-Mi So, Jin Young Lee, Minsub Oh, Areum Kim, and Seungmin Hyun  
(KIMM)

[TS03W\_P\_16]

10:00~10:30

**Flexible and thick battery electrode using thermal induced phase separation process**

Niguss Haregot Hatsey, Hye-Mi So, Hyunho Ha, Areum Kim, Jin Young Lee, Minsub Oh, and Seungmin Hyun  
(KIMM)

[TS03W\_P\_17]

10:00~10:30

**Silicon nanoparticles as seed layer for electrodeposition of ultrathin Li-metal anode for next generation-secondary batteries**

Hyeongjin Lee, Daeil Kim, Joonsoo Kim, and Boyun Jang  
(KIER)

[TS03W\_P\_18]

10:00~10:30

**Fiber-type lithium primary and lithium-ion secondary batteries**

Hye-Mi So, Hyunho Ha, Niguss Haregot Hatsey, and Seungmin Hyu  
(KIMM)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS03T\_P\_01]

10:00~10:30

**Sulfide-based inorganic sodium ion conductors for all-solid-state batteries prepared by solid state reaction**

Woo Jung Lee and Sung-jin Kim  
(Ewha Womans University)

[TS03T\_P\_02]

10:00~10:30

**Facile synthesis of recyclable core-shell Porous Si@SiO<sub>2</sub> nanocomposite decorated with ZnO as dual performance of photocatalysts and lithium storage anode materials**

Yechan Lee, Jinhyeok Lee, and Sang-Wha Lee  
(Gachon University)

[TS03T\_P\_03]

10:00~10:30

**Improvement of electrochemical performances of electrochromic-zinc ion batteries system utilizing V<sup>4+</sup>-V<sub>2</sub>O<sub>5</sub> as a cathode**

Yonghan Kim, Seonwoo Kang, and Tae Gwang Yun  
(Myongji University)

[TS03T\_P\_04]

10:00~10:30

**Study on the synthesis of 2D MXene-based heterostructured materials and their energy storage application**

Hyojun Lim<sup>1,2</sup> and Sang-Ok Kim<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST-KIST)

[TS03T\_P\_05]

10:00~10:30

**Li stabilization using a 3D porous Ni inverse opal structure for stable lithium-metal batteries**

Do Youb Kim<sup>1</sup>, Soo Min Jeong<sup>1,2</sup>, Mihye Wu<sup>1</sup>, Tae Yeong Kim<sup>1</sup>, Dong Hwan Kim<sup>3</sup>, Se-Hee Kim<sup>1</sup>, Hong Kyoon Choi<sup>3</sup>, and Yun Chan Kang<sup>2</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Korea University, <sup>3</sup>Kongju National University)

[TS03T\_P\_06]

10:00~10:30

**Synthesis of reduced graphene oxide coated SiO<sub>x</sub> and their electrochemical analysis for lithium ion battery anode**

Sang Hyuk Gong<sup>1,2</sup>, Yeongje Lee<sup>3</sup>, Sunho Jeong<sup>3</sup>, and Hyung-Seok Kim<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>Kyung Hee University)

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[TS03T\_P\_07]

10:00~10:30

**Lithium argyrodite sulfide electrolytes with high ionic conductivity and air stability for all-solid-state Li-Ion batteries**

Yongheum Lee<sup>1,2</sup> and Seungho Yu<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University of Science and Technology)

[TS03T\_P\_08]

10:00~10:30

**MXene ink hosting zinc anode for high performance of aqueous zinc metal batteries**

Jae Min Park, Sang Ha Baek, and Ho Seok Park  
(Sungkyunkwan University)

[TS03T\_P\_09]

10:00~10:30

**Revitalizing multi-cation redox chemistry of LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> high-voltage cathode by revisiting degradation mechanism**

Gukhyun Lim<sup>1,2</sup>, Dongki Shin<sup>1,2</sup>, Keun Hwa Chae<sup>1</sup>, Min Kyung Cho<sup>1</sup>, Seok Su SOHN<sup>2</sup>, Minah Lee<sup>1</sup>, and Jihyun Hong<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

[TS03T\_P\_10]

10:00~10:30

**Polymer-inorganic composite using porous spherical graphitic carbon nitride (g-C<sub>3</sub>N<sub>4</sub>) for solid-state hybrid electrolytes**

Yu Jin Hong<sup>1,2</sup>, Jungdon Suk<sup>1</sup>, Sungho Choi<sup>1</sup>, Won Bin Im<sup>2</sup>, and Mihye Wu<sup>1</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Hanyang University)

[TS03T\_P\_11]

10:00~10:30

**Study on the electrochemical properties of single-crystalline high-nickel cathode materials synthesized under various conditions**

Kyoung-Eun Kim<sup>1,2</sup>, Han-Su Kim<sup>2</sup>, and Sang-Ok Kim<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Hanyang University, <sup>3</sup>UST)

[TS03T\_P\_12]

10:00~10:30

**A water-based inorganic/metal hybrid protective layer for stable lithium metal anodes fabricated via transfer-printing methods**

Junyoung Choi<sup>1,2</sup> and Jungdon Suk<sup>1,2</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>UST)

[TS03T\_P\_13]

10:00~10:30

**Suppressing dendrite growth and hydrogen evolution using a tetrabutylammonium iodide electrolyte additive for aqueous zinc ion batteries**

Hyo Jin Lim<sup>1,2</sup>, Hyun Wook Jung<sup>2</sup>, and Hyung Seok Kim<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

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[TS03T\_P\_14]

10:00~10:30

## Nanoparticle cluster based ion-exchange membranes for vanadium redox flow batteries

Jung-Je Woo, Jiyoung Ma, Jung-Soo Choi, Sunghun Choi, and Il-Chan Jang  
(*KIER*)

[TS03T\_P\_15]

10:00~10:30

## Multi-layered, bipolar solid-state battery enabled by plastic-crystal polymer electrolyte

Hye Min Choi<sup>1,2</sup>, Su Jin Jun<sup>1,3</sup>, Myung-Hyun Ryu<sup>1</sup>, and Kyu-Nam Jung<sup>1</sup>  
(<sup>1</sup>*KIER*, <sup>2</sup>*Chungnam National University*, <sup>3</sup>*Yonsei University*)

[TS03T\_P\_16]

10:00~10:30

## Rational design of hybrid electrolyte for all-solid-state lithium battery based on investigation of lithium ion transport mechanism

Jinkyu Park<sup>1,2</sup>, and Jungdon Suk<sup>1,2</sup>  
(<sup>1</sup>*KRICT*, <sup>2</sup>*UST*)

[TS03T\_P\_17]

10:00~10:30

## Investigation on the redox mechanism of the cathode active material and solid electrolyte for high-performance all-solid-state lithium-sulfur battery

Eunbyoul Lee<sup>1,2</sup>, Jiwon Jeong<sup>1</sup>, and Kyung Yoon Chung<sup>1,2</sup>  
(<sup>1</sup>*KIST*, <sup>2</sup>*UST*)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS03F\_P\_01]

10:00~10:30

### **Inorganic-organic solid composite electrolytes for all-solid-state Li-ion batteries**

Mingony Kim<sup>1,2</sup>, Yiseul Yoo<sup>1</sup>, Hee-Dae Lim<sup>1,2</sup>, and Kyung Yoon Chung<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST)

[TS03F\_P\_02]

10:00~10:30

### **Tailored 3D Cu-Zn alloy foam structure free of Li-dendrite growth for Li-metal anode with high reversibility**

SuMin Ko<sup>3</sup>, Yongbeom Kim<sup>1</sup>, Jeong-Hee Choi<sup>2</sup>, Byung-Gon Kim<sup>2</sup>, Jun-Ho Park<sup>2</sup>, and Sang-Min Lee<sup>3</sup>  
(<sup>1</sup>LGChem.Ltd., <sup>2</sup>KERI, <sup>3</sup>POSTECH)

[TS03F\_P\_03]

10:00~10:30

### **A polysulfide capturing strategy with multimodal functional separator for flexible high-energy-density lithium-sulfur batteries**

Jeong-Won Hong<sup>1</sup>, Yung-Soo Jo<sup>1</sup>, Junghwan Sung<sup>1,2</sup>, Suriyakumar Dasarathan<sup>1,2</sup>, You-Jin Lee<sup>1</sup>, Hae-Young Choi<sup>1</sup>, Byung gon Kim<sup>1,2</sup>, Doohun Kim<sup>1,2</sup>, and Jun-Woo Park<sup>1,2</sup>  
(<sup>1</sup>KERI, <sup>2</sup>UST)

[TS03F\_P\_04]

10:00~10:30

### **Enhanced infiltration of solution-processable LPSCI solid electrolyte for achieving high-energy-density all-solid-state batteries**

Junghwan Sung<sup>1,2</sup>, Suriyakumar Dasarathan<sup>1,2</sup>, Jeong-won Hong<sup>1</sup>, Yung-Soo Jo<sup>1</sup>, Byung gon Kim<sup>1,2</sup>, Jun-Ho Park<sup>1</sup>, You-Jin Lee<sup>1</sup>, Yoon-cheol Ha<sup>1,2</sup>, Doohun Kim<sup>1,2</sup>, and Jun-Woo Park<sup>1,2</sup>  
(<sup>1</sup>KERI, <sup>2</sup>UST)

[TS03F\_P\_05]

10:00~10:30

### **A novel approach to sulfide solid electrolytes for commercialization of all-solid-state batteries**

Yung-Soo Jo<sup>1</sup>, Jeong-Won Hong<sup>1</sup>, Junghwan Sung<sup>1,2</sup>, Suriyakumar Dasarathan<sup>1,2</sup>, Byung gon Kim<sup>1,2</sup>, Jun-Ho Park<sup>1</sup>, You-Jin Lee<sup>1</sup>, Yoon-cheol Ha<sup>1,2</sup>, Doohun Kim<sup>1,2</sup>, and Jun-Woo Park<sup>1,2</sup>  
(<sup>1</sup>KERI, <sup>2</sup>UST)

[TS03F\_P\_06]

10:00~10:30

### **Solid electrolyte particle control strategic approach for the high-mass-loading of cathode in all-solid-state batteries**

Eun Seong Kim<sup>1,2</sup> and Kyung Yoon Chung<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST)



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[TS03F\_P\_07]

10:00~10:30

## Synthesis of high nickel cathode materials for all solid state batteries

Jiwon Jeong<sup>1,2</sup>, Eunbi Kim<sup>1,2</sup>, Sunwoo Kim<sup>1</sup>, Woo Young Yoon<sup>2</sup>, and Kyung Yoon Chung<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>UST)

[TS03F\_P\_08]

10:00~10:30

## Mössbauer studies of e-beam irradiated <sup>57</sup>Fe-N/C catalysts and electrode prepared using ultrasonic spray

Young Rang Uhm<sup>1</sup>, Jaegi Lee<sup>1</sup>, Gwang-Min Sun<sup>1</sup>, Ji Hyun Park<sup>2</sup>, and Taesung Ha<sup>2</sup>  
(<sup>1</sup>KAERI, <sup>2</sup>Seoul Radiology Service Co.)

[TS03F\_P\_09]

10:00~10:30

## Achieving SiO<sub>x</sub> nanoparticles/carbon composite via photothermal effect for high-performance Li-ion batteries

Na-Yeong Kim, Il Gyu Kim, and Ji-Won Jung  
(University of Ulsan)

[TS03F\_P\_10]

10:00~10:30

## Application of Electro spray for solving CNT bundling problem in Li-ion batteries

Ilgyu Kim, Na-Yeong Kim, Jeong-Hwan Seol, Jeong-Ho Park, Min-Gyeong Gi, Hyun Min Na, Ha-Eun Baeg, and Ji-Won Jung  
(University of Ulsan)

[TS03F\_P\_11]

10:00~10:30

## $\pi$ -bridge spacer embedded polyimide based active materials for electrochromic Zn-ion aqueous batteries with high electrochemical-electrochromic reliability

Yun Kwag<sup>1</sup>, Ji young Lee<sup>2</sup>, and Tae Gwang Yun<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Myongji University)

[TS03F\_P\_12]

10:00~10:30

## Enhancing the electrochemical performances of NaNi<sub>0.6</sub>Co<sub>0.2</sub>Mn<sub>0.2</sub>O<sub>2</sub> as cathode material for sodium-ion batteries by sodium tungstate coating

Min-Young Kim<sup>1,2</sup>, Jae-Ho Park<sup>1</sup>, Seung-Ho Yu<sup>2</sup>, and Kyung Yoon Chung<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>UST)

[TS03F\_P\_13]

10:00~10:30

## Ultrafine metallic Cu nano-framework to reinforce electrochemical kinetics in Fe<sub>2</sub>O<sub>3</sub> anode for high-rate Li-ion batteries

Jae Young Seok  
(KIMM)

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[TS03F\_P\_14]

10:00~10:30

**Plasma-assisted LIB graphite anode coating for cyclability improvement for EV application**

Jin Young Lee and Seungmin Hyun  
(KIMM)

[TS03F\_P\_15]

10:00~10:30

**N, P co-doped 3D porous carbon nanosheets as polysulfide confinements for high-performance lithium-sulfur batteries**

Dae Kyom Kim and Jungdon Suk  
(KRICT)

[TS03F\_P\_16]

10:00~10:30

**Lithium ion capacitors using conductive metal-organic structure as anode**

BumJin Kim<sup>1,2</sup>, TaeHyeong Kim<sup>1,2</sup>, Subiyanto Iyan<sup>1</sup>, JeongHun Baek<sup>1</sup>, KangJick Kim<sup>1,3</sup>, SangHui Kang<sup>1,2</sup>, Heonjin Choi<sup>2</sup>, Hyunuk Kim<sup>1</sup>, and JungJoon Yoo<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>Yonsei University, <sup>3</sup>Hanyang University)

[TS03F\_P\_17]

10:00~10:30

**Integration of transparent supercapacitors and electrodes using nanostructured metallic glass films for wirelessly rechargeable, skin heat patches**

Sangil Lee<sup>1</sup>, Sang-Woo Kim<sup>2</sup>, Matteo Ghidelli<sup>3</sup>, Hyeon Seok An<sup>1</sup>, Jiuk Jang<sup>1</sup>, Andrea Li Bassi<sup>3</sup>, Sang-Young Lee<sup>4</sup>, and Jang-Ung Park<sup>1</sup>  
(<sup>1</sup>IBS, <sup>2</sup>UNIST, <sup>3</sup>Laboratorio Materiali Micro e Nanostrutturati, <sup>4</sup>Yonsei University)

# NANO KOREA 2022

The 20th International Nanotech Symposium

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## TS04. Nanobiotechnology

### Oral Presentation

<b>Session Title</b>	[TS04W1] Nanobiotechnology 1
<b>Date &amp; Time</b>	July 6(Wed.), 2022 / 10:30~12:15
<b>Place</b>	Room 303
<b>Session Chair(s)</b>	Sungsu Park (Sungkyunkwan University), Heungsoo Shin (Hanyang University)

[TS04W1\_I\_1] Invited 10:30~11:00

**Engineering biology – from biomanufacturing to living medicine**

Matthew Wook Chang  
(National University of Singapore)

[TS04W1\_O\_2] 11:00~11:15

**Fully stretchable self-powered sensor patch integrated with cotton thread-embedded microfluidic for wearable continuous glucose monitoring**

Chan Wool Bae, Mottour Vinayagam Chinnamani, Eung Hyuk Lee, and Nae Eung Lee  
(Sungkyunkwan University)

[TS04W1\_O\_3] 11:15~11:30

**Fluorescence-enhanced ZnO nano-bur for biomarker monitoring**

Montri Meeseepong, Gargi Ghosh, Sajal Shrivastava, and Nae Eung Lee  
(Sungkyunkwan University)

[TS04W1\_I\_4] Invited 11:30~12:00

**Plant-inspired phenyl chemistry to engineer injectable and electroconductive hydrogels for biomedical applications**

Mikyung Shin  
(Sungkyunkwan University)

[TS04W1\_O\_5] 12:00~12:15

**Electrochemical biosensors based on metal-organic framework derived carbon nanohybrids**

Bhavna S. Hedau, Byeong-Cheol Kang, and Tae-Jun Ha  
(Kwangwoon University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS04W2] Nanobiotechnology 2</b>
<b>Date &amp; Time</b>	<b>July 6(Wed.), 2022 / 15:45~18:00</b>
<b>Place</b>	<b>Room 303</b>
<b>Session Chair(s)</b>	<b>Yun Jung Heo (Kyung Hee University), Daeha Seo (DGIST)</b>

**[TS04W2\_O\_1]** 15:45~16:00

### **Synthesis of gold nanoshells with biodegradable cores for photothermal therapy**

Won Kyu Lee and Jae-Seung Lee  
(Korea University)

**[TS04W2\_O\_2]** 16:00~16:15

### **Nanoporous carbon-incorporated wearable multimodal patch for simultaneous biochemical and electrophysiological monitoring**

Md Abu Zahed, Hyosang Yoon, Md Sharifuzzaman, Dong Kyun Kim, Young Do Shin, Md Asaduzzaman, Soo Kyeong Seonu, Hye Su Song, and Jae Yeong Park  
(Kwangwoon University)

**[TS04W2\_O\_3]** 16:15~16:30

### **Metal complex based chemosensor for measuring hydrogen sulfide level by electrochemiluminescence**

Yecheol Bak<sup>1,2</sup>, Jihwan Kim<sup>1</sup>, Kangwon Lee<sup>2</sup>, and Sehoon Kim<sup>1</sup>  
(<sup>1</sup>Korea Institute of Science and Technology, <sup>2</sup>Seoul National University)

**[TS04W2\_O\_4]** 16:30~16:45

### **Multi-inlet spheroid generator for enabling drug testing and modulating tumor-stroma ratio**

Seokgyu Han and Sungsu Park  
(Sungkyunkwan University)

**[TS04W2\_O\_5]** 16:45~17:00

### **Changes in cell cytoskeleton and traction force by coronavirus infection**

Abdurazak Aman Ketebo, Li Jinyan, and Sungsu Park  
(Sungkyunkwan University)

**[TS04W2\_O\_6]** 17:00~17:15

### **CRISPR/Cas13a based electrochemical biosensor for ultrasensitive detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA**

Woong Heo, Kyungyeon Lee, Sunyoung Park, Kyung-A Hyun, and Hyo-Il Jung  
(Yonsei University)

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[TS04W2\_O\_7]

17:15~17:30

**Encapsulation of extracellular vesicles in photodegradable hydrogel microparticles using droplet-based microfluidics**

Jaejeung Kim, Junhyun Park, Kyung-A Hyun, and Hyo-II Jung  
(*Yonsei University*)

[TS04W2\_O\_8]

17:30~17:45

**Gold nanostructured electrochemical aptasensor for monitoring and risk assessment of migrated di(2-ethylhexyl)phthalate in daily plastic products**

Kyungyeon Lee, N.G. Gurudatt, Woong Heo, Kyung-A Hyun, and Hyo-II Jung  
(*Yonsei University*)

[TS04W2\_O\_9]

17:45~18:00

**3D printed fluidic swab for painless self-collection of large volumes of nasal specimen**

Joochan Kim<sup>1</sup>, Jaehyung Jeon<sup>1</sup>, Taejoon Kang<sup>2</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>*Sungkyunkwan University*, <sup>2</sup>*KRIBB*)

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## Oral Presentation

Session Title	[TS04T1] Nanobiotechnology 3
Date & Time	July 7(Thu.), 2022 / 10:30~12:00
Place	Room 303
Session Chair(s)	Tae-Hyung Kim (Chung-Ang University)

[TS04T1\_I\_1] Invited 10:30~11:00

### Human microphysiological systems for disease modeling and drug screening

Deok-Ho Kim  
(Johns Hopkins University)

[TS04T1\_O\_2] 11:00~11:15

### A pumpless microfluidic device based on the reverse-Tesla structure for improving reaction efficiency of nucleic acid amplification

Cheng Nie, Woong Heo, Kyung-A Hyun, and Hyo-II Jung  
(Yonsei University)

[TS04T1\_I\_3] Invited 11:15~11:45

### Precise microengineering of biomaterials for remodeling 3D cellular environments

Masumi Yamada  
(Chiba University)

[TS04T1\_O\_4] 11:45~12:00

### Fabrication mechanism of porous nanostructures under balance between evaporation and capillary action

Sung-Jo Kim<sup>1</sup>, Won-Geun Kim<sup>1</sup>, Jong-Min Lee<sup>2</sup>, and Jin-Woo Oh<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>Hallym University)

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## Oral Presentation

Session Title	[TS04T2] Nanobiotechnology 4
Date & Time	July 7(Thu.), 2022 / 14:00~15:45
Place	Room 303
Session Chair(s)	Tae-Joon Jeon (Inha University), Hyo-II Jung (Yonsei University)

[TS04T2\_I\_1] Invited 14:00~14:30

### Bottom-up construction of de novo designed nanopore using peptides

Ryuji Kawano  
(Tokyo University of Agriculture and Technology)

[TS04T2\_O\_2] 14:30~14:45

### Dynamically tunable plasmonic coupling based on thickness modulation using the M13 phage

Thanh Mien Nguyen and Jin-Woo Oh  
(Pusan National University)

[TS04T2\_O\_3] 14:45~15:00

### Curcumin synthesized, isonicotinic acid hydrazide, tyrosine, and quercetin co-decorated gold nanoparticles for selective cell interactions and anti-inflammatory action

Mamta Kumawat<sup>1</sup>, Akhela Umapathi<sup>1</sup>, Harishkumar Madhyastha<sup>2</sup>, Mandeep Singh<sup>3</sup>, Hemant Kumar Daima<sup>1</sup>  
(<sup>1</sup>Amity University Rajasthan, <sup>2</sup>University of Miyazaki, <sup>3</sup>RMIT University)

[TS04T2\_I\_4] Invited 15:00~15:30

### Augmented immune-synapse interaction via biomaterial-mediated ex vivo cell surface engineering

Kyobum Kim  
(Dongguk University)

[TS04T2\_O\_5] 15:30~15:45

### Nanosensor technology for next-generation biochemical informatics

Sooyeon Cho  
(Sungkyunkwan University)

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## Oral Presentation

Session Title	[TS04T3] Nanobiotechnology 5
Date & Time	July 7(Thu.), 2022 / 16:00~18:00
Place	Room 303
Session Chair(s)	Nakwon Choi (KIST), Jinmyoung Joo (DGIST)

[TS04T3\_I\_1] Invited 16:00~16:30

### Functional polymer thin films and nanostructures for designing bio-interfaced electronics

Hyejeong Seong<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST)

[TS04T3\_O\_2] 16:30~16:45

### Fluorogenic and chromogenic dual sensor for urine monitoring with hybrid carbon-dot nanosensor

Mohamed R. Elmasry<sup>1,2</sup>, Samy M. Shaban<sup>1,2</sup>, Soo-Yeon Cho<sup>1</sup>, and Dong-Hwan Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Egyptian Petroleum Research Institute)

[TS04T3\_O\_3] 16:45~17:00

### Electrochemical impedance biosensor based on conducting polymer for detecting biomarker proteins

HyunHo Youn and Dong-Hwan Kima  
(Sungkyunkwan University)

[TS04T3\_I\_4] Invited 17:00~17:30

### Development of RNA therapeutics and lipid nanoparticle (LNP) formulation for in vivo delivery

Hyukjin Lee  
(Ewha Womans University)

[TS04T3\_O\_5] 17:30~17:45

### Probeless capacitive biosensor by aptamer for amyloid beta ( $A\beta_{1-42}$ ) detection in human plasma

Parshant Kumar Sharma<sup>1</sup>, Enkhzaya Ganbold<sup>1</sup>, Sachin Mishra<sup>1</sup>, Eun-Seong Kim<sup>1</sup>, Sang Tae Kim<sup>2</sup>, Nam-Young Kim<sup>1</sup>  
(<sup>1</sup>Kwangwoon University, <sup>2</sup>JnPharma Inc.)

[TS04T3\_O\_6] 17:45~18:00

### Isonicotinylhydrazide on epigallocatechin gallate-protected gold nanoparticles: Toxicity management and stability enhancement

Akhela Umapathi, Mamta Kumawat, Priyamwada Mishra, and Hemant Kumar Daima  
(Amity University Rajasthan)



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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS04B\_P\_01]

10:00~10:30

**Development of digital real-time NESBA system (Dr. NEBSA) for ultrasensitive and absolute quantitative detection of COVID-19**

Yong Ju and Hyun Gyu Park  
(KAIST)

[TS04B\_P\_02]

10:00~10:30

**Multi-scale hierarchical topography to enhance cardiomyocytes maturation through synergistic mechanotransduction**

Hyunah Ahn, Younghak Cho, Sung Gap Im, and Hee-Tae Jung  
(KAIST)

[TS04B\_P\_03]

10:00~10:30

**Development of HRP-gold nanocluster embedded fluorescent protein nanoparticles for detection of hydrogen peroxide**

Myeong-Jun Lee<sup>1</sup>, Ji-Ae Song<sup>1</sup>, Jeong-Hyeop Shin<sup>1</sup>, Jin-Ha Choi<sup>2</sup>, and Byung-Keun Oh<sup>1</sup>  
(<sup>1</sup>Sogang University, <sup>2</sup>Jeonbuk National University)

[TS04B\_P\_04]

10:00~10:30

**Membrane rigidity modulation of host-cell-mimetic liposomes for enhanced detection of influenza A virus via viral membrane fusion**

Chaewon Park<sup>1</sup>, Geunseon Park<sup>1</sup>, Jong-Woo Lim<sup>2</sup>, Sojeong Lee<sup>1</sup>, Soohyun Chung<sup>1</sup>, Eunjung Kim<sup>3</sup>, and Seungjoo Haam<sup>1</sup>  
(<sup>1</sup>Yonsei University, <sup>2</sup>Seoul National University, <sup>3</sup>Incheon National University)

[TS04B\_P\_05]

10:00~10:30

**Fabrication of composite spheroids with improved diffusion using porous electrospun PCL fibers**

Sangmin Lee and Heungsoo Shin  
(Hanyang University)

[TS04B\_P\_06]

10:00~10:30

**Electrochemical investigation of supported lipid bilayers with ultrashort carbon nanotubes**

Yunjeong Park<sup>1</sup>, Min-Sung Hong<sup>1,2</sup>, Hyeonseo Na<sup>1</sup>, Teayeop Kim<sup>1</sup>, Jung-Gu Kim<sup>1</sup>, and Kyunghoon Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>UC Berkeley)

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[TS04B\_P\_07]

10:00~10:30

## Label-free identification of naïve and primed pluripotent stem cells

Kyeong-Mo Koo<sup>1</sup>, Young-Hyun Go<sup>2</sup>, Hyuk-Jin Cha<sup>2</sup>, and Tae-Hyung Kim<sup>1</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Seoul National University)

[TS04B\_P\_08]

10:00~10:30

## Immunoassay and biosensor based on autodisplay of protein G

Seong Gi Kim, Jee Young Kim, Mi Yeon Kim, Hyomin Lee, Da Hyeon Kim, Bong Gwan Jeon, Yejin Song, and Min Park  
(Hallym University)

[TS04B\_P\_09]

10:00~10:30

## Attomolar level of detection system via amplified fluorogenic nanoprobe for early diagnosis of AD in tear fluid

Sojeong Lee<sup>1</sup>, Jong-Woo Lim<sup>1</sup>, Chaewon Park<sup>1</sup>, Geunseon Park<sup>1</sup>, Jisun Ki<sup>2</sup>, Moo-Kwang Shin<sup>1</sup>, and Seungjoo Haam<sup>1</sup>  
(<sup>1</sup>Yonsei University, <sup>2</sup>KRISS)

[TS04B\_P\_10]

10:00~10:30

## Development of CRISPR-Cas9 system to correct abnormal gene in disease

Nan-Ee Lee<sup>1</sup>, Seoyoung Kim<sup>1,2</sup>, Seongchan Kim<sup>1</sup>, and Hyojin Lee<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

[TS04B\_P\_11]

10:00~10:30

## Sensitivity enhancement of lateral flow assays using superabsorbent polymers

Seoyoon Song, Taeyeong You, Woojin Jeong, Sun Min Kim, and Tae-Joon Jeon  
(Inha University)

[TS04B\_P\_12]

10:00~10:30

## Model membranes of cancer cells and normal cells for biophysical characterization of reactive oxygen species and antioxidants interaction

Deborah Lee, Geonho Cho, Sun Min Kim, and Tae-Joon Jeon  
(Inha University)

[TS04B\_P\_13]

10:00~10:30

## Bio-inspired Ag nano-villi SERS aptasensor for the ultrasensitive and selective detection of 25-hydroxy vitamin D<sub>3</sub>

Woochang Kim<sup>1</sup>, Joohyung Park<sup>1</sup>, Woong Kim<sup>2</sup>, Minwoo Kim<sup>1</sup>, Chihyun Kim<sup>1</sup>, Hyunjun Park<sup>1</sup>, Wonseok Lee<sup>3</sup>, and Jinsung Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Hanyang University, <sup>3</sup>Korea National University of Transportation)

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[TS04B\_P\_14]

10:00~10:30

**Single molecular nanoscale imaging of miRNA in a single neuronal cell with force-based AFM**

Hyun Jin Kim<sup>2</sup>, Joung-Hun Kim<sup>2</sup>, and Ikbum Park<sup>1</sup>  
(<sup>1</sup>Research Institute of Industrial Science & Technology, <sup>2</sup>POSTECH)

[TS04B\_P\_15]

10:00~10:30

**Multiplex SNP genotyping using SWITCH: sequence-specific nanoparticle with interpretative toehold-mediated sequence decoding in hydrogel**

Eunhye Park<sup>1,2</sup>, Woongsun Choi<sup>1,3</sup>, Jwa-Min Nam<sup>2</sup>, Jungkyu Choi<sup>3</sup>, Hyojin Lee<sup>1</sup>, and Nakwon Choi<sup>1,3,4</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Seoul National University, <sup>3</sup>Korea University, <sup>4</sup>UST)

[TS04B\_P\_16]

10:00~10:30

**Detection of Sars-CoV-2 on the surface using graphene nano surface**

Jiatong Kang, Wen Ying Cui, Yun Guang Li, Hyun Jin Yoo, Changyoon Baek, and Junhong Min  
(Chung-Ang University)

[TS04B\_P\_17]

10:00~10:30

**Isolation of short-length DNA from liquid biopsy based on graphene oxide**

Tailin Wu, Jiatong Kang, Hyun Jin Yoo, Changyoon Baek, and Junhong Min  
(Chung-Ang University)

[TS04B\_P\_18]

10:00~10:30

**Fabrication of antiviral nanofibers containing copper nanoparticles by electrospinning**

Hong Eun Park, Wen Ying Cui, Yun Guang Li, Hyun Jin Yoo, Changyoon Baek, and Junhong Min  
(Chung-Ang University)

[TS04B\_P\_19]

10:00~10:30

**G-quadruplex-based in situ color-changing murine norovirus diagnosis chip in fecal samples**

Jeong Hyun Hong, Wen Ying Cui, Yun Guang Li, Hyun Jin Yoo, Changyoon Baek, and Junhong Min  
(Chung-Ang University)

[TS04B\_P\_20]

10:00~10:30

**Development of in-situ clostridium difficile detection sensor based on isothermal amplification using graphene oxide surface**

Hye Jin Lee, Wen Ying Cui, Yun Guang Li, Hyun Jin Yoo, Changyoon Baek, and Junhong Min  
(Chung-Ang University)

[TS04B\_P\_21]

10:00~10:30

**Ultrasensitive label-free capacitive biosensor by highly specific aptamers for SARS-CoV-2 detection**

Parshant Kumar Sharma<sup>1</sup>, Enkhzaya Ganbold<sup>1</sup>, Sachin Mishra<sup>1</sup>, Eun-Seong Kim<sup>1</sup>, Sang Tae Kim<sup>2</sup>, and Nam-Young Kim<sup>1</sup>  
(<sup>1</sup>Kwangwoon University, <sup>2</sup>JnPharma Inc.,)

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[TS04B\_P\_22]

10:00~10:30

**Detection of intracellular ATP in microalgae using graphene oxide-aptamer molecular beacon complex**

Jee Young Kim and Yoon-E Choi  
(Korea University)

[TS04B\_P\_23]

10:00~10:30

**Cytotoxic effect of nano/micro-sized graphene oxide on euglena gracilis**

Ka Young Kim, Shin Myung Kim, Jee Young Kim, and Yoon-E Choi  
(Korea University)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS04W\_P\_01]

10:00~10:30

### Scaffold-free 3D microphysiological system for recapitulating human gut

Min-Hyeok Kim<sup>1</sup>, Jong Hwan Sung<sup>2</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Hongik University)

[TS04W\_P\_02]

10:00~10:30

### Gut-kidney axis on chip for studying differential effects of antibiotics against Shiga toxin-producing Escherichia coli on risk of hemolytic-uremic syndrome

Yugyeong Lee<sup>1</sup>, Min-Hyeok Kim<sup>1,2</sup>, Jong Hwan Sung<sup>2</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Hongik University)

[TS04W\_P\_03]

10:00~10:30

### Herd immunity on chip: reconstituting virus transmission in human society

Wanyoung Lim<sup>1</sup>, Narina Jung<sup>1,2</sup>, Jiande Zhang<sup>1</sup>, Zhenzhong Chen<sup>1</sup>, Byung Mook Weon<sup>1</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Korea Institute for Advanced Study)

[TS04W\_P\_04]

10:00~10:30

### Effect of trastuzumab and camelid antibody on mechanobiology of HER-2 positive breast cancer cells

Li Jinyan<sup>1</sup>, Abdurazak Aman Ketebo<sup>1</sup>, Kibum Kim<sup>2</sup>, Kisung Ko<sup>2</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Chung-Ang University)

[TS04W\_P\_05]

10:00~10:30

### 3D Printed hanging drop spheroid plate for studying cytotoxic effect of immune cells on cancer spheroids

Zhenzhong Chen<sup>1</sup>, Seokgyu Han<sup>1</sup>, Arleen Sanny<sup>2</sup>, Dorothy Leung-Kwan Chan<sup>2</sup>, Danny van Noort<sup>3,4</sup>, Wanyoung Lim<sup>1</sup>, Takashi Murakami<sup>5</sup>, Andy Hee-Meng Tan<sup>2</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Agency for Science, Technology and Research, <sup>3</sup>Universidad de Ingenieria y Tecnologia, <sup>4</sup>Linköping University, <sup>5</sup>Saitama Medical University)

[TS04W\_P\_06]

10:00~10:30

### Elucidation of differential mechanisms of sterilization of coronavirus by plasma ozone and UV-C using atomic force microscopy

Jinseung Bae<sup>1</sup>, Cheolwoo Bong<sup>1</sup>, Chanyong Park<sup>2</sup>, Moon Soo Bak<sup>1</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>KIMM)

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[TS04W\_P\_07]

10:00~10:30

**Uniaxial stretching device with stretchable gelatin hydrogel gratings for studying effect of cyclic stretch on aligned myotube formation**

Jaehyung Jeon, Subin An, Jong-Sun Kang, and Sungsu Park  
(*Sungkyunkwan University*)

[TS04W\_P\_08]

10:00~10:30

**3D Printed spheroid assembloder for formation of Janus spheroids**

Sein Kim, Seokgyu Han, Huong Nguyen, Cheajeong Heo, and Sungsu Park  
(*Sungkyunkwan University*)

[TS04W\_P\_09]

10:00~10:30

**Vancomycin-conjugated polydopamine-coated magnetic nanoparticles for improving molecular diagnostics of bacteria in whole blood**

Abdurhaman Teyib Abafogi<sup>1</sup>, Tepeng Wu<sup>2</sup>, Daekyu Lee<sup>1</sup>, Jinyeop Lee<sup>1,2</sup>, and Sungsu Park<sup>1</sup>  
(<sup>1</sup>*Sungkyunkwan University*, <sup>2</sup>*KingoBio Inc.*)

[TS04W\_P\_10]

10:00~10:30

**Fully integrated paper device for point-of-care testing of multiple infectious diseases**

Vu Phong Dinh and Nae Yoon Lee  
(*Gachon University*)

[TS04W\_P\_11]

10:00~10:30

**A paper-based integrated sensing platform for point-of-care diagnostics of vancomycin-resistant enterococcus**

Duc Anh Thai, Thi Ngoc Diep Trinh, and Nae Yoon Lee  
(*Gachon University*)

[TS04W\_P\_12]

10:00~10:30

**Development of the PCR platform with low power heating system**

Hwan Gyun Jeon, Ji Wook Choi, Hee Uk Lee, and Bong Geun Chung  
(*Sogang University*)

[TS04W\_P\_13]

10:00~10:30

**High-throughput 3D co-culture tumor spheroids in a microfluidic device**

Sang Ik Lee, Tae Hyun Kim, Seong Goo Kang, Yoon Young Choi, Ji Wook Choi, Young Jae Kim, and Bong Geun Chung  
(*Sogang University*)

[TS04W\_P\_14]

10:00~10:30

**Fabrication of 3D hierarchical polyaniline-metal hybrid nanopillars for antibacterial application**

Jueun Kim, Nam-Ho Bae, Tae Jae Lee, Seok Jae Lee, and Kyoung G. Lee  
(*NNFC*)

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[TS04W\_P\_15]

10:00~10:30

**Development of stable exosome-embedded microbubbles for longer diagnosis and photodynamic-immune combination therapy**

Yongho Jang and Hyuncheol Kim  
(Sogang University)

[TS04W\_P\_16]

10:00~10:30

**Development of antibiotics nano-lipid drill nanoparticles**

YoungHeun Cho and Hyuncheol Kim  
(Sogang University)

[TS04W\_P\_17]

10:00~10:30

**Extremely uniform graphene oxide thin film as a universal platform for one-step biomaterial patterning**

Cheol-Hwi Kim<sup>1</sup>, Yoojung Han<sup>2</sup>, Hyungbin Son<sup>1</sup>, and Tae-Hyung Kim<sup>1</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Nanobase, Inc.)

