Wednesday, May 12

Room A

8:45–9:00 Opening Remark

9:00–10:00 **Keynote Lecture I:** Comprehensive SiP Enabling New System Integration
CP Hung, ASE Group
Chairs: Y. Orii, Nagase, S. Hayashida, ASE Group

10:00–10:10 Break

10:10–11:50

Room A

WA1: Heterogeneous Integration Roadmap-1
Chairs: Y. Orii, Nagase, S. Aoki, Lintec

WA1-1 <Session Invited>
HIR Overview
Wilmer R Bottoms, 3MT Solutions / USA

WA1-2 <Session Invited>
Beyond Scaling - Trends in AI Hardware R&D
Dale McHerron, IBM Research / USA

WA1-3 <Session Invited>
Organic Interposer (CoWoS-R) Technology
Shin-Puu Jeng, TSMC / Taiwan

WA1-4 <Session Invited>
Advanced Packaging : Road Mapping the Future
Ravi Vithal Mahajan, Intel / USA

Room B

WB1: Interconnections-1
Chairs: M. Fujino, AIST, H. Ohkuma, HTO

WB1-1
Pressureless and Low Temperature Direct Bonding on Si, SiC and GaN via Ag Paste Sinter-joining
Zheng Zhang, Chuantong Chen, Aiji Suetake, Ming-Chun Hsieh, Aya Iwaki, Katsuaki Suganuma, Osaka University / Japan

WB1-2
Cobalt-Tin Intermetallic Compounds as Alternative Surface Finish for Low Temperature Die-to-Wafer Solder Stacking
Fumihiro Inoue, Jaber Derakhshandeh, Carine Gerets, Eric Beyne, imec / Belgium

WB1-3
Photonic Sintering of Composite Pastes with Copper Oxide Powders Using Different Light Sources
Wei-Han Cheng[1], Po-Hsiang Chiu[1], Yan-Jie Li[1], Ming-Tsang Lee[2], Kiyokazu Yasuda[3], Jenn-Ming Song[1,3], [1]National Chung Hsing University, [2]National Tsing Hua University / Taiwan, [3]Osaka University / Japan

(11:25)

Room C

WC1: Emerging Technologies-1
Chairs: N. Fujimori, Olympus Medical Systems, T. Kasahara, Hosei University

WC1-1
Fabrication of Micropatterned Fish Scale Collagen Scaffold Using Soft Lithography for Oral Mucosa Tissue Engineering
Kazuma Kishimoto[1], Keito Miwa[1], Ayako Suzuki[2], Isamu Yamaguchi[3], Yoshihiro Kodama[3], Orakarn Suebsamarn[2], Shuichi Shoji[1], Kenji Izumi[2], Jun Mizuno[1,4], [1]Waseda University, [2]Niigata University, [3]Taki Chemical, [4]Suwa University of Science / Japan

WC1-2
Battery Less Soil Moisture Sensors for Strawberry Seedlings
Haruichi Kanaya[1], Osamu Takiguchi[2], Shunsuke Uto[3], Katsumi Shimomura[3], [1]Kyushu University, [2]ALSENS, [3]Fukuoka Agriculture and Forestry Research Center / Japan

WC1-3
Ni coated Cu Foils as the Substrate for Flexible Piezocomposite Power Generators
Chi-Hsuan Lin[1], Jun-Hao Lee[1], Chia-Che Wu[2], Jenn-Ming Song[1], [1]National Chung Hsing University, [2]National Chung Hsing University / Taiwan

WC1-4
MCU and Motor Driver Leaf Modules of Coin-Sized PCBs in an Open-Innovation IoT/CPS Platform
Kenichi Agawa[1], Tokihiko Mori[2], Ryoji Ninomiya[1], Minoru Takizawa[1], Takayasu Sakurai[2], [1]Toshiba Electronic Devices & Storage, [2]The University of Tokyo / Japan

11:50–12:40 Lunch Time

Room A

12:40–13:40 **Keynote Lecture II:** Future View: technology merger strengthens evolution of semiconductor chips in the hyper-scaling AI/ML era
Kazuya Okamoto, Yamaguchi University / Osaka University
Chairs: A. Shigetou, NIMS, Y. Kanechika, Tokuyama

13:40–13:50 Break

13:50–15:30

Room A

WA2: Heterogeneous Integration Roadmap-2
Chair: Y. Orii, Nagase

WA2-1 <Session Invited>
Introduction to HIR Workshop Session
William Chen, ASE / USA (14:00)

WA2-2 <Session Invited>
Heterogenous Integration for HPC and Data Centers
Kanad Ghose, SUNY-Binghamton, Dale Becker, IBM / USA (14:20)

WA2-3 <Session Invited>
Photonics TWG update
Amr S Helmy, University of Toronto / Canada (14:40)

WA2-4 <Session Invited>
Wafer Level and Panel Level Packaging
John Hunt, ASE / USA (15:00)

WA2-5 <Session Invited>
Overview of the Co-Design Chapter
Jose Schutt Aine, University of Illonois / USA (15:20)

WA2-6 <Session Invited>
HIR Workshop Session Wrap-up
Tom Salmon, SEMI / USA

Room B

WB2: Interconnections-2
Chairs: K. Yasuda, Osaka University, K. Hirano, Panasonic

WB2-1
Reliable Joint Material by Sn-Cu-Ni IMC Fine Particles
Shigenobu Sekine[1], Hiroaki Ikeda[1], Shigeo Arai[2], [1]Napra, [2]Nagoya University / Japan

WB2-2
A Technique to Mount Narrow-Pitch Micro Solder Balls
Shunichi Haraguchi[1], Chisato Oyama[1], Kotaro Usuda[2], Hideki Ikeda[1], [1]KOMORI, [2]SERIA ENGINEERING / Japan

