ISMP 2021
The 19th International Symposium on Microelectronics and Packaging
Hybrid (both onsite face-to-face and online sessions) Symposium
November 3(Wed.)~5(Fri.), 2021, Hanwha Resort, Busan, Korea

Organized by The Korean Microelectronics and Packaging Society (KMEPS)
Sponsored by LG Chem, Daeduck Electronics Co., Ltd., DISCO Corporation,
HAESUNG DS Co., Ltd., HANA Micron Inc., MK ELECTRON Co., Ltd.,
Samsung Electro-Mechanics Co., Ltd., SIMMTECH Co., Ltd., SK hynix Inc.,
YMT Co., Ltd., INHA University Manufacturing Innovation School, KOSTAT Inc.,
INHA University Next Generation Engineering Researcher Development Center
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LG Chem prioritizes corporate sustainability management to fulfill our social responsibility for a healthier and brighter future

LG Chem

Responsible product development - manufacturing / Responding to climate change / Responsible Supply chain development - management / Sustainable recycling of resources
IN THE DIGITAL WORLD, CONNECTING EVERYONE, EVERYTHING & EVERYWHERE AT ITS CORE IS DAEDUCK COMPONENT

Semiconductor & Network

FCBGA
[CPU, GPU, AI, Data Center]

FCCSP
[AP, Baseband, Controller]

FCBOC
[Server, PC, SSD]

SIP
[RF Module]

AIP
[5G Antenna Module]

Ultra Thin CSP
[Mobile DRAM (POP), NAND]

Probe Card
[Wafer Test Inspection]

Load Board
[AP Chip, Semiconductor Tester]

Optical High End Network
[Optical Networking]
Kiru · Kezuru · Migaku Technologies

DISCO HI-TEC KOREA CORPORATION
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Bundang-gu, Seongnam-si, Gyeonggi-do, Korea 13486
Phone: +82-31-8038-8250
www.disco.co.jp
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It is our great pleasure to announce that the 19th International Symposium on Microelectronics and Packaging (ISMP 2021) will be held as hybrid meeting (both onsite face-to-face and online sessions) at Hanwha Resort, Busan, Korea, on November 3rd (Wed.) ~ 5th (Fri.), 2021.

The ISMP 2021, organized by KMEPS (the Korean Microelectronics and Packaging Society), presents a valuable chance to share the latest electronic packaging technologies with other professionals as well as to boost communication and collaboration with colleagues around the world.

Especially, valuable presentations about HIR (Heterogeneous Integration Roadmap) will be prepared. Also, special symposium honoring Professor Kyung W. Paik on his retirement is planned.

The ISMP 2021 organizing committee promises to provide an outstanding and fruitful program, which will be a great opportunity that you do not miss. We cordially invite you to submit abstracts for oral and poster presentation. We look forward to meeting you at ISMP 2021 in Busan, Korea on November 3rd (Wed.) ~ 5th (Fri.).

Dr. Sayoon Kang
General Chair
Overview

ISMP 2021 is the 19th International Symposium on Microelectronics and Packaging. ISMP is the top-tier international event that brings together the expertise in electronics packaging and microelectronic systems from academia to industry. This year, the conference is held to provide a bigger chance to exchange ideas and experiences from November 3rd (Wed.) to 5th (Fri.), 2021 at Hanwha Resort, Busan, Korea. As the conference site, Busan is the second-largest city in Korea and famous for tourist and shopping attractions as well as its astounding variety of fresh seafood. You will not forget the vibrant marketplace experience and the exceptional hospitality of Busan. We look forward to seeing you in Busan at the ISMP 2021.

Conference Topics

- Novel Packaging Technologies for AI, IoT, and Big data
- Packaging Solutions for 5G/6G Applications
- System Integration with Advanced Packaging Technologies
- Electronic Materials for Interconnects and Packaging
- Emerging Process for Interconnects and Packaging
- PCB, Solder, and Assembly Process
- Automotive & Power Electronic Packaging
- Sensors, LED, and Emerging Packaging Technology
- Flexible, Wearable, and Printed Electronics
- MEMS/NEMS Packaging and Applications
- Reliability of Electronic Devices and Systems
- Design Tools and Modeling
ISMP 2021

Committee

General Chair
• Sayoon Kang (Korea Microelectronics and Package Society)

Program Committee
• Chair Sungdong Kim (Seoul National University of Science and Technology)
• Co-chair Sehoon Yoo (Korea Institute of Industrial Technology)
• Kwang-Seok Kim (Korea Institute of Industrial Technology)
• Jong Woong Kim (Jeonbuk National University)
• Jong heon Kim (Nepes corporation)
• Joo-Hyung Kim (Inha University)
• Tae-il Kim (Sungkyunkwan University)
• Seunghoon Nam (Andong National University)
• Sungwook MHIN (Kyonggi University)
• Ah-Young Park (Korea Institute of Machinery & Materials)
• KyuBong Yeon (Korea Automotive Technology Institute)
• Yoonchul Sohn (Chosun University)
• Yoo Bong Young (Hanyang University)
• Yohan Yoon (Korea Aerospace University)
• Hyunsik Yoon (Seoul National University of Science and Technology)
• Kwangjoo Lee (LG Chem)
• Jonghyun Lee (Seoul National University of Science and Technology)
• Tae-Ik Lee (Korea Institute of Industrial Technology)
• Kwang-Seong Choi (Electronics and Telecommunications Research Institute)

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• Young-Bae Park (Andong National University)
• Sung-Hoon Cho (Seoul National University of Science and Technology)
• Jae Pil Jung (University of Seoul)

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Committee

- Kyung Wook Paik (Korea Advanced Institute of Science and Technology)
- Gu-Sung Kim (Kangnam University)
- Taek-Soo Kim (Korea Advanced Institute of Science and Technology)
- Hiroshi Nishikawa (Osaka University, Japan)
- Joungho Kim (Korea Advanced Institute of Science and Technology)
- Yong M. Kim (Intel Corp., USA)
- Mitsumasa Koyanagi (Tohoku University)
- Saikumar Jayaraman (Intel Corp.)
- C. L. Gan (Nanyang Technological University)
- Shuye Zhang (Harbin Institute of Technology)

Local Organization Committee
- Chair Myungyung Jeong (Pusan National University)
- Co-chair Suck Won Hong (Pusan National University)
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- Jeong-Won Yoon (Chungbuk National University)
- Jin Young Kim (Amkor Technology Korea)

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- Min Hyun Kim (Hanmi Semiconductor Co., Ltd.)
- Nam Gi Kang (Korea Electronics Technology Institute)
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- Hyuk Lee (Flex Com Co.)
- Tae-Gon Lee (Samsung Electro-Mechanics)

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- SungSoon Park (Amkor Technology Korea)
- Se Young Jeong (Ntrium inc.)

Secretariat
- Minjin Kim (Korean Microelectronics and Packaging Society)
Plenary Speaker 1

November 4, Thursday | 1:20~1:50 P.M.
Hanwha Resort, Room Monterosso, B1F

Name: Yun Tae Lee  
Affiliation: Samsung Electro-Mechanics Co., Ltd., Korea  
Position: Former CEO  
Title: Semiconductor Industry Savior: Further Acceleration in Package Innovation

Biography

Education
1985. Feb. (Master) KAIST, Electrical Engineering  
1983. Feb. (Bachelor) Seoul National University, Electrical Engineering

Career
Name: Joungho Kim  
Affiliation: KAIST (Korea Advanced Institute of Science and Technology), Korea  
Position: Professor  
Title: Next Generation Terabyte/s HBM (High-bandwidth Memory Module) Designs for Advanced Artificial Intelligence (AI) Servers

Abstract  
Recently, we are facing a newly emerging technology and industrial transition, named as 4th Industrial Revolution, which is based on artificial intelligence (AI), big data platform, cloud computing, and metaverse system. Especially, emergence of artificial intelligence and machine learning is aided by availability of big data, deep learning algorithms, and high-performance GPU computing machines. Accordingly, demands for advanced performance of terabyte/s bandwidth computing performance are rapidly increasing. However, continuously growing gaps between GPU performance and DRAM I/O data bandwidth are becoming the critical barrier to limit the AI computing performance. In order to meet the pressing needs of higher data transfer bandwidth, we are proposing High Bandwidth Memory (HBM) solutions using TSV, Si interposer technologies, and stacked memory architectures.

In this presentation, we will introduce the advanced approaches and designs of the next generation terabyte/s bandwidth 2.5D HBM (High-bandwidth Memory Module), which will be critically needed for artificial intelligent servers and super computers. Especially, we will talk about the signal and power integrity design issues, and analysis results of TSV and Si interposer channels, including GPU-DRAM channels, and high-
Plenary Speaker 2

speed serial channels. In addition, we will discuss PDN (power Distribution Network) impedance designs, and decoupling capacitor schemes as well. We will also suggest new computer architectures including PIM-HBM and Integrated HBM for hybrid and memory-based computing architectures to meet the increasing performance needs of AI serves with reduced power consumptions. Finally, we will demonstrate the Machine Learning based Design Methods (MLDB) for semiconductor, HBM, and package designs.

Biography

Dr. Joungho Kim received B.S. and M.S. degrees in electrical engineering from Seoul National University, Seoul, Korea, in 1984 and 1986, respectively, and Ph.D degree in electrical engineering from the University of Michigan, Ann Arbor, in 1993. In 1994, he joined Memory Division of Samsung Electronics, where he was engaged in Gbit-scale DRAM design. In 1996, he moved to KAIST (Korea Advanced Institute of Science and Technology). He is currently professor at electrical engineering department of KAIST and the joint faculty member of KAIST AI college. He serves as the director of Samsung Industry Collaboration Center.