[TS04W\_P\_18]

10:00~10:30

**A multifunctional platform that enables in-situ electrical detection of cell viability in multicellular brain cancer model**

Intan Rosalina Suhito, Kwang-Ho Lee, Cheol-Hwi Kim, and Tae-Hyung Kim  
(Chung-Ang University)

[TS04W\_P\_19]

10:00~10:30

**High-throughput cancer spheroid formation and drug screening platform**

Fu-Nan Ju, Kwang-Ho Lee, and Tae-Hyung Kim  
(Chung-Ang University)

[TS04W\_P\_20]

10:00~10:30

**Nanocomposite ink-based supercapacitor microarray**

Ho Yeon Lee, Hee Uk Lee, and Bong Geun Chung  
(Sogang University)

[TS04W\_P\_21]

10:00~10:30

**Surface modification of nanoparticle by phospholipid nanodrills for enhanced drug delivery**

Doyeon Kim and Hyuncheol Kim  
(Sogang University)

[TS04W\_P\_22]

10:00~10:30

**Guiding neuronal differentiation using homogeneous periodic nanohole pattern arrays**

Min-Ji Kang, Yeon-Woo Cho, and Tae-Hyung Kim  
(Chung-Ang University)

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[TS04W\_P\_23]

10:00~10:30

**Comparison of lung toxicity between diesel exhaust particulates and artificial particulate matter in mice**

Dong Im Kim<sup>1</sup>, Mi-Kyung Song<sup>1,2</sup>, Ji Eun Yuk<sup>1</sup>, and Kyuhong Lee<sup>1,2</sup>  
(<sup>1</sup>Korea Institute of Toxicology, <sup>2</sup>UST)

[TS04W\_P\_24]

10:00~10:30

**One-step assembly of multi-functional organic-inorganic nanoparticles for anti-inflammation and osteogenesis**

Hayeon Byun and Heungsoo Shin  
(Hanyang University)

[TS04W\_P\_25]

10:00~10:30

**Super-resolution dark-field microscopy for observing endosomal tug-of-war in live cells**

Siwoo Jin and Daeha Seo  
(DGIST)

[TS04W\_P\_26]

10:00~10:30

**Lipid-molecular motion analysis pipeline (Lipid-MAP): Separated phases observation using single-molecule tracking in living cells**

Jiseong Park and Daeha Seo  
(DGIST)

[TS04W\_P\_27]

10:00~10:30

**Optical microscopic observation and quantitative analysis of Au effect on semiconductor catalysts at single-particle level**

Yongdeok Ahn and Daeha Seo  
(DGIST)

[TS04W\_P\_28]

10:00~10:30

**Non-enzymatic glucose sensor without sample pretreatment via local pH modulation for use as in-situ monitoring device**

Woojae Jeong, Beomsang Kim, Jong-hyun Kwak, Akhsunkar Khazhmurat, and Heungjoo Shin  
(UNIST)



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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS04T\_P\_01]

10:00~10:30

**3D analysis of Raman spectroscopy based odontogenic differentiation of human dental pulp stem cell spheroids**

Chang Dae Kim<sup>1</sup>, Huijung Kim<sup>1</sup>, Yoojoong Han<sup>2</sup>, Hyungbin Son<sup>1</sup>, Hyung-Ryong Kim<sup>3</sup>, and Tae-Hyung Kim<sup>1</sup>

(<sup>1</sup>Chung-Ang University, <sup>2</sup>Nanobase, Inc., <sup>3</sup>Jeonbuk National University)

[TS04T\_P\_02]

10:00~10:30

**Electrical stimulation-based mRNA delivery to promote osteogenesis of human mesenchymal stem cell on polypyrrole-graphene oxide film**

Huijung Kim<sup>1</sup>, Kübra Solak<sup>2</sup>, Ahmet Mavi<sup>2</sup>, and Tae-Hyung Kim<sup>1</sup>

(<sup>1</sup>Chung-Ang University, <sup>2</sup>Atatürk University)

[TS04T\_P\_03]

10:00~10:30

**Detection of intracellular miRNA by Raman active DNA-Gold nanoparticle assembly**

Yeochan Yun, So-hee Ju, Jeongmin An, Hyeon Joong Kim, and Hyeon-Yeol Cho

(Kookmin University)

[TS04T\_P\_04]

10:00~10:30

**Slide glass-sized PMMA engraved with a CO<sub>2</sub> laser to create ddPCR droplets**

Rakyeom Kim and Hyun Gyu Park

(KAIST)

[TS04T\_P\_05]

10:00~10:30

**Single nanoparticle-dispersed nanopit arrays to accelerate in vitro neurogenesis**

Yeon-Woo Cho and Tae-Hyung Kim

(Chung-Ang University)

[TS04T\_P\_06]

10:00~10:30

**Eco-friendly synthesis of silver nanoparticles decorated reduced graphene oxide: its characterization and toxicological assessment studies**

Chandran Krishnaraj<sup>1</sup>, Ji Hyung Park<sup>1</sup>, Stacey Harper<sup>2</sup>, and Soon-Il Yun<sup>1</sup>

(<sup>1</sup>Jeonbuk National University, <sup>2</sup>Oregon State University)

[TS04T\_P\_07]

10:00~10:30

**Eco-friendly synthesis of chitosan nanoparticles, selenium nanoparticles, chitosan/selenium nanocomposites, silver nanoparticles, chitosan/silver nanocomposites and their biological as well as biosensing applications**

Chandran Krishnaraj<sup>1</sup>, Ji Hyung Park<sup>1</sup>, Nitin Nitin<sup>2</sup>, and Soon-Il Yun<sup>1</sup>

(<sup>1</sup>Jeonbuk National University, <sup>2</sup>University of California-Davis)

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[TS04T\_P\_08]

10:00~10:30

**Synthesis of gold and copper nanoparticles using plant leaves extract and its antibacterial and In vitro toxicological assessment studies**

Chandran Krishnaraj<sup>1</sup>, Soon Hark Kwona<sup>1</sup>, Ji Hyung Park<sup>1</sup>, Nitin Nitin<sup>2</sup>, Soon-Il Yun<sup>1</sup>  
(<sup>1</sup>Jeonbuk National University, <sup>2</sup>University of California-Davis)

[TS04T\_P\_09]

10:00~10:30

**Early detection of SARS-CoV-2 antibody responses in asymptomatic patients on ZnO nanowire-based immunoassay**

Jung Kim<sup>1</sup>, Sung Kyun Lee<sup>1</sup>, Jong-Hwan Lee<sup>1</sup>, Nam Hoon Kim<sup>1</sup>, Chang-Seop Lee<sup>2,3</sup>, and Hong Gi Kim<sup>1</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Jeonbuk National University Medical School, <sup>3</sup>Biomedical Research Institute of Jeonbuk National University Hospital)

[TS04T\_P\_10]

10:00~10:30

**Development of functional ophthalmic materials using natural materials and gold nanoparticles**

Su-Mi Shin, Hye-In Park, and A-Young Sung  
(Daegu Catholic University)

[TS04T\_P\_11]

10:00~10:30

**Development of 3D placenta-on-a-chip to analyze the effect of hypoxic environment on the initial formation of the placenta**

Jeong Uiechan, Seorin Jeong, Tae-Joon Jeon, and Sun Min Kim  
(Inha University)

[TS04T\_P\_12]

10:00~10:30

**Investigating trophoblast invasion under hypoxic conditions using a simple PDMS-based platform**

Gun Ko<sup>1</sup>, Ahmed Fuwad<sup>1</sup>, Gi Jin Kim<sup>2</sup>, Tae-Joon Jeon<sup>1</sup>, and Sun Min Kim<sup>1</sup>  
(<sup>1</sup>Inha University, <sup>2</sup>CHA University)

[TS04T\_P\_13]

10:00~10:30

**Signal variation reduction in SPR with uniformly decorated gold nanoparticle by thermal-annealing method**

Joon-Ha Park, Jeong-Hyeon Lee, Yeon-Woo Cho, and Tae-Hyung Kim  
(Chung-Ang University)

[TS04T\_P\_14]

10:00~10:30

**Non-destructive and label-free detection of mesenchymal stem cells multipotency using rGO-hybrid Au nanoelectrodes**

Jeong-Hyeon Lee, Yeon-Woo Cho, Joon-Ha Park, Min-Ji Kang, and Taehyung Kim  
(Chung-Ang University)

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[TS04T\_P\_15]

10:00~10:30

## Detection of enrofloxacin in milk using lateral flow Immunoassay

Jingon Yoo, Munirah Alhammadi, and Yun Suk Huh  
(*Inha University*)

[TS04T\_P\_16]

10:00~10:30

## Evaluation of toxicity of polypropylene microplastic particles according to micro and nano size

Hyeon Jin Seo<sup>1</sup>, Jong-Hwan Woo<sup>1</sup>, Isaac Kwabena Danso<sup>1,2</sup>, and Kyuhong Lee<sup>1,2</sup>  
(<sup>1</sup>*Korea Institute of Toxicology*, <sup>2</sup>*UST*)

[TS04T\_P\_17]

10:00~10:30

## Mesoporous silica constructed graphene oxide nanocomposite for NIR light-mediated dual phototherapy of colorectal cancer

Jae Hyun Lim<sup>1</sup>, Hyung Woo Choi<sup>1</sup>, Chan Woo Kim<sup>2</sup>, Eunmi Lee<sup>2</sup>, Jin-Moo Kim<sup>2</sup>, Kiyuk Chang<sup>2</sup>, and Bong Geun Chung<sup>1</sup>  
(<sup>1</sup>*Sogang University*, <sup>2</sup>*The Catholic University of Korea*)

[TS04T\_P\_18]

10:00~10:30

## Development of in vitro model of exosome transport in gut-brain axis

Gwang Myeong Seo<sup>1</sup>, Euna Jeong<sup>1</sup>, Donghyun Kim<sup>2</sup>, and Jong Hwan Sung<sup>1</sup>  
(<sup>1</sup>*Hongik University*, <sup>2</sup>*Yonsei University*)

[TS04T\_P\_19]

10:00~10:30

## Development of gut-liver-kidney multi-organ chip to mimic ADEM of drugs

Ko Byoung Ho, Lee Seung Yeon, Yang Da Yun, Lee Hae Jung, and Sung Jong Hwan  
(*Hongik University*)

[TS04T\_P\_20]

10:00~10:30

## Development of in vitro 3D unidirectional cerebral region circuit analytic platform by controlling the growth rate of neurites

Kyeong Seob Hwang<sup>1,2</sup>, Hyun Wook Kang<sup>2,3</sup>, Nakwon Choi<sup>2</sup>, Jongbaeg Kim<sup>1</sup>, and Hong Nam Kim<sup>2</sup>  
(<sup>1</sup>*Yonsei University*, <sup>2</sup>*KIST*, <sup>3</sup>*Korea University*)

[TS04T\_P\_21]

10:00~10:30

## 3D human glioblastoma in vitro platform for investigating the interaction between tumor microenvironment and glioblastoma

Eun U Seo and Hong Nam Kim  
(*KIST*)

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[TS04T\_P\_22]

10:00~10:30

**Development of a photonic switch via electro-capillarity-induced water penetration across a 10-nm gap**

Eui-Sang Yu, Taehyun Kim, Jongsu Lee, and Yong-Sang Ryu  
(KIST)

[TS04T\_P\_23]

10:00~10:30

**Study for the effect of carbon nanoparticles in the atmosphere on the brain diseases development**

Seongchan Kim and Hyojin Lee  
(KIST)

[TS04T\_P\_24]

10:00~10:30

**Formation and transplantation of 3D prevascularized tissue construct inspired by microphysiological system**

Seokyoung Bang<sup>1</sup>, Dongha Tahk<sup>2</sup>, Young Hwan Choi<sup>2</sup>, Hong Nam Kim<sup>1</sup>, Nathaniel S. Hwang<sup>2</sup>, and Noo Li Jeon<sup>2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Seoul National University)

[TS04T\_P\_25]

10:00~10:30

**PEGylated nanoparticle albumin-bound steroidal ginsenoside derivatives ameliorate SARS-CoV-2-mediated hyper-inflammatory responses**

Hyelim Kim<sup>1,2</sup>, Eun U Seo<sup>1</sup>, and Hong Nam Kim<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Yonsei University)

[TS04T\_P\_26]

10:00~10:30

**Hyperglycemic neurovasculature-on-a-chip to study the axis of diabetes and alzheimer's disease**

Minjeong Jang and Hong Nam Kim  
(KIST)

[TS04T\_P\_27]

10:00~10:30

**Deep learning-assisted droplet digital PCR analysis**

Young Suh Lee, Ji Wook Choi, and Bong Geun Chung  
(Sogang University)

[TS04T\_P\_28]

10:00~10:30

**Composite gelatin methacryloyl hydrogels incorporating osteoinductive and radical-scavenging nanoparticles for bone tissue regeneration**

Eunhyung Kim and Heungsoo Shin  
(Hanyang University)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS04F\_P\_01]

10:00~10:30

**Size control and enhanced sealing of 3D freestanding lipid bilayer (3D FLB) array by hydrostatic pressure and ac frequency variation**

Bong-Kyu Kim<sup>1,2</sup>, Dong-Hyun Kang<sup>1</sup>, Seok Chung<sup>2</sup>, and Tae Song Kim<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

[TS04F\_P\_02]

10:00~10:30

**Hydrogel-based hybridization chain reaction (HCR) for detection of urinary exosomal miRNAs as a diagnostic tool of prostate cancer**

Junbeom Kim<sup>1,2</sup>, Ji Sung Shim<sup>2</sup>, Bo Hoon Han<sup>1,3</sup>, Hye Jin Kim<sup>3</sup>, Jaesung Park<sup>4</sup>, Il-Joo Cho<sup>1,5,6</sup>, Sung Gu Kang<sup>2</sup>, Ji Yoon Kang<sup>1,6</sup>, Ki Wan Bong<sup>2</sup>, and Nakwon Choi<sup>1,2,6</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>Kyung Hee University, <sup>4</sup>POSTECH, <sup>5</sup>Yonsei University, <sup>6</sup>UST)

[TS04F\_P\_03]

10:00~10:30

**Label-free and washing-free electrochemical detection for target DNA using DNAzyme-incorporated probes**

Shin Chan Kang<sup>1</sup>, Sang Mo Lee<sup>1</sup>, Sujeong Shin<sup>2</sup>, Ki Soo Park<sup>3</sup>, and Hyun Gyu Park<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Ministry of Agriculture, <sup>3</sup>Konkuk University)

[TS04F\_P\_04]

10:00~10:30

**Retroreflection-associated upconversion luminescence biosensing for Salmonella detection**

Hoyeon Lee, Ka Ram Kim, Kyung Won Lee, Eun Kyeong Yang, Eunhye Park, and Hyun C. Yoon  
(Ajou University)

[TS04F\_P\_05]

10:00~10:30

**An ultrasensitive detection method for RNase H activity using fluorescent light-up aptamer**

Jinhwan Lee and Hyun Gyu Park  
(KAIST)

[TS04F\_P\_06]

10:00~10:30

**Development of 3D SERS platform for stomach cancer diagnosis based on three-dimensional plasmonic clusters.**

Minsu Jang<sup>1</sup>, You-Hwan Kim<sup>1</sup>, Ye-Ji Kim<sup>1</sup>, Eun-Jung Choi<sup>1</sup>, Cheol Woong Choi<sup>1</sup>, Jong-Min Lee<sup>2</sup>, and Jinwoo-Oh<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>Hallym University)

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[TS04F\_P\_07]

10:00~10:30

**Discrimination of the breathing compound in lung cancer patients and healthy subjects by a biosensor based on essential 20 amino acids.**

Gyeong Ha Bak<sup>1</sup>, Jong-Min Lee<sup>2</sup>, Eun Jung Choi<sup>1</sup>, and Jin-Woo Oh<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>Hallym University)

[TS04F\_P\_08]

10:00~10:30

**Paper-based point-of-care testing for rapid diagnosis of osteoarthritis biomarker**

So Yeon Park and Nae Yoon Lee  
(Gachon University)

[TS04F\_P\_09]

10:00~10:30

**Introduced a new fabrication method of colorimetric sensor derived tunable functional bacteriophages**

Nayeung Kim, Eun-Jung Choi, and Jinwoo-Oh  
(Pusan National University)

[TS04F\_P\_10]

10:00~10:30

**Deep learning-based circulating tumor cell detector for precision medicine**

Ahyeon Jeon, Seunghoon Kim, and Minseok S. Kim  
(DGIST)

[TS04F\_P\_11]

10:00~10:30

**CRISPR-based amplification-free viral DNAs detection with SERS-active gold nanoflower substrate**

Min-Yu Choi, Dong-Hyeok Park, and Jin-Ha Choi  
(Jeonbuk National University)

[TS04F\_P\_12]

10:00~10:30

**In Situ detection of neurotransmitters from stem cell-derived neuron at the single-cell level using graphene oxide (GO)-hybrid surface-enhanced raman scattering (SERS) nano array**

Dong-Hyeok Park, Min-Yu Choi, and Jin-Ha Choi  
(Jeonbuk National University)

[TS04F\_P\_13]

10:00~10:30

**Synthesis and characterization of very thin two-dimensional alpha-quartz nanoplates from amorphous silica nanoparticles as precursor for application of microalgal harvest**

Gyuseop Moon<sup>1</sup>, Nakyeong Lee<sup>2</sup>, You-Kwan Oh<sup>1</sup>, and Sungwook Chung<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>HNIBR)

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[TS04F\_P\_14]

10:00~10:30

## Electroceutical approaches to relieve sarcopenia

Min Young Kim<sup>1</sup>, Aseer Intisar<sup>1</sup>, Sohae Yang<sup>1</sup>, Hyun Young Shin<sup>2</sup>, and Minseok S. Kim<sup>1,2</sup>  
(<sup>1</sup>DGIST, <sup>2</sup>CTCELLS, Inc)

[TS04F\_P\_15]

10:00~10:30

## Molecular interpretation of intermolecular interaction between organic light emitting crystals and doped nucleic acid

Woo Hyuk Jung, Jin Hyuk Park, Seokho Kim, and Dong June Ahn  
(Korea University)

[TS04F\_P\_16]

10:00~10:30

## A photo-polymerized hydrogel ICC (PHI) technology for lossless rare cell analysis

Hyeongjung Woo, Seung-Hoon Kim, Taehoon Kim, and Minseok S. Kim  
(DGIST)

[TS04F\_P\_17]

10:00~10:30

## Strategic delivery of fibroblast growth factor using human serum albumin and porous silicon microparticles for enhanced wound care

Minju Kim and Jinmyoung Joo  
(UNIST)

[TS04F\_P\_18]

10:00~10:30

## Starfish derived collagen peptide-encapsulating elastic nanoliposomes for the cosmetic application

Seong-Beom Han<sup>1</sup>, Seung-chan Yang<sup>2</sup>, and Dong-Hwee Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Star's tech CO., Ltd.)

[TS04F\_P\_19]

10:00~10:30

## Irreversible conformational transition of polyethylene glycol on mesoporous surface for controlled drug release

Kyunghwan Kim, Suhyun Kim, and Jinmyoung Joo  
(UNIST)

[TS04F\_P\_20]

10:00~10:30

## Immunogenicity monitoring chip by incorporating cell growth and colorimetric paper-based analytical device function

Kyung Won Lee, Eun Kyeong Yang, Yujeong Oh, Ka Ram Kim, Hoyeon Lee, and Hyun C. Yoon  
(Ajou University)

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[TS04F\_P\_21]

10:00~10:30

**Pathogen gene determination using Loop-mediated isothermal amplification and non-spectroscopic optical setup**

Yujeong Oh, Yangwon Jin, Kyung Won Lee, Eun Kyeong Yang, Eunhye Park, and Hyun C. Yoon  
(Ajou University)

[TS04F\_P\_22]

10:00~10:30

**Magnetic nanoparticles-based continuous enrichment for biomarker isolating of transplant rejection**

Suhyun Kim and Jinmyoung Joo  
(UNIST)

[TS04F\_P\_23]

10:00~10:30

**DNA-based synthetic condensates as a computation hub**

Sungho Do, Chanseok Lee, Taehyun Lee, Do-Nyun Kim, and Yongdae Shin  
(Seoul National University)

[TS04F\_P\_24]

10:00~10:30

**Quantitative analysis of DNA using polydopamine coated lateral flow assay strip**

Seo Yeon Park and Nae Yoon Lee  
(Gachon University)

[TS04F\_P\_25]

10:00~10:30

**AAO-assisted large-yield AgNP array for localized surface plasmon resonance biosensor application**

Bao-Hua Zhu, Eun-Seong Kim, Sachin Mishra, Dong-Min Lee, and Nam-Young Kim  
(Kwangwoon University)

[TS04F\_P\_26]

10:00~10:30

**High-performance implantable bioelectrodes with immunocompatible topography for modulation of macrophage responses**

Sanghun Lee<sup>1</sup>, Junggeon Park<sup>1</sup>, Semin Kim<sup>1</sup>, Jehyung Ok<sup>2</sup>, Jung Il Yoo<sup>1</sup>, Yong Sook Kim<sup>3</sup>, Youngkeum Ahn<sup>3</sup>, Tae-il Kim<sup>2</sup>, Heung Cho Ko<sup>1</sup>, and Jae Young Lee<sup>1</sup>  
(<sup>1</sup>GIST, <sup>2</sup>Sungkyunkwan University, <sup>3</sup>Chonnam National University Hospital)

[TS04F\_P\_27]

10:00~10:30

**Conductive hydrogel incorporated three-dimensionally connected reduced graphene oxide networks for biomedical applications**

Junggeon Park, Nayeong Jeon, Sanghun Lee, Goeun Choe, Eunji Lee, and Jae Young Lee  
(GIST)

[TS04F\_P\_28]

10:00~10:30

**Magnetophoretic interparticle distance control and disaggregation by decoupler circuit**

Keonmok Kim, Hyeonseol Kim, Byeonghwa Lim, Jonghwan Yoon, Sri Ramulu Torati, and CheolGi Kim<sup>1</sup>  
(DGIST)



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## TS05. Nanomedicine

### Oral Presentation

Session Title	[TS05W2] Nanomedicine 1
Date & Time	July 6(Wed.), 2022 / 15:45~17:45
Place	Room 304
Session Chair(s)	Ji-Ho Park (KAIST)

[TS05W2\_I\_1] Invited 15:45~16:15

#### Potential and application of exosome-based intracellular delivery of therapeutic proteins

Chulhee Choi  
(KAIST)

[TS05W2\_O\_2] 16:15~16:30

#### GCC2-enriched extracellular vesicles acts as a promising biomarker and therapeutic target for lung adenocarcinoma

Byeong Hyeon Choi<sup>1</sup>, Yu Hua Quan<sup>1</sup>, Jiyun Rho<sup>1</sup>, Kyungsu Kim<sup>1</sup>, Yeonho Choi<sup>1</sup>, Yong Park<sup>1</sup>, Ji-Ho Park<sup>2</sup>, Sunghoi Hong<sup>1</sup>, and Hyun Koo Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>KAIST)

[TS05W2\_O\_3] 16:30~16:45

#### Green synthesized pectin-Ag nanocomposites for potential theranostic application

Anastasiia Saichuk, Aliaksei Ihnatsyeu-Kachan, Kseniya Hileuskaya, Aliaksandr Kraskouski, Viktoryia Kulikouskaya, and Sehoon Kim  
(UST)

[TS05W2\_O\_4] 16:45~17:00

#### Biofunctionalized carbon nanotubes for promoting neural regeneration

Hyun-Soo Kim<sup>1</sup>, Kam W. Leong<sup>1,2</sup>, Ji-Young Hwang<sup>3</sup>, Ueon Sang Shin<sup>1,2</sup>, and Hae-Won Kim<sup>1,2</sup>  
(<sup>1</sup>Dangook University, <sup>2</sup>Columbia University, <sup>3</sup>Korea Carbon Industry Promotion Agency)

[TS05W2\_O\_5] 17:00~17:15

#### Glycoengineered nanoparticles for drug delivery to the central nervous system

Chang-Hee Whang, Dohyeon Kim, and Sangyong Jon  
(KAIST)

[TS05W2\_O\_6] 17:15~17:30

#### Electrochemical detection of creatinine based on its chemical reaction with an electrochemical probe molecule

Dong Hun Kim, Jong Kwan Park, Aejin Lee, and Wan Soo Yun  
(Sungkyunkwan University)

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[TS05W2\_O\_7]

17:30~17:45

**PEG-functionalized hyaluronic acid-gold nanoparticles as niclosamide carriers for enhanced bioavailability**

You Jin Choi<sup>1,2</sup>, Hyoung-Mi Kim<sup>1</sup>, Won-Gun Koh<sup>2</sup>, and Junghun Park<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Yonsei University)

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## Oral Presentation

Session Title	[TS05T1] Nanomedicine 2
Date & Time	July 7(Thu.), 2022 / 10:30~12:00
Place	Room 304
Session Chair(s)	Yun-Sang Lee (Seoul National University Hospital)

[TS05T1\_I\_1] Invited 10:30~11:00

### (Cancer) Theranostics with radiolabeled nanomaterials

Weibo Cai  
(University of Wisconsin)

[TS05T1\_I\_2] Invited 11:00~11:30

### Multifunctional nanocarriers mediated interventional local immunotherapy

Dong-Hyun Kim<sup>1,2,3,4</sup>  
(<sup>1</sup>Northwestern University, <sup>2</sup>McCormick School of Engineering, <sup>3</sup>Robert H. Lurie Comprehensive Cancer Center, <sup>4</sup>University of Illinois at Chicago)

[TS05T1\_O\_3] 11:30~11:45

### Glucose-albumin nanoplatform for treating renal ischemia-reperfusion injury through improvement of mitochondrial function

Ji Yong Park<sup>1,2</sup>, Seung Hee Yang<sup>3</sup>, and Yun-Sang Lee<sup>1</sup>  
(<sup>1</sup>Seoul National University Hospital, <sup>2</sup>Seoul National University College of Dentistry, <sup>3</sup>Seoul National University Hospital)

[TS05T1\_O\_4] 11:45~12:00

### Biomimetic high-density lipoprotein-based nano-carrier for efficient delivery of hepatocellular carcinoma-targeting siRNA therapeutics

Aliaksei Ihnatsyeu-Kachan<sup>1,2</sup>, Olga Sharko<sup>3</sup>, Viktor Abashkin<sup>3</sup>, Anastasiia Saichuk<sup>1,2</sup>, Victoriya Zhogla<sup>3</sup>, Egor Ulashchik<sup>3</sup>, Andrei Bekish<sup>3</sup>, Vadim Shmanai<sup>3</sup>, Dzmitry Shcharbin<sup>3</sup>, and Sehoon Kim<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST, <sup>3</sup>National Academy of Sciences of Belarus)

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## Oral Presentation

Session Title	[TS05T2] Nanomedicine 3
Date & Time	July 7(Thu.), 2022 / 14:00~15:45
Place	Room 304
Session Chair(s)	Hyun Koo Kim (Korea University GURO Hospital)

[TS05T2\_I\_1] Invited 14:00~14:30

### Image-guided delivery of antiviral drugs to treat emerging COVID-19

Kai Bao<sup>1,2</sup>, Homan Kang<sup>1,2</sup>, and Hak Soo Choi<sup>1,2,3</sup>  
(<sup>1</sup>Harvard Medical School, <sup>2</sup>Massachusetts General Hospital, <sup>3</sup>Dana-Farber/Harvard Cancer Center)

[TS05T2\_O\_2] 14:30~14:45

### Macrophage targeted phototherapy of atherosclerotic plaques assessed by serial in vivo optical imaging

Joon Woo Song<sup>1</sup>, Jae Won Ahn<sup>2</sup>, Min Woo Lee<sup>3</sup>, Hyun Jung Kim<sup>1</sup>, Dong Oh Kang<sup>1</sup>, Ryeong Hyun Kim<sup>1</sup>, Ungyo Kang<sup>1</sup>, Yeon Hoon Kim<sup>4</sup>, Jeongmoo Han<sup>4</sup>, Ye Hee Park<sup>1</sup>, Hyeong Soo Nam<sup>4</sup>, Hongki Yoo<sup>4</sup>, Kyeongsoon Park<sup>2</sup>, and Jin Won Kim<sup>1</sup>  
(<sup>1</sup>Korea University Guro Hospital, <sup>2</sup>Chung-Ang University, <sup>3</sup>Hanyang University, and <sup>4</sup>KAIST)

[TS05T2\_O\_3] 14:45~15:00

### Nanosensor for simultaneous detection of mRNAs involved in cancer related signaling pathway for monitoring the efficacy of anticancer therapeutic agent in living cells

Seong Min Ahn and Dal-Hee Min  
(Seoul National University)

[TS05T2\_O\_4] 15:00~15:15

### Lymph-directed self-immolative nitric oxide prodrug for inhibition of intractable metastatic cancer

Taejeong Kim and Won Jong Kim  
(POSTECH)

[TS05T2\_O\_5] 15:15~15:30

### Ultrasmall Gd<sub>2</sub>O<sub>3</sub> nanoparticle as potential dual imaging agent

Dejun Zhao and Gang Ho Lee  
(Kyungpook National University)

[TS05T2\_O\_6] 15:30~15:45

### Phase 1 trial evaluating safety of the novel surgical technique using macrophage target sentinel lymph node tracer with indocyanine green for intraoperative sentinel lymph nodes detection in lung cancer patients

Jun Hee Lee<sup>1</sup>, Jae Seon Eo<sup>1</sup>, Hwan Seok Yong<sup>1</sup>, Jiyun Rho<sup>1</sup>, Byeong Hyeon Choi<sup>1</sup>, Yu Hua Quan<sup>1</sup>, Yun Sang Lee<sup>2</sup>, Jae Min Jeong<sup>2</sup>, and Hyun Koo Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Seoul National University)

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## Oral Presentation

Session Title	[TS05T3] Nanomedicine 4
Date & Time	July 7(Thu.), 2022 / 16:00~17:45
Place	Room 304
Session Chair(s)	Won Jong Kim (POSTECH)

[TS05T3\_I\_1] Invited 16:00~16:30

### Cancer diagnosis by deep-learning based plasma exosome analysis

HyunKu Shin<sup>2</sup>, and Yeonho Choi<sup>1,2</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Expert Cooperation)

[TS05T3\_I\_2] Invited 16:30~17:00

### Targeted delivery of PPAR gamma agonist via a mannose receptor for atherosclerosis therapy

Kyeongsoon Park  
(Chung-Ang University)

[TS05T3\_O\_3] 17:00~17:15

### Optimization of indocyanine green for intraoperative fluorescence imageguided thoracoscopic resection of lung cancer

Yu Hua Quan, Byeong Hyeon Choi, Jiyun Rho, Jun Hee Lee, Jinhwan Lee, Beop-Min Kim, and Hyun Koo Kim  
(Korea University)

[TS05T3\_O\_4] 17:15~17:30

### Reusable electrochemical microgap sensor for the detection of H1N1 nucleoproteins

Sanghyeon Park, Jonghwan Lim, Eun Bin Kang, Seunghun Kim, and Wan Soo Yun  
(Sungkyunkwan University)

[TS05T3\_O\_5] 17:30~17:45

### In Vivo self-degradable graphene nanomedicine operated by DNAzyme and photo-switch for controlled anti-cancer therapy

Hyori Lee<sup>1</sup>, Jinhwan Kim<sup>1</sup>, and Won Jong Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>OmniaMed Co., Ltd.)

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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS05B\_P\_01]

10:00~10:30

**Simultaneous fluorescence visualization of lung cancer and intersegmental planes using indocyanine green during segmentectomy**

Kyungsu Kim<sup>1</sup>, Byeong Hyeon Choi<sup>1,2</sup>, Jiyun Rho<sup>1</sup>, Jun Hee Lee<sup>1</sup>, Beop-Min Kim<sup>2</sup>, Yu Hua Quan<sup>1</sup>, and Hyun Koo Kim<sup>1</sup>  
(<sup>1</sup>Korea University College of Medicine, <sup>2</sup>Korea University)

[TS05B\_P\_02]

10:00~10:30

**Fabrication and characterization of highly biocompatible silica nanocarriers decorated with polyethylene glycol and graphene oxide nanosheets**

Tae-Lin Kim and Sang-Wha Lee  
(Gachon University)

[TS05B\_P\_03]

10:00~10:30

**Immunostimulation of tumor microenvironment by targeting tumor-associated macrophage with hypoxia-responsive nanocomplex for enhanced anti-tumor therapy**

Yeoul Kang, Junha Lim, and Won Jong Kim  
(POSTECH)

[TS05B\_P\_04]

10:00~10:30

**Real-time in vivo imaging and therapeutic effects of high-risk plaque using dectin-1 receptor targeted theranostic agent**

Jin Hyuk Kim<sup>1</sup>, Jae Won Ahn<sup>2</sup>, Hyun Jung Kim<sup>1</sup>, Ryeong Hyun Kim<sup>1</sup>, Ye Hee Park<sup>1</sup>, Ungyo Kang<sup>3</sup>, Hongki Yoo<sup>3</sup>, Kyeongsoo Park<sup>2</sup>, and Jin Won Kim<sup>1</sup>  
(<sup>1</sup>Korea University Guro Hospital, <sup>2</sup>Chung-Ang University, <sup>3</sup>KAIST)

[TS05B\_P\_05]

10:00~10:30

**Dual-channel near-infrared fluorescence imaging for simultaneous identification of lung cancer and intersegmental plane**

Yu Hua Quan<sup>1</sup>, Kai Bao<sup>2</sup>, Kyungsu Kim<sup>1</sup>, Haoran Wang<sup>2,3</sup>, Shinya Yokomizo<sup>2</sup>, G. Kate Park<sup>2</sup>, Byeong Hyeon Choi<sup>1</sup>, Jiyun Rho<sup>1,2</sup>, Chungyeul Kim<sup>3</sup>, Hak Soo Choi<sup>2</sup>, and Hyun Koo Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Massachusetts General Hospital and Harvard Medical School, <sup>3</sup>Shenyang Pharmaceutical University)

[TS05B\_P\_06]

10:00~10:30

**Hyaluronan-coated Prussian blue nanoparticles relieve LPS-induced peritonitis by suppressing oxidative species generation in tissue-resident macrophages**

Ansuja Pulickal Mathew, Aditya Narayanan Mohaptra, Arathy Vasukutty, and In-Kyu Park  
(Chonnam National University)

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[TS05B\_P\_07]

10:00~10:30

**Human neural stem cell-derived extracellular vesicles protect against parkinson's disease pathologies**

Eun Ji Lee<sup>1,2</sup>, Yoori Choi<sup>1,2</sup>, Hong J Lee<sup>3,4</sup>, Do Won Hwang<sup>1,5</sup>, and Dong Soo Lee<sup>1,2</sup>

(<sup>1</sup>Seoul National University, <sup>2</sup>Seoul National University Hospital, <sup>3</sup>Chungbuk National University, <sup>4</sup>huMetaCELL Inc., <sup>5</sup>THERABEST, Inc.)

[TS05B\_P\_08]

10:00~10:30

**Glioblastoma targeted drug delivery: A new homing peptide with porous silicon nanoparticles**

Rae Hyung Kang and Dokyoung Kim

(Kyung Hee University)

[TS05B\_P\_09]

10:00~10:30

**Improvement of motor function through knockout of MSTN gene using silica nanoparticles**

Se-Youl Chae<sup>1</sup>, and Dal-Hee Min<sup>1,2</sup>

(<sup>1</sup>Seoul National University, <sup>2</sup>Lemonex Inc.)

[TS05B\_P\_10]

10:00~10:30

**Graphene oxide-based biosensor for intracellular nucleic acid detection and application to cell-based screening**

Yeajee Yim and Dal-Hee Min

(Seoul National University)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS05W\_P\_01]

10:00~10:30

**N-Methyl-D-aspartate receptors (NMDAR) as novel M1 macrophage-specific biomedical imaging nanoplatform agents: Feasibility of targeted imaging in inflammatory mice model**

Sang Bong Lee<sup>1</sup>, Hui-Jeon Jeon<sup>2</sup>, Yong Hyun Jeon<sup>2</sup>, and Do Won Hwang<sup>1</sup>  
(<sup>1</sup>THEABEST IND., <sup>2</sup>KMEDIhub)

[TS05W\_P\_02]

10:00~10:30

**Synthesis and characterization of ultrasmall platinum nanoparticles surface coated by different kinds of ligand as a high-performance CT contrast agent**

Abdullah Al Saidi and Gang Ho Lee  
(Kyungpook National University)

[TS05W\_P\_03]

10:00~10:30

**Ultrasmall YEuO<sub>3</sub> nanoparticles surface-coated by polyacrylic acid (PAA)**

Ying Liu and Gang Ho Lee  
(Kyungpook National University)

[TS05W\_P\_04]

10:00~10:30

**Comparison of biodistribution according to administration route for the development of liposome therapeutics**

Ran Ji Yoo, Tae Hyeon Choi, Ji Yong Park, Jin Sil Kim, and Yun-Sang Lee  
(Seoul National University)

[TS05W\_P\_05]

10:00~10:30

**GCC2 enriched extracellular vesicles in cancer-draining pulmonary blood plasma as an informative biomarker in patients underwent lung cancer surgery**

Byeong Hyeon Choi<sup>1</sup>, Yu Hua Quan<sup>1</sup>, Jiyun Rho<sup>1</sup>, Kyungsu Kim<sup>1</sup>, Yeonho Choi<sup>1</sup>, Yong Park<sup>1</sup>, Ji-Ho Park<sup>2</sup>, Sunghoi Hong<sup>1</sup>, and Hyun Koo Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>KAIST)

[TS05W\_P\_06]

10:00~10:30

**A feasible phenylboronic acid-based delivery platform of immune checkpoint blockade for effective cancer immunotherapy**

Junha Lim<sup>1</sup>, Junseok Lee<sup>1</sup>, Sungjin Jung<sup>1</sup>, and Won Jong Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>OmniaMed Co., Ltd.)

[TS05W\_P\_07]

10:00~10:30

**Aptamer-gold nanoconstruct coated with polymer for treatment of inflammatory disease**

Jinseong Kim<sup>1</sup>, Hyeongmok Park<sup>1</sup>, and Won Jong Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>OmniaMed Co, Ltd.)



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[TS05W\_P\_08]

10:00~10:30

**Disassembly of polymeric micelles by enzyme-triggered depolymerization for tumor-targeted drug delivery**

Jaehyun Park<sup>1</sup>, Seokhee Jo<sup>1</sup>, and Won Jong Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>OmniaMed Co., Ltd.)