WB2-3
Voidless Chip-on-Wafer Process for Functional Interposer
Yoshiaki Satake[1,2], Tatsuya Funaki[1,2], Kyosuke Kobinata[1,3], Youngsuk Kim[1,3], Takayuki Ohba[1], [1]Tokyo Institute of Technology, [2]Murata Manufacturing, [3]DISCO / Japan

(15:05)

Room C

WC2: Emerging Technologies-2
Chairs: N. Fujimori, Olympus Medical Systems, T. Nonaka, Huawei Technologies Japan

WC2-1 <Session Invited>
Industry 4.0 Adoption: A Journey in Smart Supply Chain and Manufacturing Transformation
Feng Xue, IBM / Singapore

WC2-2
Development of Power Management System for RF Energy Harvester
Masaya Murakami[1], Mohamed M. Mansour[2], Shota Torigoe[2], Shuya Yamamoto[2], Haruichi Kanaya[2], [1]SEIKO ELECTRIC, [2]Kyushu University / Japan

WC2-3
Silicon-Photonics-Embedded Interposers and Their Applications
Koichi Takemura[1], Daisuke Ohshima[1], Akihiro Noriki[1,2], Daisuke Okamoto[1], Akio Ukita[1], Jun Ushida[1], Masatoshi Tokushima[1], Daisuke Shimura[1], Tsuyoshi Aoki[1], Takeru Amano[1,2], [1]Photonics Electronics Technology Research Association, [2]National Institute of Advanced Industrial Science and Technology / Japan

WC2-4
A High-Sensitivity Olfactory System with a Graphene FET Biosensor and a Portable Odorant Capture Module
Hideyuki Tomizawa[1], Kou Yamada[1], Hiroshi Hamasaki[1], Yoshiaki Sugizaki[1], Miyuki Tabata[2], Yuji Miyahara[2], Atsunobu Isobayashi[1], [1]Toshiba, [2]Tokyo Medical and Dental University / Japan

15:30–15:40 Break

15:40–17:20

Room A

WA3: Thermal Management
Chairs: H. Sakamoto, Huawei Technologies Japan, T. Hatakeyama, Toyama Prefectural University

WA3-1 <Session Invited>
Possibility of Next Innovation of Forced Convection Cooling in High-Density Packaging Electronic Equipment by Pulsating Flow Phenomena from Knowledge of Nature
Takashi Fukue, Kanazawa Institute of Technology / Japan

WA3-2
Low Pressure Subcooled Boiling in a Compact Vessel for Cooling Technology
Noriyuki Unno, Kazuhisa Yuki, Risako Kibushi, Koichi Suzuki, Sanyo-Onoda City University / Japan

WA3-3
Parameter Identification of Distributed Thermal Network for Surface Mount Type Power Semiconductor Packages
Koji Nishi, Ashikaga University / Japan

WA3-4
Room-Temperature Bonding of AlN Ceramic and Si Semiconductor Substrates for Improved Thermal Management
Takashi Matsumae[1], Yuichi Kurashima[1], Hideki Takagi, Kazunori Nishizono[2], Tsutomu Amano[2], Eiji Higurashi[1], [1]National Institute of Advanced Industrial Science and Technology, [2]MARUWA / Japan

Room B

WB3: Interconnections-3
Chairs: T. Aoki, IBM Japan, Y. Morikawa, Ulvac

WB3-1
Low Temperature Bonding of Cu Bump to WBG Device Using the Surface Activation Method
Tadatomo Suga[1], Kai Takeuchi[1], Seongbin Shin[1], Nora Martinez[1], Yoshinari Ikeda[2], Akira Hirao[2], Motohito Hori[2], [1]Meisei University, [2]Fuji Electric / Japan

WB3-2
Surface Activated Bonding of Nb-Nb for Surperconducting Device Interconnect
Yuta Takahashi[1,2], Masahisa Fujino[2], Takashi Matsumae[2], Hiroshi Nakagawa[2], Katsuya Kikuchi[2], Tohru Taino[1], [1]Saitama University, [2]National Institute of Advanced Industrial Science and Technology / Japan

WB3-3
Effects of Surface Physical Properties on Ultrasonic Cu/Cu Bonding
I-You Yu, Liang-Shing Shih, Jenn-Ming Song, National Chung Hsing University / Taiwan

(16:55)

Room C

WC3: Power Electronics
Chairs: Y. Inaba, Denso, T. Onishi, Grand Joint Technology

WC3-1
Packaging of (650 V, 150 A) GaN HEMT with Low Parasitics and High Thermal Performance
Shengchang Lu, Tianyu Zhao, Rolando Burgos, Guo-Quan Lu, Virginia Tech / USA

WC3-2
Direct Bonding of Diamond and Si Substrates Using NH_3/H_2O_2 Cleaning
Shoya Fukumoto[1,2], Takashi Matsumae[2], Yuichi Kurashima[2], Hideki Takagi[2], Hitoshi Umezawa[2], Masanori Hayase[1], Eiji Higurashi[2], [1]Tokyo University of Science, [2]National Institute of Advanced Industrial Science and Technology / Japan

WC3-3
Low Temperature Bonding of GaN and Carbon Composite via Au Capping Layer Activated by Ar Fast Atom Bombardment
Kai Takeuchi[1], Suga Tadatomo[1], Atsushi Tanaka[2], Akio Wakejima[3], [1]Meisei University, [2]Nagoya University, [3]Nagoya Institute of Technology / Japan

(16:55)

Thursday, May 13

Room A

9:00 – 10:00

Keynote Lecture III: Direct Bonding: A New Paradigm Shift in Semiconductor Assembly