Recently, his research is focusing on the developing Deep Reinforcement Learning Methods for the optimal design of high-speed channels and the delivery networks in HBM and AI computer modules. In addition, his research centers on signal integrity and power integrity modeling, design, and measurement methodologies for HBM, 3D IC, TSV, Interposer, and System-in-Packages. He has authored and co-authored over 588 technical papers published at refereed journals and conference proceedings. Also, he has given more than 267 invited talks and tutorials at the academia and the related industries. He is currently the director of Samsung-KAIST industrial Collaboration Center.

He published a book, “Electrical Design of Through Silicon Via,” by Springer in 2014. And he was the symposium chair of IEEE EDAPS Symposium 2008, and was the TPC chair of...
Plenary Speaker 2

APEMC 2011. He was also an associated editor of the IEEE Transactions of Electromagnetic Compatibility. He received Outstanding Academic Achievement Faculty Award of KAIST in 2006, KAIST Grand Research Award in 2008, National 100 Best Project Award in 2009, KAIST International Collaboration Award in 2010, KAIST Grand Research Award in 2014, and Teaching Award in 2015, respectively. He was appointed as an IEEE EMC society distinguished lecturer in a period from 2009-2011. He received Technology Achievement Award from IEEE Electromagnetic Society in 2010. He is IEEE fellow.
Keynote Speaker 1

November 4, Thursday | 11:05~11:35 P.M.
Hanwha Resort, Room Monterosso, B1F

Name: Bongtae Han
Affiliation: University of Maryland, USA
Position: Professor
Title: Warpage after molding processes: Can we really predict this?

Abstract

Residual stresses exist inherently in components encapsulated by molding processes. They are combined with the stresses caused by the CTE mismatch, and eventually dictate the final warpage of components at room and reflow temperatures. For the past couple of decades, extensive efforts have been made to enhance the predictability of warpage. On the modeling front, commercial software packages are equipped with advanced but user-friendly analysis modules. As a result, even non-experts can model/simulate almost any kind of electronic packaging products. On the experimental front, thermo-mechanical properties required for numerical predictions, including CTE, Tg, and the temperature-dependent viscoelastic properties, are routinely measured by commercial tools such as TMA and DMA. In addition, temperature-dependent warpage can be measured using commercial shadow Moiré and DIC tools, and the results are used for model validation. Then, why is it still difficult to make quantitative prediction of warpage after molding processes?
Some studies in the literature show excellent agreements between warpage measurements and predictions. Yet, even the verified model does not predict the warpage of different packages molded by the same EMC accurately. In fact, good agreements of warpage between predictions and measurements are possible even when the properties of EMC are not correct and/or some critical properties of EMC are missing.
Keynote Speaker 1

This presentation discusses in detail the incorrect and missing properties for the current practice of warpage modeling, and presents novel experimental methods to measure the required properties.

Biography
Dr. Bongtae Han is Keystone Professor at the Mechanical Engineering Department of the University of Maryland. Dr. Han has co-authored a textbook entitled “High Sensitivity Moiré: Experimental Analysis for Mechanics and Materials,” Springer-Verlag (1997) and edited two books. He has published 13 book chapters and over 300 journal and conference papers in the field of microelectronics, photonics and experimental mechanics.

He was a recipient of the 2002 Society for Experimental Mechanics (SEM) Brewer Award for his contributions to development of photomechanics tools used in semiconductor packaging. He was named the 2015 American Society of Mechanical Engineering (ASME) Mechanics Award winner in Electronic and Photonic Packaging Division for his contributions to structural mechanics of electronic systems. His publication awards include (1) the Year 2004 Best Paper Award of the IEEE Transactions on Components and Packaging Technologies, (2) the Gold Award (best paper in the Analysis and Simulation session) of the 1st Samsung Technical Conference in 2004 and (3) the Year 2015 Best Paper Award of the 16th International Conference on Electronic Packaging Technology (ICEPT 2015). He served as an Associate Technical Editor for Experimental Mechanics, from 1999 to 2001; for Journal of Electronic Packaging, Transaction of the ASME from 2003 to 2012; for Microelectronics Reliability from 2017 to 2020. He is currently serving as a Co-Editor-in-Chief for Microelectronics Reliability.

He was elected Fellow of the SEM and the ASME in 2006 and 2007, respectively.
Abstract
Semiconductor industry has entered a new age where mobile/consumer and other drivers like big data, artificial intelligence, 5G, high performance computing (HPC), AR/VR/MR, cloud/edge computing, IoTs (including industrial IoT), smart automotive, industry 4.0, hyperscale data centers is creating demand for system or subsystems which require high computing power, high speed, more bandwidth, low latency, low power, more functionality, more memory, system level integration, variety of sensors while keeping the cost low. Heterogeneous integration using AP technologies is key to fulfil these system performance requirements and increase the value of a semiconductor product, adding functionality, maintaining/increasing performance while lowering cost. This places immense pressure on package suppliers with an increasing degree of customization required for each individual customer. Advanced Packaging market was $30B in 2020 and is expected to grow at CAGR2020-2026 of ~8% to reach ~ $48B in 2026. The megatrend applications are fueling the next generation of advanced packaging platforms (high-density FOWLP, 3D stacked TSV memory, WLCSP, and flip-chip), which have reached a new level of complexity and now demand higher integration-level requirements. These lofty standards will strongly influence the increasing demand for advanced materials with new technical specifications, to achieve better performance. The presentation will discuss about the advanced packaging technology and related materials trends.
Keynote Speaker 2

Biography
Santosh Kumar is currently working as Senior Director & Principal Analyst at Yole Développement. He is a technologist and strategist with a multifaceted experience in the materials, process and business development including industrial market & technology strategic analysis in the field of semiconductor packaging and manufacturing. He is involved in the market, technology and strategic analysis of the microelectronic assembly and packaging technologies. His main interest areas are advanced IC packaging technology including equipment & materials. He is the author of several reports on fan-out / fan-in WLP, flip chip, and 3D/2.5D packaging. He worked on multiple projects with several multi-national companies covering entire microelectronics supply chain from fabless players, OEMs, IDMs, OSATs to equipment & material suppliers. He received the bachelor and master’s degree in engineering from the Indian Institute of Technology (IIT), Roorkee and University of Seoul, respectively. He has published more than 50 papers in peer reviewed journals and has obtained 2 patents. He has presented and given talks at numerous conferences and technical symposiums related to advanced microelectronics packaging.
### Invited Speaker

**Thursday, 4 ~ Friday, 5 November 2021**  
Hanwha Resort, Room Monterosso, B1F

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<td>Universiti Kebangsaan Malaysia/ Malaysia</td>
<td>Sintered Silver as Die Attach Materials</td>
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<td>I1-3</td>
<td>Prof. Sang Won Yoon</td>
<td>Hanyang University/ Korea</td>
<td>Power Semiconductor Packaging Approaches for Reliable Power Module Systems</td>
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<td>I1-5</td>
<td>Sir. Hyeong Il Jeon</td>
<td>Amkor Technology Korea/ Korea</td>
<td>Complete EMI Shielding Leadless Package Solution in Automotive</td>
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<td>I2-1</td>
<td>Dr. William Chen Dr. W. R. “Bill” Bottoms</td>
<td>ASE Technology Holding, Co., Ltd./ USA Third Millennium Test Solutions Inc.(3MTS)/ USA</td>
<td>HIR workshop-International: HIR Overview</td>
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<td>I2-3</td>
<td>Sir. Timothy Lee</td>
<td>IEEE/ USA</td>
<td>HIR workshop-International: 5G Communication</td>
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<td>I2-5</td>
<td>Sir. Rich Rice</td>
<td>ASE Technology Holding, Co., Ltd./ USA</td>
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<td>I2-7</td>
<td>Prof. Jose E Schutt-Aine</td>
<td>University Of Illinois Urbana-Champaign/ USA</td>
<td>HIR workshop-International: Co-Design</td>
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<td>I2-9</td>
<td>Dr. Kyuoh Lee</td>
<td>Intel Corporation/ USA</td>
<td>Substrate Roadmap for Heterogenous Integration</td>
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<td>Dr. Max Min</td>
<td>Ex. Samsung Foundry, USA</td>
<td>CUBE and ISC Technologies for 2.5D and 3D Heterogeneous Integration</td>
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<td>I2-13</td>
<td>Sir. PilJe Sung</td>
<td>Amkor Technology Korea/ Korea</td>
<td>Heterogeneous 2.5D Integration Packaging Technology</td>
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<td>I2-15</td>
<td>Sir. Insoo Kang</td>
<td>NEPES Corporation/ Korea</td>
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<td>I2-16</td>
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<td>Hana Micron Inc./ Korea</td>
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<td>I2-18</td>
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<td>SK hynix Inc./ Korea</td>
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<td>Sir. Jun Sang Park</td>
<td>Protec Co., Ltd./ Korea</td>
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<td>Sir. Seong Jin Park</td>
<td>ASM Pacific/ Korea</td>
<td>Advanced Packaging Interconnect Solutions</td>
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Thursday, 4 ~ Friday, 5 November 2021  
Hanwha Resort, Room Forum 1, 3F