[TS05W\_P\_09]

10:00~10:30

**Protein-based calcium phosphate nanoparticles with tumor targeting for endosomal escape in cancer therapy**

Eunsu Kim, Suheon Kim, Hoomin Lee, Kwanwoo Kim, and Yun Suk Huh  
(Inha University)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS05T\_P\_01]

10:00~10:30

**In vitro photoactivation effect of scavenger receptor-a targeted chlorin e6 on macrophage-derived foam cells**

Joon Woo Song<sup>1</sup>, Jae Won Ahn<sup>2</sup>, Min Woo Lee<sup>3</sup>, Hyun Jung Kim<sup>1</sup>, Dong Oh Kang<sup>1</sup>, Ryeong Hyun Kim<sup>1</sup>, Ungyo Kang<sup>1</sup>, Yeon Hoon Kim<sup>4</sup>, Jeongmoo Han<sup>4</sup>, Ye Hee Park<sup>1</sup>, Hyeong Soo Nam<sup>4</sup>, Hongki Yoo<sup>4</sup>, Kyeongsoon Park<sup>2</sup>, and Jin Won Kim<sup>1</sup>  
(<sup>1</sup>Korea University Guro Hospital, <sup>2</sup>Chung-Ang University, <sup>3</sup>Hanyang University, and <sup>4</sup>KAIST)

[TS05T\_P\_02]

10:00~10:30

**EGFR mutation detection by surface enhanced raman spectroscopy (SERS)**

Seungmin Kim<sup>1</sup>, Byeong Hyeon Choi<sup>1</sup>, Hyunku Shin<sup>2</sup>, Hyun Koo Kim<sup>1,3</sup>, and Yeonho Choi<sup>1,2</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Expert Corporation, <sup>3</sup>Korea University Guro Hospital)

[TS05T\_P\_03]

10:00~10:30

**Systematic engineering and In vivo screening of glyco-nanoparticle library for organotropic drug delivery**

Dohyeon Kim and Sangyong Jon  
(KAIST)

[TS05T\_P\_04]

10:00~10:30

**Nanovaccine displaying immunodominant T cell epitopes of fibroblast activation protein is effective against desmoplastic tumors**

Hoehcol Shin, Yujin Kim, and Sangyong Jon  
(KAIST)

[TS05T\_P\_05]

10:00~10:30

**Biotinylated polyethylene glycol anchored magnetotactic bacteria for enhanced biodistribution of drugs**

Richa Chaturvedi, Yumin Kang, Yunji Eom, Sri Ramulu Torati, and CheolGi Kim  
(DGIST)

[TS05T\_P\_06]

10:00~10:30

**Highly optimized iron oxide embedded poly (Lactic Acid) nanocomposites for effective magnetic hyperthermia and biosecurity**

Chiseon Ryu<sup>1</sup>, Hwangjae Lee<sup>1</sup>, Hohyeon Kim<sup>1</sup>, Seong Hwang<sup>1</sup>, Yaser Hadadian<sup>1</sup>, Ayeskanta Mohanty<sup>2</sup>, In-Kyu Park<sup>2</sup>, Beongki Cho<sup>1</sup>, Jungwon Yoon<sup>1</sup>, and Jae Young Lee<sup>1</sup>  
(<sup>1</sup>GIST, <sup>2</sup>Chonnam National University)

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[TS05T\_P\_07]

10:00~10:30

## Diabetes typing based on integrated nanogap sensor

Aejin Lee, Jong Kwan Park, Dong Hun Kim, Cho Yeon Lee, and Wan Soo Yun  
(Sungkyunkwan University)

[TS05T\_P\_08]

10:00~10:30

## Electrochemical biosensor for multiplexed detection of nucleoproteins from H1N1 a virus and SARS-CoV-2

Eun Bin Kang, Sanghyeon Park, Jonghwan Lim, Seunghun Kim, and Wan Soo Yun  
(Sungkyunkwan University)

[TS05T\_P\_09]

10:00~10:30

## Multiple strategic electrochemical biosensor for the detection of low-concentration influenza a virus

Jonghwan Lim, Sanghyeon Park, Eun Bin Kang, Seul Bin Ha, Seunghun Kim, and Wan Soo Yun  
(Sungkyunkwan University)

[TS05T\_P\_10]

10:00~10:30

## Electrochemical sensing of low concentration aspergillus niger with the use of multi-gap devices

Semee Kim, Jisu Lee, Jihee Chae, Seunghun Kim, and Wan Soo Yun  
(Sungkyunkwan University)

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## TS06. Nanoelectronic Devices

### Oral Presentation

Session Title	[TS06W1] Nanoelectronic Devices 1
Date & Time	July 6(Wed.), 2022 / 10:30~12:00
Place	Room 209
Session Chair(s)	Gunuk Wang (Korea University)

[TS06W1\_I\_1] Invited 10:30~11:00

**Defect control in 2D materials: from magnetism to bio-applications and catalysis**

Mauricio Terrones  
(The Pennsylvania State University)

[TS06W1\_I\_2] Invited 11:00~11:30

**Green nanoelectronics made from microbial protein nanowires**

Jun Yao  
(University of Massachusetts)

[TS06W1\_O\_3] 11:30~11:45

**Wettability regulation for ultrathin Ag layers via Ag-ZnO interface engineering**

Taehyeong Lee and Dooho Choi  
(Dong-Eui University)

[TS06W1\_O\_4] 11:45~12:00

**Ar<sup>+</sup> -mediated physicochemical alteration for simultaneous enhancement in visible transparency and electrical conductivity**

Vo Thi Bao Tran and Dooho Choi  
(Dong-Eui University,)

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## Oral Presentation

Session Title	[TS06W2] Nanoelectronic Devices 2
Date & Time	July 6(Wed.), 2022 / 15:45~17:45
Place	Room 209
Session Chair(s)	Min-Kyu Joo (Sookmyung Women's University)

[TS06W2\_I\_1] Invited 15:45~16:15

### Ultra clean contacts on two dimensional semiconductors

Manish Chhowalla  
(University of Cambridge)

[TS06W2\_O\_2] 16:15~16:30

### High performance IR photodetector based on n-MoS<sub>2</sub>/graphene/p-Si heterostructure

Woojin Park, Wondeok Seo, and Byungjin Cho  
(Chungbuk National University)

[TS06W2\_O\_3] 16:30~16:45

### Force-sensing thin film transistors based on a piezoelectric semiconductor (ZnO) for scalable tactile sensor arrays

Hongseok Oh  
(Soongsil University)

[TS06W2\_O\_4] 16:45~17:00

### The study of polymer-based piezoelectric materials to optimize piezoelectric properties of membrane devices

Ganghee Lee, Shaheer Mohiuddin Khalil, Jaewoo Joung, Daehyun Cho, and Doyoung Byun  
(Sungkyunkwan University)

[TS06W2\_O\_5] 17:00~17:15

### Study of interface traps in two-dimensional WSe<sub>2</sub> field-effect transistors

Fida Ali, Hyungyu Choi, Nasir Ali, Tien Dat Ngo, Myeongjin Lee, Won-Kyu Park, and Won Jong Yoo  
(Sungkyunkwan University)

[TS06W2\_O\_6] 17:15~17:30

### Impacts of mechanical stress engineering on feedback field effect transistor

Jaehyuk Lim<sup>1</sup> and Changhwan Shin<sup>2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Korea University)

[TS06W2\_O\_7] 17:30~17:45

### Effect of reverse switching on charge boost in metal-ferroelectric-metal and metal-insulator-ferroelectric-metal capacitors

Gwon Kim<sup>1</sup> and Changhwan Shin<sup>2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Korea University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS06T1] Nanoelectronic Devices 3</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.), 2022 / 10:30~12:00</b>
<b>Place</b>	<b>Room 209</b>
<b>Session Chair(s)</b>	<b>Byungjin Cho (Chungbuk National University)</b>

**[TS06T1\_I\_1] Invited** **10:30~11:00**

### **Nanoelectronics for cognition-on-chip systems**

Muhammad Hussain  
(Purdue University)

**[TS06T1\_O\_2]** **11:00~11:15**

### **Chemiresistive nano gas sensors based on molybdenum disulfide thin-film transistors for bioelectronic applications**

Sang-Joon Park, Jun-Young Jeon, and Tae-Jun Ha  
(Kwangwoon University)

**[TS06T1\_O\_3]** **11:15~11:30**

### **Re-configurable logic and memory device using multi-gate feedback field effect transistor**

Misun Cha, Jun Hyeong Lee, and Min-Woo Kwon  
(Gangneung-Wonju National University)

**[TS06T1\_O\_4]** **11:30~11:45**

### **Non-synthetic phonon managements for soft semiconductors**

Sae Byeok Jo  
(Sungkyunkwan University)

**[TS06T1\_O\_5]** **11:45~12:00**

### **A monolithic 3-dimensional integrated static random access memory containing a feedback field effect transistor**

Jong Hyeok Oh and Yun Seop Yu  
(Hankyong National University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS06T2] Nanoelectronic Devices 4</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.), 2022 / 14:00~15:45</b>
<b>Place</b>	<b>Room 209</b>
<b>Session Chair(s)</b>	<b>Ki Kang Kim (Sungkyunkwan University)</b>

**[TS06T2\_I\_1] Invited** **14:00~14:30**

**Electrical properties of organic- or TMDC-based FETs with molecular treatment**

Takhee Lee  
(*Seoul National University*)

**[TS06T2\_O\_2]** **14:30~14:45**

**Anisotropic carrier transport in rhenium disulfide using 1D edge contact**

Myeongjin Lee, Nasir Ali, and Won Jong Yoo  
(*Sungkyunkwan University*)

**[TS06T2\_O\_3]** **14:45~15:00**

**Design optimization of vertical N+ pocket p-n-p-n tunnel field-effect transistor with double metal-gate layers**

Juho Sung<sup>1</sup> and Changhwan Shin<sup>2</sup>  
(<sup>1</sup>*Sungkyunkwan University*, <sup>2</sup>*Korea University*)

**[TS06T2\_O\_4]** **15:00~15:15**

**Investigation of three-dimensional graphene/nickel foam as a label-free urine neutrophil gelatinase-associated lipocalin electrochemical sensor for early diagnosis of acute kidney injury**

Netnapa Sittihakote<sup>1</sup>, Sirirat Anutrakulchai<sup>1</sup>, Ubon Cha'on<sup>1</sup>, Pobporn Danvirutai<sup>2</sup>, and Chavis Srichan<sup>1</sup>  
(<sup>1</sup>*Khon Kaen University*, <sup>2</sup>*T. Robotics, Co. Ltd.*)

**[TS06T2\_O\_5]** **15:15~15:30**

**Materials-enabled stretchable, flexible, and wearable electronics and their biomedical applications**

Nadeem Qaiser<sup>1</sup>, Maha Nour<sup>2</sup>, and Vincent Tung<sup>1</sup>  
(<sup>1</sup>*King Abdullah University of Science and Technology*, <sup>2</sup>*Research & Development Center*)

**[TS06T2\_O\_6]** **15:30~15:45**

**Low-frequency noise characteristics of ferroelectric tunnel junction**

Wonjun Shin<sup>1</sup>, Kyung Kyu Min<sup>2</sup>, Daewoong Kwon<sup>3</sup>, and Jong-Ho Lee<sup>1</sup>  
(<sup>1</sup>*Seoul National University*, <sup>2</sup>*SK Hynix Inc.*, <sup>3</sup>*Inha University*)

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## Oral Presentation

Session Title	[TS06T3] Nanoelectronic Devices 5
Date & Time	July 7(Thu.), 2022 / 16:00~17:45
Place	Room 209
Session Chair(s)	Jiyong Woo (Kyungpook National University)

[TS06T3\_I\_1] Invited 16:00~16:30

### Basics and current status of ferroelectric devices

Thomas Mikolajck<sup>1,2</sup>  
(<sup>1</sup>NaMLab, <sup>2</sup>Dresden University of Technology)

[TS06T3\_O\_2] 16:30~16:45

### Interfacial trap analysis for optimization of Al composition in AlGaN/GaN high electron mobility transistors

Walid Amir, Ki-Yong Shin, Ju-Won Shin, Surajit Chakraborty, and Tae-Woo Kim  
(University of Ulsan)

[TS06T3\_O\_3] 16:45~17:00

### Gate current degradation and critical voltage dependencies increasing Lsd of AlGaN/GaN high electron mobility transistor

Surajit Chakraborty, Ki-Yong Shin, Ju-Won Shin, Walid Amir, and Tae-Woo Kim  
(University of Ulsan)

[TS06T3\_O\_4] 17:00~17:15

### Reduction of pass gate effect with spherical shallow trench isolation in BCAT structure

Yeon Seok Kim, Chang Young Lim, and Min-Woo Kwon  
(Gangneung-Wonju National University)

[TS06T3\_O\_5] 17:15~17:30

### Vertical double-gate heterostructure InGaAs TFETs with a swing of 58 mV/decade and a maximum $g_m$ of 141 $\mu S/\mu m$

Ji-Min Baek<sup>1</sup>, Tae-Woo Kim<sup>2</sup>, and Dae-Hyun Kim<sup>1</sup>  
(<sup>1</sup>Kyungpook National University, <sup>2</sup>University of Ulsan)

[TS06T3\_O\_6] 17:30~17:45

### In<sub>x</sub>Ga<sub>1-x</sub>As quantum-well high-electron-mobility transistors: From the mobility relevant to ballistic transport regimes

Hyeon-Bhin Jo<sup>1</sup>, Ji-Hoon Yoo<sup>1</sup>, Hyeon-Seok Jung<sup>1</sup>, Wan-Soo Park<sup>1</sup>, In-Geun Lee<sup>1</sup>, Sethu Merin George<sup>1</sup>, Sang-Kuk Kim<sup>2</sup>, Jacob Yun<sup>2</sup>, Ted Kim<sup>2</sup>, Takuya Tsutsumi<sup>3</sup>, Hiroki Sugiyama<sup>3</sup>, Hideaki Matsuzaki<sup>3</sup>, and Dae-Hyun Kim<sup>1</sup>  
(<sup>1</sup>Kyungpook National University, <sup>2</sup>QSI, <sup>3</sup>NTT Device Technology Laboratories)



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## Oral Presentation

Session Title	[TS06F1] Nanoelectronic Devices 6
Date & Time	July 8(Fri.), 2022 / 10:30~12:00
Place	Room 209
Session Chair(s)	Hongseok Oh (Soongsil University)

[TS06F1\_I\_1] Invited 10:30~11:00

**Nanoelectronic activation neurons for full hardware implementation of neural networks**

Duygu Kuzum  
(University of California San Diego)

[TS06F1\_O\_2] 11:00~11:15

**Light-stimulated long-term potentiation behavior enabled by HfO<sub>2</sub>/InGaZnO synaptic structure**

Seyoung Oh and Byungjin Cho  
(Chungbuk National University)

[TS06F1\_O\_3] 11:15~11:30

**Neuromorphic image sensor array inspired by human synapse for machine vision applications**

Changsoon Choi  
(KIST)

[TS06F1\_O\_4] 11:30~11:45

**Synaptic device based on ferroelectric tunnel junctions with semiconducting SWCNT**

Hyeonjin Cha, Dong Jun Jang, Hyunwoo Ryu, Na-Young Lee, and Min-Woo Kwon  
(Gangneung-Wonju National University)

[TS06F1\_O\_5] 11:45~12:00

**Artificial neuron based on nanorod structured silicon oxide memristor for probabilistic computing application**

Sanghyeon Choi<sup>1</sup>, Gwang Su Kim<sup>1,2</sup>, Jehyeon Yang<sup>1</sup>, Haein Cho<sup>1</sup>, Chong-Yun Kang<sup>1,2</sup>, and Gunuk Wang<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>KIST)

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## Oral Presentation

<b>Session Title</b>	<b>[TS06F2] Nanoelectronic Devices 7</b>
<b>Date &amp; Time</b>	<b>July 8(Fri.), 2022 / 14:00~16:00</b>
<b>Place</b>	<b>Room 209</b>
<b>Session Chair(s)</b>	<b>Jehyung Kim (UNIST)</b>

**[TS06F2\_I\_1] Invited** **14:00~14:30**

### **Quantum nanophotonics with hexagonal boron nitride**

Igor Aharonovich<sup>1,2</sup>

(<sup>1</sup>University of Technology Sydney, <sup>2</sup>ARC Centre of Excellence for Transformative Meta-Optical Systems)

**[TS06F2\_O\_2]** **14:30~14:45**

### **Extremely fast heating capability of planar cu layer transparent heater**

Jaeun Lim and Dooho Choi

(Dong-Eui University,)

**[TS06F2\_O\_3]** **14:45~15:00**

### **Highly moisture-impermeable Al<sub>2</sub>O<sub>3</sub> barrier for optoelectronics**

Si Hyeon Joo and Dooho Choi

(Dong-Eui University)

**[TS06F2\_O\_4]** **15:00~15:15**

### **Plug-and-play single photon emitter at telecom band with efficient quantum dot-fiber interface**

Woong Bae Jeon<sup>1</sup>, Jong Sung Moon<sup>1</sup>, Kyu-Young Kim<sup>1</sup>, Young-Ho Ko<sup>2</sup>, Christopher J. K. Richardson<sup>3</sup>, Edo Waks<sup>3,4</sup>, and Je-Hyung Kim<sup>1</sup>

(<sup>1</sup>UNIST, <sup>2</sup>ETRI, <sup>3</sup>University of Maryland, <sup>4</sup>University of Maryland and the National Institute of Standards and Technology)

**[TS06F2\_O\_5]** **15:15~15:30**

### **Charged moiré excitons in 2D materials**

Hyeonjun Baek

(Sogang University)

**[TS06F2\_O\_6]** **15:30~15:45**

### **Mechanism analysis of emissive color shift in DC voltage driven organic light-emitting diodes with a single-cell structure**

Tae Jun Ahn<sup>1,2</sup>, Bum Ho Choi<sup>3</sup>, Young Baek Kim<sup>2</sup>, and Yun Seop Yu<sup>1</sup>

(<sup>1</sup>Hankyong National University, <sup>2</sup>KITECH, <sup>3</sup>PJPTECH)

**[TS06F2\_O\_7]** **15:45~16:00**

### **Energy-band engineering by remote doping of self-assembled monolayers leads to high-performance IGZO/p-Si heterostructure photodetectors**

Gunhoo Woo<sup>1</sup>, Hocheon Yoo<sup>2</sup>, and Taesung Kim<sup>1,2</sup>

(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Gachon University)

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	<b>Best Poster Award Candidate Presentation</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30</b> *Exact dates of each poster will be announced separately.
<b>Place</b>	<b>Exhibition Hall 5</b>

[TS06B\_P\_01]

10:00~10:30

**Impact of structural variations of buried-channel-array-transistor (BCAT) on its electrical characteristics**

Minjae Sun<sup>1,2</sup>, Hyoungwon Baac<sup>1</sup>, and Changhwan Shin<sup>3</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Samsung Electronics Co., Ltd., <sup>3</sup>Korea University)

[TS06B\_P\_02]

10:00~10:30

**Dopamine sensing for neurotransmitter-mediated synaptic devices based on molybdenum(VI) oxide**

Duc Minh Tran<sup>1</sup>, Jong Wan Son<sup>2</sup>, and Bae Ho Park<sup>1</sup>  
(<sup>1</sup>Konkuk University, <sup>2</sup>KRISS)

[TS06B\_P\_03]

10:00~10:30

**Study on the  $V_{DD}$  scalability of complementary ternary logic circuit using stack channel ternary thin film transistor**

Kiyung Kim, Youngsu Lee, Hae-won Lee, Heejin Kwon, and Byoung Hun Lee  
(POSTECH)

[TS06B\_P\_04]

10:00~10:30

**Tunable visible emission of mixed halide zero-dimensional perovskites synthesized via mechanochemistry**

Hyungbin Lim, Kyeong-Yoon Baek, Jae Il Kim, Jonghoon Lee, Woocheol Lee, Jaeyoung Kim, Heebeom Ahn, Junwoo Kim, Tae-Woo Lee, Keehoon Kang, and Takhee Lee  
(Seoul National University)

[TS06B\_P\_05]

10:00~10:30

**Study on the stability of SnO<sub>2</sub> stack channel ternary device**

Hae-Won Lee, So-Young Kim, Ho-In Lee, Yongsu Lee, Seung-Mo Kim, Hyeon Jun Hwang, and Byoung Hun Lee  
(POSTECH)

[TS06B\_P\_06]

10:00~10:30

**Optimization of DNTT-based thin film transistor and its ternary application**

Heejin Kwon, Yongsu Lee, Ho-In Lee, Kiyung Kim, Hae-Won Lee, Minjae Kim, Jae Hyeon Jun, Hyeon Jun Hwang, and Byoung Hun Lee  
(POSTECH)

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[TS06B\_P\_07]

10:00~10:30

**Reliability analysis based on trap behavior of InAlAs/InGaAs metamorphic HEMTs with pulsed IV and 1/f noise measurement**

Ki-Yong Shin, Ju-Won Shin, Walid Amir, Surajit Chakraborty, and Tae-Woo Kim  
(University of Ulsan)

[TS06B\_P\_08]

10:00~10:30

**IGZO TFT with embedded Rf-sputtered AlO<sub>x</sub> film for synaptic transistor applications**

Yeojin Lee, Hyerin Jo, Hyobin Yoo, Hyeonjun Baek, and Hongseok Oh  
(Soongsil University)

[TS06B\_P\_09]

10:00~10:30

**Investigation of characteristics due to plasma treatment effects of AlGaIn/GaN HEMT on SiC Substrates**

Ju-Won Shin, Ki-Yong Shin, Walid Amir, Surajit Chakraborty, and Tae-Woo Kim  
(University of Ulsan)

[TS06B\_P\_10]

10:00~10:30

**Superior chemical sensing performance of hydrogen-substituted graphdiyne**

Yoon Tae Nam, Hohyung Kang, Sanggyu Chong, Jihan Kim, and Hee-Tae Jung  
(KAIST)

[TS06B\_P\_11]

10:00~10:30

**Impact of state-stability of HfO<sub>x</sub> RRAM based convolutional kernel on feature extraction for image recognition**

Seonuk Jeon, Eun Ryeong Hong, Heebum Kang, Hyun Wook Kim, Nayeon Kim, and Jiyong Woo  
(Kyungpook National University)

[TS06B\_P\_12]

10:00~10:30

**High-performance Mo/MoSe<sub>2</sub>/Ag memories: an approach towards in-situ fabrication using selective diffusion of Se in Mo**

ByunJun So, Arindam Bala, and SunKook Kim  
(Sungkyunkwan University)

[TS06B\_P\_13]

10:00~10:30

**Effects of plasma-induced etch damage to channel surface in a-IGZO TFTs and post-treatment process for recovery**

Dongseon Kim, Changjo Choi, Minjin Kwon, Hyongbeen Ju, Jiyoung Bang, Jinsil Gong, Yeonsu Lee, Hyeonjeong Sun, Sangdeok Kim, Yeonghun Lee, Onejae Sul, and Seung-Beck Lee  
(Hanyang University)

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[TS06B\_P\_14]

10:00~10:30

## A study on the memory effects of neuromorphic devices based on flash memory using quantum dots

Jisoo Choi<sup>1</sup>, Yeeun Kim, JeongMok Yang, Changyu Park, Soyeon Jung, Jaehun Jeong, and Moongyu Jang  
(Hallym University)

[TS06B\_P\_15]

10:00~10:30

## Electrochemical sensors for the detection of nano plastics in water systems

Chihyun Kim<sup>1</sup>, Joohyung Park<sup>1</sup>, Woochang Kim<sup>1</sup>, Minwoo Kim<sup>1</sup>, Hyunjun Park<sup>1</sup>, Woong Kim<sup>3</sup>, Wonseok Lee<sup>2</sup>, and Jinsung Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Korea National University of Transportation, <sup>3</sup>Hanyang University)

[TS06B\_P\_16]

10:00~10:30

## Characterization and modeling of Cu ion-driven electrochemical RAM for neuromorphic synaptic devices

Nayeon Kim, Heebum Kang, Hyun Wook Kim, Eunryeong Hong, and Jiyong Woo  
(Kyungpook National University)

[TS06B\_P\_17]

10:00~10:30

## Analysis of the field-effect mobility of c-IGZO TFTs depending on Ta crystallization accelerating layer dimensions

Mingi Kim, Yewon Kang, Hyeonjeong Sun, Hyoungbeen Ju, Jiyoung Bang, Jinsil Gong, Yeonsu Lee, Minjin Kwon, Sangdeok Kim, Yeonghun Lee, Onejae Sul and Seung-Beck Lee  
(Hanyang University)

[TS06B\_P\_18]

10:00~10:30

## Characterization of coupling effect between P/NMOS by source/drain recess depth variations in sub-3-nm node silicon forksheet FETs

Jaewan Lim, Jinsu Jeong, Seunghwan Lee, Junjong Lee, Sanguk Lee and Rock-Hyun Baek  
(POSTECH)

[TS06B\_P\_19]

10:00~10:30

## MoO<sub>3</sub> nanoribbons for ultra-sensitive NH<sub>3</sub> gas detection: integrated experimental and density functional theory (DFT) simulation studies

Dongwook Kwak<sup>1</sup>, Mengjing Wang<sup>3</sup>, Kristie J. Koski<sup>3</sup>, Liang Zhang<sup>4</sup>, Henry Sokol<sup>4</sup>, Radenka Maric<sup>2,4</sup>, and Yu Lei<sup>4</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Center for Clean Energy Engineering, <sup>3</sup>University of California, <sup>4</sup>University of Connecticut)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS06W\_P\_01]

10:00~10:30

**Study on the optical properties of Ce<sup>3+</sup> ion doped BaSO<sub>4</sub> nanophosphor prepared by co-precipitation method**

Min Jae Jeong<sup>1</sup>, J. H. Choi<sup>2</sup>, and Y. S. Lee<sup>1</sup>  
(<sup>1</sup>Soongsil University, <sup>2</sup>Korea Basic Science Institute)

[TS06W\_P\_02]

10:00~10:30

**Charge trapping memory devices using MoS<sub>2</sub>/CrPS<sub>4</sub> heterostructure**

Minjeong Shin<sup>1</sup>, Chansoo Yoon<sup>1</sup>, Mijung Lee<sup>1</sup>, Sungmin Lee<sup>2</sup>, Je-Geun Park<sup>2</sup>, and Bae Ho Park<sup>1</sup>  
(<sup>1</sup>Konkuk University, <sup>2</sup>Seoul National University)

[TS06W\_P\_03]

10:00~10:30

**Hydrothermal synthesis of Au@Co<sub>3</sub>O<sub>4</sub> core-shell nanoparticles and gas sensing for acetone**

Dong Jae Yu, Ka Yoon Shin, Wansik Oum, Suk Woo Kang, Eun Bi Kim, Hyeong Min Kim, and Hyoun Woo Kim  
(Hanyang University)

[TS06W\_P\_04]

10:00~10:30

**The characteristics of the a-In<sub>2</sub>Se<sub>3</sub> ferroelectric synaptic device with incremental step pulse programming/erase (ISPP/ISPE)**

Sangyong Park<sup>1,2</sup> and Jin-Hong Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Samsung Electronics Co., Ltd.)

[TS06W\_P\_05]

10:00~10:30

**FinFET architecture with gate-all-around structure for 5 nm technology**

Changwoo Noh<sup>1,2</sup>, Sangmin Won<sup>1</sup>, and Changhwan Shin<sup>3</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Samsung Electronics Co., Ltd., <sup>3</sup>Korea University)

[TS06W\_P\_06]

10:00~10:30

**Low-power consumption field effect transistor biosensor via TMD/Graphene vertical heterostructure**

Yea Hyun Kim and Woo Jong Yu  
(Sungkyunkwan University)

[TS06W\_P\_07]

10:00~10:30

**Electrical and magnetic properties of graphene/graphene oxide heterostructure fabricated by chemical modification**

Eun Hee Kee<sup>1</sup>, Mohd Musaib Haidari<sup>1</sup>, Ji Hye Lee<sup>2, 3</sup>, Jin Sik Choi<sup>1</sup>, and Bae Ho Park<sup>1</sup>  
(<sup>1</sup>Konkuk University, <sup>2</sup>Seoul National University, <sup>3</sup>IBS)

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[TS06W\_P\_08]

10:00~10:30

**Gradual current modulation for synaptic device based on Au/Ni/Pb(Zr<sub>0.52</sub>Ti<sub>0.48</sub>)O<sub>3</sub>/Nb doped SrTiO<sub>3</sub> structure**

Sohwi Kim, Chansoo Yoon, Gwangtaek Oh, and Bae Ho Park  
(Konkuk University)

[TS06W\_P\_09]

10:00~10:30

**IGZO artificial synaptic device using electrical double layer effect**

Jae-Ho Jung<sup>1,2</sup> and Jin-Hong Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Samsung Electronics)

[TS06W\_P\_10]

10:00~10:30

**The epitaxially grown ferroelectric Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> thin film using pulsed laser deposition method**

Woohyeon Ryu, Chansoo Yoon, and Bae Ho Park  
(Konkuk university)

[TS06W\_P\_11]

10:00~10:30

**IGZO based non-volatile resistive switching memory for synaptic application**

Sang-Woo Seon<sup>1,2</sup> and Jin-Hong Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Samsung Electronics)

[TS06W\_P\_12]

10:00~10:30

**Luminescent properties of rare earth ions-doped perovskite stannates ASnO<sub>3</sub>(A=Ca, Sr, and Ba)**

Kwanchul Lee and Y. S. Lee  
(Soongsil University)

[TS06W\_P\_13]

10:00~10:30

**Delicate modulation of IGZO synaptic property using a TiO<sub>2</sub> interlayer**

SooHong Jeong and Byungjin Cho  
(Chungbuk National University)

[TS06W\_P\_14]

10:00~10:30

**Flexible GaAs single-junction solar cells for biocompatible energy harvesting**

Yonghyun Nam, Sunghyun Moon, Yeojun Yun, Ohdo Kwon, Inho Lee, Seongjun Park, and Jaejin Lee  
(Ajou University)

[TS06W\_P\_15]

10:00~10:30

**Top-emitting 940-nm thin-film VCSELs transferred onto aluminum heatsinks**

Sunghyun Moon<sup>1</sup>, Yeojun Yun<sup>1</sup>, Ohdo Kwon<sup>1</sup>, Yonghyun Nam<sup>1</sup>, Donghwan Kim<sup>2</sup>, Wonjin Choi<sup>2</sup>, and Jaejin Lee<sup>1</sup>  
(<sup>1</sup>Ajou University, <sup>2</sup>RayIR Corporation, LTD)

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[TS06W\_P\_16]

10:00~10:30

## Thin-film 930 nm VCSEL on PDMS for biomedical applications

Ohdo Kwon<sup>1</sup>, Sunghyun Moon<sup>1</sup>, Yeojun Yun<sup>1</sup>, Yong-hyun Nam<sup>1</sup>, In-ho Lee<sup>1</sup>, Donghwan Kim<sup>2</sup>, Wonjin Choi<sup>2</sup>, Seongjun Park<sup>1</sup>, and Jaejin Lee<sup>1</sup>  
(<sup>1</sup>Ajou University, <sup>2</sup>RayIR Corporation, LTD)

[TS06W\_P\_17]

10:00~10:30

## Fabrication of thin film transistors by efficient purification of semiconducting single-walled carbon nanotubes

Mihn Kim, Se Jin Park, Hong-Seok Kim, and Jae-Hee Han  
(Gachon University)

[TS06W\_P\_18]

10:00~10:30

## Fabrication of photoelectric devices by exfoliation of two-dimensional MoS<sub>2</sub> nanosheets

Yu-Jeong Choi, Seung Chan Jung, Hong-Seok Kim, and Jae-Hee Han  
(Gachon University)

[TS06W\_P\_19]

10:00~10:30

## Neuromorphic devices based on the electrochemical metallization in the ferroelectric material

Chansoo Yoon, Gwangtaek Oh, and Bae Ho Park  
(Konkuk University)

[TS06W\_P\_20]

10:00~10:30

## Quaternary lithium sulfide compounds with defects for solid-state electrolyte

Yuna Kim and Sung-Jin Kim  
(Ewha Womans University)

[TS06W\_P\_21]

10:00~10:30

## Meta-structured substrates with negative poisson's ratio for stretchable device

BeomGil Ha and Byung Yang Lee  
(Korea University)

[TS06W\_P\_22]

10:00~10:30

## Stretchable electrode by liquid metal for self-healing soft machine

Dong Jin Han and Byung Yang Lee  
(Korea University)

[TS06W\_P\_23]

10:00~10:30

## Memristor based on Al<sub>2</sub>O<sub>3</sub>/HfO<sub>x</sub> for switching layer using single-walled carbon nanotubes

Dong Jun Jang, Hyunwoo Ryu, Hyeonjin Cha, Na-Young Lee, Younglae Kim, and Min-Woo Kwon  
(Gangneung-Wonju National University)



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[TS06W\_P\_24]

10:00~10:30

**Optimization of highly efficient GaAs thin-film solar cell with deep-junction configuration**

Yeojun Yun, Yonghyun Nam, Sunghyun Moon, Ohdo Kwon, and Jaejin Lee  
(Ajou University)

[TS06W\_P\_25]

10:00~10:30

**Conductivity change detector through binding of graphene layer with antibody that detects specific drug substance**

Jihun Sim and Woojong Yu  
(Sungkyunkwan University)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS06T\_P\_01]

10:00~10:30

**The Ag nanoparticles intercalation in molybdenum ditelluride interlayer as artificial synapse for neuromorphic computing**

Gayoung Cho and Woo Jong Yu  
(Sungkyunkwan University)

[TS06T\_P\_02]

10:00~10:30

**Implementation of disposable synaptic transistors using starch electrical double layer on paper substrate**

Hyun-Sik Choi, Young-Jun Lee, and Won-Ju Ch  
(Kwangwoon University)

[TS06T\_P\_03]

10:00~10:30

**Robust field emitters of B-doped MWCNTs synthesized via arc discharge technique**

Syed Muhammad Zain Mehdi, Jeung Choon Goak, and Naesung Lee  
(Sejong University)

[TS06T\_P\_04]

10:00~10:30

**Photodiode using doping-controlled transition metal dichalcogenide PN heterostructure**

Sung Hyun Kim and Woo Jong Yu  
(Sungkyunkwan University)

[TS06T\_P\_05]

10:00~10:30

**Using Mos<sub>2</sub>/WSe<sub>2</sub> 2D van der waals heterostructure as photo-absorber**

Seok won Choi and Woo jong Yu  
(Sungkyunkwan University)

[TS06T\_P\_06]

10:00~10:30

**Conditional control of boron nitride using growth conditions in chemical vapor deposition and synthesis of amorphous BN**

Dokyeong Yun and Woojong Yu  
(Sungkyunkwan University)

[TS06T\_P\_07]

10:00~10:30

**Exploring top surface channel in two-dimensional multilayers**

Minji Chae, Sooyeon Kim, Youkyung Seo, Yeongseo Han, Yoojin Choi, Dahyun Choi, Hyejin Kim, and Min-Kyu Joo  
(Sookmyung Women's University)

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[TS06T\_P\_08]

10:00~10:30

**High-current field emitters of CNT pastes with silicides formed using chemically reactive fillers**

Sayed Zafar Abbas, Seon Ae Byun, and Naesung Lee  
(Sejong University)

[TS06T\_P\_09]

10:00~10:30

**Electrolyte-gated vertical synapse array based on van der Waals heterostructure for parallel computing**

Ju-Hee Lee and Jin-Hong Park  
(Sungkyunkwan University)

[TS06T\_P\_10]

10:00~10:30

**Stabilization of amorphous In-Ga-Zn-O high voltage thin film transistor for biomimetic haptic feedback display**

Seungwoo Kim, Ghiljae Moon, Sangduk Kim, Hyoungbeen Ju, Jiyoung Bang, Jinsil Gong, Yeonsu Lee, Hyeonjeong Sun, Minjin Kwon, Yeonghun Lee, Eunsuk Choi, Onejae Sul, and Seung-Beck Lee  
(Hanyang University)

[TS06T\_P\_11]

10:00~10:30

**Optimization of dry etching in vertical field-effect transistor structure**

Jinwoo Lee, Jaehyun Hong, Yeonghun Lee, Hyoungbeen Ju, Jiyoung Bang, Jinsil Gong, Yeonsu Lee, Minjin Kwon, Hyeonjeong Sun, Sangduk Kim, Onejae Sul, and Seung-Beck Lee  
(Hanyang University)

[TS06T\_P\_12]

10:00~10:30

**Negative-differential-transconductance WSe<sub>2</sub> field-effect transistor for a reconfigurable ternary NAND/NOR gate**

Maksim Andreev, Juncheol Kang, and Jin-Hong Park  
(Sungkyunkwan University)

[TS06T\_P\_13]

10:00~10:30

**Field-effect mobility boosting of IGZO TFTs using Nb crystallization accelerating layer**

Hyeonjeong Sun, Hyoungbeen Ju, Jiyoung Bang, Jinsil Gong, Yeonsu Lee, Minjin Kwon, Sangdeok Kim, Yeonghun Lee, Onejae Sul, and Seung-Beck Lee  
(Hanyang University)

[TS06T\_P\_14]

10:00~10:30

**Graphene/Silicon photodetector-based voltage spike array generation according to optical signal**

Sungbum Park and Woojong Yu  
(Sungkyunkwan University)

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[TS06T\_P\_15]

10:00~10:30

**Enhancing ZnO ALD thin film FET array's on/off ratio By using assembly molecule buffer layer**

Tae hyeon Kim and Woo jong Yu  
(Sungkyunkwan University)

[TS06T\_P\_16]

10:00~10:30

**Comparison of analysis with impedance biosensors and biological assays for NIH/3T3 cells growth and drug reaction monitoring**

Gayoung Lee, Yeeun Kim, Dahyun Kang, and Moongyu Jang  
(Hallym University)

[TS06T\_P\_17]

10:00~10:30

**Frequency dependence of NIH 3T3 Cells with pattern width and spacing variations of impedance biosensors and correlation between electrode and spacing according to cell capacitance**

Yeeun Kim, Jisoo Choi, Dahyun Kang, Seokgyu Kim, Gayoung Lee, and Moongyu Jang  
(Hallym University)

[TS06T\_P\_18]

10:00~10:30

**Photo-switchable molecular electronic devices activated by perovskite/graphene electrodes**

Changjun Lee, Junwoo Kim, Jonghoon Lee, Minwoo Song, Keehoon Kang, and Takhee Lee  
(Seoul National University)

[TS06T\_P\_19]

10:00~10:30

**Ultrasensitive electrochemical detection of Pb<sup>2+</sup> and Cd<sub>2+</sub> using nafion blanketed bismuth nanoplates**

Minwoo Kim, Joohyung Park, Woochang Kim, Chihyun Kim, Hyunjun Park, and Jinsung Park  
(Sungkyunkwan University)

[TS06T\_P\_20]

10:00~10:30

**Development of paper-based NO<sub>2</sub> detection sensing platform and application using rGO/Chitosan composites**

Hyunjun Park<sup>1</sup>, Joohyung Park<sup>1</sup>, Woochang Kim<sup>1</sup>, Minwoo Kim<sup>1</sup>, Chihyun Kim<sup>1</sup>, Woong Kim<sup>2</sup>, and Jinsung Park<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Hanyang University)

[TS06T\_P\_21]

10:00~10:30

**Optimizing optoelectronic properties of ZnO/Cu/ZnO transparent electrodes**

Dooho Choi  
(Dong-Eui University)

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[TS06T\_P\_22]

10:00~10:30

**Reverse short channel effect in multilayer ReS<sub>2</sub>**

Sooyeon Kim and Min-Kyu Joo  
(Sookmyung Women's University)

[TS06T\_P\_23]

10:00~10:30

**Modulating operation frequency of an Ag/HfO<sub>2</sub>-based threshold switching device**

Sungsoo Lee and Jinhong Park  
(Sungkyunkwan University)

[TS06T\_P\_24]

10:00~10:30

**Selective piezoresistive microstructured sensor using carbon black-PDMS nanocomposite for pressure sensing**

Jiwan Hong, Sangmin Lee and Wanjun Park  
(Hanyang University)

[TS06T\_P\_25]

10:00~10:30

**Piezoelectric tunneling transistor for flexible, highly sensitive, power efficient force sensing**

Hyerin Jo and Hongseok Oh  
(Soongsil University)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS06F\_P\_01]

10:00~10:30

**An artificial optoelectronic synapse based on CuPc/p-6P heterojunction**

Byeongchan Kim and Jin-Hong Park  
(Sungkyunkwan University)

[TS06F\_P\_02]

10:00~10:30

**Partially formed potential barrier for negative-differential-resistance and its application to multi-valued logic computing**

Taeran Lee and Jin-Hong Park  
(Sungkyunkwan University)

[TS06F\_P\_03]

10:00~10:30

**Fabrication and characteristics IGZO tunneling thin film transistors**

Jaewon Kim and Hongseok OH  
(Soongsil University)

[TS06F\_P\_04]

10:00~10:30

**Detection of NO<sub>2</sub> gas at low temperature with SnS functionalized SnO<sub>2</sub> nanowires**

Hyeong Min Kim, Ka Yoon Shin, Wansik Oum, Dong Jae Yu, Suk Woo Kang, Eun Bi Kim, and Hyoun Woo Kim  
(Hanyang University)

[TS06F\_P\_05]

10:00~10:30

**Negative differential transconductance device based on the WSe<sub>2</sub> / WTe<sub>2</sub> heterojunction**

Hogeun Ahn and JinHong Park  
(Sungkyunkwan University)

[TS06F\_P\_06]

10:00~10:30

**Simple and facile synthesis of ZnS QDs and fabrication of MSM photodetector for UVC sensor application**

Ye Jun Ban, Kyung Il Ko, and Sang Joon Park  
(Gachon University)

[TS06F\_P\_07]

10:00~10:30

**Experimental study on the heat transfer performance of various magnet arrangements in a closed space filled with ferrofluid**

Hyun-Su Kang, Yun-Seok Choi, and Youn-Jea Kim  
(Sungkyunkwan University)

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[TS06F\_P\_08]

10:00~10:30

**Smart glove using strain sensor for language translation system by applying pattern recognition method**

Sohee Kim, Sangmin Lee, Yujin Seong, Jaewon Jang, Jiwan Hong, and Wanjun Park  
(Hanyang University)

[TS06F\_P\_09]

10:00~10:30

**Rectification ratio modulation of ferrocenyl alkanethiolate molecular vertical junctions with ion-gel gating**

Minwoo Song, Wang-Taek Hwang, Jongwoo Nam, Changjun Lee, Keehoon Kang, and Takhee Lee  
(Seoul National University)

[TS06F\_P\_10]

10:00~10:30

**Modulative luminescent properties in  $\text{Eu}^{3+}$  doped  $(1-x)\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3 - x\text{BaTiO}_3$  using poling induced structural changes**

S. W. Wi<sup>1</sup>, J. H. Han<sup>1</sup>, E. Y. Kim<sup>2</sup>, S. Y. Cho<sup>2</sup>, S. D. Bu<sup>2</sup>, and Y. S. Lee<sup>1</sup>  
(<sup>1</sup>Soongsil University, <sup>2</sup>Jeonbuk National University)

[TS06F\_P\_11]

10:00~10:30

**Investigation of effect of monolithic 3D inverter stacked with MOSFETs on work-function variation**

Geun Jae Lee and Yun Seop Yu  
(Hankyong National University)

[TS06F\_P\_12]

10:00~10:30

**Effect of electrolytic factors on the crystal structure and hardness of non-cyanide gold plating layer**

Wonyoung Heo<sup>1</sup>, Sunghwa Bae<sup>2</sup>, and Injoon Son<sup>1</sup>  
(<sup>1</sup>Kyungpook National University, <sup>2</sup>Kyushu University)

[TS06F\_P\_13]

10:00~10:30

**Au-in alloy plating to development of connector plating process with improved contact resistance and solder wetting**

Woojoo Jeon, Wonyoung Heo, and Injoon Son  
(Kyungpook National University)

[TS06F\_P\_14]

10:00~10:30

**Two-dimensional van-der-Waals heterostructure based neuromorphic device**

Ho-Jin Choi and Jin-Hong Park  
(Sungkyunkwan University)

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[TS06F\_P\_15]

10:00~10:30

## Intrinsically stretchable conducting polymers for stretchable electrochromic devices

Gaeun Kim<sup>1,2</sup>, Youngno Kim<sup>1</sup>, Ki-Seob Hwang<sup>2</sup>, Jun-Young Lee<sup>2</sup>, and Jung Hyun Kim<sup>1</sup>  
(<sup>1</sup>Yonsei University, <sup>2</sup>KITECH)

[TS06F\_P\_16]

10:00~10:30

## Improvement breakdown voltage by using crown shape gate in IGBT

Dong Gyu Park and Jang Hyun Kim  
(Pukyong National University)

[TS06F\_P\_17]

10:00~10:30

## Study on anti-solvent addition method to improve the performance of perovskite photodiode for blue light detection

Seung Chan Yoo, Kyu Young Kim, Eung Kyeong Lee, and Young Jin Choi  
(Sejong University)

[TS06F\_P\_18]

10:00~10:30

## Spin-orbit torque-driven majority gate devices with geometry variations

Soobeom Lee, Dongryul Kim, Junsu Kim, Suhyeok An, Jaehun Cho, June-Seo Kim, and Chun-Yeol You  
(DGIST)

[TS06F\_P\_19]

10:00~10:30

## P3HT-doped PC<sub>60</sub>BM charge transport layer for improved performance of perovskite photodiode

Eung Kyeong Lee, Kyu Young Kim, Seung Chan Yoo, and Young Jin Choi  
(Sejong University)