Belgacem Haba, Xperi

Chairs: O. Suzuki, Namics, N. Tanaka, Showadenko Materials

10:00 – 10:10 Break

10:10 – 11:50

Room A

TA1: iNEMI Session

Chairs: Y. Tomita, Intel, H. Yamada, Toshiba

TA1-1 <Session Invited>
5G Standard Reference Materials
Nathan Orloff, National Institute of Standards and Technology / USA

TA1-2
Predictive Modelling Methodologies for Bi-Material Wafer Warpage
Kang Eu Ong[1], Wei Keat Loh[1], Jenn An Wang[2], Arvind Purushotaman[3], Tatsuro Yoshida[4], Kei Murayama[4], Makoto Tsukahara[4], Ron W. Kulterman[5], Haley Fu[6], [1]Intel Technology / Malaysia, [2]CoreTech System (Moldex3D) / Taiwan, [3]ANSYS / USA, [4]Shinko Electric Industries / Japan, [5]Flex / USA, [6]iNEMI / China

TA1-3
Voids Inspection Capability Study in First-Level Interconnects for Flip Chip Packages
Masahiro Tsuriya[1], Kor Oon Lee[2], Kiyoshi Oi[3], Sze Pei Lim[4], Yvonne Yeo[5], Keith Sweatman[6], Toshiaki Ono[7], Kei Murayama[3], Steven R. Martell[7], Haruo Shimamoto[8], Evstatin Krastev[7], [1]iNEMI / Japan, [2]Intel / Malaysia, [3]Shinko Electric Industries / Japan, [4]Indium / Malaysia, [5]IBM / Singapore, [6]Nihon Superior / Australia, [7]Nordson Electronics Solutions / Japan & USA, [8]AIST, Japan

TA1-4
Low Temperature 1st Level Interconnect in Packaging and Its Challenges
Sze Pei Lim[1], Charles Arvin[2], David Locker[3], Ravi Pokhrel[4], Wei Keat Loh[5], Keith Sweatman[6], Derek Daily[7], Naoki Kubota[8], Masahiro Tsuriya[9], [1]Indium / Malaysia, [2]IBM, [3]DoD, [4]Dupont / USA, [5]Intel / Malaysia, [6]Nihon Superior / Australia, [7]Senju Metal Industry / USA, [8]Tamura, [9]iNEMI / Japan

Room B

TB1: Materials and Processing-1

Chairs: S. Takyu, Lintec, H. Hozoji, AIST

TB1-1 <Session Invited>
Advanced Thermal Materials and Systems: Technology and Trend Analysis for the Future
Yukihiro Kanechika, Kazuya Okamoto, Yamaguchi University / Japan

TB1-2
Characterization of Additively Formed Copper Layer by Blue Laser-Sintered Copper Nanoparticles
Kiyokazu Yasuda[1], Yuki Takada[1], Jenn-Ming Song[1,2], [1]Osaka University / Japan, [2]National Chung Hsing University / Taiwan

TB1-3
Die-attach Properties of Pressure-sintered Copper Joints on Adhesive Metallization Surfaces in N_2 Atmosphere
Dai Ishikawa[1], Bao Ngoc An[2], Matthias Mail[2], Helge Wurst[2], Benjamin Leyrer[2], Thomas Blank[2], Marc Weber[2], Hideo Nakako[1], [1]Showa Denko Materials / Japan, [2]Karlsruhe Institute of Technology / Germany

TB1-4
Fine Pitch Bumping and Flip Chip Joining with Sn-Bi Based Solders by Injection Molded Solder Technology
Toyohiro Aoki[1], Katsuhiro Yoshida[2], Koki Nakamura[2], Takashi Hisada[1], Kozo Fujimoto[2], Shinji Fukumoto[2], [1]IBM Japan, [2]Osaka University / Japan

Room C

TC1: Advanced Interface

Chairs: J. Mizuno, Waseda University, T. Matsunaga, Tottori University

TC1-1 <Session Invited>
Hybrid Bonding Without Vacuum and High Temperature for Cross-Cutting Applications
Akitsu Shigetou, National Institute for Materials Science / Japan

TC1-2 <Session Invited>
Metasurface Quantum-Well Infrared Photodetectors
Hideki T. Miyazaki, National Institute for Materials Science / Japan

TC1-3 <Session Invited>
High-Performance SAW Devices Using Bonded Dissimilar-Material Structures
Shoji Kakio, University of Yamanashi / Japan

TC1-4 <Session Invited>
Fabrication and Characterization of Microfluidic Electrogenerated Chemiluminescence Devices
Takashi Kasahara[1], Jun Mizuno[2], [1]Hosei University, [2]Waseda University / Japan

11:50 – 12:40 Lunch Time

12:40 – 13:40 Poster Session

13:40 – 13:50 Break

13:50 – 15:30

Room A

TA2: LED Technologies

Chairs: K. Ichikawa, Nichia, A. Okuno, Green Planets

TA2-1 <Session Invited>
Medical Study of 400-410nm LED and micro LED
Atsushi Okuno, Green Planets / Japan

TA2-2 <Session Invited>
2MGy High Radiation Tolerance LED & UVC LED Packaging
Tetsuya Onishi, Grand Joint Technology / Hong Kong

TA2-3 <Session Invited>
Ultrafast Laser Transfer Technology
Yoshiyuki Arai, Toray Engineering / Japan

TA2-4 <Session Invited>
Fluidic Assembly of microLED Displays
Paul Schuele, eLux / USA

Room B

TB2: Materials and Processing-2

Chairs: Y. Kanechika, Tokuyama, K. Shibayama, Sekisui Chemical

TB2-1
Effect of Sequential Plasma Activation on Al_2O_3 for Low Temperature Bonding of Glass
Kai Takeuchi, Tadatomo Suga, Meisei University / Japan