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<td>KITECH/ Korea</td>
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<td>I1-4</td>
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<td>Korea University/ Korea</td>
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<td>I1-6</td>
<td>Prof. Il Kwon Oh</td>
<td>KAIST/ Korea</td>
<td>Soft Ionic Transducers based on Nanomaterials</td>
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<td>I1-7</td>
<td>Prof. Hyejin Jang</td>
<td>Seoul National University/ Korea</td>
<td>Thermal Management at Nanoscale in Electronics Packaging</td>
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<td>I1-8</td>
<td>Prof. Seung-Kyun Kang</td>
<td>Seoul National University/ Korea</td>
<td>Transient Packaging Strategies for Biodegradable Electronics</td>
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<td>I1-9</td>
<td>Dr. Chukwudi Okoro</td>
<td>Coming Incorporated/ USA</td>
<td>Achieving Crack-Free Metallized Through-Glass Via Substrate for Reliable High Frequency Microelectronic Packages</td>
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<td>I1-10</td>
<td>Dr. Sang Mok Lee</td>
<td>CNNT, Co. Ltd./ Korea</td>
<td>Low Dielectric, High Crystalline, Natural Nano Fiber, as Packaging Materials</td>
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<td>I2-2</td>
<td>Prof. W. Hong Yeo</td>
<td>Georgia Tech/ USA</td>
<td>Intelligent Soft Bioelectronics for Advancing Human Healthcare</td>
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<tr>
<td>I2-4</td>
<td>Prof. Nanshu Lu</td>
<td>University of Texas Austin/ USA</td>
<td>Soft Electronics for Mobile Health and Human-Centered Robotics</td>
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<td>I2-6</td>
<td>Prof. Hyun-Joong Chung</td>
<td>University of Alberta/ Canada</td>
<td>Sensors and Medical Devices Based on Textiles and Elastomers</td>
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<td>I2-8</td>
<td>Prof. Xian Huang</td>
<td>Tianjin university/ China</td>
<td>Printing and Water Sintering Techniques for High Performance Transient Electronic Circuits</td>
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<td>I2-10</td>
<td>Prof. Sungjune Jung</td>
<td>POSTECH/ Korea</td>
<td>Flexible and Printed 3D Organic Circuits and Active-Matrix Sensor Arrays</td>
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<td>I2-12</td>
<td>Prof. Jang-Ung Park</td>
<td>Yonsei University/ Korea</td>
<td>High-Resolution 3D Printing of Stretchable Interconnections for Wearable Electronics</td>
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<td>I2-14</td>
<td>Prof. Yei-Hwan Jung</td>
<td>Hanyang University/ Korea</td>
<td>Skin-Integrated Wireless Haptic Interface for VR and AR</td>
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<td>I2-17</td>
<td>Dr. Sung-Bin Kim</td>
<td>AnyCasting Co., Ltd./ Korea</td>
<td>How to Apply Selective Electrochemical 3D Printer to the Additive Process of Thermal Resistant Bonding Materials for High-Power Semiconductors in the PCB Mass Production?</td>
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<td>I2-19</td>
<td>Prof. Shuye Zhang</td>
<td>Harbin Institute of Technology/ China</td>
<td>Effects of Co on the Morphology, Shear Strength and Fracture of the Low Temperature SAC305/Sn-58Bi/Cu Composite Solder Joint</td>
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### Special Session for Honor Retirement of Professor Kyung W. Paik

**Thursday, 4 November 2021 | 15:20 A.M.~17:25 P.M.**  
Hanwha Resort, Room Monterosso, B1F

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<td>S1-1</td>
<td>Dr. Kiwon Lee</td>
<td>Ybrain Inc./ Korea</td>
<td>Electroceuticals: The Future of Miniaturized Medical Devices</td>
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<td>S1-2</td>
<td>Dr. Min Hyung Lee</td>
<td>KITECH/ Korea</td>
<td>Development of SmartPlate™ Series: Superb Copper Electroplating Solution for Overcoming Process Limitations of Micro-Bump</td>
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<td>S1-3</td>
<td>Dr. Kim Hyoung Joon</td>
<td>Qualcomm Technologies, Inc./ Korea</td>
<td>Packaging Trend &amp; FOWLP Development</td>
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<td>S1-4</td>
<td>Dr. Ho-Young Son</td>
<td>SK hynix Inc./ Korea</td>
<td>Interconnect Challenges in Memory Packaging</td>
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<td>S1-5</td>
<td>Dr. DalJin Yoon</td>
<td>SK hynix Inc./ Korea</td>
<td>Effects of Magnetic Field on the Dispersion of Conductive Particles in Anchoring Polymer Layer (APL) Anisotropic Conductive Films (ACFs) for Ultra-Fine Pitch Interconnection</td>
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# Program at a Glance

## Nov. 3, 2021 (Wed.)

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<td>Welcome Reception</td>
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## Nov. 4, 2021 (Thu.)

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<td>08:30-08:55</td>
<td>O1-1 Synthesis of Crystalline Pure Mesoporous TiO₂ B and its Application on Environmental Pollutants Degradation Dr. Md Kamal Hossain (Bangladesh Council of Scientific and Industrial Research/ Bangladesh)</td>
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<td>08:55-09:20</td>
<td>O1-3 Ultrafast Sinter-Bonding Technique in Air Using Size-Controllable Cu Dendritic Particles Dr. Eun Byeol Choi, Prof. Jong-Hyun Lee (Seoul National University of Science and Technology/ Korea)</td>
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<tr>
<td>09:20-09:45</td>
<td>(Invited) I1-1 Sintered Silver as Die Attach Materials Dr. Siow Kim Shyong (Universiti Kebangsaan Malaysia/ Malaysia)</td>
</tr>
<tr>
<td>09:45-10:10</td>
<td>(Invited) I1-3 Power Semiconductor Packaging Approaches for Reliable Power Module Systems Prof. Sang Won Yoon (Hanyang University/ Korea)</td>
</tr>
<tr>
<td>10:10-10:35</td>
<td>(Invited) I1-5 Complete EMI Shielding Leadless Package Solution in Automotive Sir. HyeongIl Jeon (Amkor Technology Korea/ Korea)</td>
</tr>
<tr>
<td>10:35-10:55</td>
<td>Coffee break</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:55-09:20</td>
<td>O1-2 Manganese and Nitrogen Doped Graphene Oxide-Based Hybrid Composite Materials for DMMP Detection Mr. Sanjeeb Lama, Dr. Sivalingam Ramesh*, Dr. Young-Jun Lee, Mr. Bong-Gyu Bae, Mr. Jae-Hong Kim, Prof. Joo-Hyung Kim (Dongguk University*, Inha University/ Korea)</td>
</tr>
<tr>
<td>09:20-09:45</td>
<td>O1-4 Mesoporous Pd@Au Film Integrated with Blood Plasma Separation Membrane for Surface-Enhanced Raman Scattering (SERS) Biosensor Dr. Hyun-Jong Kim, Ms. Hana Lim, Dr. Young Min Park, Dr. Ho-Nyun Lee (KITECH/ Korea)</td>
</tr>
<tr>
<td>09:45-10:10</td>
<td>(Invited) I1-2 Flexible Pressure Sensor Based on 3D Structure and its Application Dr. Hanchul Cho (KITECH/ Korea)</td>
</tr>
<tr>
<td>10:10-10:35</td>
<td>(Invited) I1-4 Ultra-Wide Bandgap Ga2O3-Based Solar-Blind Photodetectors Prof. Jihyun Kim (Korea University/ Korea)</td>
</tr>
<tr>
<td>10:35-10:55</td>
<td>(Invited) I1-6 Soft Ionic Transducers based on Nanomaterials Prof. Il Kwon Oh (KAIST/ Korea)</td>
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<tr>
<td>10:55-11:05</td>
<td>Opening Remark</td>
<td>Room Monterosso, B1F</td>
<td>Session Chair: Sungdong Kim (Seoul National University of Science and Technology/ Korea)</td>
</tr>
<tr>
<td>11:05-11:35</td>
<td>Keynote Talk 1 Warpage after Molding Processes: Can we Really Predict This?</td>
<td>Room Monterosso, B1F</td>
<td>Prof. Bongtae Han (University of Maryland/ USA)</td>
</tr>
<tr>
<td>11:35-12:05</td>
<td>Keynote Talk 2 Advanced Packaging Technology &amp; Materials trends</td>
<td>Room Monterosso, B1F</td>
<td>Dr. Santosh Kumar (Yole Dévelopement/ France)</td>
</tr>
<tr>
<td>13:50-14:20</td>
<td>Plenary Talk 2 Next Generation Terabyte/s HBM (High-bandwidth Memory Module) Designs for Advanced Artificial Intelligence (AI) Servers</td>
<td>Room Monterosso, B1F</td>
<td>Prof. Joungho Kim (Korea Advanced Institute of Science and Technology/ Korea)</td>
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<tr>
<td>14:20-14:40</td>
<td>Coffee break</td>
<td>Room Forum 2 &amp; Forum 3, 3F</td>
<td>Session Chair: Young-Bae Park (Andong National University/ Korea) &amp; Yong-Ho Ko (Korea Institute of Industrial Technology)</td>
</tr>
<tr>
<td>14:40-15:20</td>
<td>Poster Presentation Session</td>
<td>Room Forum 2 &amp; Forum 3, 3F</td>
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The 19th International Symposium on Microelectronics and Packaging
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<th>Time</th>
<th>Session A2: Special Session for Honor Retirement of Prof. Kyung W. Paik</th>
<th>Session B2: Microelectronics &amp; Packaging Materials 1</th>
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<tbody>
<tr>
<td>15:20-15:45</td>
<td>S1-1 Electroceuticals: The Future of Miniaturized Medical Devices</td>
<td>(Invited) I1-7 Thermal Management at Nanoscale in Electronics Packaging</td>
</tr>
<tr>
<td></td>
<td>Dr. Kiwon Lee (Ybrain Inc./ Korea)</td>
<td>Prof. Hyejin Jang (Seoul National University/ Korea)</td>
</tr>
<tr>
<td>15:45-16:10</td>
<td>S1-2 Development of SmartPlate™ Series: Superb Copper Electroplating Solution for Overcoming Process Limitations of Micro-Bump</td>
<td>(Invited) I1-8 Transient Packaging Strategies for Biodegradable Electronics</td>
</tr>
<tr>
<td></td>
<td>Dr. Min Hyung Lee (KITECH/ Korea)</td>
<td>Prof. Seung-Kyun Kang (Seoul National University/ Korea)</td>
</tr>
<tr>
<td>16:10-16:35</td>
<td>S1-3 Packaging Trend &amp; FOWLP Development</td>
<td>(Invited) I1-9 Achieving Crack-Free Metallized Through-Glass Via Substrate for Reliable High Frequency Microelectronic Packages</td>
</tr>
<tr>
<td></td>
<td>Dr. Kim Hyoung Joon (Qualcomm Technologies, Inc./ Korea)</td>
<td>Dr. Chukwudi Okoro (Corning Incorporated/ USA)</td>
</tr>
<tr>
<td>16:35-17:00</td>
<td>S1-4 Interconnect Challenges in Memory Packaging</td>
<td>(Invited) I1-10 Low Dielectric, High Crystalline, Natural Nano Fiber, as Packaging Materials</td>
</tr>
<tr>
<td></td>
<td>Dr. Ho-Young Son (SK hynix Inc./ Korea)</td>
<td>Dr. Sang Mok Lee (CNNT, Co. Ltd./ Korea)</td>
</tr>
<tr>
<td>17:00-17:25</td>
<td>S1-5 Effects of Magnetic Field on the Dispersion of Conductive Particles in Anchoring Polymer Layer (APL) Anisotropic Conductive Films (ACFs) for Ultra-Fine Pitch Interconnection</td>
<td>O1-5 Novel Synthesis of Highly Periodic Mesoporous Organosilicas SMS-1 &amp; SMS-2 and Application for Various Electronic Materials</td>
</tr>
<tr>
<td></td>
<td>Dr. DaJin Yoon (SK hynix Inc./ Korea)</td>
<td>Dr. Md Kamal Hossain (Bangladesh Council of Scientific and Industrial Research/ Bangladesh)</td>
</tr>
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**Room Monterosso, B1F**