[TS06F\_P\_20]

10:00~10:30

## Large-area WS<sub>2</sub> /Graphene heterostructure film grown on Au foil for high-efficiency photodetector

Jae Sik Bang, Soo Ho Choi, Ki Kang Kim, and Young Hee Lee  
(Sungkyunkwan University)

[TS06F\_P\_21]

10:00~10:30

## Noise and offset reduction with self-balanced PHMR sensor integrated with bridge resistance compensation

Changyeop Jeon<sup>1</sup>, Jae Hoon Lee<sup>1</sup>, Taehyeong Jeon<sup>1</sup>, Proloy Taran Das<sup>1</sup>, Yong-Ho Lee<sup>3</sup>, Byeonghwa Lim<sup>1</sup>, and CheolGi Kim<sup>1</sup>  
(<sup>1</sup>DGIST, <sup>2</sup>KRISS)



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[TS06F\_P\_22]

10:00~10:30

## Experiment on highly bendable PHMR sensor

Mijin Kim<sup>1</sup>, Sunjong Oh<sup>2</sup>, Taehyeong Jeon<sup>1</sup>, Richa Chaturvedi<sup>1</sup>, Sungwon Lee<sup>1</sup>, and Cheolgi Kim<sup>1</sup>  
(<sup>1</sup>DGIST, <sup>2</sup>KIMM)

[TS06F\_P\_23]

10:00~10:30

## A transparent self-healing polyurethane–isophorone-diisocyanate elastomer based on hydrogen-bonding interactions

Junfei Ma<sup>1,2</sup>, Ga-Hyun Lee<sup>1,2</sup>, Ji-Hyeon Kim<sup>1</sup>, Sang-Woo Kim<sup>1</sup>, Sungjin Jo<sup>2</sup>, and Chang Su Kim<sup>1</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>Kyungpook National University)

[TS06F\_P\_24]

10:00~10:30

## Conditional control of boron nitride using growth conditions in chemical vapor deposition and synthesis of amorphous BN

Dokyeong Yun and Woojong Yu  
(Sungkyunkwan University)

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## TS07. Nanophotonics

### Oral Presentation

Session Title	[TS07T1] Nanophotonics 1
Date & Time	July 7(Thu.), 2022 / 10:30~12:00
Place	Room 212
Session Chair(s)	Joon Heon Kim (APRI)

[TS07T1\_I\_1] Invited 10:30~11:00

TBA

Heng Pan  
(Texas A&M University)

[TS07T1\_O\_2] 11:00~11:15

**Nanoscale copper-silicon Schottky barrier photodetectors operable in the near-infrared region**

Jongeun Seok, Yeonghoon Jin, and Kyoungsik Yu  
(KAIST)

[TS07T1\_O\_3] 11:15~11:30

**Hot electron photodetection with spectral selectivity using bismuth: strong light-matter interaction with nanosecond excited-state lifetime**

Amir Ghobadi and Ekmel Ozbay  
(Bilkent University)

[TS07T1\_O\_4] 11:30~11:45

**Loss mechanism analysis of nanoscale thin-film Schottky barrier photodetectors**

Yeonghoon Jin, Jongeun Seok, and Kyoungsik Yu  
(KAIST)

[TS07T1\_O\_5] 11:45~12:00

**All-graphene-contact electrically pumped on-demand transferrable nanowire source**

Min-Woo Kim, Kyong-Tae Park, Byung-Ju Min, and You-Shin No  
(Konkuk University)

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## Oral Presentation

Session Title	[TS07T2] Nanophotonics 2
Date & Time	July 7(Thu.), 2022 / 14:00~15:45
Place	Room 212
Session Chair(s)	Mooseok Jang (KAIST)

[TS07T2\_I\_1] Invited 14:00~14:30

### Colloidal Meta-Optics

Seungwoo Lee  
(Korea University)

[TS07T2\_O\_2] 14:30~14:45

### Topological photonic crystal waveguide and cavity

Safa Ahadi Maragheh and Thomas Møller Søndergaard  
(Aalborg University)

[TS07T2\_O\_3] 14:45~15:00

### 3D DNA origami phononic crystals

Sung Hun Park<sup>1</sup>, Haedong Park<sup>2</sup>, and Seungwoo Lee<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Cardiff University)

[TS07T2\_O\_4] 15:00~15:15

### Broadband coherent perfect loss in a photonic crystal nanobeam interferometer

Jihoon Choi and Heeso Noh  
(Kookmin University)

[TS07T2\_O\_5] 15:15~15:30

### Investigation of non-hermitian coupled photonic crystal cavity using the overlap integral method

Kyong-Tae Park<sup>1</sup>, Kyong-Ho Kim<sup>2</sup>, and You-Shin No<sup>1</sup>  
(<sup>1</sup>Konkuk University, <sup>2</sup>Chungbuk National University)

[TS07T2\_O\_6] 15:30~15:45

### Achromatic and polarization-insensitive metafiber over entire telecommunication band

Jaehyuck Jang and Junsuk Rho  
(POSTECH)

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## Oral Presentation

Session Title	[TS07T3] Nanophotonics 3
Date & Time	July 7(Thu.), 2022 / 16:00~18:00
Place	Room 212
Session Chair(s)	Seungwoo Lee (Korea University)

[TS07T3\_I\_1] Invited 16:00~16:30

### How light is trapped in atomic-scale picocavities and how they form

Jeremy J Baumberg  
(University of Cambridge)

[TS07T3\_O\_2] 16:30~16:45

### Realization of large scale graphene plasmonic resonator using epsilon-near-zero substrate

Shinho Kim, Soojeong Baek, Sungyun Min, Heonhak Ha, Dongjin Seo, Junghyung Kim, Geonwoo Lee, Bumki Min, and Min Seok Jang  
(KAIST)

[TS07T3\_O\_3] 16:45~17:00

### Molecular displays with full darkfield color and plasmon resonant energy transfer

Hongyoon Kim and Junsuk Rho  
(POSTECH)

[TS07T3\_O\_4] 17:00~17:15

### Near-infrared selective absorber with single-material based on refractive index-controllable Tamm plasmon structure

So Hee Kim<sup>1</sup>, Joo Hwan Ko<sup>1</sup>, Young Jin Yoo<sup>1</sup>, Min Seok Kim<sup>1</sup>, Gil Ju Lee<sup>2</sup>, Satoshi Ishii<sup>3</sup>, and Young Min Song<sup>1</sup>  
(<sup>1</sup>GIST, <sup>2</sup>Pusan National University, <sup>3</sup>NIMS)

[TS07T3\_O\_5] 17:15~17:30

### Giant non-linear response from MXene plasmon in short-wave infrared range

Changhoon Park<sup>1</sup>, Nu-Ri Park<sup>1</sup>, Jisung Kwon<sup>1</sup>, Hyerim Kim<sup>1,2</sup>, Chong Min Koo<sup>3</sup>, and Myung-Ki Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>KIST, <sup>3</sup>Sungkyunkwan University)

[TS07T3\_O\_6] 17:30~17:45

### Shrunk and disorder-tolerant waveguides and power splitters exploiting the TE<sub>01</sub> Mie bandgap

Kiyanoush Goudarzi and Moonjoo Lee  
(POSTECH)

[TS07T3\_O\_7] 17:45~18:00

### On-chip nanoplasmonic photothermal cell lysis with high density Au nanoislands

Eun-Sil Yu, Byoung-Hoon Kang, Myeong-Su Ahn, and Ki-Hun Jeong  
(KAIST)

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## Oral Presentation

Session Title	[TS07F1] Nanophotonics 4
Date & Time	July 8(Fri.), 2022 / 10:30~12:00
Place	Room 212
Session Chair(s)	Young Min Song (GIST)

[TS07F1\_I\_1] Invited 10:30~11:00

### Design and implementation of practical optical metasurfaces and metasystems

Amir Arbabi  
(University of Massachusetts Amherst)

[TS07F1\_O\_2] 11:00~11:15

### Disorder-based X-ray Nanoimaging

KyeoReh Lee<sup>1</sup>, Jun Lim<sup>2</sup>, Su Yong Lee<sup>2</sup>, and YongKeun Park<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>POSTECH)

[TS07F1\_O\_3] 11:15~11:30

### Physics-informed unsupervised deep learning for digital holographic microscopy

Chanseok Lee, Gookho Song, Jaeyeon Oh, and Mooseok Jang  
(KAIST)

[TS07F1\_O\_4] 11:30~11:45

### Single-shot full-field nano-scale topography measurement using spectrally multiplexed Kramers–Kronig holographic imaging

Chungha Lee<sup>1</sup>, Hervé Hugonnet<sup>1</sup>, Yoonseok Baek<sup>2</sup>, and YongKeun Park<sup>1,3</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Kastler Brossel Laboratory, <sup>3</sup>Tomocube Inc.)

[TS07F1\_O\_5] 11:45~12:00

### High-resolution on-chip microscopy using LED matrix

JongIn You, Gookho Song, and Mooseok Jang  
(KAIST)

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## Oral Presentation

Session Title	[TS07F2] Nanophotonics 5
Date & Time	July 8(Fri.), 2022 / 14:00~15:45
Place	Room 212
Session Chair(s)	Ki-Hun Jeong (KAIST)

[TS07F2\_I\_1] Invited 14:00~14:30

### Recent advances in fluidic optical microsystems

Hans Zappe  
(University of Freiburg)

[TS07F2\_O\_2] 14:30~14:45

### Printed glass for micro- and nano-optics

Phuong-Ha Cu-Nguyen and Hans Zappe  
(University of Freiburg)

[TS07F2\_O\_3] 14:45~15:00

### Electrothermal tunable grating-based single-pixel MEMS spectrometer using avalanche photodiode

Jaehun Jeon, Jung-Woo Park, Gi Beom Kim, Myeong-Su Ahn, and Ki-Hun Jeong  
(KAIST)

[TS07F2\_O\_4] 15:00~15:15

### Miniature spectrometer with random filter array designed with 3D printing by two-photon polymerization.

Serim Kim, Min Seok Kim, and Young Min Song  
(GIST)

[TS07F2\_O\_5] 15:15~15:30

### Spectrometer based on disordered metasurface

Dong-gu Lee, Chunghyeong Lee, Gookho Song, Chanseok Lee, and Mooseok Jang  
(KAIST)

[TS07F2\_O\_6] 15:30~15:45

### Light-field camera for 3D in vivo imaging with a large depth-of-field

Jae-Myeong Kwon, Sang-In Bae, and Ki-Hun Jeong  
(KAIST)

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## Oral Presentation

Session Title	[TS07F3] Nanophotonics 6
Date & Time	July 8(Fri.), 2022 / 16:00~18:00
Place	Room 212
Session Chair(s)	Mina Lee (KRISS)

[TS07F3\_I\_1] Invited 16:00~16:30

### Geometric on-chip graphene photodetectors for mid-infrared light

Cheng-Wei Qiu  
(National University of Singapore)

[TS07F3\_O\_2] 16:30~16:45

### Inverse design enables single-celled multifunctional metasurfaces

Sunae So<sup>1</sup>, Joocheon Kim<sup>1</sup>, Trevon Badloe<sup>1</sup>, Chihun Lee<sup>1</sup>, Younghwan Yang<sup>1</sup>, Hyunjung Kang<sup>1</sup>, and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute of Nanomaterials Technology)

[TS07F3\_O\_3] 16:45~17:00

### Chiral spin-preserving reflection in helicoid-based plasmonic metamaterials

Eunji Im<sup>1</sup>, Hyeohn Kim<sup>2</sup>, Ji-hyeok Huh<sup>1</sup>, Ki Tae Nam<sup>2</sup>, and Seungwoo Lee<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Seoul National University)

[TS07F3\_O\_4] 17:00~17:15

### Full-space structured light projecting metasurface for three-dimensional imaging

Gyeongtae Kim<sup>1</sup>, Yeseul Kim<sup>1</sup>, Jooyeong Yun<sup>1</sup>, and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute of Nanomaterials Technology)

[TS07F3\_O\_5] 17:15~17:30

### High refractive index optical metamaterials at the fundamental bounds

Ji-Hyeok Huh, Nayeon Kim, and Seungwoo Lee  
(Korea University)

[TS07F3\_O\_6] 17:30~17:45

### Photonic encryption platform using dual-band UV vectorial hologram

Joocheon Kim<sup>1</sup> and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute of Nanomaterials Technology)

[TS07F3\_O\_7] 17:45~18:00

### Enhancement of light harvesting in photovoltaic device with micro-nano disordered structures

So Hee Kim, Joo Hwan Ko, Young Jin Yoo, and Young Min Song  
(GIST)

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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS07B\_P\_01]

10:00~10:30

### Water-selective treatment of solvents for superior stability perovskite quantum dots

Jin Young Kim, Byung Gi Kim, Woongsik Jang, and Dong Hwan Wang  
(Chung-Ang University)

[TS07B\_P\_02]

10:00~10:30

### Handheld real-time photothermal PCR system for rapid clinical molecular diagnostics

Byoung-Hoon Kang, Eun-Sil Yu, Hamin Na, and Ki-Hun Jeong  
(KAIST)

[TS07B\_P\_03]

10:00~10:30

### DOS-dependent electrochromic behaviors of plasmonic nanocubes

Yoonhee Kim, Seungsang Cha, and Jwa-Min Nam  
(Seoul National University)

[TS07B\_P\_04]

10:00~10:30

### Disordered near-field speckles on metallic nanoislands for super-resolved imaging

Hajun Yoo, Hongki Lee, Woo Joong Rhee, Gwiyeong Moon, Changhun Lee, Jeon-Soo Shin, and Donghyun Kim  
(Yonsei University)

[TS07B\_P\_05]

10:00~10:30

### Side wall effect of micro light-emitting diodes using SiO<sub>2</sub> passivation

Gyeong-Hun Jung<sup>1</sup>, Tae-Hyeon Kim<sup>1</sup>, So-Hyeon Kim<sup>1</sup>, Byung-Hoon Ahn<sup>1</sup>, Su-Han Lee<sup>2</sup>, Kyoung-Kook Kim<sup>1</sup>, and Yong-Jin Yoon<sup>2</sup>  
(<sup>1</sup>Tech University of Korea, <sup>2</sup>KAIST)

[TS07B\_P\_06]

10:00~10:30

### Printed hybrid silicon laser for SOI-based interconnect on-chip source

Byoung Jun Park<sup>1</sup>, Min-Woo Kim<sup>2</sup>, Kyong-Tae Park<sup>2</sup>, You-Shin No<sup>2</sup>, and Myung-Ki Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Konkuk University)



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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS07W\_P\_01]

10:00~10:30

**Comparing contact and thermal stability properties of Ni films on  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> and doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> substrates for solar-blind ultraviolet (UV) photodetectors**

Kyeong-keun Choi<sup>1</sup>, Sung-Kyu Kim<sup>1</sup>, An-na Cha<sup>2</sup>, and Jun-Seok Ha<sup>2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>Chonnam National University)

[TS07W\_P\_02]

10:00~10:30

**Controlling the hole injection barrier of quantum dot light-emitting diodes by graphene barrister**

Sanghyun Lee, Jaewon Jeong, Junekyun Park, and Yonghan Roh  
(Sungkyunkwan University)

[TS07W\_P\_03]

10:00~10:30

**Phase-gradient TiO<sub>2</sub> metasurfaces by plasma-enhanced local crystallizing**

Junhwa Seong<sup>1</sup>, Yoonghwan Yang<sup>1</sup>, and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute for Nanomaterials Technology)

[TS07W\_P\_04]

10:00~10:30

**On-chip transferrable microlasers**

Byung-Ju Min, Sun-Wook Park, Min-Woo Kim, Kyong-Tae Park, Ja-Hyun Ku, and You-Shin No  
(Konkuk University)

[TS07W\_P\_05]

10:00~10:30

**Investigation of radiative cooling performance of random microparticle-polymer composite coating structure**

Jooyeong Yun<sup>1</sup>, Dongwoo Chae<sup>2</sup>, Heon Lee<sup>2</sup>, and Junusuk Rho<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>Korea University)

[TS07W\_P\_06]

10:00~10:30

**Stroboscopic effect of metasurface in UV regime**

Seokwoo Kim<sup>1</sup> and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute of Nanomaterials Technology)

[TS07W\_P\_07]

10:00~10:30

**Electric field enhancement of bowtie nano-structure for extreme ultraviolet radiation**

Yeongkon Jeong<sup>1,2</sup>, Yong Soo Kim<sup>1</sup>, Young Jun An<sup>1,2</sup>, Seungwon Lee<sup>2</sup>, Byeong-Kwon Ju<sup>2</sup>, and Young Min Jhon<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

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[TS07W\_P\_08]

10:00~10:30

## Humidity-responsive tunable color filter via nanoporous Fabry-Perot structure

Jaekyung Kim<sup>1</sup>, Byoungsu Ko<sup>1</sup>, Younghwan Yang<sup>1</sup>, and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute of Nanomaterials Technology)

[TS07W\_P\_09]

10:00~10:30

## Explosives detection using Photoluminescence quenching towards drone applications

Daegwon Noh, Emmanuel K. Ampadu, and Eunsoon Oh  
(Chungnam National University)

[TS07W\_P\_10]

10:00~10:30

## Optimal fluorescence enhancement by dipole and quadrupole surface plasmons of composite silver nanosurfaces

Daedu Lee, Gyoungyun Song, and Yoonsoo Pang  
(GIST)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS07T\_P\_01]

10:00~10:30

**Infrared photodetector arrays using epitaxy-free and extremely low power Graphene/Ge Schottky junction**

Cihyun Kim<sup>1</sup>, Tae Jin Yoo<sup>1</sup>, Kyoung Eun Chang<sup>2</sup>, Sunwoo Heo<sup>2</sup>, Min Gyu Kwon<sup>2</sup>, Hyeon Jun Hwang<sup>1</sup>, and Byoung Hun Lee<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>GIST)

[TS07T\_P\_02]

10:00~10:30

**Investigation of optical properties of Ag nanoparticles with graphene oxide foams in microfluidics channels**

Ye-Eun Kim, Ye Won Hwang, Seung Chan Jung, Hong-Seok Kim, and Jae-Hee Han  
(Gachon University)

[TS07T\_P\_03]

10:00~10:30

**Laser-induced phase separation of PEDOT:PSS and its application to bioelectronic applications**

Daeyeon Won and Seung Hwan Ko  
(Seoul National University)

[TS07T\_P\_04]

10:00~10:30

**Reversible laser induced redox for monolithic Cu, Cu<sub>2</sub>O, and CuO nanowire network**

Junhyuk Bang and Seung Hwan Ko  
(Seoul National University)

[TS07T\_P\_05]

10:00~10:30

**Effect of time gating on stimulated emission depletion microscopy using sub-nanosecond pulses**

Mina Lee<sup>1</sup> and Tae Geol Lee<sup>1,2</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>UST)

[TS07T\_P\_06]

10:00~10:30

**Subcutaneous vein Imaging using active plasmonic spectral filter**

Myeong-Su Ahn, Charles Soon Hong Hwang, Jaehun Jeon, Kyung-Won Jang, and Ki-Hun Jeong  
(KAIST)

[TS07T\_P\_07]

10:00~10:30

**A plasma-assisted simple fabrication of the wrinkled nanoporous silver film for SERS applications**

Jin-Hyun Ham, Jung Su Park, Myoung-Kyu Oh, and Joon Heon Kim  
(GIST)

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[TS07T\_P\_08]

10:00~10:30

**High-performance ultrathin microspectrometer with back-reflection grating structure for point-of-care testing**

Jung-Woo Park, Jaehun Jeon, Gi-Beom Kim, and Ki-Hun Jeong  
(KAIST)

[TS07T\_P\_09]

10:00~10:30

**Development of aberration correction lens grating based microspectrometer**

Gi-Beom Kim, Jung-Woo Park, Jae Hun Jeon, and Ki-Hun Jeong  
(KAIST)

[TS07T\_P\_10]

10:00~10:30

**Fabrication of carbazole derivative nanoparticles assisted with DNA enabling two-photon absorption**

Min Joon Kang, Seokho Kim, and Dong June Ahn  
(Korea University)

[TS07T\_P\_11]

10:00~10:30

**Upconversion multi-band vortex lasing from bound state in continuum**

Minsu Jeong and Junsuk Rho  
(POSTECH)

[TS07T\_P\_12]

10:00~10:30

**Au-TiO<sub>2</sub> nanoislands as highly adsorptive SERS substrate for aerosol detection**

Charles Soon Hong Hwang, Sejin Lee, and Ki-Hun Jeong  
(KAIST)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS07F\_P\_01]

10:00~10:30

### Reflective RGB structural colors filters in penta-layered dual cavities

HoJae Kwak, Incheol Jung, Hyeonwoo Kim, Seunghyun Oh, and Kyu-Tae Lee  
(*INHA University*)

[TS07F\_P\_02]

10:00~10:30

### Ultrafast head-mountable miniaturized microscope using offset arrayed camera

Hyun-kyung Kim, Kyung-Won Jang, Sang-In Bae, Eunsil-Yu, Younggil Cha, and Ki-Hun Jeong  
(*KAIST*)

[TS07F\_P\_03]

10:00~10:30

### Transmissive structural colors with high efficiency and high color purity employing higher-order resonances in symmetric Tri-layered dual-cavities

Hyeonwoo Kim, Donggyu Kim, Incheol Jung, HoJae Kwak, Seunghyun Oh, and Kyu-Tae Lee  
(*Inha University*)

[TS07F\_P\_04]

10:00~10:30

### Fabrication of bioinspired multispectral microlens array camera

Younggil Cha, Kyung-Won Jang, Myungsoo Ahn, Hyun-Kyung Kim, and Ki-Hun Jeong  
(*KAIST*)

[TS07F\_P\_05]

10:00~10:30

### High efficiency and NA reflective metalens in wideband wavelength

Aran Yu, Da In Song, Moohyuk Kim, and Myung-Ki Kim  
(*Korea University*)

[TS07F\_P\_06]

10:00~10:30

### Ultrasensitive infrared spectroscopy of molecules fingerprints by MXene acoustic plasmon resonator

Jisung Kwon<sup>1</sup>, Changhoon Park<sup>1</sup>, Hyerim Kim<sup>1,2</sup>, Chongmin Koo<sup>1,2</sup>, and Myung-Ki Kim<sup>1</sup>  
(<sup>1</sup>*Korea University*, <sup>2</sup>*KIST*)

[TS07F\_P\_07]

10:00~10:30

### Transmissive RGB primary structural colors with high color purity and high brightness generated by dual Fabry-Perot cavities exploiting a mode suppression

Incheol Jung, HoJae Kwak, Hyeonwoo Kim, Seunghyun Oh, and Kyu-Tae Lee  
(*Inha University*)

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[TS07F\_P\_08]

10:00~10:30

## Long term stability of blue CsPbBr<sub>3</sub> NPL by Cu<sup>2+</sup> doping

Han Bin Cho and Won Bin Im  
(Hanyang University)

[TS07F\_P\_09]

10:00~10:30

## MXene(Ti<sub>3</sub>C<sub>2</sub>TX) surface plasmon resonance in the short-wave infrared (SWIR) wavelength

Han-Na Kim<sup>1</sup>, Da In Song<sup>1</sup>, Young-Ho Jin<sup>1</sup>, Changhoon Park<sup>1</sup>, Jisung Kwon<sup>1</sup>, Chong Min Koo<sup>2</sup>, and Myung-Ki Kim<sup>1</sup>  
(<sup>1</sup>Korea University, <sup>2</sup>Sungkyunkwan University)

[TS07F\_P\_10]

10:00~10:30

## In-situ visualization of surface plasmon-driven hot carrier generation with photoconductive AFM

Hyunhwa Lee<sup>1</sup> and Jeong Young Park<sup>1,2</sup>  
(<sup>1</sup>IBS, <sup>2</sup>KAIST)

[TS07F\_P\_11]

10:00~10:30

## Enhanced hot electron lifetime and flux on a perovskite modified plasmonic nanodiode

Yujin Park<sup>1</sup>, Jungkweon Choi<sup>2</sup>, Hyunhwa Lee<sup>2</sup>, Hyotcherl Ihee<sup>1,2</sup>, and Jeong Young Park<sup>1,2</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>IBS)

[TS07F\_P\_12]

10:00~10:30

## Time analysis for maximizing productivity in photolithography by machine learning

Juyoung Jung and Byoungdeog Choi  
(Sungkyunkwan University)

[TS07F\_P\_13]

10:00~10:30

## Effect of various dielectric layers on performance of IR camouflage metamaterials

Joon-Soo Lim, Injoong Chang, Juyeong Nam, and Hyung Hee Cho  
(Yonsei University)

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## TS08. Hybrid Nanomaterials for Next Generation Convergence Science and Technology

### Oral Presentation

<b>Session Title</b>	<b>[TS08W1] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 1</b>
<b>Date &amp; Time</b>	<b>July 6(Wed.), 2022 / 10:30~12:00</b>
<b>Place</b>	<b>Room 210</b>
<b>Session Chair(s)</b>	<b>Il-Doo Kim (KAIST)</b>

**[TS08W1\_I\_1] Invited** **10:30~11:00**

#### **Nanofabricated hydrogen gas sensors**

Reginald M. Penner  
(*UC Irvine*)

**[TS08W1\_O\_2]** **11:00~11:15**

#### **Shock synthesis of advanced catalysts using flash-thermal lamping**

Dong-Ha Kim<sup>1,2</sup>, Jun-Hwe Cha<sup>1,2</sup>, Sung-Yool Choi<sup>1</sup>, and Il-Doo Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>)

**[TS08W1\_O\_3]** **11:15~11:30**

#### **Concave ZnO nanocube-decorated 2D WS<sub>2</sub> nanoflakes for improved NO<sub>2</sub> sensing property at low temperature**

Jae-Woo Seo, Joon-Seok Lee, Seung-Ho Choi, Won-Jun Choi, and Seon-Jin Choi  
(*Hanyang University*)

**[TS08W1\_O\_4]** **11:30~11:45**

#### **Millisecond-scale rapid synthesis of single-atom catalysts-stabilized carbon nanoonion**

Dogyong Jeon, Hamin Shin, Jun-Hwe Cha, and Il-Doo Kim  
(*KAIST*)

**[TS08W1\_O\_5]** **11:45~12:00**

#### **2D Conductive metal-organic frameworks for room temperature chemiresistive H<sub>2</sub>S sensors**

Joon-Seok Lee<sup>1</sup>, Minhyuk Kim<sup>2</sup>, Seoyeon Seong<sup>2</sup>, Mingyu Jeon<sup>3</sup>, Honghui Kim<sup>3</sup>, Jihan Kim<sup>3</sup>, Hoi Ri Moon<sup>2</sup>, and Seon-Jin Choi<sup>1</sup>  
(<sup>1</sup>Hanyang University, <sup>2</sup>UNIST, <sup>3</sup>KAIST)

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## Oral Presentation

<b>Session Title</b>	<b>[TS08W2] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 2</b>
<b>Date &amp; Time</b>	<b>July 6(Wed.), 2022 / 15:45~18:00</b>
<b>Place</b>	<b>Room 210</b>
<b>Session Chair(s)</b>	<b>Seon-Jin Choi (Hanyang Univ.)</b>

**[TS08W2\_I\_1] Invited** **15:45~16:15**

**Nanomaterials for sensitive detection of biomarkers in clinical samples**

Yoon-Kyoung Cho<sup>1,2</sup>  
(<sup>1</sup>IBS, <sup>2</sup>UNIST)

**[TS08W2\_O\_2]** **16:15~16:30**

**Surface activity-tuned metal oxide chemiresistor: Toward direct and quantitative halitosis diagnosis**

Hamin Shin, Dong-Ha Kim, and Il-Doo Kim  
(KAIST)

**[TS08W2\_O\_3]** **16:30~16:45**

**Nanocomposite of MWCNT and metal-organic frameworks for voltammetric heavy metal ion sensors**

Won-Jun Choi, Seung-Ho Choi, Joon-Seok Lee, Jae-Woo Seo, and Seon-Jin Choi  
(Hanyang University)

**[TS08W2\_I\_4] Invited** **16:45~17:15**

**Thiol-functionalized Zr metal-organic frameworks for efficient removal of Fe<sup>3+</sup> from water**

Yufei Yuan and Yoonseob Kim  
(The Hong Kong University)

**[TS08W2\_O\_5]** **17:15~17:30**

**Promoting ex-solution from metal-organic framework mediated oxide scaffold for highly active and robust catalysts**

Seyeon Park, DongHwan Oh, Jaewan Ahn, Jun Kyu Kim, Dong-Ha Kim, Seunghyun Kim, Chungseong Park, WooChul Jung, and Il-Doo Kim  
(KAIST)

**[TS08W2\_O\_6]** **17:30~17:45**

**Functional polymer wrapped single-walled carbon nanotube composite for heavy metal ion detection**

Seung-Ho Choi, Joon-Seok Lee, Won-Jun Choi, Jae-Woo Seo, and Seon-Jin Choi  
(Hanyang University)

**[TS08W2\_O\_7]** **17:45~18:00**

**High temperature sintering induced acetone gas sensing properties of sol-gel synthesized HfO<sub>2</sub> nanocrystals**

Anamitra Chattopadhyaya, and Jhasaketan Nayak  
(Indian Institute of Technology)



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## Oral Presentation

Session Title

**[TS08T1] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 3**

Date & Time

July 7(Thu.), 2022 / 10:30~12:00

Place

Room 210

Session Chair(s)

Won-Hee Ryu (Sookmyung Women's Univ.)

[TS08T1\_I\_1] Invited

10:30~11:00

**Bioinspired metal oxide nanomaterials for sustainable applications**

Ziqi Sun

(Queensland University of Technology)

[TS08T1\_O\_2]

11:00~11:15

**Fabrication of high-performance amorphous  $V_2O_{5-x}$  thin film aqueous battery using RF sputter**

Jun-Seob Park<sup>1</sup>, Su-Ho Cho<sup>2</sup>, IL-Doo Kim<sup>2</sup>, and Hyun-Suk Kim<sup>1</sup>

(<sup>1</sup>Chungnam National University, <sup>2</sup>KAIST)

[TS08T1\_O\_3]

11:15~11:30

**Fabricating hierarchical porous single-wall carbon nanohorns with atomic level designed Co sites for efficient oxygen reduction**

Jae Young Jung<sup>1</sup>, Sungjun Kim<sup>2</sup>, Jeong-Gil Kim<sup>1</sup>, Min Ji Kim<sup>1</sup>, Kug-Seung Lee<sup>3</sup>, Yung-Eun Sung<sup>3</sup>, Pil Kim<sup>4</sup>, Sung Jong Yoo<sup>1</sup>, Hyung-Kyu Lim<sup>5</sup>, Nam Dong Kim<sup>1</sup>

(<sup>1</sup>KIST, <sup>2</sup>Seoul National University, <sup>3</sup>Pohang Accelerator Laboratory, <sup>4</sup>Jeonbuk National University, <sup>5</sup>Kangwon National University)

[TS08T1\_O\_4]

11:30~11:45

**MXene-ALD engineering and carbon heterostructures for energy applications**

Debananda Mohapatra, Youn-Hye Kim, Yejin Park, and Soo-Hyun Kim

(Yeungnam University)

[TS08T1\_O\_5]

11:45~12:00

**A 2D-layered halide perovskite embedded in a polymer matrix for development of self-charging power unit**

Swathi Ippili, Venkatraju Jella, and Soon-Gil Yoon

(Chungnam National University)

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## Oral Presentation

**Session Title**

**[TS08T2] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 4**

**Date & Time**

July 7(Thu.), 2022 / 14:00~15:15

**Place**

Room 210

**Session Chair(s)**

Seong-jong Yoo (KIST)

**[TS08T2\_I\_1] Invited**

**14:00~14:30**

**Dynamic electrochemical interface design for energy conversion and storage**

Dong Young Chung  
(GIST)

**[TS08T2\_O\_2]**

**14:30~14:45**

**Multi-deformable piezoelectric energy nano-generator with high conversion efficiency for subtle body movements**

Jihoon Bae and Sungwon Lee  
(DGIST)

**[TS08T2\_O\_3]**

**14:45~15:00**

**Fabrication of nanostructured permanent magnetic powders and bulk properties for energy conversion**

Jihoon Park, Hui-Dong Qian, Jung Tae Lim, and Chul-Jin Choi  
(Korea Institute of Materials Science)

**[TS08T2\_O\_4]**

**15:00~15:15**

**Highly-stable lead-free bismuth halide perovskite cathodes for lithium ion batteries**

Subhashree Behera, Swathi Ippili, Soon-Gil Yoon, and Hyun Suk Kim  
(Chungnam National University)

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## Oral Presentation

Session Title

[TS08T3] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 5

Date & Time

July 7(Thu.), 2022 / 16:00~18:00

Place

Room 210

Session Chair(s)

Sungwon Lee (DGIST)

[TS08T3\_I\_1] Invited

16:00~16:30

**Realistic electrochemical artificial skins for human and robots**

Unyong Jeong  
(POSTECH)

[TS08T3\_O\_2]

16:30~16:45

**All-nanofibre-based substrate-less, extremely conformal, and breathable organic field effect transistor**

Sungwon Lee  
(DGIST)

[TS08T3\_O\_3]

16:45~17:00

**High-performance stretchable piezoelectric nanogenerators based on air stable and eco-friendly 2D-halide perovskite**

Venkatraju Jella, Swathi Ippili, and Soon-Gil Yoon  
(Chung-Ang University)

[TS08T3\_O\_4]

17:00~17:15

**Stretchable piezoelectric nanogenerator based on multi-stacked flexoelectric ZnAl:LDH nanosheets and piezoelectric ZnO nanorods**

Chongsei Yoon<sup>1</sup>, Venkatraju Jella<sup>2</sup>, Swathi Ippili<sup>2</sup>, Giwan Yoon<sup>1</sup>, and Soon-Gil Yoon<sup>2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Chungnam National University)

[TS08T3\_O\_5]

17:15~17:30

**Halide-doping of lead-free bismuth perovskite MA<sub>3</sub>Bi<sub>2</sub>I<sub>9</sub> films via CVD for high performance flexible self-powered photodetectors**

Van-Hoang Vuong and Soon Gil Yoon  
(Chungnam National University)

[TS08T3\_O\_6]

17:30~17:45

**High performance flexible UV photodetector based on facilely synthesized, eco-friendly Zn-Al: LDH Nanosheets**

Alphi Maria Thomas and Soon-Gil Yoon  
(Chungnam National University)

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[TS08T3\_O\_7]

17:45~18:00

**Laser-induced hierarchically interactive MXene reinforced carbon nanofibrous patch for long-term biopotentials monitoring**

Md Sharifuzzaman, Dong Kyun Kim, Young Do Shin, Seong Hoon Jeong, and Jae Yeong Park  
(*Kwangwoon University*)

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## Oral Presentation

Session Title

[TS08F1] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 6

Date & Time

July 8(Fri.), 2022 / 10:30~11:45

Place

Room 210

Session Chair(s)

BongSup Shim (Inha Univ.)