TB2-2
Low-temperature Printable and Stretchable Circuit Board and Its Application to Flexible Hybrid Electronics
Teppei Araki[1,2], Yusuke Okabe[3], Naoko Kurihira[1], Yuko Kasai[1,2], Yuki Noda[1], Tsuyoshi Sekitani[1,2], [1]Osaka University, [2]AIST-Osaka University, [3]CEMEDINE / Japam

TB2-3
X-ray Radiolysis-Induced-Photochemical Reaction at Interface Between Liquid and Substrate
S. Saegusa[1], N. Akamatsu[1], I. Sakurai[2], I. Okada[3], Y. Utsumi[1], A. Yamaguchi[1], [1]University of Hyogo, [2]Nagoya University, [3]Aichi Synchrotron Radiation Center / Japan

TB2-4
Analysis of Low Friction Force and Low Contact Resistance Film Using Sn-Cu Plating
Hiroki Hayashi[1,2], Naohiro Takaine[1], Hiroyuki Funasaki[1], Mitsuhiro Watanabe[2], [1]TAKAMATSU Plating, [2]Kanto Gakuin University / Japan

Room C

TC2: Quality, Modeling, and Reliability

Chairs: K. Yasuda, Osaka University, H. Sakamoto, Huawei Technologies Japan

TC2-1
Characterization Of Copper Sintered Interconnects By Transient Thermal Analysis
Maximilian Schmid, Sri Krishna Bhogaraju, Gordon Elger, Technische Hochschule Ingolstadt / Germany

TC2-2
Crevice Elimination and Stitch Integrity Improvement on eaded Packages Thru Shifted Lead Neck Design
Dolores B. Milo, Gloria B. Manaois, Texas Instruments Philippines / Philippines

TC2-3
Study on Suppression of External Stress Type Tin Whisker by PR Current Method
Hiroyuki Iwamoto[1], Katsuji Nakamura[1], Kaichi Tsuruta[1], Osamu Munekata[2], [1]Senju Metal Industry, [2]Industrial Analysis Service / Japan

(15:05)

15:30 – 15:40 Break

15:40 – 16:55

Room A

TA3: IMPACT Session

Chairs: J. Mizuno, Waseda University, A. Shigetou, NIMS

TA3-1 <Session Invited>
Shear Behavior of the High Temperature Pb-Free Solder Joint with Zn-25Sn-xTi-yCu
Kwang-Lung Lin, Che-Wei Chang, Min-Ren Chen, National Cheng Kung University / Taiwan

TA3-2 <Session Invited>
Advanced SiP Development for mmWave Antenna in Package
Yupo Wang, Siliconware Precision Industries / Taiwan

TA3-3 <Session Invited>
Reliability Issues of Cu-Cu Direct Bonds
Chih Chen[1], Kai-Cheng Shie[1], Po-Ning Hsu[1], King-Ning Tu[1,2], [1]National Yang Ming Chiao Tung University / Taiwan, [2]UCLA / USA United

Room B

TB3: Advanced Packaging

Chairs: T. Aoki, IBM Japan, M. Aoyagi, AIST

TB3-1 <Session Invited>
Highlighting a New Package!! "PhotoMold"
Shuzo Akejima, Rising Technologies / Japan

TB3-2
New Ag Pastes Siter Joining on Ag and Cu Surface for High Temperature Application
Jinting Jiu, Yoshie Tachibana, Shunsuke Koga, Ryuki Horie, Tomoki Sasaki, Senju metal Industry / Japan

TB3-3
Development of Au/Pt/Ti Multilayers for Wafer-Level Packaging and Residual Gas Gettering
Shingo Kariya[1], Takashi Matsumae[2], Yuichi Kurashima[2], Hideki Takagi[2], Masanori Hayase[1], Eiji Higurashi[2], [1]Tokyo University of Science, [2]National Institute of Advanced Industrial Science and Technology / Japan

Friday, May 14

Room A

9:00–10:00

Keynote Lecture IV: Superconducting Circuits for Quantum Technologies
Yasunobu Nakamura, The University of Tokyo / RIKEN Center for Emergent Matter Science
Chairs: M. Fujino, AIST, S. Takyu, Lintec

10:00–10:10 — **Break**

10:10–11:50

Room A	Room B	Room C
FA1: Quantum Computing / Annealer Chair: M. Fujino **FA1-1 <Session Invited>** Digital Annealer and Its Applications Taisuke Iwai, Fujitsu / Japan **FA1-2 <Session Invited>** Overview and Present Status of CMOS Annealing Masanao Yamaoka, Hitachi / Japan **FA1-3 <Session Invited>** Quantum Annealer Using Superconducting Parametric Oscillators Tsuyoshi Yamamoto, NEC / Japan **FA1-4 <Session Invited>** Combinatorial Optimization Machines Using Quantum or Classical Parametric Oscillators Hayato Goto, Toshiba / Japan	**FB1: Epoxy in Innovation** Chairs: M. Oda, Printed Electronics Network, M. Inoue, Gunma University **FB1-1** Development of Flexible Epoxy Film with High Thermal Stability, Especially Suitable for Display and Printed Electronics Applications Iori Doi, Takashi Komori, Noriyasu Yamane, Kotaro Nozawa, Takayoshi Hirai, Mitsubishi Chemical / Japan **FB1-2** Development of Stretchable Epoxy Film with High Thermal Stability, Especially Suitable for Printed Electronics Applications Iori Doi, Takashi Komori, Noriyasu Yamane, Kotaro Nozawa, Takayoshi Hirai, Mitsubishi Chemical / Japan **FB1-3 <Session Invited>** Fabrication of Stretchable Electrode with Epoxy Film using Printing Technology Tomohito Sekine[1], Kosuke Muraki[1], Itaru Watanabe[2], Iori Doi[2], Noriyasu Yamane[2], Shizuo Tokito[1], [1]Yamagata University, [2]Mitsubishi Chemical / Japan **FB1-4** Development of Novel Low Dielectric Epoxy Resin for High Frequency Applications Takaaki Watanabe, Noriyuki Kida, Makoto Takahashi, Takayoshi Hirai, Mitsubishi Chemical / Japan	**FC1: High-Speed, Wireless & Components** Chairs: K. Yamada, Toshiba, K. Hasegawa, JSR **FC1-1 <Session Invited>** Wired and Wireless Seamless Networks for Beyond 5G Tetsuya Kawanishi, Waseda University / Japan **FC1-2** Prototype Evaluation of Antennas with Artificial Magnetic Conductor for Firefighter Support Systems Yusuke Ikuma[1], Takahiko Yamamoto[1], Masayuki Mizuno[1], Yoshifumi Ohmiya[1], Kohji Koshiji[1], Yuji Shimizu[2], Tetsuya Shimizu[2], [1]Tokyo University of Science, [2]Tokyo Fire Department / Japan **FC1-3** Impact of Modularization on the Design Process -Case Study of Antenna Design for Smartphones- Atsushi Maeda, Hirofumi Tatsumoto, University of Tsukuba / Japan (11:25)