**Session Chair:** Sung-Hoon Choa (Seoul National University of Science and Technology/ Korea)

- **17:25-17:40** Retirement Ceremony of Professor Kyung W. Paik
- **17:40-** Dinner (Blue Seagull, 2F)
# Program at a Glance

### Nov. 5, 2021 (Fri.)

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<tr>
<td>Session Chair: Gu-Sung Kim</td>
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<tr>
<td>(Kangnam University/ Korea)</td>
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<tr>
<td><strong>C1. Heterogeneous Integration Roadmap (HIR) Workshop 1</strong></td>
</tr>
<tr>
<td>08:30-08:55</td>
</tr>
<tr>
<td>(Invited) I2-1 HIR Workshop-International: HIR Overview</td>
</tr>
<tr>
<td>Dr. William Chen</td>
</tr>
<tr>
<td>(ASE Technology Holding, Co., Ltd./ USA)</td>
</tr>
<tr>
<td>Dr. W. R. “Bill” Bottoms</td>
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<tr>
<td>(Third Millennium Test Solutions Inc.(3MTS)/ USA)</td>
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<th>Room Forum 1, 3F</th>
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<tbody>
<tr>
<td>Session Chair: Tae-il Kim</td>
</tr>
<tr>
<td>(Sungkyunkwan University/ Korea)</td>
</tr>
<tr>
<td><strong>D1. Flexible/Wearable Electronics 1</strong></td>
</tr>
<tr>
<td>08:30-08:55</td>
</tr>
<tr>
<td>(Invited) I2-2 Intelligent Soft Bioelectronics for Advancing Human Healthcare</td>
</tr>
<tr>
<td>Prof. W. Hong Yeo</td>
</tr>
<tr>
<td>(Georgia Tech/ USA)</td>
</tr>
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</table>

| 08:55-09:20 |
| (Invited) I2-3 HIR Workshop-International: 5G Communication |
| Sir. Timothy Lee  |
| (IEEE/ USA)  |
| (Invited) I2-4 Soft Electronics for Mobile Health and Human-Centered Robotics |
| Prof. Nanshu Lu  |
| (University of Texas Austin/ USA)  |

| 09:20-09:45 |
| (Invited) I2-5 HIR Workshop-International: Automotive Electronics |
| Sir. Rich Rice  |
| (ASE Technology Holding, Co., Ltd./ USA)  |
| (Invited) I2-6 Sensors and Medical Devices Based on Textiles and Elastomers |
| Prof. Hyun-Joong Chung  |
| (University of Alberta/ Canada)  |

| 09:45-10:10 |
| (Invited) I2-7 HIR Workshop-International: Co-Design |
| Prof. Jose E Schutt-Aine  |
| (University OF Illinois Urbana-Champaign/ USA)  |
| (Invited) I2-8 Printing and Water Sintering Techniques for High Performance Transient Electronic Circuits |
| Prof. Xian Huang  |
| (Tianjin university/ China)  |

| 10:10-10:30 |
| Coffee break |
## Program at a Glance

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<th>Time</th>
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<tbody>
<tr>
<td>10:30-10:55</td>
<td>C2. Heterogeneous Integration Roadmap (HIR) Workshop 2</td>
<td>Room Monterosso, B1F</td>
<td>Taek-Soo Kim (Korea Advanced Institute of Science and Technology/ Korea)</td>
</tr>
<tr>
<td>10:55-11:20</td>
<td>D2. Flexible/Wearable Electronics 2</td>
<td>Room Forum 1, 3F</td>
<td>Suck Won Hong (Pusan National University/ Korea)</td>
</tr>
<tr>
<td>10:30-11:45</td>
<td>(Invited) I2-9 Substrate Roadmap for Heterogenous Integration</td>
<td>Room Monterosso, B1F</td>
<td>Dr. Kyuoh Lee (Intel Corporation/ USA)</td>
</tr>
<tr>
<td>10:30-11:45</td>
<td>(Invited) I2-11 CUBE and ISC Technologies for 2.5D and 3D Heterogeneous Integration</td>
<td>Room Monterosso, B1F</td>
<td>Dr. Max Min (Ex. Samsung Foundry, USA)</td>
</tr>
<tr>
<td>11:20-11:45</td>
<td>(Invited) I2-12 High-Resolution 3D Printing of Stretchable Interconnections for Wearable Electronics</td>
<td>Room Forum 1, 3F</td>
<td>Prof. Jang-Ung Park (Yonsei University/ Korea)</td>
</tr>
<tr>
<td>11:45-12:10</td>
<td>(Invited) I2-13 Heterogeneous 2.5D Integration Packaging Technology</td>
<td>Room Monterosso, B1F</td>
<td>Sir. PilJe Sung (Amkor Technology Korea/ Korea)</td>
</tr>
<tr>
<td>11:45-12:10</td>
<td>(Invited) I2-14 Skin-Integrated Wireless Haptic Interface for VR and AR</td>
<td>Room Forum 1, 3F</td>
<td>Prof. Yei-Hwan Jung (Hanyang University/ Korea)</td>
</tr>
<tr>
<td>12:10-12:30</td>
<td>Lunch</td>
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<tr>
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<th>Room Forum 1, 3F</th>
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<tr>
<td></td>
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<td>Dr. Donghyun Kim (Hana Micron Inc./ Korea)</td>
<td>Dr. Sung-Bin Kim (AnyCasting Co., Ltd./ Korea)</td>
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<td></td>
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<td></td>
<td>Dr. Heejin Lee (SK hynix Inc./ Korea)</td>
<td>Prof. Shuye Zhang (Harbin Institute of Technology/ China)</td>
</tr>
<tr>
<td>14:20-14:45</td>
<td>O2-2</td>
<td></td>
<td>(Invited) I2-20 Proposal of Micro UF(Underfill) &amp; SBA (Solder ball attach) for Advanced Package</td>
<td>O2-2 Study of Sn-Bi-In Ternary Solders for Solder from Eutectic Point to 79°C Ternary Eutectic</td>
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<tr>
<td></td>
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<td></td>
<td>Sir. Jun Sang Park (Protec Co., Ltd./ Korea)</td>
<td>Mr. Hoon Choi, Mr. Sung-Ryul Mang, Prof. Hoo-Jeong Lee (Sungkyunkwan University/ Korea)</td>
</tr>
<tr>
<td>14:45-15:10</td>
<td>O2-3</td>
<td></td>
<td>(Invited) I2-21 Advanced Packaging Interconnect Solutions</td>
<td>O2-3 2-Layer Rt-QFN: a New Coreless Substrate Based on Lead-Frame Technology</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Sir. SeongJin Park (ASM Pacific/ Korea)</td>
<td>Dr. In Seob Bae, Mr. Hong Chan Kim, Mr. Ho Jun Ryu, Mr. Sung Il Kang (HaesungDS/ Korea)</td>
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<td></td>
<td>Ms. Gahui Kim, Mr. Doheon Kim, Prof. Young-Bae Park (Andong National University/ Korea)</td>
<td>Mr. Sun Woo Lee*, Mr. Dong Jun Kim*, Dr. Jinho Jeon, Dr. Won Jun Yun, Dr. Tae-Sung Kim, Prof. Taek-Soo Kim* (WONIK IPS CO., Ltd., KAIST*/ Korea)</td>
</tr>
<tr>
<td>15:35-15:55</td>
<td></td>
<td></td>
<td>Coffee break</td>
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## Program at a Glance