[TS08F1\_I\_1] Invited

10:30~11:00

**Hybrid and multi-dimensional architectures for studying quantum phenomena**

Jinkyoun Yoo  
(Los Alamos National Laboratory)

[TS08F1\_O\_2]

11:00~11:15

**Beyond binary 2D metal-chalcogenides: 2D ternary metal chalcogenides and 2D oxides**

Kibum Kang  
(KAIST)

[TS08F1\_O\_3]

11:15~11:30

**An emerging material for synaptic device: Alkali ion intercalated layered metal oxide**

Gichang Noh<sup>1</sup>, Jeongho Kim<sup>2</sup>, Eunpyo Park<sup>1</sup>, Yooyeon Jo<sup>1</sup>, Dong Yeon Woo<sup>1</sup>, Min Jee Kim<sup>1</sup>, Yong Woo Sung<sup>1</sup>, Hamid Reza Rasouli<sup>3</sup>, Talip Serkan Kasirga<sup>3</sup>, Kibum Kang<sup>2</sup>, and Joon Young Kwak<sup>1,4</sup>  
(<sup>1</sup>KIST, <sup>2</sup>KAIST, <sup>3</sup>Bilkent University UNAM, <sup>4</sup>UST)

[TS08F1\_O\_4]

11:30~11:45

**Enhancement of photoresponse on narrow bandgap mott insulator  $\alpha$ -RuCl<sub>3</sub> via intercalation**

Min-kyung Jo<sup>1,2</sup>, Hoseok Heo<sup>3</sup>, Jung-Hoon Lee<sup>4</sup>, Seungwook Choi<sup>1</sup>, Ansoon Kim<sup>1</sup>, HanBeom Jeong<sup>2</sup>, Hu Young Jeong<sup>5</sup>, Jong Min Yuk<sup>2</sup>, Daejin Eom<sup>6</sup>, Junghoon Jahng<sup>1</sup>, Eun Seong Lee<sup>1</sup>, In-young Jung<sup>1</sup>, Seong Rae Cho<sup>2</sup>, Jeongtae Kim<sup>1</sup>, Seorin Cho<sup>2</sup>, Kibum Kang<sup>2</sup>, and Seungwoo Song<sup>1</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>KAIST, <sup>3</sup>Harvard University, <sup>4</sup>SAIT, <sup>5</sup>KIST, <sup>6</sup>UNIST)

# NANO KOREA 2022

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## Oral Presentation

**Session Title**

**[TS08F2] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 7**

**Date & Time**

July 8(Fri.), 2022 / 14:00~15:45

**Place**

Room 210

**Session Chair(s)**

Hyeonsu Jeong (KIST)

**[TS08F2\_I\_1] Invited**

**14:00~14:30**

**Carbon Nanotube Fiber Research at KIST**

Hyeon Su Jeong and Seung Min Kim  
(KIST)

**[TS08F2\_O\_2]**

**14:30~14:45**

**Biodegradable electroactive nanomaterials for bioelectronics**

Bong Sup Shim, Taeshik Eom, Busra Ozlu, and Seunghyun Lee  
(Inha University)

**[TS08F2\_O\_3]**

**14:45~15:00**

**Breathable and reusable core-shell metal nanowire networks-based electronics on polymer nanofiber-mesh substrate**

Wooseong Jeong and Sungwon Lee  
(DGIST)

**[TS08F2\_O\_4]**

**15:00~15:15**

**Pd doped  $\text{In}_2\text{O}_3$  hollow nanofiber as a robust oxygen carrier for low temperature chemical looping  $\text{CO}_2$  splitting**

DongHwan Oh, Seyeon Park, Il-Doo Kim, and WooChul Jung  
(KAIST)

**[TS08F2\_O\_5]**

**15:15~15:30**

**Anomalous absorption of electromagnetic waves by 2D transition metal carbonitride  $\text{Ti}_3\text{CNT}_x$  (MXene)**

Aamir Iqbal and Chong Min Koo  
(Sungkyunkwan University)

**[TS08F2\_O\_6]**

**15:30~15:45**

**Topological design and materials for micro/nano heater system and a novel square-wave based microfluidic actuator**

Nadeem Qaiser<sup>1</sup>, Maha Nour<sup>2</sup>, and Vincent Tung<sup>1</sup>  
(<sup>1</sup>KUST, <sup>2</sup>Saudi Aramco)

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## Oral Presentation

<b>Session Title</b>	<b>[TS08F3] Hybrid Nanomaterials for Next Generation Convergence Science and Technology 8</b>
<b>Date &amp; Time</b>	<b>July 8(Fri.), 2022 / 16:00~18:00</b>
<b>Place</b>	<b>Room 210</b>
<b>Session Chair(s)</b>	<b>Jin-young Jeong (KRIBB)</b>

**[TS08F3\_I\_1] Invited 16:00~16:30**

**Flexible multichannel neural probe developed by electropolymerization for localized stimulation and sensing**

Kwok Ki Chik, Na Xiao, and Paddy K. L. Chan

(<sup>1</sup>The University of Hong Kong, <sup>2</sup>Advanced Biomedical Instrumentation Center)

**[TS08F3\_O\_2] 16:30~16:45**

**3D printing of hybrid materials for optoelectronic devices**

Sung Hyun Park  
(KITECH)

**[TS08F3\_O\_3] 16:45~17:00**

**Toward producing homogeneous nanogaps over large scale**

Sungwoon Lee and Sung-Gyu Park  
(KIMS)

**[TS08F3\_O\_4] 17:00~17:15**

**Support-less bioceramic 3D printing via hydrogel bath**

Yeong-Jin Choi, Naren Raja, and Hui-suk Yun  
(KIMS)

**[TS08F3\_O\_5] 17:15~17:30**

**Organo hotspot engineering using electrochemistry for ultrasensitive surface-enhanced Raman spectroscopy detection of bacterial DNAs**

Soo Hyun Lee<sup>1</sup>, Won-Chul Lee<sup>1</sup>, Eun Hye Koh<sup>1</sup>, Iris Baffour Ansah<sup>1,2</sup>, Jun-Yeong Yang<sup>1</sup>, ChaeWon Mun<sup>1</sup>, Seunghun Lee<sup>1</sup>, Dong-Ho Kim<sup>1,2</sup>, Ho Sang Jung<sup>1</sup>, and Sung-Gyu Park<sup>1</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>UST)

**[TS08F3\_O\_6] 17:30~17:45**

**Fabrication of transparent yttria with complex 3D structure by ceramic additive manufacturing technology**

Sinuo Zhang<sup>1,2</sup>, Hyeon-Myeong Oh<sup>2</sup>, Chang Woo Gal<sup>2</sup>, Young-jin Choi<sup>2</sup>, Ha-Neul Kim<sup>2</sup>, Young-Jo Park<sup>2</sup>, and Hui-suk Yun<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIMS)

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[TS08F3\_O\_7]

17:45~18:00

**In situ electrochemical surface modification of Au electrodes for simultaneous label-free SERS detection of biomolecules in human urine**

Iris Ansah and Dong-Ho Kim  
(KIMS)



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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS08B\_P\_01]

10:00~10:30

**Bitter flavored soft encapsulants for miniaturized, skin-interfaced devices designed to reduce risks of choking in infants**

Donghwi Cho<sup>1</sup> and John A. Rogers<sup>2</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Northwestern University)

[TS08B\_P\_02]

10:00~10:30

**Hyaluronic acid-coated gold nanoparticle as an effective intestinal targeted sulfasalazine drug delivery system**

Hyoung-Mi Kim<sup>1</sup>, You Jin Choi<sup>1,2</sup>, Jae-Min Oh<sup>3</sup>, and Junghun Park<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Yonsei University, <sup>3</sup>Dongguk University)

[TS08B\_P\_03]

10:00~10:30

**Rapid thermal shock synthesis of high-entropy alloy nanoparticles stabilized by metal oxide overlayers as an ultra-stable catalyst toward the conversion of CO<sub>2</sub> into CO by the reverse water-gas shift reaction**

Jaewan Ahn, Seyeon Park, and Il-Doo Kim  
(KAIST)

[TS08B\_P\_04]

10:00~10:30

**Enhanced thermal stability of tunicate cellulose nanofibers by inorganic nanocomposites**

Yeongbeom Hong and Bong Sup Shim  
(Inha University)

[TS08B\_P\_05]

10:00~10:30

**Phase/structure engineering of molybdenum sulfide on rGO**

Euichul Shin, Seolwon Yun, and Il-Doo Kim  
(KAIST)

[TS08B\_P\_06]

10:00~10:30

**Strategies to improve sensing ability of perovskite oxide gas sensor**

Minhyun Kim, Seyeon Park, and Il-Doo Kim  
(KAIST)

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[TS08B\_P\_07]

10:00~10:30

**Biodegradable electrospun poly(butyleneadipate-co-terephthalate) (PBAT) nanofibers for air filter applications**

Yong-Koo Son, Yu-Jang Cho, and Il-Doo Kim  
(KAIST)

[TS08B\_P\_08]

10:00~10:30

**Violacein-embedded nanofiber filters with antiviral and antibacterial activities**

Jiyoung Lee<sup>1</sup>, Jaehyeong Bae<sup>1,2</sup>, Doo-Young Youn<sup>1</sup>, Jaewan Ahn<sup>1</sup>, Won-Tae Hwang<sup>1</sup>, Hyunae Bae<sup>4</sup>, Pan Kee Bae<sup>3</sup>, and Il-Doo Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Harvard University, <sup>3</sup>BioNano Health Guard Research Center, <sup>4</sup>CJ CheilJedang Corporation)

[TS08B\_P\_09]

10:00~10:30

**Layered structure of MOFs for highly sensitive room temperature chemiresistor**

Chungseong Park and Il-Doo Kim  
(KAIST)

[TS08B\_P\_10]

10:00~10:30

**Organic-inorganic nanocomposites with yarn electrospinning prepared via phase separation nano-coating for piezoelectric nanogenerator**

Yujang Cho and Il-Doo Kim  
(KAIST)

[TS08B\_P\_11]

10:00~10:30

**Atomically miniaturized Bi-phase IrOx/Ir catalysts dotted on N-doped carbon nanotubes for high-performance Li-CO<sub>2</sub> batteries**

Yeo-Jin Rho<sup>1</sup>, Boran Kim<sup>1</sup>, Kihyun Shin<sup>2</sup>, Graeme Henkelman<sup>2</sup>, and Won-Hee Ryu<sup>1</sup>  
(<sup>1</sup>Sookmyung Women's University, <sup>2</sup>The University of Texas at Austin)

[TS08B\_P\_12]

10:00~10:30

**One-pot synthesis of ratio-controlled binary metal oxide nanoparticle catalysts for long lifespan Li-air battery**

Jong Seok Nam, Min Soo Kim, Jihoon Choi, and Il-Doo Kim  
(KAIST)

[TS08B\_P\_13]

10:00~10:30

**Dynamic reliability evaluation in sport motion for knitted e-textile sensor**

Hyemi Kim, Jihyang Yoon, Jonghan Lee, Changmin In, Woo Jae Lee, Youn Hee Kim, Ki-Kwang Lee, and Mi Jung Lee  
(Kookmin University)

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[TS08B\_P\_14]

10:00~10:30

## Electrochemical olefin epoxidation by Co-TAML catalysts

Suyeon Kim<sup>1</sup>, Wonwoo Nam, Sun Hee Kim, and Kyoungsuk Jin<sup>1</sup>,  
(<sup>1</sup>Korea University, <sup>2</sup>Ewha Woman's University, <sup>3</sup>KBSI)

[TS08B\_P\_15]

10:00~10:30

## Sustainable electrosynthetic amine preparation at metal electrode

Taemin Kim, Dong Il Park, Hyo Jae Yoon, and Kyoungsuk Jin  
(Korea University)

[TS08B\_P\_16]

10:00~10:30

## Electrochemical nitric oxide synthesis via cobalt oxide nanocatalysts

Sojin Kim, Suyeon Kim, Chanju Won, Chaeri Park, Hugh I. Kim, and Kyoungsuk Jin  
(Korea University)

[TS08B\_P\_17]

10:00~10:30

## Improving adsorption and retention efficiency of volatile organic compounds (VOCs) through viscosity control of organogels

Jihoon Han and Youn Soo Kim  
(POSTECH)

[TS08B\_P\_18]

10:00~10:30

## Phase-separated hydrogels with embedded nanogels to improve shrinking and re-swelling processes

Taehun Chung, Young Kwang Kim, Junwoo Son, and Youn Soo Kim

(POSTECH)

[TS08B\_P\_19]

10:00~10:30

## Deposition of transparent LiFePO<sub>4</sub> and Li<sub>2</sub>Ti<sub>5</sub>O<sub>12</sub> thin film electrodes by RF magnetron sputtering for all-solid-state battery

Kwan-Young Oh<sup>1,2</sup>, Haena Yim<sup>1</sup>, and Ji-Won Choi<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST)

[TS08B\_P\_20]

10:00~10:30

## Topotactic chlorination boosts the surface activity and stability of solid oxide fuel cell air electrodes

Hyunseung Kim<sup>1</sup>, Jinwook Kim<sup>1</sup>, Seungwoo Nam<sup>1</sup>, Bonjae Koo<sup>1,2</sup>, and WooChul Jung<sup>1,2</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Sungshin Women's University)

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[TS08B\_P\_21]

10:00~10:30

**In-situ silver development for molecule-specific biological imaging through highly accessible microscopes**

Dae-Hyeon Song<sup>1</sup>, Chang Woo Song<sup>1</sup>, Jinkyung Chung<sup>2</sup>, Eun-Hae Jang<sup>3</sup>, Hyunwoo Kim<sup>1</sup>, Yongsuk Hur<sup>1</sup>, Eun-Mi Hur<sup>3</sup>, Doory Kim<sup>2</sup>, and Jae-Byum Chang<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Hanyang University, <sup>3</sup>Seoul National University)

[TS08B\_P\_22]

10:00~10:30

**Effects of plasma power and duration time on physical property of ZnO nanowires during direct current diode plasma system**

Woo-Young Lee, Jong-Hwan Lee, and Goo-Hwan Jeong  
(Kangwon National University)

[TS08B\_P\_23]

10:00~10:30

**Direct growth of carbon nanotubes on ZnO tetrapods and characterization of UV light sensing ability**

Jong-Min Seo, Eun Seok, Jeong-Yun Yang, Soo-Hyuk Kang, and Goo-Hwan Jeong  
(Kangwon National University)

[TS08B\_P\_24]

10:00~10:30

**A facile approach to fabricate nanocomposite with carbon nanotubes and ZnO and its enhanced photosensing property**

Jong-Min Seo, Jeong-Yun Yang, Jong-Hwan Lee, Eun Seok, Soo-Hyuk Kang, and Goo-Hwan Jeong  
(Kangwon National University)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS08W\_P\_01]

10:00~10:30

**Chalcogen atom induced surface reconstruction of iridium nanoparticles for enhanced oxygen evolution reaction**

Myeong-Geun Kim and Sung Jong Yoo  
(KIST)

[TS08W\_P\_02]

10:00~10:30

**Physical vapor deposition for preparation of multi-element nano-electrocatalysts for PEMFCs**

Injoon Jang and Sung Jong Yoo  
(KIST)

[TS08W\_P\_03]

10:00~10:30

**Rational design of molecular sieving membranes for high stability and selective surface activity**

Gwang Su Kim, Chong-Yun Kang, and Ji-Soo Jang  
(KIST)

[TS08W\_P\_04]

10:00~10:30

**Temperature dependent binary superlattices of gold nanoparticle in water**

Young-Jin Yoon and Tae-Hwan Kim  
(Jeonbuk National University)

[TS08W\_P\_05]

10:00~10:30

**Synthesis of composites of nano-sized porous structures using graphene oxide with conducting polymers**

Seung Chan Jung, Hong-Seok Kim, Daeyoon Kim, Dawoon-Jung, and Jae-Hee Han  
(Gachon University)

[TS08W\_P\_06]

10:00~10:30

**Facile synthesis and characterization of mesoporous hollow silica for formaldehyde adsorption**

Jong-tak Lee and Jae Young Bae  
(Keimyung University)

[TS08W\_P\_07]

10:00~10:30

**Synthesis and characterization of mesoporous silica for anti-reflection coatings**

Han San Ko and Jae Young Bae  
(Keimyung University)

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[TS08W\_P\_08]

10:00~10:30

**Correlation analysis of durability and alloying degree of PtNi alloy catalyst through ex-situ study**

Eungjun Lee<sup>1,2</sup> and Sung Jong Yoo<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Seoul National University)

[TS08W\_P\_09]

10:00~10:30

**Characterization of synthetic diopside powder by Sol-Gel method**

Hyunjung Park and Jong Kook Lee  
(Chosun University)

[TS08W\_P\_10]

10:00~10:30

**In vitro properties of akermanite powder synthesized by solid state reaction**

Jaeun Go and Jong Kook Lee  
(Chosun University)

[TS08W\_P\_11]

10:00~10:30

**Engineering copper sulfide nanocatalysts toward electrochemical nitrogen reduction**

Haneul Jin<sup>1</sup>, Hyun S. Park<sup>1,2</sup>, and Sung Jong Yoo<sup>1,2,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST, <sup>3</sup>Kyung Hee University)

[TS08W\_P\_12]

10:00~10:30

**Effect of the fabrication condition of membrane electrode assemblies with carbon-supported ordered PtCo electrocatalyst on the durability of polymer electrolyte membrane fuel cells**

Jeawoo Jung<sup>1,2</sup>, Hyun S. Park<sup>1,2</sup>, Sung Jong Yoo<sup>1,3</sup>, Jin Young Kim<sup>1,2,3</sup>, So Young Lee<sup>1</sup>, Bora Seo<sup>1</sup>, Kwang Ho Song<sup>2</sup>, Hee-Young Park<sup>1</sup>, and Jong Hyun Jang<sup>1,2,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>UST)

[TS08W\_P\_13]

10:00~10:30

**Tuning oxygen evolution kinetics and stability using hybrid support: IrRu alloy supported on TiO<sub>2</sub>-rGO for proton exchange membrane water electrolyzers**

In Gyeom Kim<sup>1,2,3</sup>, Hee-Young Park<sup>2</sup>, Jong Hyun Jang<sup>2,3,4</sup>, Kwan-Young Lee<sup>3</sup>, In Wook Nah<sup>2</sup>, and Sehkyu Park<sup>1</sup>  
(<sup>1</sup>Kwangwoon University, <sup>2</sup>KIST, <sup>3</sup>Korea University, <sup>4</sup>UST)

[TS08W\_P\_14]

10:00~10:30

**Nanoengineering of SnO<sub>2</sub> nanotube surface via carbothermal radiative shock for highly sensitive gas sensors with tunable selectivity**

Jaehyun Ko and Il-Doo Kim  
(KAIST)

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[TS08W\_P\_15]

10:00~10:30

**(001) Textured Mn-doped PYN-PMN-PT piezoelectric ceramics for high power applications**

Dong-gyu Lee<sup>1,2</sup>, Sahn Nahm<sup>2</sup>, Chong-Yun Kang<sup>1</sup>, and Hyun-Cheol Song  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

[TS08W\_P\_16]

10:00~10:30

**Highly efficient hydrogen release from organic hydrogen carriers by novel hybrid catalytic materials with induction heating**

Dong-gwon Kang<sup>1</sup>, Kwanyong Jeong<sup>1</sup>, Sang-Joon Kim<sup>1,2</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>UST)

[TS08W\_P\_17]

10:00~10:30

**Engineering pore size and surface area of activated carbon support for dehydrogenation efficiency of liquid organic hydrogen carrier**

Juseong Lee<sup>1,2</sup>, Kwanyong Jeong<sup>2</sup>, Sunil Kwon<sup>2</sup>, Sang-Joon Kim<sup>1,2</sup>, and Ji Hoon Park<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KRICT)

[TS08W\_P\_18]

10:00~10:30

**High-performance pt-based bimetallic catalyst functionalized on activated carbon fiber by carbothermal shock for dehydrogenation of liquid organic hydrogen carrier**

Suhyeon Lee<sup>1,2</sup>, Ji Hoon Park<sup>1,2</sup>, and Sang-Joon Kim<sup>1,2</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>UST)

[TS08W\_P\_19]

10:00~10:30

**Effect of atomic rearrangement in Pd@Cu@Pt on oxygen reduction reaction in acidic electrolyte**

Daeil Choi and Sung Jong Yoo  
(KIST)

[TS08W\_P\_20]

10:00~10:30

**Surface modification of hydroxyapatite/forsterite on zirconia substrate by room temperature spray coating**

Yu Hyeon Yun and Jong Kook Lee  
(Chosun University)

[TS08W\_P\_21]

10:00~10:30

**Electrochemical nitrogen reduction on the ru-based sub-nano cluster catalyst: a DFT study**

Seung-hoon Kim<sup>1</sup>, Sung Jong Yoo<sup>1,2,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Kyung Hee University, <sup>3</sup>UST)

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[TS08W\_P\_22]

10:00~10:30

**Effects of surface passivation through ultraviolet/ozone treatment on the performance of GaN light-emitting diodes**

Kwangeun Kim, Chulwoong Kim, Hyo Gun Lee, and Won Suk Jung  
(Korea Aerospace University)

[TS08W\_P\_23]

10:00~10:30

**Biodegradable clay composites with a layered-nanostructure for green electronic**

Seunghyeon Lee and Bong Sup Shim  
(Inha University)

[TS08W\_P\_24]

10:00~10:30

**Maximizes the active site density of a single atom Fe-N-C electrocatalyst for anion membrane fuel cell**

Subin Park and Sung Jong Yoo  
(KIST)

[TS08W\_P\_25]

10:00~10:30

**Enhanced property of phase change materials encapsulated by silica/polydopamine for thermal energy storage**

Taeksu Kim and Bong Sup Shim  
(Inha University)

[TS08W\_P\_26]

10:00~10:30

**Biodegradable MMT-DMSO composites for solid-state ionic conductor**

Hyun Been Park, Seunghyeon Lee, and Bong Sup Shim  
(Inha University)

[TS08W\_P\_27]

10:00~10:30

**Electrochemical synthesis of highly conductive melanin-like polymers for non-enzymatic glucose biosensors**

Busra Ozlu and Bong Sup Shim  
(Inha University)

[TS08W\_P\_28]

10:00~10:30

**Modified activated carbon efficacy in reducing heavy metals bioavailability in sediment**

Nano Lee , Nano Choi, and Nano Kim, So-Jeong KIM, and Jae-Woo PARK  
(Hanyang University)

[TS08W\_P\_29]

10:00~10:30

**The surface modification of cationic tunicate cellulose and characterization**

Jun Hyeok Lee and Bong Sup Shim  
(Inha University)



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[TS08W\_P\_30]

10:00~10:30

**Effect of heat-treatment conditions on characteristics of conductive thick film layers containing core-shell nanoparticles**

Sung-Jei Hong<sup>1</sup>, Sang Hyeok Hong<sup>1</sup>, Ajin Jo<sup>1</sup>, and Sangmun Lee<sup>2</sup>  
(<sup>1</sup>KETI, <sup>2</sup>Selcos Co. Ltd.)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS08T\_P\_01]

10:00~10:30

**Surface hydration of membranes by using water-absorbing MOF for energy applications**

Chanhoon Kim  
(KITECH)

[TS08T\_P\_02]

10:00~10:30

**Polyaniline decorated ultra-thick CNT fiber for practical wearable supercapacitors**

Sungju Lee<sup>1,2</sup> and Hyeonsu Jeong<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Hanyang University)

[TS08T\_P\_03]

10:00~10:30

**A study on the fabrication of a facile and efficient fiber-shaped supercapacitors through 3D architecture system of 1D and 2D materials**

Hayoung yu<sup>1,2</sup>, Jeong-Gil Kim<sup>1</sup>, Min Gook Han<sup>1</sup>, Nam Dong Kim<sup>1</sup>, Heung Cho Ko<sup>2</sup>, and Hyeon Su Jeong<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>GIST)

[TS08T\_P\_04]

10:00~10:30

**Orientation/densification method for high-performance carbon nanotube fibers**

Dong-Myeong Lee, Seung Min Kim, and Hyeon Su Jeong  
(KIST)

[TS08T\_P\_05]

10:00~10:30

**Magnetic alignment of graphite platelets in polyimide matrix toward a flexible electronics substrate**

Seok-Hwan Chung, Jong Tae Kim, Hoyoung Kim, Dong Hwan Kim, and Sang Won Jeong  
(DGIST)

[TS08T\_P\_06]

10:00~10:30

**Intense pulsed light induced MoS<sub>2</sub> growth on carbon nanofibers for high performance lithium-sulfur batteries**

Seung Hyun Jeong, Min Soo Kim, Seo Hak Park, Jong Seok Nam, Su-Ho Cho, Sung-Yool Choi, and Il-Doo Kim  
(KAIST)

[TS08T\_P\_07]

10:00~10:30

**Effects of surficial graphitic layer of carbon nanofiber in lithium-sulfur battery system**

Min Soo Kim<sup>1</sup>, Jong Seok Nam<sup>1</sup>, Su-Ho Cho<sup>1</sup>, Seung Hyun Jeong<sup>1</sup>, Ji-Won Jung<sup>2</sup>, and Il-Doo Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>University of Ulsan)

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[TS08T\_P\_08]

10:00~10:30

## Magnetic composite powders for widening mmwave absorption bandwidth

Min-Byeol Yun<sup>1,2</sup>, Gi-Ryeon Jo<sup>1,2</sup>, Yeong-Hun Son<sup>1,2</sup>, Young-Guk Son<sup>2</sup>, and Youn-Kyoung Baek<sup>1</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>Pusan National University)

[TS08T\_P\_09]

10:00~10:30

## Synthesis of hard nanoferrites for millimeter wave absorption

Yeong-Hun Son<sup>1,2</sup>, Min-Byeol Yun<sup>1,2</sup>, Gi-Ryeon Jo<sup>1,2</sup>, Young-Guk Son<sup>2</sup>, and Youn-Kyoung Baek<sup>1</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>Pusan National University)

[TS08T\_P\_10]

10:00~10:30

## Multi-element oxide nanoparticles composed of non-precious cations on reduced graphene oxide by rapid heating and cooling process to enhance the electrocatalytic performance

Haeseong Lim, Jaewan Ahn, Su-Ho Cho, Jong Seok Nam, Min Soo Kim, and Il-Doo Kim  
(KAIST)

[TS08T\_P\_11]

10:00~10:30

## Porous Pd-Sn alloy nanotube-based chemiresistor for highly stable and sensitive H<sub>2</sub> detection

Lu Song, Dong-Ha Kim, Hamin Shin, Jaewan Ahn, and Il-Doo Kim  
(KAIST)

[TS08T\_P\_12]

10:00~10:30

## Porous nanofiber membrane: rational platform for highly sensitive thermochromic sensor

Jaehyeong Bae<sup>1,2</sup>, Dong-Ha Kim<sup>1</sup>, Jiyoung Lee<sup>1</sup>, Jaewan Ahn<sup>1</sup>, Won-Tae Hwang<sup>1</sup>, Jaehyun Ko<sup>1</sup>, and Il-Doo Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Harvard University)

[TS08T\_P\_13]

10:00~10:30

## Plasma filter system for inactivating infectious bioaerosols

Seunghun Lee<sup>1</sup>, Ki-Ho Baek<sup>1</sup>, Sunghoon Jung<sup>1</sup>, Joo-Young Park<sup>1</sup>, Do-Geun Kim<sup>1</sup>, Sungweon Ryoo<sup>2</sup>, and Sanggu Lee<sup>3</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>Masan National Tuberculosis Hospital, <sup>3</sup>Korea Conformity Laboratories)

[TS08T\_P\_14]

10:00~10:30

## Galvanic replacement reaction in perovskite oxide for superior acetylene gas sensors

Jong Won Baek and Il-Doo Kim  
(KAIST)

[TS08T\_P\_15]

10:00~10:30

## Non-covalent functionalization of single-walled carbon nanotubes for chemiresistive anion sensor

Min-Kyung Lee, Seung-Ho Choi, Joon-Seok Lee, and Seon-Jin Choi  
(Hanyang University)

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[TS08T\_P\_16]

10:00~10:30

**Development of copper coated filter using roll-to-roll ion beam treatment for antimicrobial property**

Sunghoon Jung<sup>1</sup>, Jun-Young Yang<sup>1</sup>, Donghwan Jang<sup>2</sup>, Taeyoon Kim<sup>2</sup>, Sungweon Ryoo<sup>2</sup>, and Seunghun Lee<sup>1</sup>

(<sup>1</sup>KIMS, <sup>2</sup>Masan National Tuberculosis Hospital)

[TS08T\_P\_17]

10:00~10:30

**Synthesis of biodegradable nanofabric membrane with highly efficient and functional air filtration system**

Hyunsub Song and Il-Doo Kim

(KAIST)

[TS08T\_P\_18]

10:00~10:30

**Lithium surface leveler additives for stabilizing lithium-metal batteries**

Seo-Young Jun, Jun-Seo Lee, Suji Kim, and Won-Hee Ryu

(Sookmyung Women's University)

[TS08T\_P\_19]

10:00~10:30

**Functional polymer-SWCNT composite materials for flexible cyclohexanone sensors**

Soo-Min Kim, Jae-Woo Seo, and Seon-Jin Choi

(Hanyang University)

[TS08T\_P\_20]

10:00~10:30

**Effect of ion beam modification on fluorinated ethylene propylene (FEP) film for high-frequency flexible copper clad laminate**

Jun-Yeong Yang<sup>1,2</sup>, Sunghoon Jung<sup>1</sup>, Eun-Yeon Byeon<sup>1</sup>, Do-Geun Kim<sup>1</sup>, Hyo Jung Kim<sup>2</sup>, and Seunghun Lee<sup>1</sup>

(<sup>1</sup>KIMS, <sup>2</sup>Pusan National University)

[TS08T\_P\_21]

10:00~10:30

**Memristor type hydrogen gas sensors using TiO<sub>2</sub> nanorods**

Suk Yeop Chun<sup>1,2</sup>, Young Geun Song<sup>2</sup>, Chong-Yun Kang<sup>1,2</sup>, and Jung Ho Yoon<sup>2</sup>

(<sup>1</sup>Korea University, <sup>2</sup>KIST)

[TS08T\_P\_22]

10:00~10:30

**Optimization of selectivity and catalytic activity for electrochemical CO<sub>2</sub> reduction reaction by introducing of ZnAl based layered double hydroxide nanosheets on Zn foil**

Hee-il Nam<sup>1,2</sup>, Kyoung Ryeol Park<sup>1</sup>, Hye-ji Sim<sup>1,3</sup>, Pyeong Kang Yoo<sup>1</sup>, Keun Yong Sohn<sup>2</sup>, and Dong-Ha Lim<sup>1</sup>

(<sup>1</sup>KITECH, <sup>2</sup>Inje University, <sup>3</sup>Pusan National University)

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[TS08T\_P\_23]

10:00~10:30

**Soft replica materials for nanoscale-to-microscale pattern formation by nanotransfer printing**

Young Lim Kang<sup>1</sup>, Tae Wan Park<sup>2</sup>, Chan Park<sup>1</sup>, and Woon Ik Park<sup>1</sup>  
(<sup>1</sup>Pukyong National University, <sup>2</sup>Korea University)

[TS08T\_P\_24]

10:00~10:30

**3D architecturing strategy on the state-of-the-art carbon nanotube fiber for high electrochemical performance of fiber shaped supercapacitors**

Jeong-Gil Kim<sup>1,2</sup>, Hayoung Yu<sup>2,3</sup>, Jae Young Jung<sup>2</sup>, Min Ji Kim<sup>2,3</sup>, Hyeon Su Jeong<sup>2</sup>, and Nam Dong Kim<sup>2</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>KIST, <sup>3</sup>GIST)

[TS08T\_P\_25]

10:00~10:30

**Anomalous optoelectric properties of an ultra-thin ruthenium film with a surface oxide layer for flexible transparent conducting electrodes**

Jae Myoung Oh<sup>1</sup>, Mohammad Nasir<sup>1</sup>, Byung ki Ryu<sup>2</sup>, Hyeong Joong Yoon<sup>3</sup>, Chel-Jong Choi<sup>4</sup>, Jong-Seong Bae<sup>3</sup>, and Hee Jung Park<sup>1</sup>  
(<sup>1</sup>Dankook University, <sup>2</sup>KERI, <sup>3</sup>KBSI, <sup>4</sup>Jeonbuk University)

[TS08T\_P\_26]

10:00~10:30

**Bottom-up self-assembly of aramid amphiphiles for construction of nanoribbons, nanotubes, and nanoplates**

Dae-Yoon Kim  
(KIST)

[TS08T\_P\_27]

10:00~10:30

**Optical diffraction tomography-based analysis for investigation of the interaction between nanoparticles and live cells**

Wang Sik Lee<sup>1</sup> and Jinyoung Jeong<sup>1,2</sup>  
(<sup>1</sup>KRIBB, <sup>2</sup>UST)

[TS08T\_P\_28]

10:00~10:30

**Roll-to-roll surface treatment process of nanostructured polymer films for anti-reflective property**

Eun-yeon Byeon, Jun-Yeong Yang, Seunghun Lee, and Sunghoon Jung  
(KIMS)

[TS08T\_P\_29]

10:00~10:30

**High entropy metal oxide based wearable supercapacitor with high electrochemical performance**

Hyungsub Yoon<sup>1</sup>, Tae Gwang Yun<sup>2</sup>, and Byungil Hwang<sup>1</sup>  
(<sup>1</sup>Chung-Ang University, <sup>2</sup>Myongji University)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS08F\_P\_01]

10:00~10:30

**Development of Zr-MOF@CNT nanostructures with high power density for supercapacitor**

Woojin Jang and Tae Gwang Yun  
(Myongji University)

[TS08F\_P\_02]

10:00~10:30

**Flexible chirophotonic crystal reflectors**

Seunghui Han and Dae-Yoon Kim  
(KIST)

[TS08F\_P\_03]

10:00~10:30

**Solid-state luminescence switching controlled by hierarchical nanostructures**

Ki-Hyun Ryu and Dae-Yoon Kim  
(KIST)

[TS08F\_P\_04]

10:00~10:30

**Ultrasonic spray chemistry: Atomized chemical reaction for heteroatom bond (C-X) Formation**

Hyun-Tak Kim  
(KRICT)

[TS08F\_P\_05]

10:00~10:30

**Ionic-activated TiO<sub>2</sub> room temperature gas sensor with optimum sensitivity at a various relative humidity**

Yumin Park<sup>1</sup>, Gwang Su Kim<sup>1,2</sup>, and Chong-Yun Kang<sup>1,2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST)

[TS08F\_P\_06]

10:00~10:30

**Volatile organic compounds sensing array and optoelectronic filter system via ion-pairing dyes with wide visible spectrum**

Donghyun Kim<sup>1,2</sup>, Ki-Seob Hwang<sup>1</sup>, Won-Gun Koh<sup>2</sup>, Chanmin Lee<sup>1</sup>, and Jun-Young Lee<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Yonsei University)

[TS08F\_P\_07]

10:00~10:30

**A feasible digital light processing (DLP) 3D printing of biodegradable porous polymer with high internal phase emulsion (HIPE) structure**

Won Jun Choi<sup>1,2</sup>, Ki Seob Hwang<sup>1</sup>, and Jun-Young Lee<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Yonsei University)

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[TS08F\_P\_08]

10:00~10:30

**Preparation of polymeric composites with low temperature PCM microcapsule for insulation using photopolymerization 3D printing**

Hyuk Jun Kwom<sup>1,2</sup>, Chanmin Lee<sup>1</sup>, Ki-Seob Hwang<sup>1</sup>, Jun-Young Lee<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Yonsei University)

[TS08F\_P\_09]

10:00~10:30

**Amphiphobic coating of core-shell nanoparticles with various glass transition temperatures**

Yongsoo Kim, Ki-Seob Hwang, Chanmin Lee, and Jun-Young Lee  
(KITECH)

[TS08F\_P\_10]

10:00~10:30

**Stabilization of Ru nanocatalyst through CO<sub>2</sub>-induced SMSI for oxygen evolution**

Yong Beom Kim, DongHwan Oh, and WooChul Jung  
(KAIST)

[TS08F\_P\_11]

10:00~10:30

**Design of multifunctional 2D nanomaterial for high-capacity hydrogen storage**

Yeo-Ju Kang<sup>1,2</sup> and Sang-Joon Kim<sup>1,2</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>UST)

[TS08F\_P\_12]

10:00~10:30

**Fabrication of ZnV<sub>2</sub>O<sub>4</sub> nanoparticles embedded in carbon nanofibers as a cathode material for high-performance aqueous Zn-ion batteries**

Jeong-Ho Park, Il-Gyu Kim, Na-Yeong Kim, Jeong-Hwan Seol, Min-Gyeong Gi, Hyun Min Na, Ha-Eun Baeg, Ji-Won Jung  
(University of Ulsan)

[TS08F\_P\_13]

10:00~10:30

**Fabrication of a composite of zirconium monoxide/carbon nanofiber catalyst for improving oxygen reduction reaction in Zn-air batteries**

Min Kyeong Gi<sup>1</sup>, Il-Gyu Kim<sup>1</sup>, Na-Yeong Kim<sup>1</sup>, Jeong-Hwan Seol<sup>1</sup>, Jeong-Ho Park<sup>1</sup>, Hyun-Min Na<sup>1</sup>, Ha-Eun Baeg<sup>1</sup>, Ki Ro Yoon<sup>2</sup>, and Ji-Won Jung<sup>1</sup>  
(<sup>1</sup>University of Ulsan, <sup>2</sup>KITECH)

[TS08F\_P\_14]

10:00~10:30

**Study on catalytic activity of La<sub>1-x</sub>Ca<sub>x</sub>CoO<sub>3-δ</sub> for alkaline-based water electrolysis**

Jeongah Lee, Sangwoo Kim, DongHwan Oh, Yong Beom Kim, and WooChul Jung  
(KAIST)

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[TS08F\_P\_15]

10:00~10:30

**Alkaline leaching: A new strategy to improve the surface activity and stability of double perovskite-based cathode for solid oxide fuel cells**

Yeongtaek Hong, Hyunseung Kim, Jeongah Lee, Yong Beom Kim, Sangwoo Kim, Hainan Sun, and WooChul Jung  
(KAIST)

[TS08F\_P\_16]

10:00~10:30

**Engineering active sites with noble metal on two-dimensional transition metal hydroxide for electrocatalytic applications**

Su-Ho Cho, Hamin Shin, Dogyung Jeon, Jaewan Ahn, Jong Seok Nam, and Il-Doo Kim  
(KAIST)

[TS08F\_P\_17]

10:00~10:30

**A persistent photoconductivity effect of ReS<sub>2</sub> and its application for optoelectronic synapse.**

Jiwon Moon and Jin-Hong Park  
(Sungkyunkwan University)

[TS08F\_P\_18]

10:00~10:30

**Dielectric properties of Dion-Jacobson layers perovskite nanosheets film**

So-Yeon Yoo<sup>1,2</sup>, Haena Yim<sup>1</sup>, Sahn Nahm<sup>2</sup>, and Ji-Won Choi<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>UST)

[TS08F\_P\_19]

10:00~10:30

**Explored composition spread of gallium doped in Li<sub>7</sub>La<sub>3</sub>Zr<sub>2</sub>O<sub>12</sub> solid electrolytes for all-solid-state-battery by RF sputtering**

Ahrom Ryu<sup>1</sup>, Sahn Nahm<sup>2</sup>, and Ji-Won Choi<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University, <sup>3</sup>UST)

[TS08F\_P\_20]

10:00~10:30

**Transparent thin film battery with SiNx-Ag anode by continuous composition spreaded sputtering**

Yae-Lim Hwang<sup>1,2</sup>, Ho-Won Jang<sup>2</sup>, and Ji-Won Choi<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Seoul National University, <sup>3</sup>UST)

[TS08F\_P\_21]

10:00~10:30

**A artificial synapse based on two-dimensional layered Sr<sub>2</sub>Nb<sub>3</sub>O<sub>10</sub> nanosheets**

Haena Yim<sup>1</sup>, Chansoo Yoon<sup>2</sup>, Ahrom Ryu<sup>1</sup>, So Yeon Yoo<sup>1</sup>, Bae Ho Park<sup>2</sup>, and Ji-Won Choi<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Konkuk University, <sup>3</sup>UST)



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[TS08F\_P\_22]

10:00~10:30

**A single step in-situ surface engineering for facile ORR: simultaneous exsolution and surface amorphization**

SungHyun Jeon, Jongsu Seo, Sejong Ahn, and WooChul Jung  
(KAIST)

[TS08F\_P\_23]

10:00~10:30

**Amorphous carbon decorated TeO<sub>2</sub> nanowires for NO<sub>2</sub> sensing**

Eun Bi Kim<sup>1</sup>, Ka Yoon Shin, Wansik Oum, Dong Jae Yoo, Sukwoo Kang, Hyeong Min Kim, and Hyounwoo Kim  
(Hanyang University)

[TS08F\_P\_24]

10:00~10:30

**Direct observation of electron coupling effect with monitoring hot electron behavior on Au@Pd core-shell nanocatalysts**

Beomjoon Jeon<sup>1,2</sup>, Daeho Kim<sup>1,2</sup>, Taek-Seung Kim<sup>1,2</sup>, Han-Koo Lee<sup>3</sup>, and Jeong Young Park<sup>1,2</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>IBS, <sup>3</sup>PAL)

[TS08F\_P\_25]

10:00~10:30

**Hybrid polymer electrolytes based on aligned fibrous reinforcement for long-lasting zinc-air battery**

Kwang Won Kim<sup>1,2</sup>, Seon-Jin Choi<sup>2</sup>, and Ki Ro Yoon<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Hanyang University)

[TS08F\_P\_26]

10:00~10:30

**A study on the correlation between the alignment of nanofibrous nonwoven and the air filtration performance**

Jihyun Lee<sup>1,2</sup>, Wontae Hwang<sup>3</sup>, Seon-Jin Choi<sup>2</sup>, Il-Doo Kim<sup>3</sup>, and Ki Ro Yoon<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Hanyang University, <sup>3</sup>KAIST)

[TS08F\_P\_27]

10:00~10:30

**Development of ex-solved Pt nanocatalysts supported on tungsten oxide nanofibers for highly durable oxygen reduction reaction**

Chang Ho Lee<sup>1,2</sup>, Caroline Sunyong Lee<sup>2</sup>, and Ki Ro Yoon<sup>1</sup>  
(<sup>1</sup>KITECH, <sup>2</sup>Hanyang University)

[TS08F\_P\_28]

10:00~10:30

**Optical emission analysis of horizontal type inductively coupled plasma for reduced defect formation during nitrogen doping on graphene**

Sung-Il Jo and Goo-Hwan Jeong  
(Kangwon National University)

[TS08F\_P\_29]

10:00~10:30

**Effects of crystallographic property on photocatalytic performance of ZnO tetrapods produced by atmospheric pressure plasma jet**

Sung-Gyu Heo and Goo-Hwan Jeong  
(Kangwon National University)

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## TS09. Nanofabrication Platform

### Oral Presentation

Session Title	[TS09W1] Nanofabrication Platform 1
Date & Time	July 6(Wed.), 2022 / 10:30~11:45
Place	Room 213
Session Chair(s)	Yeong-Eun Yoo (KIMM)

[TS09W1\_I\_1] Invited 10:30~11:00

#### Scalable nanofabrication of wearable biomedical devices

Chi Hwan Lee  
(Purdue University)

[TS09W1\_O\_2] 11:00~11:15

#### Liquid metal droplet printing by impact on a surface-modified mesh

Gaabhin Ryu, Hyoungsoo Kim, and Sanha Kim  
(KAIST)

[TS09W1\_O\_3] 11:15~11:30

#### 300 mm large area wire grid polarizers with 50 nm half-pitch by ArF immersion lithography

Jungchul Song<sup>1,2</sup>, Jae Sub Oh<sup>1</sup>, Min Jun Bak<sup>1</sup>, Il-Suk Kang<sup>1</sup>, Sung Jung Lee<sup>3</sup>, and Ga-Won Lee<sup>1,2</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>Chungnam National University, <sup>3</sup>Pavonine Korea, Inc.)

[TS09W1\_O\_4] 11:30~11:45

#### Electrochemical pentane sensing at high temperature with using YSZ as O<sup>2-</sup> conductor while NiO as a electrode.