11:50–12:40 — **Lunch Time**

12:40–13:40 — **Poster Session**

13:40–13:50 — **Break**

Room A

13:50–14:50

Keynote Lecture V: Progress of Wafer Level Packaging Technology for RF Devices at 5G Era
Daquan Yu, Xiamen University
Chairs: E. Higurashi, AIST, S. Takyu, Lintec

14:50–15:00 — **Break**

15:00–17:10

ICEP 20th Anniversary Special Lecture: Challenges and Future Directions in the Semiconductor Industry
A Stacked Direct Time of Flight Depth Sensor for Automotive LiDAR with SPAD Pixels
Oichi Kumagai, Sony Semiconductor Solutions
Present and Future of Semiconductor Technology in the Age of Paradigm Shift
Akihisa Sekiguchi, Tokyo Electron
Chairs: T. Ohba, Tokyo Institute of Technology, E. Higurashi, AIST

17:10–17:20

Introduction of ICEP 2022
Closing Remark

Poster Session

From 12:40-14:40 on May 13 (P01-P07 and Sponsors)

P01 Development of Semi-Analytical Formulation for Asymmetric Warpage Prediction in Fan-out Reconstitution Process
K.-S. Chen[1], Y. -C. Lee[1], C. -Y. Chen[1], T. -Y. Chen[2], D. -L. Chen[2], David Tarng[2], [1]National Cheng-Kung University, [2]Advanced Semiconductor Engineering / Taiwan

P02 The Simulation and Detection of Copper/Polyimide Delamination of Fan-Out Package Trace/ Passivation Interface
Chung-Yu Ke, Liang-Pin Chen, Siliconware Precision Industries / Taiwan

P03 Analysis of Stress Generated Interface of Trench MIM (Metal-Insulator-Metal) Capacitor Structure
Eunsol Jo, Jung-Rae Park, Cheong-Ha Jung, Gu-Sung Kim, Electronic Package Research Center / Korea

P04 Evaluation of Dispersibility of Silver Nanoparticle Ink by TEM and NMR
Hirotaka Shioji[1], Kazuo Kimura[1], Shin Inamoto[1], Naoki Muraki[1] Daisuke Kumaki[2], Shizuo Tokito[2], [1]Toray Research Center, [2]Yamagata University / Japan

P05 Superhydrophobic Surface Based on Silane Coating on Silicon-Based Electrospun Nanostructures
Cho-Liang Chung, ChunWei Cheng, Cheng-Ying Tsai, Yu-Ching Chao, Wei-Hao Chen, I-Shou University / Taiwan

P06 Effects of Moisture and Oxygen on the Morphology Evolution of Electrospinning Woven
Sian-Sheng Li, Huai-You Lee, Yi-Min Lin, Cho-Liang Chung, I-Shou University / Taiwan

P07 Accuracy Assessment of Quantification Method of Cellulose Nano-Fiber in Nickel Plating Film Using Image Analysis
Makoto Iioka, Ikuo Shohji, Tatsuya Kobayashi,, Gunma University / Japan

Sponsor Zuken

Sponsor Fujitsu Interconnect Technologies

Sponsor Global Net

Sponsor Bondtech

From 12:40-13:40 on May 14 (P08-P14 and Sponsors)

P08 Materials Informatics Technology for Using Eco-Friendly Materials
Tomio Iwasaki, Hitachi / Japan

P09 Analysis of Interfacial Conductivity Variations of Copper-Filled Electrically Conductive Adhesives During Environmental Tests
Daisuke Otajima, Yuki Saito, Masahiro Inoue, Gunma University / Japan

P10 Structural Control of PEDOT: PSS Thin Films Using Non-Ionic Surfactants for Enhancing Stretchability
Kaito Oozutsumi, Masahiro Inoue, Gunma University / Japan

P11 Analysis of Reflection Characteristics and Radiation Efficiency on Thickness and Conductivity of Monopole Antenna Using Transparent Conductive Film
Yuri Yamada[1], Fukuro Koshiji[1], Yoji Yasuda[1], Takayuki Uchida[1], Katsumi Yamada[1], Kohji Koshiji[2], [1]Tokyo Polytechnic University, [2]Tokyo University of Science / Japan

P12 Investigation of Broadband Circularly-Polarized Unbalanced Dipole Antenna Consisting of Semicircular and Trapezoidal Elements
Hironori Takahashi [1], Fukuro Koshiji[1], Kohji Koshiji[2], [1]Tokyo Polytechnic University, [2]Tokyo University of Science / Japan

P13 Via Resonance Amplitude Control
Vinod Arjun Huddar, Rambus / India

P14 Development of Novel BN Filler for High Thermal Conductivity Packaging Material
Shota Daiki, Kyoichi Fujinami, Seiji Imazumi, Saiko Fujii, Isao Masada, Yukihiro Kanechika, Teruhiko Nawata, Masahide Ueda, Tokuyama Corporation / Japan

Sponsor Namics

Sponsor Huawei Technologies Japan

Sponsor Toray

Sponsor TDC

*The content of the program may be subject to change without any prior notice.
Please check the ICEP website for an updated version.