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<th>Room Monterosso, B1F</th>
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<tr>
<td>Session Chair: Hyunsik Yoon (Seoul National University of Science and Technology/ Korea)</td>
<td>Session Chair: Min-Su Kim (Korea Institute of Industrial Technology/ Korea)</td>
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### C4. Microelectronics & Packaging Materials

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<th>Time</th>
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<th>Title</th>
<th>Speakers</th>
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<tr>
<td>15:55-16:20</td>
<td>O2-6</td>
<td>Face and Phase Engineered TiO$_2$ and MoS$_2$ Nanocomposites Toward Efficient Photocatalytic H$_2$ Evolution and its Potential as a Hydrogen Sensor</td>
<td>Prof. Hyuksu Han (Konkuk University/ Korea)</td>
</tr>
<tr>
<td>16:20-16:45</td>
<td>O2-8</td>
<td>Investigation of Photovoltaic Devices Monitoring Technologies</td>
<td>Mr. Shuo Ni, Dr. Jihyun Kim, Prof. Joo-Hyung Kim (Inha University/ Korea)</td>
</tr>
<tr>
<td>16:45-17:10</td>
<td>O2-10</td>
<td>Thermal Stress Analysis of Warpage Behavior according to Application of Thermal Insulation Materials</td>
<td>Mr. Kyeong-ho Shin, Mr. Sanglok Park, Ms. HyeonJung Kwon, Mr. Hyounsub Shim, Prof. Joo-Hyung Kim (Inha University/ Korea)</td>
</tr>
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</table>

### D4. Interconnection

<table>
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<tr>
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<th>Speakers</th>
</tr>
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<tr>
<td>15:55-16:20</td>
<td>O2-7</td>
<td>Bonding with Partially Cured Low Temperature Polyimide</td>
<td>Ms. Pin-Syuan He, Mr. Kai-Cheng Shie, Prof. Chih Chen (National Yang Ming Chiao Tung University/ Taiwan)</td>
</tr>
<tr>
<td>16:20-16:45</td>
<td>O2-9</td>
<td>Development of Simultaneous Transfer and Bonding (SITRAB) Process for Micro/Mini LED Arrays Using Anisotropic SITRAB Paste (ASP) and Laser-Assisted Bonding (LAB) Technology</td>
<td>Dr. Jiho Joo, Dr. Yong-Sung Eom, Ms. Chanmi Lee, Dr. Gwang-Mun Choi, Mr. Ki-seok Jang, Mr. In-Seok Kye, Dr. Seok Hwan Moon, Dr. Ho-Gyeong Yun, Dr. Kwang-Seong Choi (ETRI/ Korea)</td>
</tr>
<tr>
<td>16:45-17:10</td>
<td>O2-11</td>
<td>Analysis of Ar/N$_2$ Two-step Plasma Activated Cu Surface for Low-Temperature Cu–Cu Direct Bonding Characteristics</td>
<td>Mr. Seonghun Choi, Ms. Gahui Kim, Prof. Sarah Eunkyung Kim*, Prof. Young-Bae Park (Seoul National University of Science and Technology*, Andong National University/ Korea)</td>
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#### 17:10-17:35

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<tr>
<td>O2-12</td>
<td>Robust and Flexible Bonding of Carbon Nanotube Adhesion Layer between Polymer Substrates via Microwave Irradiation</td>
<td>Ms. Minjeong Sohn, Dr. Min-Su Kim, Prof. Byeong-Kwun Ju*, Dr. Tae-Ik Lee (Korea University*, KITECH/ Korea)</td>
</tr>
<tr>
<td>O2-13</td>
<td>High Speed and Low-Pressure Sinter-Bonding Properties of Surface-Treated Bimodal Cu Particles for Die-Attachment</td>
<td>Mr. Doyeop Namgoong, Prof. Jonh-Hyun Lee (Seoul National University of Science and Technology/ Korea)</td>
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#### 17:35-18:00

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<th>Authors</th>
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<td>O2-14</td>
<td>Using MooN IEC 61508 Functional Safety Architecture in Throughput Logic Critical Designs: a Case of Study</td>
<td>Ms. Bruna Fernandes Flesch, Dr. Rodrigo Marques de Figueiredo, Dr. Lúcio Rene Prade (UNISINOS/ Brazil)</td>
</tr>
<tr>
<td>O2-15</td>
<td>Optimization of Cu Interconnects - SiCN Interfacial Adhesion by Surface Treatments</td>
<td>Mr. Dong Jun Kim*, Dr. Sumin Kang*, Mr. Sun Woo Lee*, Dr. Inhwa Lee, Dr. Seungju Park, Dr. Jun Soo Lee, Dr. Jihyun Lee, Dr. Joong Jung Kim, Prof. Taek-Soo Kim (Samsung Electronics, KAIST*/ Korea)</td>
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#### 18:00-18:20

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<tr>
<td>18:00-18:20</td>
<td>Award Ceremony, Lucky Draw and Closing Remark</td>
<td>Room Monterosso, B1F</td>
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* General Meeting
  Nov.4, 2021 (Thur.) 5:40 P.M., Room Monterosso, B1F
Poster Presentation Session

Nov. 4, 2021 (Thu.) 2:40~3:20 P.M, Room Forum 2, 3F

Session Chair: Name (Affiliation/ Korea)

Microelectronics & Packaging Materials

P1-01 Advanced Thermal Interfacial Material with High Thermal Conductivity for Thermal Packaging Challenges
MiKyeong Choi*, **, DongSu Ryu*, DongJoo Park*, JinYoung Khim*, SeungBoo Jung†**(Amkor technology korea*, Sungkyunkwan University**)

P1-02 A Study on the Major Characteristic Factors of Oxide Dielectric
Yongchan Kwon, Jung Won Kim, Tae Hoon Kim, Seong Won Seo, Jung-Rae Park, Cheong-Ha Jung, Gu-Sung Kim†(Kangnam University)

P1-03 Characterization of Joining Properties of Ni-coated Cu/MnSi Joint Brazed by Ag-Cu-Zn-Sn Filler Metal
Seong-Gyu Ko, Nakyung Oh, Chan-Ho Jeon, Sang-Gyu Choi, Hyeon-Woo Son, Sang-Wook Kim, Soong-Keun Hyun†(Inha University)

P1-04 Effect of EMI Shielding Fillers in EMC on RF Characterization in Range of 18GHz for Fan-out Package Structure
Eun Ha, Haksan Jeong, Seungbo Jung†(Sungkyunkwan University)

P1-05 Conductive Films Produced by Ag and Core-shell (cu@Ag) Inks for Electromagnetic Shielding in Accordance with ASTM D4935
Alexsandro Bobsin, Tayná Copes Rodrigues, Paola Lamberty, Iara Fernandes, Sandro Binsfeld Ferreira, Celso Peter, William Dutra, Willyan Hasenkamp†*, Carlos Alberto Mendes Moraes(Universidade do Vale do Rio dos Sinos(UNISINOS), HT Micron*)

P1-06 Application of Silver Nanoparticle Inks for the Production of Films in Conformal Shielding on SiP
Poster Presentation Session

P1-07  Drop Properties of Wafer Level Package Modules with Various Underfill Materials
Jun-Ho Jang, Haksan Jeong, Dong-Gil Kang, Kyung Deuk Min, Ji-Won Baek, Seong-Boo Jung†(Sungkyunkwan university)

P1-08  Evaluation of Bending Characteristics of WLP Module with Three Types of Underfill
DongGil Kang, HakSan Jung, KyungDeuk Min, JunHo Jang, Eun Ha, JiWon Baek*, SeungBoo Jung†(Sungkyunkwan University, Wonchemical*)

P1-09  HfZrO2 Based Ferroelectric-gated IGZO Thin Film Transistor Memory
Jiyong Yim, Rino Choi†, Daewoong Kwon(Inha University)

P1-10  HfZrO2 Ferroelectric Tunneling Junction with IGZO Insertion for Unidirectional Self-rectifying Characteristics
Jeong-han Kim, Rino Choi†, Daewoong Kwon(Inha University)

P1-11  Hot Electron Relaxation in MoS2 and WSe2 Field-effect Transistors
Jinshu Li, Qi Zhang†, Euy Heon Hwang(Sungkyunkwan University)

P1-12  Multiscale Model to Predict Fatigue Crack Propagation Behavior of Epoxy Nanocomposites
Hyunseong Shin†, Haolin Wang(Inha University)

P1-13  A Study on the Electrical Characteristic by Interposer Materials
Hyo Eun Kim, Jun Seong Ji, Ye Ji Kim, Han Gyoel Jeon, Eun Sol Jo, Gu Sung Kim†(Kangnam University)