Murli Manohar, Hee Jun Kim, Rahul Purbia, Jin-Kyeon Kim, Yoo Seok Jeong, Sang Heon Kim, and Jeong Min Baik  
(Sungkyunkwan University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS09W2] Nanofabrication Platform 2</b>
<b>Date &amp; Time</b>	<b>July 6(Wed.), 2022 / 15:45~18:00</b>
<b>Place</b>	<b>Room 213</b>
<b>Session Chair(s)</b>	<b>Jessie Sungyun Jeon (KAIST), Young Tae Cho (Changwon National Univ.)</b>

**[TS09W2\_I\_1] Invited 15:45~16:15**

**Scalable manufacturing of nano-engineered surfaces with increased structural dimension and hierarchy**

Sanha Kim  
(KAIST)

**[TS09W2\_I\_2] Invited 16:15~16:45**

**From nanomaterials to integrative micromachines: Fabrication, mechanisms, and biomedical applications**

Kwanoh Kim  
(KIMM)

**[TS09W2\_O\_3] 16:45~17:00**

**Phase transitions of deep eutectic solvents for gram-scale synthesis of noble metal nanoparticles**

Yoon Hyuck Kim and Jae-Seung Lee  
(Korea University)

**[TS09W2\_I\_4] Invited 17:00~17:30**

**Nanocatalytic self-locomotive antibacterial microrobot (SLAM)**

Hyunjoon Kong  
(University of Illinois Urbana-Champaign)

**[TS09W2\_O\_5] 17:30~17:45**

**Investigation on the causes of EUV transmittance degradation of EUV pellicle during exposure process**

Seong Ju Wi, Ha Neul Kim, Chang Soo Kim, Young Woo Kang, Won Jin Kim, and Jinho Ahn  
(Hanyang University)

**[TS09W2\_O\_6] 17:45~18:00**

**Effect of wrinkles on pellicle reflectivity and local critical dimension**

Dong Gi Lee, Young Woong Kim, Seungchan Moon, Jinhyuk Choi, and Jinho Ahn  
(Hanyang University)

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## Oral Presentation

Session Title	[TS09T1] Nanofabrication Platform 3
Date & Time	July 7(Thu.), 2022 / 10:30~11:45
Place	Room 213
Session Chair(s)	Hyungjun Lim (KIMM)

[TS09T1\_I\_1] Invited 10:30~11:00

### Acoustics meets microfluidics for nanofabrication

Jinsoo Park  
(Chonnam National University)

[TS09T1\_O\_2] 11:00~11:15

### Complex plasmonic nanooligomers

Jeongwon Kim and Sungho Park  
(Sungkyunkwan University)

[TS09T1\_O\_3] 11:15~11:30

### Fabrication of CMOS-compatible memristor devices for bio-medical applications

Jongwon Lee<sup>1</sup>, Youna Kwon<sup>1</sup>, Dongeun Yoo<sup>1</sup>, See-On Park<sup>2</sup>, and Shinhyun Choi<sup>2</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>KAIST)

[TS09T1\_O\_4] 11:30~11:45

### A semiconductor foundry in a box: Scalable manufacturing of nano and microelectronics using directed assembly of nanomaterials

Ahmed Busnaina, Anthony Childress, and Ahmed Abdelaziz  
(Northeastern University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS09T2] Nanofabrication Platform 4</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.), 2022 / 14:00~15:30</b>
<b>Place</b>	<b>Room 213</b>
<b>Session Chair(s)</b>	<b>Jin Soo Park (Chonnam National Univ.)</b>

**[TS09T2\_I\_1] Invited** **14:00~14:30**

### **Design and fabrication of medical microrobots**

Eunpyo Choi<sup>1,2</sup>  
(<sup>1</sup>Chonnam National University, <sup>2</sup>KIMM)

**[TS09T2\_I\_2] Invited** **14:30~15:00**

### **Lab on a particle: democratization of particle templated droplets for amplified bioassays**

Ghulam Destgeer<sup>1</sup>, Mengxing Ouyang<sup>2</sup>, Chueh-Yu Wu<sup>2</sup>, and Dino Di Carlo<sup>2</sup>  
(<sup>1</sup>Technical University of Munich, <sup>2</sup>University of California)

**[TS09T2\_I\_3] Invited** **15:00~15:30**

### **Semiconductor process based nanobiosensor for digital infectious disease test**

Hea Yeon Lee  
(Mara Nanotech Korea, inc)

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## Oral Presentation

<b>Session Title</b>	<b>[TS09T3] Nanofabrication Platform 5</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.), 2022 / 16:00~18:15</b>
<b>Place</b>	<b>Room 213</b>
<b>Session Chair(s)</b>	<b>HeaYeon Lee (Mara Nanotech Korea), Hongsoo Choi (DGIST)</b>

**[TS09T3\_I\_1] Invited** **16:00~16:30**

**Nanomaterials reinforced hybrid microgels for cardiac tissue engineering and biohybrid systems**

Su Ryon Shin  
(Harvard Medical School)

**[TS09T3\_I\_2] Invited** **16:30~17:00**

**Therapeutic luminal coating of the intestine using a latticed nano-structural organic-inorganic hybrid polymer for the treatment of metabolic disorders**

Yuhan Lee  
(BWH)

**[TS09T3\_O\_3]** **17:00~17:15**

**Roll-based fabrication of large-area wrinkled graphene on flexible substrates**

Prashant Narute<sup>1,2</sup>, Byon Ji Cheol<sup>1,2</sup>, Rakesh Sadanand Sharbidre<sup>2</sup>, and Seong-Gu Hong<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KRISS)

**[TS09T3\_I\_4] Invited** **17:15~17:45**

**Oxide TFT for all displays**

Junsung Kim, Wooseok Jeong, and Sang-Hee Ko Park  
(KAIST)

**[TS09T3\_O\_5]** **17:45~18:00**

**Development of nanoimprint lithography system and process for functional bio labware**

Hyungjun Lim<sup>1,2</sup>, Jungho Ahn<sup>1</sup>, Hak-Jong Choi<sup>1</sup>, Junhyoung Ahn<sup>1</sup>, Soongeun Kwon<sup>1</sup>, Geehong Kim<sup>1</sup>, Kee-Bong Choi<sup>1</sup>, and Jaejong Lee<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST)

**[TS09T3\_O\_6]** **18:00~18:15**

**MXene-based microsupercapacitor for on-chip with nano- and micro scale patterning process**

Eunji Kim<sup>1,2</sup>, Kathleen Maleski<sup>3</sup>, Yury Gogotsi<sup>3</sup>, Chi Won Ahn<sup>1</sup>, and Yonghee Lee<sup>1</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>KAIST, <sup>3</sup>Drexel University)

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## Oral Presentation

<b>Session Title</b>	<b>[TS09F1] Nanofabrication Platform 6</b>
<b>Date &amp; Time</b>	<b>July 8(Fri.), 2022 / 10:30~11:30</b>
<b>Place</b>	<b>Room 213</b>
<b>Session Chair(s)</b>	<b>Jong G. Ok (Seoul National University of Science Technology)</b>

**[TS09F1\_O\_1]** **10:30~10:45**

### **Sub-micrometer bonding method for stretchable substrates**

Kihoon Jeong, Yujin Lee, Youson Kim, Hyeonwoo Mun, Ki-Uk Kyung, and Sung Gap Im  
(KAIST)

**[TS09F1\_O\_2]** **10:45~11:00**

### **Controlling dynamic behavior of DNA-grafted plasmonic nanoparticle via photo-patterning**

Jongwook Kim<sup>1</sup>, Tae Soup Shim<sup>2</sup>, Jerome Kartham Hyun<sup>1</sup>, and So-Jung Park<sup>1</sup>  
(<sup>1</sup>Ewha Womans University, <sup>2</sup>Ajou University)

**[TS09F1\_O\_3]** **11:00~11:15**

### **A study on the fabrication of anticounterfeiting stamps with bio-inspired structural color**

Nguyen Hoang Minh<sup>1,2</sup>, Kwanoh Kim<sup>1</sup>, Do Hyun Kang<sup>1</sup>, Yeong-Eun Yoo<sup>1,2</sup>, and Jae Sung Yoon<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST)

**[TS09F1\_O\_4]** **11:15~11:30**

### **Review of NNFC's silicon photonics fabrication platform**

Jong-Bum You, Dong-Eun Yoo, Dong-Wook Lee, Hae Chul Hwang, and Boo Taek Lim  
(NNFC)

## Industrial Session

<b>Session Title</b>	<b>[TS09F2] Industrial Session: Nanofabrication Platform</b>
<b>Date &amp; Time</b>	<b>July 8(Fri.), 2022 / 14:00~16:00</b>
<b>Place</b>	<b>Room 213</b>
<b>Session Chair(s)</b>	<b>Kyoung G. Lee (NNFC)</b>

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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS09B\_P\_01]

10:00~10:30

**HEPA filters fabricated by gradual electrodeposition of copper nanofibers**

Jihae Chang, Seunghun Yoo, Jihun Jeong, and Sanha Kim  
(KAIST)

[TS09B\_P\_02]

10:00~10:30

**Evaluating optical/thermal properties of single MoSi<sub>2</sub> EUV pellicle**

Ha Neul Kim, Seong Ju Wi, Chang Soo Kim, Won Jin Kim, and Jinho Ahn  
(Hanyang University)

[TS09B\_P\_03]

10:00~10:30

**Fluorine-based dry etch of platinum tungsten alloy for novel EUV mask absorber**

Yunsoo Kim, Dongmin Jeong, Minsun Cho, and Jinho Ahn  
(Hanyang University)

[TS09B\_P\_04]

10:00~10:30

**Effect of diffraction phase control for low-n EUV mask**

Minsun Cho, Dongmin Jeong, Yunsoo Kim, and Jinho Ahn  
(Hanyang University)

[TS09B\_P\_05]

10:00~10:30

**Impact of thermomechanical properties of EUV pellicle on image performance**

Chang Soo Kim, Jung Hwan Kim, Seong Ju Wi, Ha Neul Kim, Young Woo Kang, Won Jin Kim, and Jinho Ahn  
(Hanyang University)

[TS09B\_P\_06]

10:00~10:30

**Orientation control of supramolecular dendrimer by high-resolution guide patterns based on block copolymer**

Heejin Park, Wonmoo Lee, Juhwan Lee, and Hee-tae Jung  
(KAIST)

[TS09B\_P\_07]

10:00~10:30

**Experimental demonstration for the influence of pellicle wrinkles on the mask imaging performance**

Jinhyuk Choi, Dong Gi Lee, Young Woong Kim, Seungchan Moon, Changsoo Kim, and Jinho Ahn  
(Hanyang University)



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[TS09B\_P\_08]

10:00~10:30

## A study on the low-k materials using polyimide varnish with nano silica hybrid material

Seungwoo Shin, Seok Kim, and Young Tae Cho  
(Changwon National University)

[TS09B\_P\_09]

10:00~10:30

## Synthesis of long-term stable, substrate-independent antifouling nanofilm via initiated chemical vapor deposition

Hogi Kim<sup>1</sup>, Younseong Song<sup>1</sup>, Seonghyeon Park<sup>1</sup>, Youson Kim<sup>1</sup>, Hyeonwoo Mun<sup>1</sup>, Jueun Kim<sup>2</sup>, Seongeun Kim<sup>1</sup>, Kyung G. Lee<sup>2</sup>, and Sung Gap Im<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>NNFC)

[TS09B\_P\_10]

10:00~10:30

## Flexible pH sensor based on polyaniline nanopillar array film

Sung Tae Jang<sup>1</sup>, Kyoung G. Lee<sup>2</sup>, and Bong Gill Choi<sup>1</sup>  
(<sup>1</sup>Kangwon National University, <sup>2</sup>NNFC)

[TS09B\_P\_11]

10:00~10:30

## Label-free and multiplexed detection via graphene field-effect transistor for monitoring airborne infectious disease

Jin Seong, Sojeong Lee, Seungjoo Haam, and Seong Chan Jun  
(Yonsei University)

[TS09B\_P\_12]

10:00~10:30

## Direct cellular penetration of supramolecular nanomachine through molecular folding and unfolding

Soyeong Jin<sup>1</sup>, Dageyeong Guk<sup>1</sup>, Hyemin Park<sup>1</sup>, Youngdo Jeong<sup>1,2</sup>, and Kwan Hyi Lee<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Hanyang University, <sup>3</sup>Korea University)

[TS09B\_P\_13]

10:00~10:30

## A fabrication method for periodic wrinkle arrays of semiconductor nanomembranes via high vacuum fusion bonding

Dong-Hyun Kang<sup>1</sup> and Byung Chul Lee<sup>1,2,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST, <sup>3</sup>Kyung Hee University)

[TS09B\_P\_14]

10:00~10:30

## Metal-organic framework based electrical biosensor for discrimination of small-molecules

Hyunro Kim<sup>1</sup>, Changjoon Keum<sup>1</sup>, Sungwook Park<sup>1</sup>, Youngdo Jeong<sup>1,2</sup>, and Kwan Hyi Lee<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Hanyang University, <sup>3</sup>Korea University)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS09W\_P\_01]

10:00~10:30

**Development of nanostructure-based biosensor platform by using improved gold etching process**

Donggee Rho, Yoo Min Park, Nam Ho Bae, Kyoung G. Lee, Moon-Keun Lee, and Tae Jae Lee  
(NNFC)

[TS09W\_P\_02]

10:00~10:30

**Fabrication and characterization of graphene composite electrodes for high-rate textile microsupercapacitors**

Soongeun Kwon<sup>1</sup>, Hak-Jong Choi<sup>1</sup>, Junhyoung Ahn<sup>1</sup>, Hyungjun Lim<sup>1,2</sup>, Geehong Kim<sup>1</sup>, Kee-Bong Choi<sup>1</sup>, and JaeJong Lee<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST)

[TS09W\_P\_03]

10:00~10:30

**Numerical simulation for optimizing wafer level lens forming process**

Jeonghoon Lee, Junsoo Shin, and Seungmo Kim  
(KOREATECH)

[TS09W\_P\_04]

10:00~10:30

**Low-cost silicon drift detector for X-ray spectroscopy**

Gyungtae Kim<sup>1</sup>, Myung Keun Lee<sup>1</sup>, Chilsung Jung<sup>1</sup>, Sung-Jin Chang<sup>1</sup>, Yun Chang Park<sup>1</sup>, Dong-Ho Kim<sup>2</sup>, and Chel-Jong Choi<sup>2</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>Jeonbuk National University)

[TS09W\_P\_05]

10:00~10:30

**Acousto-microfluidic mixing method for synthesis of gold nanoparticles using microwell platform**

Beomseok Cha, Nayeong Kim, Hyeonji Yeom, Kyungsu Na, and Jinsoo Park  
(Chonnam National University)

[TS09W\_P\_06]

10:00~10:30

**Micro-scale 3D structure using charge-reversed electro-jet writing (CREW) process**

Chanho Jung, Seungbok Lee, Sungjun Oh, and Jung-Yong Lee  
(KAIST)

[TS09W\_P\_07]

10:00~10:30

**Fabrication of alkali vapor cell with integrated photo detector for chip-scale atomic devices**

Jongcheol Park, Tae Hyun Kim, Il-Suk Kang, Sang Hyun Park, Kyoungmin Kim, Hae Cheol Hwang, Minjun Bak, Nam Soo Park, Jong Hyun Song, and Gapseop Sim  
(NNFC)

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[TS09W\_P\_08]

10:00~10:30

**Single step fabrication of nanostructure composed of TiO<sub>2</sub> nanoparticle embedded resin using nanoimprint lithography**

Hyunjung Kang<sup>1</sup>, Joocheon Kim<sup>1</sup>, Dongkyo Oh<sup>1</sup>, and Junsuk Rho<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>National Institute for Nanomaterials Technology)

[TS09W\_P\_09]

10:00~10:30

**Separation of polychiral semiconducting single-walled carbon nanotubes using gel chromatography**

Hong-Seok Kim and Jae-Hee Han  
(Gachon University)

[TS09W\_P\_10]

10:00~10:30

**Ultra-thin metal film on supported graphene for infrared material application**

Sojeong Jang<sup>1,2</sup>, Young-Bin Kim<sup>3</sup>, Geonhee Lee<sup>1</sup>, Donghwi Cho<sup>1</sup>, Jae-Min Myoung<sup>2</sup>, Hyunwoo Kim<sup>1</sup>, Sun-Kyung Kim<sup>3</sup>, and Jeong-O. Lee<sup>1</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Yonsei University, <sup>3</sup>Kyung Hee University)

[TS09W\_P\_11]

10:00~10:30

**Fabrication of microfluidic devices for observation and analysis of micrometer-scale chemical reactions**

Wonjun Jang, Dawoon Jung, Hong-Seok Kim, Seung Chan Jung, and Jae-Hee Han  
(Gachon University)

[TS09W\_P\_12]

10:00~10:30

**Effect of impurities on the structural, morphological and magnetic properties of Fe based bimetallic compound**

Kavita Kumari, Seok-Hwan Huh, Akshay Kumar, Mohit K.Sharma, Min-Ji Shin, Su-Jeong Park, and Bon-Heun Koo  
(Changwon National University)

[TS09W\_P\_13]

10:00~10:30

**Nano-droplet generation with tunable chemical concentration**

Woohyuk Kim and Jinsoo Park  
(Chonnam National University)

[TS09W\_P\_14]

10:00~10:30

**Effects of structural parameters in channels of microfluidic devices on EDC-coupling reactions**

Hyun-Jin Lim, Wonjun Jang, Seung Chan Jung, and Jae-Hee Han  
(Gachon University)

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[TS09W\_P\_15]

10:00~10:30

**In-situ optical characterization in microfluidics channels of single-walled carbon nanotubes that are separated by using gel chromatography and density gradient methods**

Man Ki Moon, Wonjun Jang, Seung Chan Jung, Hong-Seok Kim, and Jae-Hee Han  
(Gachon University)

[TS09W\_P\_16]

10:00~10:30

**Stochastic modeling with deep learning for extreme ultraviolet lithography**

Sang-Kon Kim  
(Hongik University)

[TS09W\_P\_17]

10:00~10:30

**Development of thermometer-embedded angiocatheter to monitoring the patient blood temperature**

In Jo Hwang<sup>1</sup>, Sun Young Lim<sup>1</sup>, Moon-Keun Lee<sup>1</sup>, Jun Wan Lee<sup>2</sup>, and Tae Jae Lee<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Chungnam National University)

[TS09W\_P\_18]

10:00~10:30

**Development of module chip for on-site pathogen analysis**

Woo Lim Cha, In Jo Hwang, Eun Yeong Lee, Sun Yeong Lim, Yoo Min Park, Seok Jae Lee, and Tae Jae Lee  
(NNFC)

[TS09W\_P\_19]

10:00~10:30

**Bicelle – A nanodisc carrier for transmucosal delivery of hydrophobic drugs**

Sunghak Choi<sup>1</sup>, Bongsu Kang<sup>2</sup>, Keesung Kim<sup>1</sup>, and Ho-sup Jung<sup>1</sup>  
(<sup>1</sup>Seoul National University, <sup>2</sup>Kyungpook National University)

[TS09W\_P\_20]

10:00~10:30

**Toward non-gas-permeable hBN film growth on smooth Fe surface**

Hayoung Ko<sup>1</sup>, Soo Ho Choi<sup>2</sup>, Jungmo Kim<sup>3</sup>, Yong In Kim<sup>1</sup>, Young-Hoon Kim<sup>1</sup>, Laud Anim Adofo<sup>1</sup>, Min-Hyoung Jung<sup>1</sup>, Young-Min Kim<sup>1,2</sup>, Mun Seok Jeong<sup>5</sup>, Ki Kang Kim<sup>1,2</sup>, and Soo Min Kim<sup>4</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Institute for Basic Science, <sup>3</sup>KERI, <sup>4</sup>Sookmyung Women's University, <sup>5</sup>Hanyang University)

[TS09W\_P\_21]

10:00~10:30

**Extinction ratio enhancement of a wire grid polarizer through hot-electron diffused cold-annealing in the mid-wavelength infrared range**

Hyesu Kim<sup>1,2</sup>, Seok Young Ji<sup>1,2</sup>, Joo-Yun Jung<sup>1</sup>, and Won Seok Chang<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST)

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[TS09W\_P\_22]

10:00~10:30

**Size-selective separation and concentration of colloidal nanoparticles with a field-assisted membrane process**

Ji Hyo Park, Kwano Kim, Jae Sung Yoon, Do Hyun Kang, and Yeong-Eun Yoo  
(KIMM)

[TS09W\_P\_23]

10:00~10:30

**Droplet-based digital RPA (ddRPA) for multiplexed detection of infectious diseases**

Ji Wook Choi and Bong Geun Chung  
(Sogang University)

[TS09W\_P\_24]

10:00~10:30

**Fabrication of a portable bacterial DNA extraction chip using a stereolithographic 3D-printer**

Kiwon Nam, Seungbeom Kim, and Yong Tae Kim  
(Tech University of Korea)

[TS09W\_P\_25]

10:00~10:30

**Precision alignment process of nano/micro patterns using fourier transform**

Woo Young Kim, Seok Kim, and Young Tae Cho  
(Changwon University)

[TS09W\_P\_26]

10:00~10:30

**Electric power-less microfluidic chip for on-site pathogen analysis**

Yoo Min Park<sup>1</sup>, Juhwan Park<sup>2</sup>, Nam Ho Bae<sup>1</sup>, Seok Jae Lee<sup>1</sup>, Je-kyun Park<sup>2</sup>, and Tae Jae Lee<sup>1,2</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>KAIST)

[TS09W\_P\_27]

10:00~10:30

**Residual layer free liquid transfer imprint lithography and its applications**

Junhyoung Ahn<sup>1</sup>, Hyungjun Lim<sup>1,2</sup>, Soonkeun Kwon<sup>1</sup>, Hakjong Choi<sup>1</sup>, and JaeJong Lee<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST)

[TS09W\_P\_28]

10:00~10:30

**Simple, sensitive and accurate molecular diagnostic platform using amine-containing polymer-coated tube**

Seongeun Kim<sup>1</sup>, Younseong Song<sup>1</sup>, Hogi Kim<sup>1</sup>, Buseok Jeong<sup>1</sup>, Nahyeon Park<sup>1</sup>, Kyoung G. Lee<sup>2</sup>, and Sung Gap Im<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>NNFC)

[TS09W\_P\_29]

10:00~10:30

**Optimizing process conditions for 180 nm-wide nano-patterns**

SangHoon Lee, Woo Young Kim, Seok Kim, and Young Tae Cho  
(Changwon University)

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[TS09W\_P\_30]

10:00~10:30

**Ultrasensitive molecule detection based on infrared metamaterial absorber with vertical nanogap**

Mingyun Kim<sup>1,2</sup>, Jongwon Lee<sup>2</sup>, and Joo-Yun Jung<sup>1</sup>  
(<sup>1</sup>KRIMM, <sup>2</sup>UNIST)

[TS09W\_P\_31]

10:00~10:30

**Facile fabrication of transparent flexible heaters through soft-contact patterning of ionic Ag and carbon nanotube solution coatings**

Minwook Kim, Deokyeong Jeong, Kwangjun Kim, Hojae Ji, Wonjun Lee, Hyunmin Baek, Jaehyeok Yang, and Jong G. Ok  
(Seoul National University of Science and Technology)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS09T\_P\_01]

10:00~10:30

**New approach for shape modulation of micro-patterns in single photomask lithography**

Chan Jae Shin<sup>1,2</sup> and Oh Seok Kwon<sup>1,2</sup>  
(<sup>1</sup>KRIBB, <sup>2</sup>UST)

[TS09T\_P\_02]

10:00~10:30

**Ultra-thin protein bilayer detection using surface-enhanced infrared absorption spectroscopy**

Mintyun Kim<sup>1,2</sup>, Dohyun Kang<sup>2</sup>, Jongwon Lee<sup>1</sup>, and Joo-Yun Jung<sup>2</sup>  
(<sup>1</sup>Ulsan National Institute of Science and Technology, <sup>2</sup>KIMM)

[TS09T\_P\_03]

10:00~10:30

**Wearable cortisol aptasensor for simple and rapid monitoring**

Jai Eun An and Oh Seok Kwon  
(KRIBB)

[TS09T\_P\_04]

10:00~10:30

**Real time monitoring of stress biomarker via polypyrrole nanotube coupled field-effect transistor**

Sophia Nazir<sup>1,2</sup> and Oh Seok Kwon<sup>1,2</sup>  
(<sup>1</sup>KRBB, <sup>2</sup>UST)

[TS09T\_P\_05]

10:00~10:30

**Pyrrolic N wrapping strategy to synthesize highly-efficient Fe-N-C catalysts for oxygen reduction reaction**

Gil-Seong Kang<sup>1</sup>, Jihye Lee<sup>1</sup>, and Han-Ik Joh<sup>2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>Konkuk University)

[TS09T\_P\_06]

10:00~10:30

**Preparation of chitosan microbead disinfectant through microfluidics**

Bong Su Kang<sup>1</sup>, Sung Hak Choi<sup>2</sup>, Kee Sung Kim<sup>2</sup>, Ho Sup Jung<sup>2</sup>, and Moon Kyu Kwak<sup>1</sup>  
(<sup>1</sup>Kyungpook National University, <sup>2</sup>Seoul National University)

[TS09T\_P\_07]

10:00~10:30

**Anodic aluminum oxide-based moisture sensors with micro-structured layers of nanofiber bundles**

Sanghee Jung<sup>1</sup>, Yeon-Wha Oh<sup>1</sup>, Jongcheol Park<sup>1</sup>, Gapseop Sim<sup>1</sup>, Seung Lee Nahm<sup>2</sup>, Jeong Yeon Lee<sup>2</sup>, Kiwoon Choi<sup>3</sup>, Jaehoon Jung<sup>3</sup>, and Il-Suk Kang<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>GEDIS Co., Ltd., <sup>3</sup>NEXTE&M Co., Ltd.)

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[TS09T\_P\_08]

10:00~10:30

**Development of b-stage patterned epoxy molding compound film for panel level semiconductor packaging process**

Jun Sae Han, Chung-Mo Kang, Jongkeun Sim, Jae Hyeon Ahn, Eun-Ji Gwak, Tae-Jin Je, and Doo-Sun Cho  
(KIMM)

[TS09T\_P\_09]

10:00~10:30

**Development of highly-durable micro- and nanopatterned electrodes by selective embedding of solution-processable metallic wires in continuously inscribed micro- and nanotrenches**

Kwangjun Kim, Hyein Kim, Hyunji Son, Taeyun Kim, Minwook Kim, Geonhui Jo, Hojae Ji, and Jong G. Ok  
(Seoul National University of Science and Technology)

[TS09T\_P\_10]

10:00~10:30

**Fabrication of large-area, arrangement controlled BiVO<sub>4</sub>/WO<sub>3</sub> nanorods by nanoimprint lithography and electrodeposition for PEC water splitting**

Hoyoung Lee<sup>1,2</sup>, Hanyi Im<sup>1,2</sup>, Jun-Hyuk Choi<sup>1</sup>, Jong Hyeok Park<sup>2</sup>, and Jihye Lee<sup>1</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>Yonsei University)

[TS09T\_P\_11]

10:00~10:30

**Integration of microfluidic device with optical components for point-of-care testing applications**

Da-In Kwon<sup>1,2</sup>, Jae-Ho Jin<sup>1</sup>, Jae-Hwan Oh<sup>1,2</sup>, Yeong-Eun Yoo<sup>3</sup>, and Do-Hyun Kang<sup>3</sup>  
(<sup>1</sup>Neo Nanotech Co., Ltd., <sup>2</sup>Hanbat University, <sup>3</sup>KIMM)

[TS09T\_P\_12]

10:00~10:30

**Stretchable textile sensor based on graphene ink for real-time monitoring of sodium ion in sweat**

Min Sik Kil, Jo Hee Yoon, Jin Woo Jang, and Bong Gill Choi  
(Kangwon National University)

[TS09T\_P\_13]

10:00~10:30

**Development of stretchable electrochemical ion sensor for real-time monitoring of sweat**

Seo Jin Kim, Jo Hee Yoon, Jin Wu Jang, Hong Jun Park, and Bong Gill Choi  
(Kangwon National University)

[TS09T\_P\_14]

10:00~10:30

**R-G-B CW laser annealing for Si source/drain activation**

Hyeon Jun Hwang, Seung-Mo Kim, Bohyeon Kang, Kisung Kim, Rock-Hyun Baek, and Byoung Hun Lee  
(POSTECH)



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[TS09T\_P\_15]

10:00~10:30

## Acoustofluidic reagent-free cell lysis

Hyeono Nam, Hyung Jin Sung, and Jessie S. Jeon  
(KAIST)

[TS09T\_P\_16]

10:00~10:30

## Development and optimization of carbon nanotube-polymer compositebased highly durable electronic textile via mechanically assisted printing

Kwangjun Kim, Minwook Kim, Kwangjin Choi, Hyunji Son, and Jong G. Ok  
(Seoul National University of Science and Technology)

[TS09T\_P\_17]

10:00~10:30

## Low-noise potentiostat readout circuit with chopper stabilization and dynamic element matching technique for electrochemical sensor

Sanggyun Kang, Byeongkwan Jin, Kyeongsik Nam, Gyuri Choi, Mookyoung Yoo, and Hyoungho Ko  
(Chungnam National University)

[TS09T\_P\_18]

10:00~10:30

## Direct on-site detection of highly pathogenic viruses using FET biosensor

Sungwook Park<sup>1</sup>, Hojun Kim<sup>1</sup>, Youngdo Jeong<sup>1,2</sup>, and Kwan Hyi Lee<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Hanyang University, <sup>3</sup>Korea University)

[TS09T\_P\_19]

10:00~10:30

## Recrystallization of nanostructure amorphous silicon using femtosecond laser for fabricating the high-efficiency photodetector

Seok Young Ji<sup>1,2</sup> and Won Seok Chang<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIMM)

[TS09T\_P\_20]

10:00~10:30

## Fabrication and evaluation of a micro-fluidic chip for immunoassay based on multi-step process

Yeun-Jung Jung<sup>1</sup>, Chang-Auck Choi<sup>1</sup>, Sung-Hoon Kim<sup>1</sup>, Young-Yeol Song<sup>1</sup>, and Yeong-Eun Yoo<sup>2</sup>  
(<sup>1</sup>Neo Nanotech, <sup>2</sup>KIMM)

[TS09T\_P\_21]

10:00~10:30

## Adhesion characteristics of transfer film to size of Micro-/Mini-LEDs

Min-Ah Yoon<sup>1,2</sup>, Chan Kim<sup>2</sup>, Seung Han<sup>1,2</sup>, Jae-Hyun Kim<sup>1,2</sup>, and Kwang-Seop Kim<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIMM)

[TS09T\_P\_22]

10:00~10:30

## Label-free contact-less nanoparticle capture using secondary acoustic radiation force in sessile droplet

Jeongu Ko, Hyunwoo Jeon, and Jinsoo Park  
(Chonnam National University)

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[TS09T\_P\_23]

10:00~10:30

**Preparation of stretchable, conductive, and printable graphene inks for wearable sweat sensors**

Jo Hee Yoon, Hong Jun Park, Min Sik Kil, Jin Woo Jang, and Bong Gill Choi  
(Kangwon National University)

[TS09T\_P\_24]

10:00~10:30

**Development of 3D porous polyaniline film for high-performance electrochemical pH sensor**

Jin Wu Jang, Jo Hee Yoon, Hong Jun Park, Seo Jin Kim, and Bong Gill Choi  
(Kangwon National University)

[TS09T\_P\_25]

10:00~10:30

**Electrical cartridge sensor for reliable and direct identification of microRNAs in urine of patients**

Seongchan Kim<sup>1</sup>, Sungwook Park<sup>1</sup>, Youngdo Jeong<sup>1</sup>, Seok Ho Kang<sup>2</sup>, and Kwan Hyi Lee<sup>1,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University Anam Hospital, <sup>3</sup>Korea University)

[TS09T\_P\_26]

10:00~10:30

**Metal/metal-oxide core-shell nanoparticle based color BIPV application with self-cleaning effect**

Seon Ju Yeo, Buseong Kim, Bo-Yeon Lee, Seung-Chul Park, and Hyuneui Lim  
(KIMM)

[TS09T\_P\_27]

10:00~10:30

**Mussel-inspired graphene oxide coated 3D printing scaffold for bone tissue engineering application**

Ji Min Seok<sup>1,2</sup>, Dahong Kim<sup>2</sup>, Dongjin Lee<sup>1</sup>, Seung-Hun Son<sup>1</sup>, Jun Hee Lee<sup>1</sup>, Jaejong Lee<sup>1</sup>, and Su A Park<sup>1</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>Seoul National University)

[TS09T\_P\_28]

10:00~10:30

**The performance of pore structure nano rods of zinc oxide decorated with Nickle hydroxide**

Iman Shackery and Seong Chan Jun  
(Yonsei University)

[TS09T\_P\_29]

10:00~10:30

**Controlling the flow in microfluidic platform using surface acoustic wave with interdigital transducer**

Daesik Kwak, Yongtaek Im, Seunggyu Kim, and Jessie Sungyun Jeon  
(KAIST)

[TS09T\_P\_30]

10:00~10:30

**Fabrication of microstructured metal mold for diagnosis of pathogens using injection molding-based nano-volume droplet chips**

Da Ae Jo<sup>1</sup>, Nam Kyu Jeong<sup>1</sup>, Seong Han Pyo<sup>1</sup>, So Young Kim<sup>3</sup>, Nam Ho Bae<sup>1</sup>, Seok Jae Lee<sup>1</sup>, Bong Suk Kim<sup>3</sup>, Yong Tae Kim<sup>2</sup>, and Kyoung G. Lee<sup>1</sup>  
(<sup>1</sup>National Nanofab Center, <sup>2</sup>Tech University of Korea, <sup>3</sup>BioTNS)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS09F\_P\_01]

10:00~10:30

**Acetone gas sensing characteristics of nano-structured copper fluoride hydroxides and its enhanced properties by hydrothermal syntheses**

Seungpil Oh<sup>1,2</sup>, Hoo-Jeong Lee<sup>1</sup>, Hyung-Mo Jeong<sup>1</sup>, and Joon-Shik Park<sup>2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>KETI)

[TS09F\_P\_02]

10:00~10:30

**Wafer level analysis of residual stress for pMUT in airborne application**

Joontaek Jung  
(National Nano Fab Center)

[TS09F\_P\_03]

10:00~10:30

**Non-invasive electrical biosensor platform for immunotherapy of bladder cancer**

Sungwook Park<sup>1</sup>, Harin Jin<sup>1,2</sup>, Soo Hwang Lee<sup>1,3</sup>, Hojun Kim<sup>1</sup>, Youngdo Jeong<sup>1,4</sup>, Seok Ho Kang<sup>5</sup>, and Kwan Hyi Lee<sup>1,2,3</sup>  
(<sup>1</sup>KIST, <sup>2</sup>UST, <sup>3</sup>Korea University, <sup>4</sup>Hanyang University, <sup>5</sup>Korea University)

[TS09F\_P\_04]

10:00~10:30

**Nanostructure-based biosensor platform for point-of-care testing**

Donggee Rho, Yoo Min Park, Jun Ho Jang, Nam Ho Bae, Kyoung G. Lee, Moon-Keun Lee, and Tae Jae Lee  
(NNFC)

[TS09F\_P\_05]

10:00~10:30

**Bacteria DNA extraction modular chip by using magnetic particle and portable motor**

Woo Lim Cha, Eun Yeong Lee, Sun Yeong Lim, Yoo Min Park, Seok Jae Lee, and Tae Jae Lee  
(NNFC)

[TS09F\_P\_06]

10:00~10:30

**A film-based integrated microfluidic chip to evaluate pathogen causing foodborne illnesses**

In Jo Hwang, Yoo Min Park, Nam Ho Bae, and and Tae Jae Lee  
(KAIST)

[TS09F\_P\_07]

10:00~10:30

**Highly sensitive nanopillar electrode for determining the insulin in real plasma by using the electrochemical immunoassay**

Yoo Min Park, Nam Ho Bae, Moon-Keun Lee, Tae Jae Lee, and Seok Jae Lee  
(NNFC)

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[TS09F\_P\_08]

10:00~10:30

**Naked eye analysis of amplified gene employing the magnetic particle with functionalized sepharose gel**

Ye Ji Jeong, Yoo Min Park, Chi Hyun Kim, and Moon-Keun Lee  
(NNFC)

[TS09F\_P\_09]

10:00~10:30

**Portable biosensor for quick PCR screening by using smartphone-based electronic components**

Ye Ji Jeong, Yoo Min Park, Moon-Keun Lee, and Tae Jae Lee  
(NNFC)

[TS09F\_P\_10]

10:00~10:30

**Electrochemical deposition of iridium oxide on titanium wire for portable pH sensor with high-sensing performance**

Eun Seop Yoon, Jo Hee Yoon, Jin Wu Jang, Hong Jun Park, and Bong Gill Choi  
(Kangwon National University)

[TS09F\_P\_11]

10:00~10:30

**Highly ordered nanopillar electrode for noninvasive detection of beta-amyloid**

Jun Ho Jang, Yoo Min Park, Tae Jae Lee, and Seok Jae Lee  
(NNFC)

[TS09F\_P\_12]

10:00~10:30

**Fabrication of pneumatic microfluidic chip for concentration of particles**

Jun Ho Jang, Donggee Rho, Yoo Min Park, Tae Jae Lee, and Seok Jae Lee  
(NNFC)

[TS09F\_P\_13]

10:00~10:30

**Electrode fabrication by focus ion beam in prepatterned contact pad**

Yun Chang Park, Kyoung Jin Park, Young Su Kim, and Kinam Kim  
(NNFC)

[TS09F\_P\_14]

10:00~10:30

**Development of multi-chip microfluidic module to synthesize nano liposomes uniformly in large scale**

Nguyen Thi Phuong<sup>1</sup>, Jae-Ho Jin<sup>1</sup>, Yeun-Jung Jung<sup>1</sup>, Do-Hyun Kang<sup>2</sup>, Kwanoh Kim<sup>2</sup>, Jae-Sung Yoon<sup>2</sup>, Young-Yeol Song<sup>1</sup>, and Yeong-Eun Yoo<sup>2</sup>  
(<sup>1</sup>Neo Nanotech, <sup>2</sup>KIMM)

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[TS09F\_P\_15]

10:00~10:30

**Design and fabrication of modulus graded multi-layer-polymer film for application to mechanically robust substrate platform of stretchable electronics**

Youson Kim, Junmo Kim, Chan Young Kim, Taehyun Kim, Chungryeol Lee, Kihoon Jeong, Woosung Jo, Seunghyup Yoo, Taek-Soo Kim, Kyung Cheol Choi, and Sung Gap Im  
(KAIST)

[TS09F\_P\_16]

10:00~10:30

**Noninvasive precision screening of prostate cancer by urinary multimarker sensor and artificial intelligence analysis**

Seunghwan Bang<sup>1,2</sup>, Hyunro Kim<sup>2</sup>, Sungwook Park<sup>2</sup>, Hojun Kim<sup>2</sup>, Sang Hoon Song<sup>3</sup>, In Gab Jeong<sup>3</sup>, Chung-Soo Kim<sup>4</sup>, and Kwan Hyi Lee<sup>1,2,5</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIST, <sup>3</sup>University of Ulsan College of Medicine, <sup>4</sup>Ewha Womans University Mokdong Hospital, <sup>5</sup>Korea University)

[TS09F\_P\_17]

10:00~10:30

**Cell environment changes via gradation patterning by laser direct lithography(LDL)**

Daekyeong Jung<sup>1,2</sup>, Hakjong Choi<sup>2</sup>, Soongeun Kwon<sup>2</sup>, Junhyoung Ahn<sup>2</sup>, Geehong Kim<sup>2</sup>, Kee-bong Choi<sup>2</sup>, Jaejong Lee<sup>1,2</sup>, and Hyungjun Lim<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIMM)

[TS09F\_P\_18]

10:00~10:30

**3D Nanoporous MXene for flexible microsupercapacitors**

Yunhui Choi, Eunji Kim<sup>1,2</sup>, Minju Song<sup>1</sup>, Gyuhan Lee<sup>1</sup>, Yury Gogotsi<sup>3</sup>, Chi Won Ahn<sup>1</sup>, and Yonghee Lee<sup>1</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>KAIST, <sup>3</sup>Drexel University)

[TS09F\_P\_19]

10:00~10:30

**Sequential stereolithographic co-printing of selective porous barriers in microfluidic channels**

Yong Tae Kim<sup>1</sup>, Kiwon Nam<sup>1</sup>, and Albert Folch<sup>2</sup>  
(<sup>1</sup>Tech University of Korea, <sup>2</sup>University of Washington)

[TS09F\_P\_20]

10:00~10:30

**Stereolithographic Printing of a 3D Vascular Chip Using a Cytocompatible Poly(ethylene glycol) Diacrylate Resin**

Yong Tae Kim, Kiwon Nam, and Heungsop Shin  
(Tech University of Korea)

[TS09F\_P\_21]

10:00~10:30

**3D reproduction of chemotherapeutic resistance in microfluidic device with functional endothelium**

Joonha Park<sup>1</sup>, Seunggyu Kim<sup>1</sup>, Jin-Nyoung Ho<sup>2</sup>, Sangchul Lee<sup>2</sup>, and Jessie Sungyun Jeon<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Seoul National University Bundang Hospital)

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[TS09F\_P\_22]

10:00~10:30

**Inp-based flip-chip bonding interconnection with a hundred bump connection for millimeter-wave applications**

Jonghyun Song<sup>1</sup>, Jongwon Lee<sup>1</sup>, Gapseup Sim<sup>1</sup>, and Hyoungho Ko<sup>2</sup>  
(<sup>1</sup>NNFC, <sup>2</sup>Chungnam National University)

[TS09F\_P\_23]

10:00~10:30

**Digital manufacturing of a monolithic microvalve using poly(ethylene glycol) diacrylate resin and polydimethylsiloxane**

Kiwon Nam, Seungbeom Kim, and Yong Tae Kim  
(Tech University of Korea)

[TS09F\_P\_24]

10:00~10:30

**Targeted hyperthermia therapy with magnetic nanoparticles**

Awais Ahmed, Jin-Young Kim, and Hongsoo Choi  
(DGIST)

[TS09F\_P\_25]

10:00~10:30

**Zero-stiffness behaviors of meta-stamp for transfer process of thin films**

Chan Kim, Min-Ah Yoon<sup>1,2</sup>, Seung Han<sup>1,2</sup>, Hak-Joo Lee<sup>3</sup>, Jae-Hyun Kim<sup>1,2</sup>, and Kwang-Seop Kim<sup>1,2</sup>  
(<sup>1</sup>KIMM, <sup>2</sup>UST, <sup>3</sup>CAMM)

[TS09F\_P\_26]

10:00~10:30

**High-resolution 8-inch process platform technology for transparent substrates**

Yeon-Wha Oh, Sang-Hee Jung, Jonghyun Song, Huijae Cho, Kwanghee Kim, JungChul Song, Gapsuh Shim, Sanghyun Park, and Il-Suk Kang  
(NNFC)

[TS09F\_P\_27]

10:00~10:30

**Flexible nanophotonic structure platform technology based on ultrahigh-aspect-ratio vertical si nanowires**

Huijae Cho, Yeon-WHa Oh, Sang-Hee Jung, Dong-Eun Yoo, Dong-Wook Lee, and Il Suk Kang  
(NNFC)

[TS09F\_P\_28]

10:00~10:30

**Computational modelling of graphene/MoS<sub>2</sub> based focus tunable fresnel lens at visible wavelengths**

Cheng-Yi Li, Yun Ji Hwang, Jin Seong, and Seong Chan Jun  
(Yonsei University)

[TS09F\_P\_29]

10:00~10:30

**A study on selective transfer process using micro stamp for micro-LED repair process**

Seung Han<sup>1,2</sup>, Min-Ah Yoon<sup>1,2</sup>, Chan Kim<sup>2</sup>, Jae-Hyun Kim<sup>1,2</sup>, and Kwang-Seop Kim<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KIMM)

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[TS09F\_P\_30]

10:00~10:30

## Low-cost silicon drift detector for X-ray spectroscopy

Gyungtae Kim<sup>1</sup>, Myung Keun Lee<sup>1</sup>, Chilsung Jung<sup>1</sup>, Sung-Jin Chang<sup>1</sup>, Yun Chang Park<sup>1</sup>, Dong-Ho Kim<sup>2</sup>, and Chel-Jong Choi<sup>2</sup>

(<sup>1</sup>NNFC, <sup>2</sup>Jeonbuk National University)

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## TS10. Nano Metrology & Characterization

### Oral Presentation

Session Title	[TS10W1] Nano Metrology & Characterization 1
Date & Time	July 6(Wed.), 2022 / 10:30~12:00
Place	Room 305
Session Chair(s)	Hyejin Jang (Seoul National Univ.)