On-Demand Session (Streaming Period: May 12-25)

OD1: Advanced Packaging

OD1-1
Develpoment of Leadframe for Quad Flat No-lead Package
Mei-Ling Wu, Che-Wei Kang, National Sun Yat-sen University / Taiwan

OD1-2
Evaluation of Direct Metallization Technology Plating Properties with Excellent Material Selectivity
Takuya Komeda, Tetsuji Ishida, Hisamitsu Yamamoto, C. Uyemura / Japan

OD1-3
Development of High Reliablity Joint of Sn-Bi Solder for 2.3D Organic Package
Shota Miki, Koyuki Kawakami, Kei Murayama, Kiyoshi Oi, SHINKO ELECTRIC INDUSTRIES / Japan

OD1-4
Mechanical Reliability Analysis of Dual Side Molding SiP Module
Tse-Wei Liao, Wei-Hong Lai, Hsin-Chih Shih, Dao-Long Chen, David Tarng, CP Hung, Advanced Semiconductor Engineering / Taiwan

OD1-5
Copper sintered Si3N4 Power Modules in Thermal Shock Tests
Thomas Blank[1], Hongpeng Zhang[1], Helge Wurst[1], Benjamin Leyrer[1], Felix Steiner[1], Dai Ishikawa[2], Udo Geckele[1], Ivan Peric[1], [1]Karlsruhe Institute of Technology / Germany, [2]Showa Denko Materials / Japan

OD1-6
Low Temperature Bonding with Wafer Level Nanocrystalline Cu Film
Wei-Lan Chiu, Chia-Wen Chiang, Hsiang-Hung Chang, Industrial Technology Research Institute / Taiwan

OD1-7
Novel Approach of Die Attach Technology for SiC Power Module by Pure Al Thin Film Bonding
Chuantong Chen, Katsuaki Suganuma, Osaka University / Japan

OD1-8
Prediction of Fan-Out Level Packaging Warpage Using PSO-based Modified Convolutional Neural Network Model with Laplacian Filter
G. R. Huang, M. Y. Chen, K. N. Chiang, National Tsing Hua University / Taiwan

OD1-9
Electromigration Improvement by Graphene on Cu Wire for Next Generation VLSI
Y. T. Hung[1], J. Z. Huang[1,2], H. H. Chang[1], K. P. Huang[1], O. H. Lee[1], W. L. Chiu[1], H. J. Jian[1], K. C. Huang[1], W. C. Lo[1], J. S. Hu[1], C. I. Wu[1,2], [1]Industrial Technology Research Institute, [2]National Taiwan University / Taiwan

OD1-10
A Study of Factors Affecting Process-induced Warpage Behavior of Flip Chip Package on Package
Yi-Huang Chen, Ling-Ching Tai, Yan-Cheng Liu, Hsien-Chie Cheng, Feng Chia University / Taiwan

TB3-3 (Pre-recorded video for live session presentation)
Development of Au/Pt/Ti Multilayers for Wafer-Level Packaging and Residual Gas Gettering
Shingo Kariya[1], Takashi Matsumae[2], Yuichi Kurashima[2], Hideki Takagi[2], Masanori Hayase[1], Eiji Higurashi[2] , [1]Tokyo University of Science, [2]National Institute of Advanced Industrial Science and Technology / Japan

OD2: Quality, Modeling, and Reliability

OD2-1
Experimental Investigation of Ultra-Thin ilicon Wafers Warpage
Mei Ling Wu, Tzu Chi Tseng, National Sun Yat-sen University / Taiwan

OD2-2
Study of Substrate Materials on Bias-HAST Reliability of Fine Pitch FCBGA Package
Yu-Cheng Pai, Wen-Yu Teng, Hsuan-Hao Mi, Liang-Yih Hung, Andrew Kang, Yu-Po Wang, Siliconware Precision Industries / Taiwan

OD2-3
Prognostic Health Monitoring Method For Thermal Fatigue Failure Of Power Module Solder Joints Using The Grain Boundary Sliding Model
Hideaki Uehara, Tomoko Monda, Akira Kano, Tomoya Fumikura, Kenji Hirohata, Toshiba / Japan

OD2-4
White X-ray Nanodiffraction Study of Allotropic Phase Transformation of Hexagonal- into Monoclinic-Cu_6Sn_5
Pei-Tzu Lee[1], Wan-Zhen Hsieh[2], Cheng-Yu Lee[3], C. R. Kao[1], Cheng-En Ho[3], [1]National Taiwan University, [2]National Synchrotron Radiation Research Center, Taiwan, [3]Yuan Ze University / Taiwan

OD2-5
The Voids Growth Path on Sn-Ag Thin Film Under High Current Density
Zhi Jin[1], Yu-An Shen[1], Yang Zuo[2], S.H. Mannan[2], Hiroshi Nishikawa[1], [1]Osaka University / Japan, [2]King's College London / UK

OD2-6
Detection Of Die Attach Defects Through Rapid Thermal Transient Tests
Voon Hon Wong[1], Andras Vass-Varnai[2], Antonio Caruso[3], Tomoaki Hara[4], Alvin Hsu[5], Gang Wang[5], [1]Siemens Digital Industry Software / Singapore, [2]Siemens Digital Industry Software / USA, [3]Siemens Digital Industry Software / Italy, [4]Siemens Digital Industry Software / Japan, [5]Siemens Digital Industry Software / Greater China