P1-14  Inorganic Protection Layer for Stable Resistive Switching of Organic Bulk Heterojunction
Harshada Patil, Honggyun Kim, Shania Rehman, Kalyani D. Kadam, Jamal Aziz, Muhammad Farooq Khan, Deok-kee Kim†(Sejong University)

Packaging Processing & Equipment
P1-15  Implementation of Magneto-Electric Dipole Antenna with Dual Polarization Using LTCC Process
Deokjin Seo, Ryu Jongin†(Korea Electronics Technology Institute)
Poster Presentation Session

P1-16  Through-hole Silicon Capacitor for 3D-IC Package  
Jong-Min Yook†, Hyun Je Chang, Jiyeon Park, Dongsu Kim Kim(Korea Electronics Technology Institute)

P1-17  Driver Amplifier Module with Face up Fan-out Packaging Structure Using Thermosetting Low Loss Material Applicable to mmWave  
Jae Woo Song, Sun Kook Kim, Se Hoon Park†(Korea Electronics Technology Institute)

P1-18  Plasma Treatment for Fan-Out Packaging Low Loss Dielectric Layer  
Dong Hyeok Bae, Se-Hoon Park† (Korea Electronics Technology Institute)

P1-19  Implementation of Multi-RDL Layers Using Polymeric ILD for FOWLP  
HyeokJin Chu, Sungdong Kim† (Seoul National University of Science and Technology)

P1-20  Substrate-embedded Ferrite Core Inductor using Photosensitive Glass Substrate for Integrated Voltage Regulators  
Jein Yu†, Dongsu Kim, Jong-Min Yook(Korea Electronics Technology Institute)

P1-21  Nanoscale Dewetting Based Direct Interconnection System for Assembly of Microscale Electronics  
Ju Seung Lee, Tae-il Kim† (Sungkyunkwan University)

P1-22  High Precision Hybrid Bonding Alignment System with Visible Laser  
Mingyu Kim, Rino Choi† (Inha university)

Flexible, Wearable, & Printed Electronics

P1-23  Improvement of Reliability and Flexibility for Flexible Solar Cell with Filled Structure and Optical Adhesive  
Xuan Luc Le, Duc Thinh Vuong, Sung-Hoon Choa† (Seoul National University of Science and Technology)

P1-24  Development and Characteristics of Multipurpose Transparent Polyurethane Film  
Hyun Jin Nam, Se-Hoon Park† (Korea Electronics Technology Institute)
Poster Presentation Session

P1-25 Development of Stretchable Electrodes for Wearables Using Vacuum Thermal Pressure
Hyun Jin Nam, Wal young Kim*, Na Young Seo*, Su-Yong Nam*, Se-Hoon Park†(Korea Electronics Technology Institute, Pukyong National University*)

P1-26 Spatial Independent Zone for Dynamic Noise Unaffected 2D Sensors
Chanho Jeong, Tae-il Kim†(Sungkyunkwan University)

P1-27 Characteristics of The Colorless Polyimide-Based Flexible X-ray Detector with
Non-Fullerene Polymer
Jehoon Lee, Jongkyu Won, Jungwon Kang†(Dankook University)

P1-28 Organic Transistors Based on Biocompatible and Biodegradable Solid-state
Electrolyte
Young Jin Jo, Tae-il Kim†(Sungkyunkwan University)

P1-29 Optimization of Carbon Solution for Fabrication of Conductive Cellulose
Nanofiber Column of Electrokinetic Power Generator
Min-Su Kim†(Korea Institute of Industrial Technology, Yonsei University*)

P1-30 Modification in Electron Transport Layer for Efficient Flexible Organic Solar Cells
Kalyani D. Kadam, Honggyun Kim, Shania Rehman, Harshada Patil, Jamal Aziz,
Tukaram D. Dongale, Muhammad Farooq Khan, Deok-kee Kim†(Sejong University)

P1-31 Nanofiber Channel Organic Electrochemical Transistors for Low-Power
Neuromorphic Computing and Wide-Bandwidth Sensing Platforms
Seung-hyun Oh, Sol-Kyu Lee, Young-Woon Cho, Seung-Kyun Kang†, Sang-Bum
Kim†, Young-Chang Joo†(Seoul National University)

P1-32 Bonding Properties of a Low-temperature Solder on Polymer-based Substrates
by Laser Bonding Processes
Gyeongyeong Cheon, Jahyeon Kim, Byeongjin Ahn, Min-Su Kim, Junghwan
Bang, Young-Bae Park, Yong-Ho Ko†(Korea Institute of Industrial Technology)
Poster Presentation Session

P1-33 A Study on the Reaction between Liquid Ga and Pd Substrate for the Application of Flexible Electronic Devices
Byungwoo Kim, Yoonchul Sohn†(Chosun University)

P1-34 A Study on the Reaction between Liquid Ga and Au Substrate for the Application of Flexible Electronic Devices
Hyeokgi Choi, Yoonchul Sohn†(Chosun University)

Sensors, LED, & MEMS/NEMS Packaging Technology

P1-35 Microstructure Analysis of Mini LED Bonding Joint Transferred and Bonded Using the Simultaneous Transfer and Bonding (SITRAB) Process
In-Seok Kye, Yong-Sung Eom†, Jiho Joo, Gwang-Mun Choi, Ki-Seok Jang, Chanmi Lee, Yong-Jun Oh, Kwang-Seong Choi(Electronics and Telecommunications Research Institute)

P1-36 Development of a Vacuum Device for Micro LED Transfer
Injoo Kim, Sungdong Kim†(Seoul University of Science and Technology)

P1-38 One Step Solid State Reaction of (Ni,Co,Mn)O4 Pellet as Negative Temperature Coefficient Sensor
Ko DeaHyeon, Kim Minju, So Younghee, Sungwook Mhin†(Kyonggi University)

P1-39 Fabrication of Cu-Graphite Composite Sheets for Electromagnetic Wave Shielding and Heat Dissipation Using Direct Coating and Atmospheric-Pressure Plasma Annealing
Myounghun Kim, Kwang-Seok Kim†(Korea Institute of Industrial Technology)

P1-40 Hardness Enhancement on Superhydrophobic Surface for Electronic Packaging
Doa Kim, Doo in Kim, Myung Yung Jeong†(Pusan National University)

P1-41 Performance Comparison of SAW Sensor by Coating Methods for the Detection of Chemical Warfare Agent Simulants
Bong-Gyu Bae, Hyewon Park, Young-Jun Lee†, Joo-Hyung Kim(Inha University)
Poster Presentation Session

P1-42  A Study of Improving the Sensitivity of Indirect X-ray Detectors by Adding Hybrid Perovskite Quantum Dots  
Kwanyong Lee, Jehoon Lee, Mr. Daeho Han, Jungwon Kang†(Dankook Univ.)

P1-43  Lifespan Prediction and Durability of MEMS Vertical Probe Using Various Interconnection Structures  
Xuan Luc Le, Duc Thinh Vuong, Sung-Hoon Choa†(Seoul National University of Science and Technology)

P1-44  Modelling of Peeling Process of Adhesive Tape for Electromagnetic Interference Shielding  
Duc Thinh Vuong, Xuan Luc Le, Sung-Hoon Choa†(Seoul National University of Science and Technology)

P1-45  Highly Selective Cu Etching in Cu/Ni Layer Structures for Probe Pin Fabrication  
YeongJun Park, Kwangsik Oh, Seungmin Park, YoonHo Kim, Sarrah Eun Kyung Kim†(Seoul National University of Science and Technology)

P1-46  Broadband Light Absorber with Hierarchical Nanoturf Structures for Solar-Thermal Applications  
Jong Uk Kim, Seok Joon Kwon, Tae-il Kim†(Sungkyunkwan University)

P1-47  Development of Flexible Semiconductor Products Using Roll Transfer Equipment  
Hyeonjung Yang, Semi Jeong, Hyouk Lee†*(Korea University of Technology and Education, Flexscom*)

P1-48  Facile Fabrication of Porous CuBr Films by a Solution Oxidation Method at Room Temperature  
Sang-Kwon Kim, Ji-Wook Yoon†(Jeonbuk National University)
Poster Presentation Session

Nov. 4, 2021 (Thu.) 2:40~3:20 P.M, Room Forum 3, 3F

Session Chair: Name (Affiliation/ Korea)

Inter-connection

P2-01  Formation of Nano-Porous Structured Cu by Selective Corrosion of Brass Alloy and Sinter Bonding for Cu-Cu Direct Bonding
Lee Wan Geun, Jong-Hyun Lee†(Seoul National University of Science and Technology)

P2-02  Microstructure Analysis and Thermal Fatigue Enhancement in Cu-Cu Joints
Jia-Juen Ong, Kai-Cheng Shie, Chih Chen†(National Yang Ming Chiao Tung University)

P2-03  Low Temperature Cu-Cu Bonding Using Ag Nanolayer
YoonHo Kim, SeungMin Park, Sarrah Eunkyung Kim†(Seoul National University of Science and Technology)

P2-04  Characteristics of Ti Nano Passivation for Low Temperature Cu Bonding
Seungmin Park, YoonHo Kim, YeongJun Park, Sarrah Eunkyung Kim†(Seoul National University of Science and Technology)

P2-05  Voids Evolution in Cu-Cu Joints
Hung-Che Liu, Chih Chen†(National Yang Ming Chiao Tung University)