[TS10W1\_I\_1] Invited 10:30~11:00

#### Neutrons and synchrotron x-rays for nanostructure discovery

Yang Ren  
(City University of Hong Kong)

[TS10W1\_O\_2] 11:00~11:15

#### Investigation of atomic structure changes on resistive switching oxide thin films (Memristor) applying in-situ I-V/TEM

Deok-Hwang Kwon  
(KIST)

[TS10W1\_O\_3] 11:15~11:30

#### Effect of the La addition on the oxidation behavior of SOFC interconnects

Yoon Seok Ko<sup>1,2</sup>, Heung Nam Han<sup>2</sup>, and Dong-Ik Kim<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Seoul National University)

[TS10W1\_O\_4] 11:30~11:45

#### Deep-ultraviolet photoluminescence excitation spectroscopy of hexagonal boron-nitride crystals

Su-Beom Song<sup>1,2</sup>, Sangho Yoon<sup>1,2</sup>, So Young Kim<sup>1,2</sup>, Sera Yang<sup>1</sup>, Seung-Young Seo<sup>1,2</sup>, Soonyoung Cha<sup>1,2</sup>, Hyeon-Woo Jeong<sup>1</sup>, Kenji Watanabe<sup>3</sup>, Takashi Taniguchi<sup>3</sup>, Gil-Ho Lee<sup>1</sup>, Jun Sung Kim<sup>1,2</sup>, Moon-Ho Jo<sup>1,2</sup>, Jonghwan Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>IBS, <sup>3</sup>NIMS)

[TS10W1\_O\_5] 11:45~12:00

#### Atomic-scale understanding of the role of dopant (Al, Ti, and Zr) on the structural properties of nickel-rich cathode for lithium-ion batteries

So-Yeon Kim<sup>1</sup>, Yu-Jeong Yang<sup>1</sup>, Eungyu Lee<sup>2</sup>, Gi-Yeop Kim<sup>1</sup>, Sungho Choi<sup>2</sup>, and Si-Young Choi<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>KRICT)



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## Oral Presentation

Session Title	[TS10W2] Nano Metrology & Characterization 2
Date & Time	July 6(Wed.), 2022 / 15:45~18:00
Place	Room 305
Session Chair(s)	Jaekwang Lee (Pusan National Univ.)

[TS10W2\_I\_1] Invited 15:45~16:15

### Ferroelectric thin films for integrated Si photonics

Alex Demkov  
(The University of Texas at Austin)

[TS10W2\_I\_2] Invited 16:15~16:45

### Non-contact, non-destructive, amplitude-modulation atomic force microscopy via feedback control of dynamic bifurcations

Manhee Lee<sup>1</sup>, Yunkyung Lee<sup>2</sup>, and Sang-Joon Cho<sup>2</sup>  
(<sup>1</sup>Chungbuk National University, <sup>2</sup>Park Systems Corporation)

[TS10W2\_O\_3] 16:45~17:00

### Automated nano-metrology with AFM for high resolution material research

Sang-Joon Cho and Yunkyung Lee  
(Park Systems Corp)

[TS10W2\_O\_4] 17:00~17:15

### AFM-based cross-plane seebeck coefficient measurement system for thin films

Sunho Lee and Hosun Shin  
(KRIS)

[TS10W2\_O\_5] 17:15~17:30

### Deep learning for improvement of physical property extraction in piezoresponse force microscopy

Panithan Sriboriboon<sup>1</sup>, Huimin Qiao<sup>1</sup>, Rama K. Vasudevan<sup>2</sup>, Stephen Jesse<sup>2</sup>, and Yunseok Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Oak Ridge National Laboratory)

[TS10W2\_O\_6] 17:30~17:45

### Grain boundary and grain growth behavior in na-assisted grown molybdenum disulfide

Chang-Won Choi, Min-Yeong Choi, Cheol-Joo Kim, and Si-Young Choi  
(POSTECH)

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[TS10W2\_O\_7]

17:45~18:00

## Deep-ultraviolet electroluminescence in van der Waals heterostructures of hexagonal boron nitride

Sangho Yoon<sup>1,2</sup>, Su-Beom Song<sup>1,2</sup>, So Young Kim<sup>1,2</sup>, Sera Yang<sup>1</sup>, Seung-Young Seo<sup>1,2</sup>, Soonyoung Cha<sup>1,2</sup>, Hyeon-Woo Jeong<sup>1</sup>, Kenji Watanabe<sup>3</sup>, Takashi Taniguchi<sup>3</sup>, Gil-Ho Lee<sup>1</sup>, Jun Sung Kim<sup>1,2</sup>, Moon-Ho Jo<sup>1,2</sup>, and Jonghwan Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>IBS, <sup>3</sup>NIMS)

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## Oral Presentation

Session Title	[TS10T1] Nano Metrology & Characterization 3
Date & Time	July 7(Thu.), 2022 / 10:30~12:00
Place	Room 305
Session Chair(s)	Yunseok Kim (Sungkyunkwan Univesity)

[TS10T1\_I\_1] Invited 10:30~11:00

**Machine learning for scanning probe and electron microscopy: from materials discovery to atomic fabrication**

Sergei V. Kalinin  
(*University of Tennessee*)

[TS10T1\_I\_2] Invited 11:00~11:30

**Probing deep-ultraviolet optoelectronic processes in hexagonal boron nitride**

Jonghwan Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>IBS)

[TS10T1\_O\_3] 11:30~11:45

**Investigations of stoichiometric and oxygen deficient VO<sub>2</sub> thin films**

Manish Kumar, Sunita Rani, and Hyun Hwi Lee  
(*POSTECH*)

[TS10T1\_O\_4] 11:45~12:00

**Stabilization mechanism of polar oxide surface based on vicinal surface**

Jinho Byun<sup>1</sup>, Zhipeng Wang<sup>2</sup>, Sangho Oh<sup>2</sup>, and Jaekwang Lee<sup>1</sup>  
(<sup>1</sup>*Pusan National University*, <sup>2</sup>*Korea Institute of Energy Technology*)

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## Oral Presentation

Session Title	[TS10T2] Nano Metrology & Characterization 4
Date & Time	July 7(Thu.), 2022 / 14:00~15:30
Place	Room 305
Session Chair(s)	Joo-Hee Kang (KIMS)

[TS10T2\_I\_1] Invited 14:00~14:30

**Introduction to scanning transmission x-ray microscopy and its application to Ni-rich  $\text{Li}_x\text{Ni}_{0.88}\text{Co}_{0.08}\text{Mn}_{0.04}\text{O}_2$  primary particles**

Hyun-Joon Shin  
(Chungbuk National University)

[TS10T2\_I\_2] Invited 14:30~14:45

**Metrology in spintronic device**

Chanyong Hwang, Sangsun Lee, Seungmo Yang, Changsoo Kim, and Kyoung-Woong Moon  
(KRISS)

[TS10T2\_O\_3] 14:45~15:00

**Probing oxygen redox mechanism induced by the cohesive core-shell structure of Li-rich layered oxide**

Yu-jeong Yang, Yanghui Kwon, Byoungwoo Kang, and Si-Young Choi  
(POSTECH)

[TS10T2\_O\_4] 15:00~15:15

**In situ observation of an atomically modified glassy carbon surface: From synthesis of an Fe-N-C catalyst to intrinsic combined reactions of hydrogen dissociation and the oxygen reduction reaction**

Geonhwa Kim, Siwoo Noh, Sangsul Lee, Kug-seung Lee, and Ki-jeong Kim  
(POSTECH)

[TS10T2\_O\_5] 15:15~15:30

**Ferromagnetic semiconductor with perpendicular magnetic anisotropy by strain**

Gahee Noh<sup>1</sup>, Hansol Lee<sup>2</sup>, Yongjin Kim<sup>3</sup>, Yeongrok Jin<sup>4</sup>, Jaekwang Lee<sup>4</sup>, Chan-Ho Yang<sup>3</sup>, Ho Nyung Lee<sup>2</sup>, Changhee Sohn<sup>5</sup>, and Si-Young Choi<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>UNIST, <sup>3</sup>KAIST, <sup>4</sup>Pusan National University, <sup>5</sup>Oak Ridge National Laboratory)

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## Oral Presentation

Session Title	[TS10T3] Nano Metrology & Characterization 5
Date & Time	July 7(Thu.), 2022 / 16:00~18:00
Place	Room 305
Session Chair(s)	Si-Young Choi (POSTECH)

[TS10T3\_I\_1] Invited 16:00~16:30

**Imaging materials dynamics at nanoscales using ultrafast electron microscopy and spectroscopy**

Oh-Hoon Kwon  
(UNIST)

[TS10T3\_I\_2] Invited 16:30~17:00

**Advanced in-situ transmission electron microscopy: A powerful tool for material science, energy storage & life science applications**

H. Sun, D. Zhou, A. F. Beker, J. T. van Omme, R. G. Spruit, C. Deen, A. Rozene, M. Pen, H. H. Pérez-Garza  
(DENSsolutions B.V., Delft)

[TS10T3\_I\_3] Invited 17:00~17:30

**Critical ionic transport across an oxygen-vacancy ordering transition**

Chan-Ho Yang  
(KAIST)

[TS10T3\_O\_4] 17:30~17:45

**Direct imaging of Co-CUK-1 framework with H<sub>2</sub>O guest molecules**

Dong-Hwan Yang, Minjeong Kim, Jonghwan Kim, and Si-Young Choi  
(POSTECH)

[TS10T3\_O\_5] 17:45~18:00

**Single-atom level determination of 3-dimensional surface atomic structure via neural network-assisted atomic electron tomography**

Juhyeok Lee, Chaehwa Jeong, and Yongsoo Yang  
(KAIST)

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## Oral Presentation

Session Title	[TS10F1] Nano Metrology & Characterization 6
Date & Time	July 8(Fri.), 2022 / 10:30~12:00
Place	Room 305
Session Chair(s)	Jong Hwan Kim (POSTECH)

[TS10F1\_I\_1] Invited 10:30~11:00

### Computational metrology can deliver device innovation: evolution of metrology and characterization

Myungjun Lee<sup>1</sup>, Wookrae Kim<sup>1</sup>, Taejoong Kim<sup>1</sup>, Kwangrak Kim<sup>1</sup>, Seungbeom Park<sup>1</sup>, Changhoon Choi<sup>1</sup>, Doory Kim<sup>2</sup>, Iacopo Mochi<sup>3</sup>, and Lei Tian<sup>4</sup>  
(<sup>1</sup>Samsung Electronics, <sup>2</sup>Hanyang University, <sup>3</sup>Paul Scherrer Institute, and <sup>4</sup>Boston University)

[TS10F1\_I\_2] Invited 11:00~11:30

### Technology war in industrial atomic force microscopy

Tae-Gon Kim  
(Hanyang University)

[TS10F1\_O\_3] 11:30~11:45

### Unit-cell width polar order in brownmillerite thin films

Jinhyuk Jang<sup>1</sup>, Heung-Sik Park<sup>2</sup>, Jaegyung Kim<sup>2</sup>, Taewon Min<sup>3</sup>, Kyeong Tae Kang<sup>4</sup>, Seungbum Hong<sup>2</sup>, Jaekwang Lee<sup>3</sup>, Chan-Ho Yang<sup>2</sup>, Woo Seok Choi<sup>5</sup>, and Si-Young Choi<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>KAIST, <sup>3</sup>Pusan National University, <sup>4</sup>Sungkyunkwan University, <sup>5</sup>Kyungpook National University)

[TS10F1\_O\_4] 11:45~12:00

### Control of the nonperturbative high harmonics from graphene

Minjeong Kim<sup>1,2</sup>, Soonyoung Cha<sup>1,2</sup>, Youngjae Kim<sup>3</sup>, Shinyoung Choi<sup>1</sup>, Sejong Kang<sup>1</sup>, Cheol-joo Kim<sup>1</sup>, Moon jeong Park<sup>1</sup>, B.J Kim<sup>1,2</sup>, Jaedong Lee<sup>3</sup>, Moon Ho Jo<sup>1,2</sup>, and Jonghwan Kim<sup>1,2</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>IBS, <sup>3</sup>DGIST)

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## Oral Presentation

Session Title	[TS10F2] Nano Metrology & Characterization 7
Date & Time	July 8(Fri.), 2022 / 14:00~15:15
Place	Room 305
Session Chair(s)	Soo Bong Choi (Incheon Univ.)

[TS10F2\_I\_1] Invited 14:00~14:30

**Ultrafast spectroscopy measurements of heat transport in nanostructures and across interfaces**

Yee Kan Koh  
(National University of Singapore)

[TS10F2\_O\_2] 14:30~14:45

**Highly enhanced thermal stability in lead-free piezoelectric ceramics by grain size engineering**

Soo-Yoon Hwang<sup>1</sup>, Gyoung-Ja Lee<sup>2</sup>, Youngho Kang<sup>3</sup>, Jungho Ryu<sup>4</sup>, and Si-Young Choi<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>KAERI, <sup>3</sup>Incheon National University, <sup>4</sup>Yeungnam University)

[TS10F2\_O\_3] 14:45~15:00

**Visualization of the crystallographic effect on oxygen diffusion and metal-insulator transition modulation in VO<sub>2</sub> thin films**

Hyeji Sim, Kyung-Yeon Doh, Yunkyu Park, Gi-Yeop Kim, Minguk Jo, Junwoo Son, Donghwa Lee, and Si-Young Choi  
(POSTECH)

[TS10F2\_O\_4] 15:00~15:15

**Atomically flat interface for a full strain accommodation toward ultra-flat metal films: A case of Ag/Cu heterointerface**

Seon Je Kim<sup>1</sup>, Su Jae Kim<sup>2</sup>, Min-Hyoung Jung<sup>1</sup>, Se-Young Jeong<sup>2</sup>, and Young Min Kim<sup>1,3</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Pusan National University, <sup>3</sup>IBS)

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## Oral Presentation

Session Title	[TS10F3] Nano Metrology & Characterization 8
Date & Time	July 8(Fri.), 2022 / 15:30~16:45
Place	Room 305
Session Chair(s)	Dong-Ik Kim (KIST)

[TS10F3\_I\_1] Invited 15:30~16:00

### Small-scale testing to unveil the deformation of titanium

Tea-Sung Jun  
(Incheon National University)

[TS10F3\_O\_2] 16:00~16:15

### Catalyst poisoning of Ag-M bimetallic nanoparticles (biNPs) by silver halides and their chemical regeneration

Han-Jung Ryu, Won Kyu Lee, and Jae-Seung Lee  
(Korea University)

[TS10F3\_O\_3] 16:15~16:30

### Thin film thermal property measurements using dual-mode thermoreflectance

Jihyun Kim, Jaeyoon Ko, and Jungwan Cho  
(Sungkyunkwan University)

[TS10F3\_O\_4] 16:30~16:45

### Complete spatially-resolved switching dynamics in perovskite and fluorite ferroelectrics by first-order reversal curves

Chenxi Wang<sup>1</sup>, Yeehyun Park<sup>1</sup>, Seunghun Kang<sup>1</sup>, Myeongseop Song<sup>2</sup>, Seungchul Chae<sup>2</sup>, and Yunseok Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Seoul National University)



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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS10B\_P\_01]

10:00~10:30

### High mobility two-dimensional electron gas in $\text{PbZr}_{0.5}\text{Ti}_{0.5}\text{O}_3/\text{BaSnO}_3$ heterostructure

Jaejin Hwang, Jinho Byun, and Jaekwang Lee  
(Pusan National University)

[TS10B\_P\_02]

10:00~10:30

### Topological tuning in $\text{NiTe}_{2-x}\text{Se}_{2x}$ alloy

Phuong Lien Nguyen<sup>1</sup>, Nguyen Huu Lam<sup>2</sup>, Byoung Ki Choi<sup>3</sup>, Trinh Thi Ly<sup>2</sup>, Ganbat Duvjir<sup>2</sup>, Tae Gyu Rhee<sup>4</sup>, Yong Jin Jo<sup>2</sup>, Tae Heon Kim<sup>2</sup>, Chris Jozwiack<sup>3</sup>, Aaron Bostwick<sup>3</sup>, Eli Rotenberg<sup>3</sup>, Younghun Hwang<sup>5</sup>, Young Jun Chang<sup>4</sup>, Jungdae Kim<sup>2</sup>, and Jaekwang Lee<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>University of Ulsan, <sup>3</sup>Lawrence Berkeley National Laboratory, <sup>4</sup>University of Seoul, <sup>5</sup>Ulsan College)

[TS10B\_P\_03]

10:00~10:30

### Atomistic study of site-selective doping behavior in $\text{SnO}_2$

Yeongrok Jin<sup>1</sup>, Woo-Sung Jang<sup>2</sup>, Sang-Hyeok Yang<sup>2</sup>, Seon Je Kim<sup>2</sup>, Jung A. Hong<sup>2</sup>, YoungHoon Kim<sup>2</sup>, Jaeyoon Baik<sup>4</sup>, Hangil Lee<sup>3</sup>, Young-Min Kim<sup>2</sup>, and Jaekwang Lee<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>Sungkyunkwan University, <sup>3</sup>Sookmyung Women's University, <sup>4</sup>Pohang Accelerator Laboratory)

[TS10B\_P\_04]

10:00~10:30

### The effect of e-beam irradiation on the in-plane thermal conductivity of PEDOT:PSS films

Hye Jeong Lee and Hosun Shin  
(KRISS)

[TS10B\_P\_05]

10:00~10:30

### Thermal transport properties of $\text{Ti}_3\text{C}_2\text{T}_x$ MXene flakes and thin films

Wonsik Lee and Hyejin Jang  
(Seoul National University)

[TS10B\_P\_06]

10:00~10:30

### Insight into the synthesis, structures, and electrochemical stabilization of li-excess ni-rich layered cathode materials

Seok Hyun Song<sup>1,2</sup>, Seokjae Hong<sup>1,2</sup>, Seung-Ho Yu<sup>2</sup>, and Hyungsub Kim<sup>1</sup>  
(<sup>1</sup>KAERI, <sup>2</sup>Korea University)

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[TS10B\_P\_07]

10:00~10:30

## Deep learning-assisted quantification of atomic defects in 2D materials

Sang-Hyeok Yang<sup>1</sup>, Wooseon Choi<sup>1</sup>, and Young-Min Kim<sup>1,2</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>IBS)

[TS10B\_P\_08]

10:00~10:30

## Design of optical thermometry for materials with low thermal conductivity and nonconformal surface

Yoonseong Jung and Hyejin Jang  
(Seoul National University)

[TS10B\_P\_09]

10:00~10:30

## Evaluation of the thermochromic properties of W-doped and undoped VO<sub>2</sub> nanopowders using hydrothermal and high-energy ball milling processes

Woochan Jin, Sanghoon Lee, Chan Park, and Hyejin Jang  
(Seoul National University)

[TS10B\_P\_10]

10:00~10:30

## TEM dark field analysis on domain boundary structure in twisted 2-D materials

Ayoung Yuk<sup>1</sup>, Yunyeong Chang<sup>2</sup>, Miyoung Kim<sup>2</sup>, and Hyobin Yoo<sup>1</sup>  
(<sup>1</sup>Sogang University, <sup>2</sup>Seoul National University)

[TS10B\_P\_11]

10:00~10:30

## Direct observation and calculation of frenkel defect causing electrical conductivity degradation in quasi-1D Nb<sub>2</sub>Se<sub>3</sub>

Woo-Sung Jang<sup>1,2</sup> and Young-Min Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>IBS)

[TS10B\_P\_12]

10:00~10:30

## Control the defect induced oxygen vacancies in doped zinc oxide nanoparticles to improve photocatalytic activity

Young-Hoon Kim<sup>1</sup>, Hangil Lee<sup>2</sup>, and Young-Min Kim<sup>1</sup>  
(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Sookmyung Women's University)

[TS10B\_P\_13]

10:00~10:30

## Unveiling atomistic behavior of field-controlled ferroelectricity in freestanding Yttrium-doped HfO<sub>2</sub> membrane

Min-Su Kim<sup>1</sup>, Kyoung-June Go<sup>1</sup>, Hyun-Jae Lee<sup>2</sup>, Kyoungjun Lee<sup>3</sup>, Seung Chul Chae<sup>3</sup>, Jun Hee Lee<sup>2</sup>, and Si-Young Choi<sup>1</sup>  
(<sup>1</sup>POSTECH, <sup>2</sup>UNIST, <sup>3</sup>Seoul National University)

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[TS10B\_P\_14]

10:00~10:30

## 3D structural determination of core-shell nanoparticles

Hyesung Jo<sup>1</sup>, Dae Han Wi<sup>1</sup>, Taegu Lee<sup>1</sup>, Chaehwa Jeong<sup>1</sup>, Juhyeok Lee<sup>1</sup>, Hionsuck Baik<sup>2</sup>, Alexander J. Pattison<sup>3,4</sup>, Wolfgang Theis<sup>3</sup>, Colin Ophus<sup>4</sup>, Peter Ercius<sup>4</sup>, Seunghwa Ryu<sup>1</sup>, Sang Woo Han<sup>1</sup>, and Yongsoo Yang<sup>1</sup>

(<sup>1</sup>KAIST, <sup>2</sup>KBSI, <sup>3</sup>University of Birmingham, <sup>4</sup>Lawrence Berkeley National Laboratory)

[TS10B\_P\_15]

10:00~10:30

## Observing phase degradation of NCM materials over cycling via simultaneous EDS-EELS tomography

Jaewhan Oh, Seunggu Kim, Hye ryung Byon, and Yongsoo Yang

(KAIST)

[TS10B\_P\_16]

10:00~10:30

## Characterization of facet morphology of single crystal layered cathode modified by post-engineering

Jeong-Min Kim, Youngsin Kim, Byoungwoo Kang, and Si-Young Choi

(POSTECH)

[TS10B\_P\_17]

10:00~10:30

## Prediction of morphological change at nanoscale by atomic force microscopy and deep learning

Changhyo Sun<sup>1</sup>, Sriboriboon Panithan<sup>1</sup>, Junghun Han<sup>2</sup>, Sang-Jin Ko<sup>1</sup>, Jung-Gu Kim<sup>1</sup>, Sejung Yang<sup>2</sup>, and Yunseok Kim<sup>1</sup>

(<sup>1</sup>Sungkyunkwan University, <sup>2</sup>Yonsei University)

[TS10B\_P\_18]

10:00~10:30

## Revealing the non-equilibrium sodiation pathway of CuSbS<sub>2</sub> for sodium-ion battery anode

Yoonsu Shim<sup>1</sup>, Jae Yeol Park<sup>1</sup>, Khoi Phuong Dao<sup>1</sup>, Sang-Gil Lee<sup>2</sup>, Jacob Choe<sup>1</sup>, Ho Jun Lee<sup>1</sup>, Yonghee Lee<sup>3</sup>, Yuseon Choi<sup>4</sup>, Joon Ha Chang<sup>1</sup>, Seung Jo Yoo<sup>2</sup>, Chi Won Ahn<sup>3</sup>, Wonyoung Chang<sup>6</sup>, Chan-Woo Lee<sup>5</sup>, and Jong Min Yuk<sup>1</sup>

(<sup>1</sup>KAIST, <sup>2</sup>KBSI, <sup>3</sup>NNFC, <sup>4</sup>Konkuk University, <sup>5</sup>KIER, <sup>6</sup>KIST)

[TS10B\_P\_19]

10:00~10:30

## Lithographically patterned well-type graphene liquid cell system for high resolution analysis of bio and nanomaterials

Namgyu Noh, Jungjae Park, Ji Su Park, Kunmo Koo, Jae Yeol Park, and Jong Min Yuk

(KAIST)

[TS10B\_P\_20]

10:00~10:30

## Direct atomistic visualization of t-Te doping for NiTe<sub>2</sub> band gap tuning

Sunghyuk Her<sup>1</sup>, Chang-Won Choi<sup>1</sup>, Jung Young Cho<sup>2</sup>, Kyoung-Seok Moon<sup>3</sup>, and Si-Young Choi<sup>1</sup>

(<sup>1</sup>POSTECH, <sup>2</sup>KICET, <sup>3</sup>Gyeongsang National University)

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[TS10B\_P\_21]

10:00~10:30

**Electroluminescence characterization of InGaAs/InAsPSb multiple quantum well light emitting diodes for short-wave infrared operation**

Suho Park<sup>1,2</sup>, Phuc Dinh Nguyen<sup>1,2</sup>, Sang Jun Lee<sup>1,2</sup>, and Yeongho Kim<sup>1,2</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>UST)

[TS10B\_P\_22]

10:00~10:30

**Enhanced performance initiated by superposition of Ga dopant in LLZO**

Jacob Choe<sup>1</sup>, Yoonsu Shim<sup>1</sup>, So-Yeon Kim<sup>2</sup>, Si-Young Choi<sup>2</sup>, and Jong Min Yuk<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>POSTECH)

[TS10B\_P\_23]

10:00~10:30

**Comparison of the aggregation behaviours of surface-modified cellulose nanofibrils by using liquid-phase transmission electron microscopy**

Yusra Qureshi<sup>1</sup>, Jungjae Park<sup>1</sup>, Byung Oh Jung<sup>2</sup>, Namgyu Noh<sup>1</sup>, Ji Su Park<sup>1</sup>, Sanghyun Ji<sup>1</sup>, Hui Youn Shin<sup>2</sup>, Minho Joo<sup>2</sup>, and Jong Min Yuk<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>LG Electronics)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS10W\_P\_01]

10:00~10:30

### Analysis of magnet effect according to dimensions of soft magnetic nickel

Min Ji Shin, Su Jeong Park, Akshay Kumar, Kavita Kumari, Seok Hwan Huh, and Bon Heun Koo  
(Changwon National University)

[TS10W\_P\_02]

10:00~10:30

### Nanoparticle generation using coflow flames and its evaluation in regard to benefit and limitation

Seungmo Kim, JiHoon Jeong, and Jeonghoon Lee  
(KOREATECH)

[TS10W\_P\_03]

10:00~10:30

### Ophthalmic contact lens material containing magnesium oxide nanoparticles and 3-(Trifluoromethyl)styrene for oxygen permeability

Min-Jae Lee<sup>1</sup>, Seon-Young Park<sup>2</sup>, and A-Young Sung<sup>2</sup>  
(<sup>1</sup>Jeju Tourism University, <sup>2</sup>Daegu Catholic University)

[TS10W\_P\_04]

10:00~10:30

### Slip and twinning of commercial pure titanium during in-situ tensile test

Joo-Hee Kang, Ji Hoon Kim, and Chang-Seok Oh  
(<sup>1</sup>KIMS, <sup>2</sup>Pusan National University)

[TS10W\_P\_05]

10:00~10:30

### Cooperative evolution of polar distortion and nonpolar rotation of oxygen octahedra in oxide heterostructures

Taewon Min<sup>1,2</sup>, Wooseon Choi<sup>2</sup>, Jinsol Seo<sup>2</sup>, Gyeongtak Han<sup>2</sup>, Kyung Song<sup>3</sup>, Sangwoo Ryu<sup>4</sup>, Hyungwoo Lee<sup>4</sup>, Jungwoo Lee<sup>4</sup>, Kitae Eom<sup>4</sup>, Chang-Beom Eom<sup>4</sup>, Hu Young Jeong<sup>5</sup>, Young Min Kim<sup>2</sup>, Sang Ho Oh<sup>2</sup>, and Jaekwang Lee<sup>1</sup>  
(<sup>1</sup>Pusan National University, <sup>2</sup>Sungkyunkwan University, <sup>3</sup>KIMS, <sup>4</sup>University of Wisconsin-Madison, <sup>5</sup>UCRF)

[TS10W\_P\_06]

10:00~10:30

### Bragg coherent x-ray diffractive imaging analysis of crystalline barium titanate nanoparticles

Do Yeon Kim, Su Yong Lee, and Young Hwa Jung  
(Pohang Accelerator Laboratory)

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[TS10W\_P\_07]

10:00~10:30

**Enhancement of electron generating efficiency of microbial fuel cell system with Ti nanoparticle as an electron acceptor**

Jinhee Heo<sup>1</sup>, Changman Kim<sup>2</sup>, and Jung Rae Kim<sup>3</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>Chonnam National University, <sup>3</sup>Pusan National University)

[TS10W\_P\_08]

10:00~10:30

**Microstructural analysis and phase-field simulation of epitaxial growth in additively manufactured AlSi10Mg alloy**

Jiwon Park, Joo-Hee Kang, and Chang-Seok Oh  
(KIMS)

[TS10W\_P\_09]

10:00~10:30

**Hydrothermal synthesis of heterostructured  $\alpha$ -MnO<sub>2</sub>@SnO<sub>2</sub> nanocomposites as high-performance cathode for aqueous zinc-ion batteries**

Nibagani Naresh<sup>1,2</sup>, Suyoon Eom<sup>1</sup>, Su Hwan Jeong<sup>1</sup>, So Hyeon Park<sup>1</sup>, Sang Jun Lee<sup>1</sup>, Jonghee Park<sup>1</sup>, Joo-Hyung Kim<sup>1</sup>, and Young Hwa Jung<sup>2</sup>  
(<sup>1</sup>Gyeongsang National University, <sup>2</sup>Pohang Accelerator Laboratory)

[TS10W\_P\_10]

10:00~10:30

**Structural stability and chemical compatibilities between layered cathode materials and garnet-type solid electrolyte for all-solid-state batteries**

Seokjae Hong<sup>1,2</sup>, Seok Hyun Song<sup>1,2</sup>, Seung-Ho Yu<sup>2</sup>, and Hyungsub Kim<sup>1</sup>  
(<sup>1</sup>KAERI, <sup>2</sup>Korea University)

[TS10W\_P\_11]

10:00~10:30

**Nanoscale chemical characterization of nanomaterials with heterodyne photo-induced force microscopy**

Junghoon Jahng and Eun Seong Lee  
(KRISS)

[TS10W\_P\_12]

10:00~10:30

**Understanding hydrogen effects in metals using in situ hydrogen charging setups in electron microscope and synchrotron X-ray diffraction**

Jinwoo Kim<sup>1</sup> and C. Cem Tasan<sup>2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Massachusetts Institute of Technology)

[TS10W\_P\_13]

10:00~10:30

**In situ multiscale probing of the solid-state synthesis of Ni-rich layered cathodes**

Hyeokjun Park<sup>1</sup>, Hayoung Park<sup>2</sup>, Jungwon Park<sup>2</sup>, and Kisuk Kang<sup>2</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>Seoul National University)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS10T\_P\_01]

10:00~10:30

**In-situ observation on hydrogenation of palladium using transmission electron microscopy**

Juyoung Kim, Jeehwan Bae, and Dong Won Chun  
(KIST)

[TS10T\_P\_02]

10:00~10:30

**Achieved high-energy density through nano-sized conversion-type cathode for KIBs**

Yongseok Lee and Jongsoon Kim  
(Sungkyunkwan University)

[TS10T\_P\_03]

10:00~10:30

**Nanoscale surface analysis on hydrogen storage materials**

Hayoung Kim<sup>1,2</sup>, Young-Su Lee<sup>1</sup>, Do Hyang Kim<sup>2</sup>, and Jin-Yoo Suh<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Yonsei University)

[TS10T\_P\_04]

10:00~10:30

**Thermal conductivity measurements of black phosphorus nanoribbon with point defects**

Nguyen Viet Chien<sup>1,2</sup>, Ho Sun Shin<sup>1</sup>, and Jae Yong Song<sup>1,2</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>UST)

[TS10T\_P\_05]

10:00~10:30

**Electrochemical characterization of organic-based cathode for rechargeable Li-ion batterie**

Jihye Park<sup>1,2</sup>, Sun Hwa Park<sup>1</sup>, Hosun Shin<sup>1</sup>, Jung-Yong Lee<sup>2</sup>, and Jae Yong Song<sup>1,3</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>KAIST, <sup>3</sup>UST)

[TS10T\_P\_06]

10:00~10:30

**Development of garnet-type solid electrolyte for excellent electrochemical properties**

Hwa Jung Kim, Hyeokjun Park, Sun Hwa Park, and Seung Wook Baek  
(KRISS)

[TS10T\_P\_07]

10:00~10:30

**Novel reversible conversion reactions in mesoporous iron oxide with high initial coulombic efficiency for lithium-ion batteries**

Ji-Hwan Kwon<sup>1,2</sup>, Jong Hyeok Seo<sup>1,2</sup>, and Yeonho Kim<sup>3</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>UST, <sup>3</sup>Konkuk University)

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[TS10T\_P\_08]

10:00~10:30

**Development of CdTe nanoparticles into nanowire at specific molar ratio of stabilizer to cadmium ion**

Insol Jo, Yeungchan Kim, Jeong Won Kang, and Ki-Sub Kim  
(*Korea National University of Transportation*)

[TS10T\_P\_09]

10:00~10:30

**Exceptionally high power and energy density in Ti-substituted  $\text{Na}_2\text{TiFeF}_7$  as a fluoride-based novel cathode material for Na-ion batteries**

Jungmin Kang, Yongseok Lee, and Jongsoo Kim  
(*Sungkyunkwan University*)

[TS10T\_P\_10]

10:00~10:30

**Neuromorphic computing application of in-plane ferroelectric tin monosulfide thin films**

Ki Chang Kwon and Ho Sun Shin  
(*KRISS*)

[TS10T\_P\_11]

10:00~10:30

**Magnetic optical Kerr effect microscope and observation of perpendicular magnetization thin films**

Kyoung-Woong Moon  
(*KRISS*)

[TS10T\_P\_12]

10:00~10:30

**The development of in-situ and operando systems for a solid state battery**

Huysang Kwon, Kwanghee Park, and Yong Il Kim  
(*KRISS*)

[TS10T\_P\_13]

10:00~10:30

**Precise magnetic skyrmion radius evaluation under a perpendicular magnetic field using full-field soft x-ray transmission microscope**

Seungmo Yang<sup>1</sup>, Hee-Sung Han<sup>2</sup>, Tae-Seong Ju<sup>1</sup>, Mi-Young Im<sup>2</sup>, Chanyong Hwang<sup>1</sup>  
(<sup>1</sup>*KIRSS*, <sup>2</sup>*University of California, Berkeley*)



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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS10F\_P\_01]

10:00~10:30

**Medium energy ion scattering spectroscopy in the mutual calibration for the thickness measurement of ultrathin hafnium oxide films**

Tae Gun Kim, Kyung Joong Kim, and Hyunung Yu  
(*KRISS*)

[TS10F\_P\_02]

10:00~10:30

**The hydration characteristics of light burned MgO according to the calcination temperature**

Jun Hyeon Cho, Yong Taek Lim, and Hong Seok Jang  
(*Jeonbuk National University*)

[TS10F\_P\_03]

10:00~10:30

**X-ray diffraction for characterization of interlayer distance of two dimensional layered material**

Min-kyung Jo<sup>1,2</sup>, Jeongtae Kim<sup>1,3</sup>, Minhyuk Choi<sup>1,4</sup>, Kibum Kang<sup>3</sup>, and Seungwoo Song<sup>1</sup>  
(<sup>1</sup>*KRISS*, <sup>2</sup>*Chungnam National University*, <sup>3</sup>*KAIST*, <sup>4</sup>*Hanyang University*)

[TS10F\_P\_04]

10:00~10:30

**Strength reduction rate according to the form of PET mixed into cement mortar**

Jijon Kang, Yongtaek Lim, Hongseok Jang, and Seongyoung So  
(*Jeonbuk National University*)

[TS10F\_P\_05]

10:00~10:30

**Tuning the properties of VO<sub>2</sub> thin films by Ion-implantation**

Sunita Rani, Manish Kumar, and Hyun Hwi Lee  
(<sup>1</sup>*POSTECH*)

[TS10F\_P\_06]

10:00~10:30

**A novel in situ TEM platform without bias**

Jun Young Cheong, Joon Ha Chang, Jacob Choe, Jong Min Yuk, and Il-Doo Kim  
(*KAIST*)

[TS10F\_P\_07]

10:00~10:30

**Lipid bilayer metrology and manipulation using atomic force microscopy**

Goo-Eun Jung, Seongoh Kim, and Sang-Joon Cho  
(*Park Systems*)

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[TS10F\_P\_08]

10:00~10:30

**Electromechanical SPM characterization of 2D moire superlattice of monolayer graphene on hexagonal boron nitride**

Daeyeon Won, KangHo Lee, and Sang-Joon Cho  
(Park Systems)

[TS10F\_P\_09]

10:00~10:30

**Dual frequency resonance tracking piezo force microscopy on the domain structure in the piezoresponse of hybrid perovskites**

Hakjin Kim, Ilka Hermes, and Sang-Joon Cho  
(Park Systems)

[TS10F\_P\_10]

10:00~10:30

**Structural evolution of Ga doped PtNi fuel-cell nanocatalysts during load cycles at 3D atomic scale**

Chaehwa Jeong, SangJae Lee, EunAe Cho, and Yongsoo Yang  
(KAIST)

[TS10F\_P\_11]

10:00~10:30

**Coordinated silver volume dependent surface-enhanced raman spectroscopy signal in polypyrrole**

Gi Wan Jeon and Jae-Won Jang  
(Dongguk University)

[TS10F\_P\_12]

10:00~10:30

**The influence of domain boundaries and crystallographic orientation on the exsolution of Ni-Sn nanoparticles in a perovskite stannate**

Yeon-Seo Nam, Yujeong Lee, Daseob Yoon, Junwoo Son, and Si-Young Choi  
(POSTECH)

[TS10F\_P\_13]

10:00~10:30

**Crystallography of elongated carbides in long term aged heat resistant steel**

Kyung-Won Lim<sup>1</sup>, Majid Abbasi<sup>2</sup>, and Ihho Park<sup>1</sup>  
(<sup>1</sup>KIMS, <sup>2</sup>SK Innovation)

[TS10F\_P\_14]

10:00~10:30

**Facile and precise quantitative determination of silicon in naphtha by inductively coupled plasma optical emission spectroscopy**

Sungkyung Joo and Dongchul Suh  
(Hoseo University)

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## TS11. Nano-EHS and Standardization of NT

### Oral Presentation

<b>Session Title</b>	[TS11W1] Nano-EHS and Standardization of NT 1
<b>Date &amp; Time</b>	July 6(Wed.), 2022 / 10:30~12:00
<b>Place</b>	Room 306
<b>Session Chair(s)</b>	Seokjoo Yoon (KIT)

[TS11W1\_I\_1] Invited 10:30~11:00

#### In vitro toxicity testing of nanoparticles in 3D cell culture

Min Beom Heo  
(KRISS)

[TS11W1\_I\_2] Invited 11:00~11:30

#### Management of regulation for safety evaluation of carbon-based nanomaterials

Kyung-Seuk Song  
(KCL)

[TS11W1\_O\_3] 11:30~11:45

#### Uptake and toxicity of cerium dioxide nanoparticles with different aspect ratio

Min-Sung Kang<sup>1,2</sup>, Gwang-Hee Lee<sup>3</sup>, Ik Hwan Kwon<sup>4</sup>, Mi-Jin Yang<sup>2</sup>, Min Beom Heo<sup>4</sup>, Jae-Won Choi<sup>4</sup>,  
Tae Geol Lee<sup>4</sup>, Cheol-Ho Yoon<sup>5</sup>, Myeong-Chang Sung<sup>3</sup>, Dong-Wan Kim<sup>3</sup>, Eun-Jung Park<sup>1</sup>  
(<sup>1</sup>Kyung Hee University, <sup>2</sup>KIT, <sup>3</sup>Korea University, <sup>4</sup>KRISS, <sup>5</sup>KBSI Seoul)

[TS11W1\_O\_4] 11:45~12:00

#### Biotransformation and differential particle and ion clearance kinetics of silver nanoparticles

Soyeon Jeon and Wan-Seob Cho  
(Dong-A University)

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## Oral Presentation

Session Title	[TS11W2] Nano-EHS and Standardization of NT 2
Date & Time	July 6(Wed.), 2022 / 15:45~18:00
Place	Room 306
Session Chair(s)	Taehyun Yoon (Hanyang Univ.), Jongwoon Kim (KRICT)

[TS11W2\_I\_1] Invited 15:45~16:15

**The ICP-MS based nanometrology for nanomaterial characterization and its application to environmental fate and assessment**

Byung-Tae Lee, Hyojin Baek, and Keunbae Yu  
(GIST)

[TS11W2\_I\_2] Invited 16:15~16:45

**Eco/bio-corona evolution during nanomaterials uptake & transport sheds new light on repair mechanisms and toxicity pathways in living systems**

Iseult Lynch  
(University of Birmingham)

[TS11W2\_O\_3] 16:45~17:00

**Effects of immune cell heterogeneity and protein corona on cellular association and cytotoxicity of gold nanoparticles**

Sehee Park<sup>1</sup>, My Kieu Ha<sup>1</sup>, Yangsoon Lee<sup>1</sup>, Jaewoo Song<sup>2</sup>, and Tae-Hyun Yoon<sup>1,3</sup>  
(<sup>1</sup>Hanyang University, <sup>2</sup>Yonsei University, <sup>3</sup>Yoon Idea Lab. Co. Ltd)

[TS11W2\_O\_4] 17:00~17:15

**Transcriptomic profiling of heterogeneous immune cells from rat peripheral blood mononuclear cells exposed to titanium dioxide nanoparticles**

Ha Neul Kim, Seong Ju Wi, Chang Soo Kim, Won Jin Kim, and Jinho Ahn  
(Hanyang University)

[TS11W2\_O\_5] 17:15~17:30

**Maternal exposure to polystyrene nanoplastics causes brain abnormalities in progeny**

Bohyeon Jeong<sup>1</sup>, Jeong Yeob Baek<sup>1</sup>, Jahong Koo<sup>1</sup>, Subin Park<sup>1</sup>, Young-Kyoung Ryu<sup>1</sup>, Kyoung-Shim Kim<sup>1</sup>, Seungjae Zhang<sup>2</sup>, ChiHye Chung<sup>2</sup>, Rumeysa Dogan<sup>3</sup>, Hyung-Seok Choi<sup>3</sup>, Dahun Um<sup>3</sup>, Tae-Kyung Kim<sup>3</sup>, Wang Sik Lee<sup>1</sup>, Jinyoung Jeong<sup>1,4</sup>, Won-Ho Shin<sup>4</sup>, Jae-Ran Lee<sup>1</sup>, Nam  
(<sup>1</sup>KRIBB, <sup>2</sup>Konkuk University, <sup>3</sup>POSTECH, <sup>4</sup>KITOX)

[TS11W2\_O\_6] 17:30~17:45

**Root abscission in Lemna minor as a novel, sensitive measure of aquatic pollution**

Jihae Park  
(Ghent University Global Campus)

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[TS11W2\_O\_7]

17:45~18:00

## Toxicity assessment of standard TiO<sub>2</sub> nanomaterial (E171) in aquatic environments

Kanghee Kim<sup>1,2</sup>, Hakwon Yoon<sup>1</sup>, and June-Woo Park<sup>1,2</sup>  
(<sup>1</sup>Korea Institute of Toxicology, <sup>2</sup>UST)

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## Oral Presentation

Session Title	[TS11T1] Nano-EHS and Standardization of NT 3
Date & Time	July 7(Thu.), 2022 / 10:30~12:00
Place	Room 306
Session Chair(s)	Sanghun Kim (Kyungsung Univ.)