OD2-7
Detectable Resistance Increase of Open Defects in Assembled PCBs by Quiescent Currents Through Embedded Diodes
Yuya Okumoto[1], Hiroyuki Yotsuyanagi[1], Masaki Hashizume[1], Shyue-Kung Lu[2], [1]Tokushima University / Japan, [2]National Taiwan University of Science and Technology / Taiwan

OD3: Interconnections

OD3-1
Morphology and Mechanical Property of Cu Pillar Formed by Sintered Cu Nanoparticles for the Plating-Free Bumping Process
Chinami Marushima[1], Toyohiro Aoki[1], Sayuri Kohara[1], Ryota Yamaguchi[2], Nobuhiro Sekine[2], Kenichi Yatsugi[2], Kuniaki Sueoka[1], Takashi Hisada[1], [1]IBM Japan, [2]DIC / Japan

WB1-1 (Pre-recorded video for live session presentation)
Pressureless and Low Temperature Direct Bonding on Si, SiC and GaN via Ag Paste Sinter-joining
Zheng Zhang, Chuantong Chen, Aiji Suetake, Ming-Chun Hsieh, Aya Iwaki, Katsuaki Suganuma, Osaka University / Japan

WB2-1 (Pre-recorded video for live session presentation)
Reliable Joint Material by Sn-Cu-Ni IMC Fine Particles
Shigenobu Sekine[1], Hiroaki Ikeda[1], Shigeo Arai[2], [1]Napra, [2]Nagoya University / Japan

WB2-2 (Pre-recorded video for live session presentation)
A Technique to Mount Narrow-Pitch Micro Solder Balls
Shunichi Haraguchi[1], Chisato Oyama[1], Kotaro Usuda[2], Hideki Ikeda[1], [1]KOMORI, [2]SERIA ENGINEERING / Japan

OD4: Materials and Processing

OD4-1
Development of Novel Bevel Profile for Wafer-level Stacking Technology
Tatsuhiko Aoki[1,2], Manabu Hirasawa[2], Koji Izunome[2], Takayuki Ohba[1], [1]Tokyo Institute of Technology, [2]Global Wafers Japan / Japan

OD4-2
The Control of Material Surface Condition for Plasma Technology to Fabricate Advanced Packaging
Daisuke Hironiwa, Yasuhiro Morikawa, Tsuyoshi Kagami, Takashi Kurimoto, Kazumasa Horita, Ryuichiro Kamimura, ULVAC / Japan

OD4-3
High Aspect/Narrow Pitch Substrate Wiring and Bump Formation Using Imprinting Technology for Low Temperature Flip Chip Bonding
Hiroshi Komatsu[1], Daisuke Sakai[1], Nozomi Shimoishizaka[1], Toshihiro Yamada[2], [1]CONNECTEC JAPAN, [2]Industrial Research Institute of Niigata Prefecture / Japan

OD4-4
Novel Isotropic Low Dk/Df film for 5G Application
Meiten Koh1, Masayuki Shimura1, Shoya Sekiguchi2, Shoko Mishima2, Nobuhiro Ishikawa2, Toshiyuki Ogata2, 1Taiyo Ink MFG., 2Taiyo Holdings / Japan

OD4-5
Effects of Epoxy Molding Compound on Managed NAND(mNAND) Package Strain Enhancement
Joyce Chen[1], Vance Liu[1], Lewis Lin[1], Min Chung[1], Chong Leong, Gan[1], Hem Takiar[2], [1]Micron Technology / Taiwan, [2]Micron Technology / USA

OD4-6
Surface Modification of Tetra-needle like ZnO (T-ZnO) and Characterization of Interface Between Sn1.0Ag0.5Cu and NiO Decorated TZnO
Fupeng Huo[1], Keke Zhang[2], Hiroshi Nishikawa[1], [1]Osaka University / Japan, [2]Henan University of Science and Technology / China

OD4-7
Better Warpage Control by Using Low Temperature Solder for Large FCBGA Application
Da-Sheng Lai, Jackson Lee, Joe Huang, Yu-Po Wang, Siliconware Precision Industries / Taiwan
OD4-8
Post Mechanical Shock Test Failure Analysis on Mixed SnAgCu-BiSn BGA Solder Joints
Raiyo Aspandiar[1], Kei Murayama[2], Pubudu Goonetilleke[1], Jagadeesh Radhakrishnan[1], Haley Fu[3], [1]Intel / USA, [2]Shinko Electric Industries / Japan, [3]iNEMI / China
OD4-9
Effect of 4.0 mass % Cu Addition on Microstructure and Mechanical Properties of In-48Sn Alloy
Duy Le Han[1,2], Byungho Park[1], Hiroshi Nishikawa[1], [1]Osaka University / Japan, [2]Hanoi University of Science and Technology / Vietnam
OD4-10
High-Performance Film-Type Thermal Interface Material Containing Vertically Aligned Carbon Nanofibers
Wen-Yu Teng, Hsin-Ming Tseng, Liang-Yi Hung, Yu-Po Wang, Siliconware Precision Industries / Taiwan
TB1-4 (Pre-recorded video for live session presentation)
Fine Pitch Bumping and Flip Chip Joining with Sn-Bi Based Solders by Injection Molded Solder Technology
Toyohiro Aoki[1], Katsuhiro Yoshida[2], Koki Nakamura[2], Takashi Hisada[1], Kozo Fujimoto[2], Shinji Fukumoto[2], [1]IBM Japan, [2]Osaka University / Japan
TB2-3 (Pre-recorded video for live session presentation)
X-ray Radiolysis-Induced-Photochemical Reaction at Interface Between Liquid and Substrate
S. Saegusa[1], N. Akamatsu[1], I. Sakurai[2], I. Okada[3], Y. Utsumi[1], A. Yamaguchi[1], [1]University of Hyogo, [2]Nagoya University, [3]Aichi Synchrotron Radiation Center / Japan