P2-06  Analysis and Comparison about Dielectric and Plating Conditions
Jung Jaewoong, Ryu Jongin†(Korea Electronics Technology Institute)

P2-07  A Study on the Electrodeposition of Copper at Low Temperature and its Application
Haneul Han, Jinhyun Lee, Bongyoung Yoo†(Hanyang university)

P2-08  A Study on Au Coated High-purity Silver-core Wire with Low Resistivity Bonded Possible in the Atmosphere
Sung Min Jeon, Sang-Yeob Kim, Su-Hun lee, Hyun-Jun Park, , Bae-yun Ah, Mong-hyun Cho, Jeong-Tak Moon†(MK Electron co., Ltd)

P2-09  New Metal Coated Cu Bonding Wire for Semiconductor Packaging
SukYoun Lee, JeongTak Moon†, MongHyun Cho, GyuMin Sim, HyunJun Park(MK Electron co., Ltd)
Poster Presentation Session

P2-10 Joint Reliabilities of Al Wire Bonding on Cu(OSP) and ENIG Surface-finished Substrate under Complexed Stress with Current and Temperature
Byeongjin Ahn, Jahyeon Kim, Gyeong-Yeong Cheon, Jungsoo Kim, Chang-Woo Lee, Young-Bae Park*, Yong-Ho Ko†(Korea Institute of Industrial Technology, Andong National University*)

P2-11 Interfacial Adhesion Energy of TiN Diffusion Barriers Prepared by Atomic Layer Deposition for Ru Interconnect

P2-12 Analysis of Bonding Structure of Flexible Devices Using Anisotropic Solder Paste (ASP) and Laser-Assisted Bonding (LAB) Technology
Yoon Hwan Moon*, Yong Sung Eom†, Jiho Joo, Gwang Mun Choi, Ki seok Jang, In Seok Kye, Chanmi Lee, Yong Jun Oh*, Kwang Seong Choi(Hanbat National University*, Electronics and Telecommunications Research Institute)

P2-13 Laser Assisted Bonding Process Using with Anistropic Solder Paste (ASP) for Fine-Pitch Interconnection
Ki-Seok Jang, Yong-Sung Eom†, Gwang-Mun Choi, Kook-Man Kim*, Jeong-Soo Lee*, Jiho Joo, Chan-Mi Lee, Ho-Gyeong Yun, In-Seok Kye, Bong-Sun Yoo*, Kwang-Seong Choi(Electronics and Telecommunications Research Institute, BNF Corporation*)

P2-14 Fatigue Life Prediction for Solder Joint of Flip-chip in Laser Bonding Process by Numerical Analysis
Duc Thinh Vuong, Xuan Luc Le, Sung-Hoon Choa†(Seoul National University of Science and Technology)

P2-15 Comparative Study of Laser and Reflow Soldered Sn-3.0Ag-0.5Cu/OSP Joints
Dong Hwan Lee, Min Seong Jeong, Jeong Won Yoon†(Chungbuk National University)
Poster Presentation Session

P2-16 The Transient Liquid Phase Bonding by Ultrasonic-assisted Soldering of Cu Contained Sn-58Bi Solder Paste for High-temperature Packaging Applications
Kyung-Yeol Kim, Eun Ha, Kyung Deuk Min, Haksan Jeong, Seung-Boo Jung†(Sungkyunkwan University)

P2-17 Effect of Rapid Thermal Shock Cycle on the Thermomechanical Reliability of Sn-90Pb Solder Bumps
Chen Shiqi†, Gan Guisheng(Chongqing University of Technology)

PCB, Solder, & Assembly Process

P2-18 Evaluations on Interfacial Reactions and Mechanical Properties of Hybrid Solder Joints with Low-temperature and Mid-temperature Pb-free Solders
Jahyeon Kim, Nayoung We, Byeongjin An, Gyungyeong Cheon, Dongyurl Yu, Sehoon Yoo, Young-Bae Park*, Yong-Ho Ko†(Korea Institute of Industrial Technology, Andong National University*)

P2-19 A Fixed Folding Test Method for Measuring Durability of Flexible Opto-Electric Circuit Cables
Hoekyung Kim†, Young-Min Im(Korea Electronics Technology Institute)

P2-20 The Effect of MgO and Sintering Temperature on Mechanical Properties of MgO-ZrO2-TiC Composite
Junho Lee, Kyu-bong Jang*, Sihyun Lee, Seoah Kim, Sungwook Mhin†(Kyonggi University, Inha University*)

P2-21 Evaluating Thermal Deformation of Solder Joint in Electronic Packages
Minjeong Sohn, Byeongjin Ahn, Yong-Ho Ko, Byeong-Kwon Ju, Tae-Ik Lee†(Korea Institute of Industrial Technology)

P2-22 Solderability of Water-Soluble Sn-3.0Ag-0.5Cu Solder Paste with Molecular Weight of Solvent
SoYeon Jun, Junhyuk Yu, HyeonJoo Yoo, Sehoon Yoo†(Korea Institute of Industrial Technology)
Poster Presentation Session

P2-23  Novel Nickel-free Electroless Palladium Immersion Gold (EPIG) Surface Finish for Fine Pitch Flip Chip Interconnects  
Tae-Young Lee So-Yeon Jun, Young-Ho Kim, Sehoon Yoo†(Korea Institute of Industrial Technology)

P2-24  The Study on Properties of Sintered Joint Using Silver Paste for High-temperature Operation  
Yun-Chan Kim, Junghwan Bang†(Korea Institute of Industrial Technology)

P2-25  Influence of Solder Alloy Compositions on the Microstructure and the Mechanical Properties of MEMS Probe Solder Joints by Laser Soldering  

P2-26  Evaluation of the Bonding Properties of Bi-Te Thermoelectric Element and Porous Cu Electrode Using SAC305 Solder  
Nakyung Oh, Seong-Gyu Ko, Hyeon-Woo Son, Sang-Wook Kim, Soong-Keun Hyun†(Inha University)

P2-27  Adapting Nanocomposite Micro-solder Ball Process to Next-gen Advanced Packaging  
Sri Harini Rajendran, Do Hoon Cho, Seong Min Seo, Jae Pil Jung†(University of seoul)

P2-28  Study of Solder Composition for High TC Reliability as Optimized Ag and Bi Contents for Advanced BGA PKG with Cu-OSP Pad Finish.  
Jaeyeol Son, Seulgi Lee*, Youngwoo Lee*, Haksan Jeong, SeungBoo Jung†(Sungkyunkwan University, MK Electron Co., Ltd.*)

P2-29  Electrochemical Evaluation of PCB Copper Etchant to Reduce Undercut Etching  
Seo-Hyang LEE, Yong-Suk KIM, Jae-Ho LEE†(Hongik University)

P2-30  Mechanical Reliability of Cu Core Solder Joints after Electromigration  
Haksan Jeong, Kyung-Yeol Kim, Kyung Deuk Min, Seung-Boo Jung†(Sungkyunkwan University)
Poster Presentation Session

P2-31  Mechanical Behavior and Shear Property of Lead-free Solder Joints at Elevated Temperatures
MinSeong Jeong, DongHwan Lee, HyeonTae Kim, YoungJin Seo, MinHaeng Heo, JeongWon Yoon†(Chungbuk National University)

Automotive & Power Electronic Packaging

P2-32  Comparison of Sintering Properties according to Powder Particle Size and Flux Composition
Yun-Ju Cho, Sang-Yeob Kim, Mong-Hyun Cho, Jung-Tak Moon†(MK Electron Co.,Ltd.)

P2-33  Electromagnetic Field Analysis for ROA (Rear Occupant Alert) Sensor Packaging Utilizing 60 GHz Band Millimeter Wave
KyuBong Yeon†*, DuHo Lee(Korea Automotive Technology Institute)

P2-34  A Study on the PRUL (Prognostics of Remaining Useful Life) Sensor Packaging for Automotive Self-diagnostics
KyuBong Yeon†*, DuHo Lee(Korea Automotive Technology Institute)

P2-35  A Study on Fault Injection Test Method of System on Chip Packaging for ASIL (Automotive Safety Integrity Level)
KyuBong Yeon†*, DuHo Lee(Korea Automotive Technology Institute)

P2-36  A Study on the dependability Characteristics of Time Driven Network in System on Chip Packaging for Autonomous Vehicle Valet Parking
KyuBong Yeon†*, DuHo Lee(Korea Automotive Technology Institute)

Kirak Son, Aesun Oh, Eunyoung Park, Kyu Ho Yeon*, Bum-Gyu Baek*, Hyun-Cheol Bae†(Electronics and Telecommunications Research Institute, KD MTEC*)

P2-38  Low-Temperature in Situ Formation of Submicrometer Cu Particles by Pyrolysis of Cu Formate Complex and Sinter-Bonding Properties for Cu-Cu Die-Attachment
Woo Lim Choi, Jong-Hyun Lee†(Seoul National University of Science and Technology)
Poster Presentation Session

P2-39 Short Pressure-Assisted Sinter Bonding Using Paste Containing Fractal Micron Ag Particles and Effect of Subsequent Pressureless Annealing on Joint Strength
Young-Jung Kim, Jong-Hyun Lee†(Seoul National University of Science and Technology)

P2-40 On-line Thermal Resistance and Power Cycle Test Monitoring for EV Power Modules With Ag Sinter Joining and Pb, Pb-Free Solders by SiC TEG Chip
Dongjin Kim†*,**, Chuantong Chen**, Katsuaki Suganuma**, Min-Su Kim*, Yong-Ho Ko*, Sehoon Yoo*(Korea Institute of Industrial Technology*, Osaka University**)