[TS11T1\_I\_1] Invited 10:30~11:00

### The direction of governance for improving nano safety

Jungwon Lee  
(University of Seoul)

[TS11T1\_I\_2] Invited 11:00~11:30

### Current status of preparation of test methods for safety assessment of nanomaterials to regulatory compliance in domestic and overseas

Heekyung Bae<sup>1</sup>, Hyejin Kim<sup>1</sup>, Jung-Taek Kwon<sup>2</sup>, Jaewoong Lee<sup>2</sup>, and Hyun-Soo Park<sup>1</sup>  
(<sup>1</sup>TO21 Co., Ltd., <sup>2</sup>NIER)

[TS11T1\_I\_3] Invited 11:30~12:00

### Recent trends of nanosafety and regulations

Hyunpyo Jeon  
(Kyungsung University)

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## Oral Presentation

Session Title	[TS11T2] Nano-EHS and Standardization of NT 4
Date & Time	July 7(Thu.), 2022 / 14:00~15:15
Place	Room 306
Session Chair(s)	Younghun Kim (Kwangwoon Univ.)

[TS11T2\_I\_1] Invited 14:00~14:30

### Nanoinformatics in EHS assessment: Advances and challenges

Tomasz Puzyn<sup>1,2</sup>  
(<sup>1</sup>University of Gdansk, <sup>2</sup>QSAR Lab Ltd.)

[TS11T2\_O\_2] 14:30~14:45

### Real-time observation of phase transition from layered to spinel phase under electron beam irradiation

Jong Hyeok Seo<sup>1,2</sup>, Joon Yong Park<sup>3</sup>, Yong-Il Kim<sup>1</sup>, Ki Min Nam<sup>3</sup>, Jae-Hyuck Jang<sup>4</sup>, and Ji-HwanKwon<sup>1,2</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>UST, <sup>3</sup>Pusan National University, <sup>4</sup>Korea Basic Science Institute)

[TS11T2\_O\_3] 14:45~15:00

### Visualizing surface phonon polaritons of boron nitride nanotube at nanoscale

Junghoon Jahng and Eun Seong Lee  
(KRISS)

[TS11T2\_O\_4] 15:00~15:15

### Giant charge reconstruction in lipid vesicles: Optical bottle study

Jaehee Lee<sup>1</sup>, Bopil Gim<sup>1</sup>, Seongmin Park<sup>1</sup>, Chang Young Park<sup>2</sup>, Hyunwoo Jang<sup>1</sup>, Suho Lee<sup>1</sup>, Dae-Woong Jeong<sup>1</sup>, H. Daniel Ou-Yang<sup>3</sup>, Mahn Won Kim<sup>1</sup>, Joon Heon Kim<sup>4</sup>, SuyongKwon<sup>5</sup>, Changbong Hyeon<sup>6</sup>, and Myung Chul Choi<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>LG Hausys, <sup>3</sup>Lehigh University, <sup>4</sup>GIST, <sup>5</sup>KRISS, <sup>6</sup>KIAS)

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## Oral Presentation

<b>Session Title</b>	<b>[TS11T3] Nano-EHS and Standardization of NT 5</b>
<b>Date &amp; Time</b>	<b>July 7(Thu.), 2022 / 16:00~18:00</b>
<b>Place</b>	<b>Room 306</b>
<b>Session Chair(s)</b>	<b>Moon-Keun Lee (NNFC)</b>

**[TS11T3\_I\_1] Invited 16:00~16:30**

### **Certification system for labeling nanoproducts**

Tsing-Tang Song and Jer-Young Chen  
(*Industrial Technology Research Institute*)

**[TS11T3\_I\_2] Invited 16:30~17:00**

### **Experimental considerations when evaluating nanoparticle performance of cellular uptake**

Dong Woo Lee  
(*Gachon University*)

**[TS11T3\_I\_3] Invited 17:00~17:30**

### **Nano-carbon based high performance supercapacitors: Developments of the technology and international standard**

Man Li, Yun Xue, Tao Chen, Yang Li, Seunghyun Song, and JoonHo Bae  
(*Gachon University*)

**[TS11T3\_I\_4] Invited 17:30~18:00**

### **Quality evaluation of 2-D nanomaterials with raman scattering**

Mun Seok Jeong  
(*Hanyang University*)



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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS11B\_P\_01]

10:00~10:30

**Charge-modulated synthesis of highly stable iron oxide nanoparticles for in vitro and in vivo toxicity evaluation**

Ning Chen, Sunyoung Woo, Sung Han Park, and Jongnam Park  
(UNIST)

[TS11B\_P\_02]

10:00~10:30

**Development of a nano-mixture QSAR model for predicting the toxicity of metal oxide mixtures to vibrio fischeri**

Minju Na<sup>1,2</sup>, Sanghwan Nam<sup>1</sup>, Kyonghwan Moon<sup>2</sup>, and Jongwoon Kim<sup>1</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Korea University)

[TS11B\_P\_03]

10:00~10:30

**A study on peripheral blood mononuclear cell and upconversion nanoparticles by single-cell mass cytometry**

Zayakhuu Gerelkhuu<sup>1</sup>, Haribalan Perumalsamy<sup>1</sup>, Mahnaz Maddahfar<sup>2</sup>, Dayong Jin<sup>2</sup>, Jaewoo Song<sup>3</sup>, and Tae Hyun Yoon<sup>1</sup>  
(<sup>1</sup>Hanyang University, <sup>2</sup>University of Technology Sydney, <sup>3</sup>Yonsei University)

[TS11B\_P\_04]

10:00~10:30

**Towards QSAR modeling of multicomponent advanced nanomaterials**

Alicja Mikolajczyk<sup>1,2</sup>, Dawid Falkowski<sup>2</sup>, Tomasz Puzyn<sup>1,2</sup>  
(<sup>1</sup>University of Gdansk, <sup>2</sup>QSAR Lab Sp. Z o. o.)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS11W\_P\_01]

10:00~10:30

**Quantifying fluorescently-labeled nanoparticle uptake in mammalian cells using a plate reader**

Hye Ji Shin and Ji Youn Lee  
(KRIS)

[TS11W\_P\_02]

10:00~10:30

**In-vitro toxicity testing of nano-bio materials in three-dimensional cell culture using matrix-assisted laser desorption/ionization mass spectrometry imaging (MALDI-MSI)**

Sohee Yoon<sup>1</sup>, Hyun Jun Jang<sup>2</sup>, Jae Won Choi<sup>1</sup>, Min Beom Heo<sup>1</sup>, and Tae Geol Lee<sup>1</sup>  
(<sup>1</sup>KRIS, <sup>2</sup>IBS)

[TS11W\_P\_03]

10:00~10:30

**Live-cell imaging analysis of silica nanoparticle-induced apoptosis**

Geun Hoe Kim<sup>1,2</sup>, Min Beom Heo<sup>2</sup>, Tae Geol Lee<sup>2</sup>, and Jun-Hyuk Choi<sup>1,2</sup>  
(<sup>1</sup>UST, <sup>2</sup>KRIS)

[TS11W\_P\_04]

10:00~10:30

**Fate determination of food additive SiO<sub>2</sub> and TiO<sub>2</sub> in commercial foods by cloud point extraction**

Su-Min Youn and Soo-Jin Choi  
(Seoul Women's University)

[TS11W\_P\_05]

10:00~10:30

**Safety and efficacy of nanoparticles targeting to vision-threatening retinopathy**

Jeong Hun Kim  
(Seoul National University)

[TS11W\_P\_06]

10:00~10:30

**A series of studies on the evaluation of the toxicity of nanomaterials using spheroid, one of the 3D cell culture methods**

Jae Won Choi<sup>1,2</sup>, Minjeong Kwak<sup>2</sup>, In Young Kim<sup>2</sup>, Tae Geol Lee<sup>2</sup>, and Min Beom Heo<sup>2</sup>  
(<sup>1</sup>Kyung Hee University, <sup>2</sup>KRIS)

[TS11W\_P\_07]

10:00~10:30

**Measurement and culture method of organoid for toxicity testing of nanomaterials**

Ahrum Baek, Tae Geol Lee, and Min Beom Heo  
(KRIS)

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[TS11W\_P\_08]

10:00~10:30

## Protein Corona formation of MWCNT under different initial BSA coating concentration

Sun Young Lee, Min Beom Heo, Tae Geol Lee, and Jin Gyeong Son  
(*KRISS*)

[TS11W\_P\_09]

10:00~10:30

## Comparative study on nanotoxicity in human primary and cancer cells

In Young Kim, Minjeong Kwak, Jaeseok Kim, Tae Geol Lee, and Min Beom Heo  
(*KRISS*)

[TS11W\_P\_10]

10:00~10:30

## Correlation of micro-absorption imaging and IR imaging technique for identifying the inhomogeneous absorbance in graphene oxide

Jaekak Yoo<sup>1,2</sup>, Jaeseok Kim<sup>1</sup>, Seong Chu Lim<sup>2</sup>, Seung Mi Lee<sup>1</sup>, Mun Seok Jeong<sup>3</sup>, and Tae Geol Lee<sup>1</sup>  
(<sup>1</sup>*KRISS*, <sup>2</sup>*Sungkyunkwan University*, <sup>3</sup>*Hanyang University*)

[TS11W\_P\_11]

10:00~10:30

## Improved performance of nanotoxicity prediction models using automated machine learning

Xiao Xiao<sup>1</sup>, Tung X. Trinh<sup>1</sup>, and Tae Hyun Yoon<sup>2</sup>  
(<sup>1</sup>*Hanyang University*, <sup>2</sup>*Yoon Idea Lab. Co. Ltd*)

[TS11W\_P\_12]

10:00~10:30

## Analyte-induced desert rose-like Ag nanostructures for surface-enhanced raman scattering-based biomolecule detection and imaging

Hee-Kyung Na<sup>1</sup>, Jung-Sub Wi<sup>2</sup>, and Tae Geol Lee<sup>1</sup>  
(<sup>1</sup>*KRISS*, <sup>2</sup>*Hanbat National University*)

[TS11W\_P\_13]

10:00~10:30

## Acute inhalation toxicity testing of nano-concrete composites containing nanomaterials in fisher 344 rats

Jae Hyuck Sung, Hye-Jin Kim, Mi-Jung Kim, Byung-gil Choi, and Kyung-Seuk Song  
(*Korea Conformity Laboratory*)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS11T\_P\_01]

10:00~10:30

**A 28-days inhalation toxicity testing of graphene oxide(rGO-V<sub>20</sub>) in Fisher 344 rats**

Jae Hyuck Sung, Hye-Jin Kim, Hyeon-Yeol Ryu, Mi-Jung Kim, Byung-gil Choi, and Kyung-Seuk Song  
(Korea Conformity Laboratory)

[TS11T\_P\_02]

10:00~10:30

**Penetration of nanoparticles in SARS-CoV-2 pseudovirus-infected three-dimensional cell culture models**

Dong U Ju<sup>1</sup>, Tae Geol Lee<sup>1</sup>, Hee-Kyung Na<sup>1</sup>, and Hee Min Yoo<sup>1,2</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>UST)

[TS11T\_P\_03]

10:00~10:30

**International organization for standardization (ISO) for high throughput screening of nanoparticles toxicity using 3D cells**

Soojin Kim<sup>1</sup>, Jung-Hwa Oh<sup>1,2</sup>, Dong Woo Lee<sup>3</sup>, Tae Geol Lee<sup>4</sup>, and Seokjoo Yoon<sup>1,2</sup>  
(<sup>1</sup>Korea Institute of Toxicology, <sup>2</sup>UST, <sup>3</sup>Gachon University, <sup>4</sup>KRISS)

[TS11T\_P\_04]

10:00~10:30

**Preparation of MWCNT particle in water using focused ultrasonication for tensile test**

Seon Ae Hwangbo and Tea Geol Lee  
(KRISS)

[TS11T\_P\_05]

10:00~10:30

**The degradation of the dye solution according to the size range of TiO<sub>2</sub> colloidal particle size**

So Yul Kim, Tae Geol Lee, and Seon Ae Hwangbo  
(KRISS)

[TS11T\_P\_06]

10:00~10:30

**A study on the optimizing surfactant-free nano emulsification and the selection of gelling agents for application of stable nanoemulsions**

Ji Yun Lee, Tae Geol Lee, and Seon Ae Hwangbo  
(KRISS)

[TS11T\_P\_07]

10:00~10:30

**Preliminary investigation for risk assessment of nanomaterials: Size and composition analysis of nanomaterials**

Yonghee Lee and Chi Won Ahn  
(NNFC)

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[TS11T\_P\_08]

10:00~10:30

**Method for nano particle characterization in cosmetics using inductively coupled plasma time of flight (ICP-ToF)**

Doyeon Kim, Jaeseok Kim, and Taegul Lee  
(KRISS)

[TS11T\_P\_09]

10:00~10:30

**Preparation and surface treatment of uniform calcium carbonate, copper oxide, and cerium oxide nanoparticles**

Dohyeong Kim<sup>1</sup>, Sumin Park<sup>1</sup>, Taehyun Yoo<sup>1</sup>, and Yuanzhe Piao<sup>1,2</sup>  
(<sup>1</sup>Seoul National University, <sup>2</sup>Advanced Institutes of Convergence Technology)

[TS11T\_P\_10]

10:00~10:30

**Developing certified reference material (CRM) of FITC labeled SiO<sub>2</sub> nanoparticles for nanosafety evaluation**

Minjeong Kwak, Jaekak Yoo, Ahruem Baek, Jaeseok Kim, and Tae Geol Lee  
(KRISS)

[TS11T\_P\_11]

10:00~10:30

**Study of stainless steel nanotube photocatalytic character**

Jongdo Im, Gunn Park, and Jae-Woo Park  
(Hanyang University)

[TS11T\_P\_12]

10:00~10:30

**Ozone nanobubble/ultrasonic cavitation process for aqueous phenol degradation**

Sangbin Lee and Jae-Woo Park  
(Hanyang University)

[TS11T\_P\_13]

10:00~10:30

**A comparison of number concentration for gold nanoparticles depending on measurement techniques**

Jaeseok Kim  
(KRISS)

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## Poster Session 3

Date & Time

July 8(Fri.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS11F\_P\_01]

10:00~10:30

**Regulatory framework of identifying nanomaterials according to the strategy of european commission's joint research centre**

Jayoung Chae and Youngjun Kim  
(KIST Europe)

[TS11F\_P\_02]

10:00~10:30

**Comparative toxicity of conventional and nanomaterials-incorporated concrete on aquatic organisms**

Rosa Kim, Hakwon Yoon, and June-woo Park  
(Korea Institute of Toxicology)

[TS11F\_P\_03]

10:00~10:30

**Acute toxicological effects induced by co-exposure of nano/microplastic and pesticide on daphnia magna**

Youngsam Kim<sup>1,2</sup> and Young Jun Kim<sup>1,2</sup>  
(<sup>1</sup>KIST Europe, <sup>2</sup>UST)

[TS11F\_P\_04]

10:00~10:30

**Reduction in toxicity of polystyrene nanoplastic through binding of jellyfish mucin**

Hyesoo Lee, Sun Woo Geum, and Min-Kyeong Yeo  
(Kyung Hee University)

[TS11F\_P\_05]

10:00~10:30

**Accurate temperature sensing in microfluidic systems using DNA melting transition**

Sihwa Joo<sup>1</sup>, Do Eun Kim<sup>1</sup>, Tae Geol Lee<sup>1,2</sup>, and Mina Lee<sup>1</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>University of Science and Technology)

[TS11F\_P\_06]

10:00~10:30

**Comparative phytotoxicity, bioaccumulation, and translocation on physicochemical properties of ZnO nanoparticles in soil-plant system**

Sunghoon Kim, Sujin Bae, and Yusik Hwang  
(KIT)

[TS11F\_P\_07]

10:00~10:30

**Evaluation of pulmonary toxicity of titanium dioxide nanoparticles following intratracheal instillation in rats**

Hyoung-Yun Han<sup>1,2</sup>, Soojin Kim<sup>1</sup>, Se-Myo Park<sup>1</sup>, Mi-Sun Choi<sup>1</sup>, Hyun Jegal<sup>1,2</sup>, Jung-Hwa Oh<sup>1,2</sup>, Min Beom Heo<sup>3</sup>, Tae Geol Lee<sup>3</sup>, and Seokjoo Yoon<sup>1,2</sup>  
(<sup>1</sup>Korea Institute of Toxicology, <sup>2</sup>UST, <sup>3</sup>KRISS)

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[TS11F\_P\_08]

10:00~10:30

## Label-free visualization of nanoscale particulate matter on human skin

Eun-Soo Lee<sup>1</sup>, Hyeon-Ji Jo<sup>2</sup>, Suho Kim<sup>3</sup>, Ik Hwan Kwon<sup>3</sup>, Sang-Won Lee<sup>2,3</sup>, and Se-Hwa Kim<sup>2,3</sup>  
(<sup>1</sup>AMOREPACIFIC, <sup>2</sup>UST, <sup>3</sup>KRISS)

[TS11F\_P\_09]

10:00~10:30

## Comparison of adsorption behavior of benzalkonium chlorides onto microplastics

Minhee Jang<sup>1</sup>, Tae-kyoung Kim<sup>2</sup>, and Yu Sik Hwang<sup>1</sup>  
(<sup>1</sup>KITOX, <sup>2</sup>University of California, Berkeley)

[TS11F\_P\_10]

10:00~10:30

## Multifunctional MXene-based lithium-sulfur batteries: Developments of the technology and international standard

Yang Li, Man Li, and Joonho Bae  
(Gachon University)

[TS11F\_P\_11]

10:00~10:30

## Optimization of fluorescent dye staining for quantitative fluorescence imaging analysis

Ik Hwan Kwon<sup>1</sup>, Jae Won Choi<sup>2</sup>, Min Beom Heo<sup>1</sup>, Tae Geol Lee<sup>1</sup>, Sang-Won Lee<sup>1</sup>  
(<sup>1</sup>KRISS, <sup>2</sup>Kyung-Hee University)

[TS11F\_P\_12]

10:00~10:30

## Monitoring the metal nanoparticles in municipal wastewater treatment plant

Keunbai Yoo, Hyojin Baek, and Byung-Tae Lee  
(GIST)

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## TS12. AI and Computational Science for NT

### Oral Presentation

<b>Session Title</b>	[TS12W1] AI and Computational Science for NT 1
<b>Date &amp; Time</b>	July 6(Wed.), 2022 / 10:30~12:15
<b>Place</b>	Room 307
<b>Session Chair(s)</b>	Hyunju Chang (KRICT)

[TS12W1\_I\_1] Invited 10:30~11:00

#### Roadmap to an autonomous chemistry lab for small molecule discovery

Connor W. Coley  
(Cambridge)

[TS12W1\_I\_2] Invited 11:00~11:30

#### Accelerated materials design via machine learning: opportunities and challenges

Bryce Meredig  
(Citrine Informatics)

[TS12W1\_O\_3] 11:30~11:45

#### Designing chemical-intuitive AI for retrosynthesis prediction

Shuan Chen and Yousung Jung  
(KAIST)

[TS12W1\_O\_4] 11:45~12:00

#### ChemDX and MatDX : big-data web services for data-driven approach in chemistry and materials science

Jungho Shin, Seunghun Jang, Gyoung S. Na, and Hyunju Chang  
(KRICT)

[TS12W1\_O\_5] 12:00~12:15

#### Research paradigm shift to the platform : Materials square

Minkyu Park  
(Virtual Lab)



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## Oral Presentation

Session Title	[TS12W2] AI and Computational Science for NT 2
Date & Time	July 6(Wed.), 2022 / 15:45~17:30
Place	Room 307
Session Chair(s)	Seungwu Han (Seoul National University)

[TS12W2\_I\_1] Invited 15:45~16:15

**Exploration and design of super functional materials and devices using artificial intelligence**

In-Ho Lee  
(KRISS)

[TS12W2\_O\_2] 16:15~16:30

**Construction of full phase diagram for MgO-CaO eutectic system using machine learning potentials**

Kyeongpung Lee and Seungwu Han  
(Seoul National University)

[TS12W2\_O\_3] 16:30~16:45

**Data-driven enhancement of ZT in thermoelectric SnSe**

Yea-Lee Lee<sup>1</sup>, Hyungseok Lee<sup>2,3</sup>, Sejin Byun<sup>2,3</sup>, Yong Kyu Lee<sup>2</sup>, Seunghun Jang<sup>1</sup>, In Chung<sup>2,3</sup>, Hyunju Chang<sup>1</sup>, and Jino Im<sup>1</sup>  
(<sup>1</sup>KRICT, <sup>2</sup>Seoul National University, <sup>3</sup>IBS)

[TS12W2\_O\_4] 16:45~17:00

**Data-free physics-informed neural networks for boltzmann transport equation**

Bokyeom Kim and Mincheol Shin  
(KAIST)

[TS12W2\_O\_5] 17:00~17:15

**Prediction of electronic density of states of metallic nanoparticles by graph based convolutional neural network**

Kihoon Bang<sup>1,2</sup>, Byung Chul Yeo<sup>3</sup>, Donghun Kim<sup>1</sup>, Sang Soo Han<sup>1</sup>, and Hyuck Mo Lee<sup>2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>KAIST, <sup>3</sup>Pukyong National University)

[TS12W2\_O\_6] 17:15~17:30

**Accelerated computation of lattice thermal conductivity using neural network interatomic potentials**

Jeong Min Choi, Kyeongpung Lee, Sangtae Kim, Minseok Moon, Wonseok Jeong, and Seungwu Han  
(Seoul National University)

# NANO KOREA 2022

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## Oral Presentation

Session Title	[TS12T1] AI and Computational Science for NT 3
Date & Time	July 7(Thu.), 2022 / 10:30~12:15
Place	Room 307
Session Chair(s)	Seoin Back (Sogang University)

[TS12T1\_I\_1] Invited 10:30~11:00

### Accelerating catalyst discovery using general datasets and graph neural networks

Zachary Ulissi  
(Carnegie Mellon University)

[TS12T1\_O\_2] 11:00~11:15

### Polymer informatics: Current status and critical next steps

Chiho Kim and Rampi Ramprasad  
(Georgia Institute of Technology)

[TS12T1\_I\_3] Invited 11:15~11:45

### AI-based catalyst design

Sang Soo Han  
(KIST)

[TS12T1\_O\_4] 11:45~12:00

### Direction-based crystal graph convolutional neural network to accelerate catalyst discovery for inverse design

Dong Hyeon Mok, Jongseung Kim, and Seoin Back  
(Sogang University)

[TS12T1\_O\_5] 12:00~12:15

### Machine learning-enabled large-scale exploration of stable single-atom catalyst for oxygen evolution reaction

Woonghyeon Park and Yousung Jung  
(KAIST)

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## Oral Presentation

Session Title	[TS12T2] AI and Computational Science for NT 4
Date & Time	July 7(Thu.), 2022 / 14:00~15:30
Place	Room 307
Session Chair(s)	Sang Soo Han (KIST)

[TS12T2\_I\_1] Invited 14:00~14:30

### The era of data-driven materials innovation and design

Kristin Persson  
(Lawrence Berkeley National Laboratory)

[TS12T2\_I\_2] Invited 14:30~15:00

### Computational platform standing on machine-learning approach to reliable data acquisition and analysis for nanocatalyst design principles

Hoje Chun, Sung Jun Hing, and Byungchan Han  
(Yonsei University)

[TS12T2\_O\_3] 15:00~15:15

### Atomistic origin of the mechanochemical NH<sub>3</sub> synthesis on Fe catalysts

Hongwoo Lee, Gaun Jung, Min-Cheol Kim, Sooyeon Kim, and Sang Soo Han  
(KIST)

[TS12T2\_O\_4] 15:15~15:30

### Unraveling the relation between the electronic structure of materials and chemisorption by using deep learning

Doosun Hong<sup>1</sup>, Jaehoon Oh<sup>2</sup>, Kihoon Bang<sup>1</sup>, Soonho Kwon<sup>3</sup>, Se-Young Yu<sup>2</sup>, and Hyuck Mo Lee<sup>2</sup>  
(<sup>1</sup>KIST, <sup>2</sup>KAIST, <sup>3</sup>MSC)

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## Oral Presentation

Session Title	[TS12T3] AI and Computational Science for NT 5
Date & Time	July 7(Thu.), 2022 / 16:00~17:45
Place	Room 307
Session Chair(s)	Donghun Kim (KIST)

[TS12T3\_I\_1] Invited 16:00~16:30

**Improved molecule design using deep learning models based on the incorporation of the physics laws and generalized fragment-based design**

Jaechang Lim  
(HITS incorporation)

[TS12T3\_O\_2] 16:30~16:45

**ChemAI, an artificial intelligence platform specialized in chemical science**

Gyoung S. Na, Seunghun Jang, and Hyunju Chang  
(KRICT)

[TS12T3\_O\_3] 16:45~17:00

**Theoretical investigation of ferroelectric and piezoelectric properties in quasi-one-dimensional transition metal oxyhalides**

P. Karuna Kumari and Se Young Park  
(Soongsil University)

[TS12T3\_O\_4] 17:00~17:15

**Three phase simulation for Pd catalytic reaction of direct H<sub>2</sub>O<sub>2</sub> synthesis: a reaxff molecular dynamics study**

Hong Woo Lee<sup>1</sup>, Kwan-Young Lee<sup>2</sup>, and Sang Soo Han<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

[TS12T3\_O\_5] 17:15~17:30

**First-principles and machine-learning assisted study for developing durable inorganic perovskite solar cell**

Wonze Jung<sup>1</sup>, Yong Youn<sup>1</sup>, Kihwan Kim<sup>1</sup>, Changho Hong<sup>2</sup>, Jiho Lee<sup>2</sup>, Seungwu Han<sup>2</sup>, and Kanghoon Yim<sup>1</sup>  
(<sup>1</sup>KIER, <sup>2</sup>Seoul National University)

[TS12T3\_O\_6] 17:30~17:45

**Crystal structure prediction of cesium lead halide perovskites using a neural network potential**

Changho Hong<sup>1</sup>, Yong Youn<sup>2</sup>, Kanghoon Yim<sup>2</sup>, and Seungwu Han<sup>1</sup>  
(<sup>1</sup>Seoul National University, <sup>2</sup>KIER)

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## Best Poster Award Candidate Presentation

Date & Time

July 7(Thu.) or July 8(Fri.), 2022 / 10:00~10:30

\*Exact dates of each poster will be announced separately.

Place

Exhibition Hall 5

[TS12B\_P\_01]

10:00~10:30

### First-principles study of conjugated polymers for engineering hyperbolic dispersion

Suim Lim<sup>1,2</sup>, Yeon-Ui Lee<sup>3</sup>, and Kanghoon Yim<sup>1</sup>

(<sup>1</sup>KIER, <sup>2</sup>Chungnam National University, <sup>3</sup>Chungbuk National University)

[TS12B\_P\_02]

10:00~10:30

### Design of nanozymes with pH-switchable peroxidase- and catalase-like activity using heteroatom-doped fullerenes

Sung Jun Hong, Hoje Chun, Minjoon Hong, and Byungchan Han

(Yonsei University)

[TS12B\_P\_03]

10:00~10:30

### Machine learning enabled high-throughput screening of solid electrolytes for lithium-ion batteries

Jongseung Kim and Seoin Back

(Sogang University)

[TS12B\_P\_04]

10:00~10:30

### Rotation-induced metastable polar structures in perovskite CaSnO<sub>3</sub>: a first-principles study

Min Chul Choi and Se Young Park

(Soongsil University)

[TS12B\_P\_05]

10:00~10:30

### Tight-binding based hamiltonian generation simulator for crystal structure using machine learning

Geunseok Choi and Mincheol Shin

(KAIST)

[TS12B\_P\_06]

10:00~10:30

### DFT-based screening of catalytic materials for H<sub>2</sub>O<sub>2</sub> production via photoelectrochemical water oxidation reaction

Hyeongjun Kim, Ji Eun Lee, Yu jin Kim, Seung Min Lee, Seong Hyeon Kweon, Seung Hak Oh, Yumi Cho, Ju Hwan Kang, and Sang Kyu Kwak

(UNIST)

[TS12B\_P\_07]

10:00~10:30

### Ab initio study on the suppression of oxidative degradation of Pb-free FASnI<sub>3</sub> perovskite by formate doping

Hyeong Yong Lim<sup>1</sup>, Su Hwan Kim<sup>2</sup>, and Sang Kyu Kwak<sup>1</sup>

(<sup>1</sup>UNIST, <sup>2</sup>LG Energy Solution Battery Research Center)

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## Poster Session 1

Date & Time

July 6(Wed.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS12W\_P\_01]

10:00~10:30

**First-principles study on Li-doped BPhen in charge-generation layer of organic light-emitting diodes**

Suyeon Ju, Jisu Kim, and Seungwu Han  
(*Seoul National University*)

[TS12W\_P\_02]

10:00~10:30

**Generation and validation of density-functional-based tight-binding parameters for indium compound semiconductors**

Seung Mi Lee  
(*KRISS*)

[TS12W\_P\_03]

10:00~10:30

**Modeling atomic layer deposition of TiN thin film using on-lattice kinetic monte carlo simulation**

Hyungmin An, Sangtae Kim, Sangmin Oh, and Seungwu Han  
(*Seoul National University*)

[TS12W\_P\_04]

10:00~10:30

**Degradation of Pt<sub>3</sub>Co nanoparticle in electrochemical environment: adaptive kinetic Monte Carlo simulation using neural network potentials**

Jisu Jung<sup>1</sup>, Suyeon Ju<sup>1</sup>, Purun-hanul Kim<sup>1</sup>, Wonseok Jeong<sup>1,2</sup>, Sungwoo Kang<sup>1,3</sup>, and Seungwu Han<sup>1</sup>  
(<sup>1</sup>*Seoul National University*, <sup>2</sup>*Lawrence Livermore National Laboratory*, <sup>3</sup>*Samsung Advanced Institute of Technology*)

[TS12W\_P\_05]

10:00~10:30

**Constructing melting temperature prediction model for general crystal structures by using transfer learning of geometric-information-enhanced crystal graph neural network**

Jaesun Kim<sup>1</sup>, Jisu Jung<sup>1</sup>, Sookyung Kim<sup>2</sup>, and Seungwu Han<sup>1</sup>  
(<sup>1</sup>*Seoul National University*, <sup>2</sup>*Palo Alto Research Center*)

[TS12W\_P\_06]

10:00~10:30

**First-principles analysis of native vacancies on GaN m plane**

Purun-hanul Kim<sup>1</sup>, Seungwu Han<sup>1</sup>, and Youngho Kang<sup>2</sup>  
(<sup>1</sup>*Seoul National University*, <sup>2</sup>*Incheon National University*)

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[TS12W\_P\_07]

10:00~10:30

**Density functional theory study of an oxygen reduction reaction on a Ti<sub>55</sub>C<sub>x</sub>(x=38,44)@Pt<sub>92</sub> cuboctahedral core-shell nanocluster**

Hyebin Yoon<sup>1</sup>, Sung Jun Hong<sup>1</sup>, Joonhee Kang<sup>2</sup>, and Byungchan Han<sup>1</sup>  
(<sup>1</sup>Yonsei University, <sup>2</sup>Pusan National University)

[TS12W\_P\_08]

10:00~10:30

**First-principles study on the outstanding stability of gd-doped UO<sub>2</sub> against surface oxidation**

Minjoon Hong and Byungchan Han  
(Yonsei University)

[TS12W\_P\_09]

10:00~10:30

**Identification of unexplored ternary metal oxides via crystal structure prediction using machine learning potentials**

Seungwoo Hwang<sup>1</sup>, Sungwoo Kang<sup>1</sup>, Jisu Jung<sup>1</sup>, Changho Hong<sup>1</sup>, Jaehoon Kim<sup>1</sup>, Wonseok Jeong<sup>2</sup>, and Seungwu Han<sup>1</sup>  
(<sup>1</sup>Seoul National University, <sup>2</sup>Lawrence Livermore National Laboratory)

[TS12W\_P\_10]

10:00~10:30

**Optical property database and machine learning-based predictions of inorganic phosphor**

Seunghun Jang, Gyoung S. Na, and Hyunju Chang  
(KRICT)

[TS12W\_P\_11]

10:00~10:30

**Catalytic activity trends of pyrite transition metal dichalcogenides for oxygen reduction and evolution**

Wooseok Lee, Jongseung Kim and, Seoin Back  
(Sogang University)

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## Poster Session 2

Date & Time

July 7(Thu.), 2022 / 10:00~10:30

Place

Exhibition Hall 5

[TS12T\_P\_01]

10:00~10:30

**Public database for thermoelectric materials and divide-and-conquer approach to predict thermoelectric properties**

Gyoung S. Na, Seunghun Jang, and Hyunju Chang  
(KRICT)

[TS12T\_P\_02]

10:00~10:30

**Constructing ceramic big database for Data-Driven material solutions**

Han Uk Lee<sup>1,2</sup>, Dong Geon Lee<sup>1,3</sup>, Hye Jeong Song<sup>1,2</sup>, Sung Beom Cho<sup>1</sup>, and Hyunseok Ko<sup>1</sup>  
(<sup>1</sup>KICET, <sup>2</sup>Gyeongsang National University, <sup>3</sup>Hanyang University)

[TS12T\_P\_03]

10:00~10:30

**A novel definition of drug-likeness based on unsupervised learning**

Kyunghoon Lee<sup>1</sup>, Jaechang Lim<sup>2</sup>, and Woo Youn Kim<sup>1,2</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>HITS Incorporation)

[TS12T\_P\_04]

10:00~10:30

**Computational Study of thermal-flow field into three-dimensions between thermal plasma and electrodes in gas tungsten arc welding**

Won-Ho Lee<sup>1</sup> and Jong-Chul Lee<sup>2</sup>  
(GWNU)

[TS12T\_P\_05]

10:00~10:30

**Computations on a segmented ferrofluid flow rotating generator for increasing the time-varying magnetic flux**

Ju-Han Bae<sup>1</sup>, Youn-Jea Kim<sup>2</sup>, and Jong-Chul Lee<sup>1</sup>  
(<sup>1</sup>GWNU, <sup>2</sup>Sungkyunkwan University)

[TS12T\_P\_06]

10:00~10:30

**Electron transport properties of monatomic phase-change memory: A first-principles study**

Kanghyun Joo and Mincheol Shin  
(KAIST)

[TS12T\_P\_07]

10:00~10:30

**Computational study on the origin of high activity of Ni-N-C catalyst for electrochemical CO<sub>2</sub> reduction and catalyst proposal through applied potential simulation**

Dongyup Shin and Hyungjun Kim  
(KAIST)



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[TS12T\_P\_08]

10:00~10:30

**Influence of surface exposure on carrier relaxation dynamics of nanostructured halide perovskites**

Yoonhoo Ha<sup>1</sup>, Ki-Ha Hong<sup>2</sup>, and Hyungjun Kim<sup>1</sup>  
(<sup>1</sup>KAIST, <sup>2</sup>Hanbat National University)

[TS12T\_P\_09]

10:00~10:30

**Predicting material failure characteristics by nondestructively deep learning void topology**

Leslie Ching Ow Tiong<sup>1</sup>, Gunjick Lee<sup>2</sup>, Seok Su Sohn<sup>2</sup>, and Donghun Kim<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)

[TS12T\_P\_10]

10:00~10:30

**Enhancing structural and cyclic stability of oxygen deficient lithium titanate at extremely low voltage: theoretical study**

Changho Yeon and Chan-Woo Lee  
(KIER)

[TS12T\_P\_11]

10:00~10:30

**Improving safety in autonomous laboratory via vial-positioning detection using deep learning and computer vision**

Leslie Ching Ow Tiong<sup>1</sup>, Hyuk Jun Yoo<sup>1,2</sup>, Nayeon Kim<sup>1,2</sup>, Chang Seop Hong<sup>2</sup>, Kwan-Young Lee<sup>2</sup>, DongHun Kim<sup>1</sup>, and Sang Soo Han<sup>1</sup>  
(<sup>1</sup>KIST, <sup>2</sup>Korea University)