OD5: Emerging Technologies
OD5-1
Frequency Characteristics of Ultrathin and Transparent Organic Electrochemical Transistors with 1-μm-Thick Parylene Lamination
Kazuya Nishimura[1], Teppei Araki[1,2], Ashuya Takemoto[1,2], Mihoko Akiyama[1], Kazuki Kiriyama[1], Yuko Kasai[2], Naoko Kurihira[1], Takafumi Uemura[1,2], Tsuyoshi Sekitani[1,2], [1]Osaka University, [2]AIST-Osaka University / Japan
OD5-2
Electronic Band-Engineering of a Dumbbell-shaped Graphene Nanoribbon by the Application of Uniaxial Tensile Strain
Jowesh Avisheik Goundar, Qinqiang Zhang, Ken Suzuki, Hideo Miura, Tohoku University / Japan
OD5-3
Experimental Demonstration of Wireless Energy Harvesting for ZigBee Wireless Communication
Mohamed M. Mansour[1,3], Masaya Murakami[2], Shota Torigoe[1], Shuya Yamamoto[1], Haruichi Kanaya[1], [1]Kyushu University, [2]SEIKO ELECTRIC / Japan, [3]Electronics Research Institute / Egypt
WC1-2 (Pre-recorded video for live session presentation)
Battery Less Soil Moisture Sensors for Strawberry Seedlings
Haruichi Kanaya[1], Osamu Takiguchi[2], Shunsuke Uto[3], Katsumi Shimomura[3], [1]Kyushu University, [2]ALSENS, [3]Fukuoka Agriculture and Forestry Research Center / Japan
WC2-2 (Pre-recorded video for live session presentation)
Development of Power Management System for RF Energy Harvester
Masaya Murakami[1], Mohamed M. Mansour[2], Shota Torigoe[2], Shuya Yamamoto[2], Haruichi Kanaya[2], [1]SEIKO ELECTRIC, [2]Kyushu University / Japan

OD6: High-Speed, Wireless & Components
OD6-1
Silver-Seed Cu-Wirings for High-Speed Transmission
Norimasa, Fukazawa, Wataru Fujikawa, Akinori Furutani, Shota Niibayashi, Hiroyuki Hagiwara, Jun Shirakami, DIC / Japan

OD7: Optoelectronics
OD7-1
Realizing Low Optical Crosstalk, Wide Color Gamut Mini-LED Displays via Laser-Patterned Quantum Dots Color Conversion Layer
Yuanjie Cheng, Jeffery C. C. Lo, Xing Qiu, S. W. Ricky Lee, Hong Kong University of Science & Technology / Hong Kong

OD8: Power Electronics
OD8-1
Effect of Sintering Density on Thermal Reliability by Non-Pressure Sintering Die-Attach
Ryo Kato, Masatoshi Okuda, Suguru Hashidate, Takamichi Mori, Junichiro Minami, Tetsuo Sakurai, Taro Fukui, OSAKA SODA / Japan
OD8-2
Design Optimization of Copper Patterns and Location of Power Semiconductors and Terminals
Yusuke Abe[1], Akira Hirao[2], Ryoichi Kato[2], Yoshinari Ikeda[2], Victor Parque[1], Muhammad Khairi Faiz[1], Makoto Yoshida[1], Tomoyuki Miyashita[1], [1]Waseda University, [2]Fuji Electric / Japan
OD8-3
The Effect of Solid-state Nanoporous Cu Bonding for Power Device
Byungho Park[1], Duy le Han[1,3], Mikiko Saito[2], Jun Mizuno[2], Hiroshi Nishikawa[1], [1]Osaka University, [2]Waseda University / Japan, [3]Hanoi University of Science and Technology / Vietnam
WC3-1 (Pre-recorded video for live session presentation)
Packaging of (650 V, 150 A) GaN HEMT with Low Parasitics and High Thermal Performance
Shengchang Lu, Tianyu Zhao, Rolando Burgos, Guo-Quan Lu, Virginia Tech / USA
WA3-2 (Pre-recorded video for live session presentation)
Low Pressure Subcooled Boiling in a Compact Vessel for Cooling Technology
Noriyuki Unno, Kazuhisa Yuki, Risako Kibushi, Koichi Suzuki, Sanyo-Onoda City University / Japan

OD9: Thermal Management
OD9-1
Relationships of Design Parameters and the Cooling Performance of the Spiral-Fin Heatsink
Shingo Otake[1], Motohito Hori[2], Ryoichi Kato[2], Yoshinari Ikeda[2], Victor Parque[1], Muhammad Khairi Faiz[1], Makoto Yoshida[1], Tomoyuki Miyashita[1], [1]Waseda University, [2]Fuji Electric / Japan
OD9-2
Investigation of Heat Transfer in 3D Packaging for Practical-scale Quantum Annealing Machines
Wei Feng, Katsuya Kikuchi, Mutsuo Hidaka, Hirotake Yamamori, Yuuki Araga, Kazumasa Makise, Shiro Kawabata, National Institute of Advanced Industrial Science and Technology / Japan
WA3-3 (Pre-recorded video for live session presentation)
Parameter Identification of Distributed Thermal Network for Surface Mount Type Power Semiconductor Packages
Koji Nishi, Ashikaga University / Japan
WA3-4 (Pre-recorded video for live session presentation)
Room-Temperature Bonding of AlN Ceramic and Si Semiconductor Substrates for Improved Thermal Management
Takashi Matsumae[1], Yuichi Kurashima[1], Hideki Takagi, Kazunori Nishizono[2], Tsutomu Amano[2], Eiji Higurashi[1], [1]National Institute of Advanced Industrial Science and Technology, [2]MARUWA / Japan