Reliability of Electronic Devices & Systems

P2-41 Effect of Electroplated Ni Finish on Interfacial Reaction and Mechanical Property of Al/Cu Ultrasonic Welding Joint
Jong-Min Jeong, Jungsoo Kim, Seung-Boo Jung, Min-Su Kim†(Korea Institute of Industrial Technology)

P2-42 Predicting the Mechanical, Creep Properties of BGA Solder Joints through Nanoindentation
Kyung Deuk Min, Jun-Ho Jang, Haksan Jeong, DongGil Kang, Seung-Boo Jung†(Sungkyunkwan University)

P2-43 Analysis of Influencing Factors of Package Strength using FEM Simulation
Min Kyu Kang†(Graduate School of Convergence Science and Technology Seoul National University)

P2-44 Effect of Dielectric Curing Condition on the Interfacial Adhesion Energies of Photosensitive Polyimide Capping Layer/ Cu Layer for Fan-out Package
Dohoen Kim, Gahui Kim, Hyejin Kim, Seunghyan Kim, Dongik Jeong, Young-Bae Park†(Andong National univaersity)

P2-45 Temporal Homogenization Formulation of Viscoelastic Materials Subjected to the Cyclic Vibration
Wonjoo Lee, Jae Hun Kim, Suhan Kim, Seohyun Jang, Hyunseong Shin†, YeongKook Kim†(Inha University)

P2-46 Stress Analysis of Cylindrical Adhesive Lap Joint between Nickel and CFRP
Amin Khaliq, Myung Yung Jeong†(Pusan National University)
Presentation Guideline

Oral presentation
- Length of oral presentation material should be in accordance to your time assigned, 25 min for invited talk and 20 min for oral presentation, including questions and discussion.
- Presenters should prepare the presentation file in MS-PowerPoint in English.
- If you use fonts other than standard Windows Office 2010 fonts, please bring the font files themselves with the presentation file.
- Please bring your PowerPoint presentation file on a CD or USB memory stick and submit it to the operator of each presentation room at least 10 minutes before each session starts. The operator will load the presentation files to the laptop PC.
- It is strongly discouraged to bring your own laptop computer (especially Apple iMac laptop) unless your presentation requires any special software and/or hardware.

For Domestic Oral Speakers,
Please prepare for an on-site presentation.
Prepare presentation materials in PPT or PDF format.
Be sure to upload it to the Secretariat Drive (https://works.do/xyB6e8) by October 27th (Wed).

For Overseas Oral Speakers,
Please upload the recorded lecture video file to the Secretariat Drive (https://works.do/xyB6e8) by October 27th (Wed).
If it is not possible to participate in the lecture in real time, questions will be contacted by E-mail after the symposium is over.

Interactive Poster presentation
1. Each poster will be assigned a panel, which has its own paper’s number, at the poster room.
2. Each poster should include the Paper Title, Authors, Affiliation, and Paper Number and must fit within a 1.2m (Width) x 1.8m (Height) space.
3. The poster text including the paper title should be printed and enlarged, so that it can be read from a distance of at least 2 meters.
4. Poster presenters are required to prepare their own poster materials in advance and post their presentations by 11 a.m. to expose their poster to the attendees as much as possible.
Presentation Guideline

5. Please remove your poster within 1 hour after your session is ended. All remaining posters will be discarded. The materials such as some scissors and tapes will be provided in Poster Session Place.

※ Poster presentation is Interactive Presentation. However, in this year’s case, if interactive presentation is not possible, online presentation can be substituted. In this case, you must send an e-mail to the society by October 27th (Wed).

For Domestic Poster Presenters,
Please prepare for an on-site presentation. (Poster Image attached to 1.2(w)x1.8(h)m panel)
Please prepare a 5-minute presentation video file (*.mp4) and PDF image file for online attendees.
Be sure to upload files to the Website (https://sigongji.ismp2021.org/) by October 27th (Wed).

For Overseas Poster Presenters,
Please prepare a 5-minute presentation video file (*.mp4) and PDF image file for all attendees.
Be sure to upload files to the Website (https://sigongji.ismp2021.org/) by October 27th (Wed).
Q&A can be delivered by E-mail through the web proceeding site (to be opened), so please respond.

Online Poster Presentation (Submit on website)
1. Submit a poster with one image (as PDF file).
2. Submit a 5-minute presentation video.
   - First, make presentation materials in MS-PowerPoint.
   - Second, the presentation material is saved as a video within 5 minutes using the PPT slideshow recording function.
   - Finally, upload the saved video file (*.mp4) to the website.
※ As this event is held in hybrid, all presenters (all onsite and online attendees) must upload your presentation materials to the website by October 27th (Wed).

How to watch the Poster Presentation Video
Conference Proceedings (Web) will be opened.
(URL: https://sigongji.ismp2021.org/wp/program.asp)
It will be open for about a week before and after the event period.
## Registration

### On-site Attendance

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<tr>
<th>Category</th>
<th>Pre-registration</th>
<th>On-site Registration</th>
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### Online Attendance

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* Additional Request for Students

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<td>Dinner ticket</td>
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* Notice

- Regular: include access to the plenary lectures, keynote lectures, invited lectures, oral sessions, poster sessions, lunch and dinner
- Student: include access to the plenary lectures, keynote lectures, invited lectures, oral sessions, poster sessions and lunch
- Students can purchase additional dinner tickets on the registration page.

* Payment Method

- Credit Card (VISA, MASTER, JCB, AMEX, Union Pay)
- Bank Transfer
## Registration

| For Overseas | - Bank Name: SHINHAN BANK  
- Account Holder: The Korean Microelectronics and Packaging Society  
- Account No.: 140-012-970710  
- Swift Code: SHBKKRSE  
- Bank Address: 20, SEJONG-DAERO 9-GIL, JUNG-GU, SEOUL, SOUTH KOREA |
| For Domestic | - 은행명: 신한은행  
- 계좌번호: 140-012-970710  
- 계좌명: (사)한국마이크로전자및패키징학회 |

* Cancellation Policy
- Until October 25, 2021: 100% Refund (Exclusive of Banking Charges)
- After October 26, 2021: No Refund
Social Events

Welcome Reception
• Date: Wednesday, 3 November 2021 | 7:00~8:30 P.M.
• Venue: Undefined

Opening Remark
• Date: Thursday, 4 November 2021 | 10:55~11:05 A.M.
• Venue: Hanwha Resort Haeundae, Room Monterosso, B1F

Retirement Ceremony of Prof. Kyung W. Paik
• Date: Thursday, 4 November 2021 | 5:25~5:40 P.M.
• Venue: Hanwha Resort Haeundae, Room Monterosso, B1F

Dinner
• Date: Thursday, 4 November 2021 | 5:40~8:00 P.M.
• Venue: Hanwha Resort Haeundae, Blue Seagull, 2F
Conference Venue Information

Hanwha Resort Haeundae, Busan, Korea

Location
Conference Venue Information

- 52 Marine city 3-ro, Haeundae-gu, Busan, Korea, Hanwha Resorts Haeundae
- Tel: [Desk] +82-51-749-5500 | [Reservation] +82-55-372-6905
- E-mail: jrspd1@hanwha.com

Transportation

- By Subway: Dongbaek Station, Line 2 > Exit No.1
- By Bus
  1) Express Buses: 1003
     - From Busan Station
     - Get off at Daewoo Marina Apt. Station | Station Number: 09125
  2) Airport Limousine Bus (Taeyeong Bus Inc. 051-972-7747)
     - From Gimhae International Airport
     - Get on: Platform 2, Floor 1, International and Domestic Terminals
     - Get off: Hanwha Resort Haeundae
### Conference Room Information

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<td>- B1. Sensor</td>
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<td>- B2. Microelectronics &amp; Packaging Materials 1</td>
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<td>- D1. Flexible/Wearable Electronics 1</td>
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<td>- Retirement Ceremony of Prof. Kyung W. Paik</td>
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<td>- General Meeting</td>
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<td>- Award Ceremony, Lucky Draw and Closing Remark</td>
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<td>- A1. Automotive Electronics and High Power Package</td>
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<td>- A2. Special Session for Honor Retirement of Professor Kyung W. Paik</td>
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<td>- C1. Heterogeneous Integration Roadmap (HIR) Workshop 1</td>
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<td>- C2. Heterogeneous Integration Roadmap (HIR) Workshop 2</td>
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<td>- C3. Packaging Processing &amp; Equipment</td>
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<tr>
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<td>Registration</td>
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Conference Room Information
Sponsors

Silver

KOSTAT

Recruitment Booth

LG Chem

HANA

ymt

INHA UNIVERSITY
Advanced materials that keep the air clean

LG Chem takes the initiative in developing materials for lightweight and reducing CO₂ emissions

LG Chem Advanced Materials develops lightweight advanced materials and CO₂-free manufacturing processes
ISMP 2021
The 19th International Symposium on Microelectronics and Packaging
Hybrid (both onsite face-to-face and online sessions) Symposium
November 3(Wed.)~5(Fri.), 2021, Hanwha Resort, Busan, Korea

The Korean Microelectronics and Packaging Society (KMEPS)

SYMPOSIUM SECRETARIAT (CONTACT)
Tel: +82-2-538-0962, Fax: +82-2-538-0963
E-mail: kmeps@ismp2021.org
Website: https://ismp2021.org/