# *2024 8th International Workshop on Low Temperature Bonding for 3D Integration*

| October 29, Tuesday | |
|---|---|
| 16:00 | *REGISTRATION (2F Reception Hall1/Corridor)* |
| 17:00 | *WELCOME DRINK (2F Reception Hall1/Corridor)* |

| October 30, Wednesday | | | | |
|---|---|---|---|---|
| 9:00 | *REGISTRATION* | | | |
| 9:30 | *Surface Activatged Bonding (I)* | *30O-01* | *(OPENING REMARKS)*<br>**[Keynote]** Recent Progress in Surface Activated Bonding for 3D and Heterogenous Integration<br>Tadatomo Suga, Meisei University | Chairs:<br>Naoteru Shigekawa<br>Takehito Shimatsu |
| 10:00 | | *30O-02* | Surface Activated Cu/SiO2 hybrid bonding for room temperature 3D integration<br>Karine Abadie, University Grenoble Alpes, CEA-Leti | |
| 10:15 | | *30O-03* | Cross-sectional Investigation by Dual Bias Modulation Electrostatic Force Microscopy on n-type Si/Si Junction Fabricated by Surface-activated Bonding<br>Daichi Kobayashi, Institute of Industrial Science, The University of Tokyo | |
| 10:30 | | *30O-04* | Application of surface activated bonding to determine the dislocation generation process at asymmetric grain boundaries in silicon<br>Yutaka Ohno, Tohoku University | |
| 10:45-11:15 | *BREAK* | | | |
| 11:15 | *Surface Activatged Bonding (II)* | *30O-05* | **[Invite]** Ga2O3-Diamond heterogeneous bonding at room temperature and interfacial thermal stress evaluation<br>Hongyue Li, Institute of Microelectronics, Chinese Academy of Sciences | Chairs:<br>Chenxi Wang<br>Yutaka Ohno |
| 11:40 | | *30O-06* | Integrating Polycrystalline Diamond with Si for Enhanced Thermal Management in Large-Scale Integration<br>Jianbo Liang, Osaka Metropolitan University | |
| 11:55 | | *30O-07* | Preparation of GaN-HEMTs devices bonded to 150μm thick diamond substrate<br>Yusuke Shirayanagi, Mitsubishi Electric Corporation | |
| 12:10 | | *30O-08* | Performance Optimization of Gigawatt-Class DFC-PowerChip Laser System Through Bonding Technology<br>Arvydas Kausas, RIKEN SPring-8 Center | |
| 12:25-13:30 | *LUNCH* | | | |
| 13:30 | *Hybrid Bonding and 3D Integration(I)* | *30O-09* | **[Invite]** Bonding for Advanced 3D Logic Devices<br>Serena Iacovo, IMEC | Chairs:<br>Frank Fournel<br>Fumihiro Inoue |
| 13:55 | | *30O-10* | **[Invite]** Low-Thermal Budget TEOS-TEOS Bonding for Multi-stack HBM Applications<br>Hemanth Kumar Cheemalamarri, Institue of Microelectronics, A*STAR | |
| 14:20 | | *30O-11* | **[Invite]** Evolution of stacked image-sensor and Cu-Cu hybrid bonding technology<br>Nobutoshi Fujii, Sony Semiconductor Solutions Corporation | |
| 14:45 | | *30O-12* | Novel IR Laser Release Temporary Bonding Solution for Advanced 3D stacking and Layer Transfer<br>Peter Urban, EV Group | |
| 15:00 | | *30O-13* | Wafer-to-Wafer Bonding for Advanced Manufacturing Nodes<br>Thomas Plach, EV Group | |
| 15:15 | | *30O-14* | Is NaOH beneficial to low temperature hybrid bonding integration?<br>Hadi Hijazi, University Grenoble Alpes, CEA-Leti | |
| 15:30-16:00 | *BREAK* | | | |
| 16:00-17:00 | *Short presentation for poster (I)* | | | *MC:*<br>*Hideki Takagi*<br>*Masahisa Fujino* |
| 17:00-18:00 | *Poster Session (I)* | | | |
| | *GAGAKU WORKSHOP and RECEPTION* | | | |

| October 31, Thursday | | | | |
|---|---|---|---|---|
| 9:30 | *Hybrid Bonding and 3D Integration(II)* | *31O-01* | **[Invite]** Die-to-Wafer Bonding for Heterogenous Integration<br>Viorel Dragoi, EV Group | Chairs:<br>Masahisa Fujino<br>Nobutoshi Fujii |
| 9:55 | | *31O-02* | **[Invite]** The Interactions between Formic Acid Vapor and Metallic Surface<br>Jenn-Ming Song, National Chung Hsing University | |
| 10:20 | | *31O-03* | Effect of Microstructures on Thermal Expansion of Cu pads in SiO2 Vias for 3D IC Hybrid Bonding<br>Pin-Lin Chen, National Yang Ming Chiao Tung University | |
| 10:35 | | *31O-04* | All-rounder hybrid bond-cluster for wafer to wafer and Co/Seq die to wafer, room temperature assemblies<br>Philippe Muller, SUSS MicroTec Solutions GmbH & Co. KG | |
| 10:50-11:20 | *BREAK* | | | |
| 11:20 | *Power Device Applications (I)* | *31O-05* | **[Keynote]**Review of Wafer Bonding for High Power Device Applications<br>Karl Hobart, US Naval Research Laboratory | Chairs:<br>Jenn-Ming Song<br>Takashi Matsumae |
| 12:00 | | *31O-06* | **[Invite]** Wafer Bonding enabling engineered substrates for large application portfolio<br>Christophe Maleville, Soitec | |
| 12:25 | | *31O-07* | Reliability of Full-Face Diffusion Bonding with Ag Coated Al Foil under Thermal Stress<br>Oji Sato, ROHM Co., Ltd. | |
| 12:40-13:50 | *LUNCH* | | | |
| 13:50-14:50 | *Short presentation for poster (II)* | | | *MC:*<br>*Hideki Takagi*<br>*Masahisa Fujino* |
| 14:50-15:50 | *Poster Session (II)* | | | |
| 15:50-16:20 | *BREAK* | | | |
| 16:20 | *Power Device Applications (II)* | *31O-08* | **[Invite]** Development of single diamond substrate and devices<br>Hong-Xing Wang, Xi'an Jiaotong University | Chairs:<br>Karl Hobart<br>Jianbo Liang |
| 16:45 | | *31O-09* | **[Invite]** Thermal boundary resistance of bonded semiconductor interfaces<br>Zhe Cheng, Peking University | |
| 17:10 | | *31O-10* | **[Keynote]**Integration of Diamond with GaN and Gallium Oxide<br>Martin Kuball, University of Bristol | |
| | *BANQUET* | | | |

| November 1, Friday | | | | |
|---|---|---|---|---|
| 9:30 | *MEMS, RF, and New Applidations* | *01O-01* | **[Invite]** The Use of Glasses in Low-Temperature Wafer Bonding Processes<br>Roy Knechtel, Schmalkalden University of Applied Sciences | Chairs:<br>Minoru Sasaki<br>Ryo Takigawa |
| 9:55 | | *01O-02* | Direct bonding using HfO2 as dielectric<br>Sander Grosemans, IMEC | |
| 10:10 | | *01O-03* | Room-temperature Bonding of Lithium Niobate on Single Crystal Diamond Wafer<br>Jiao Fu, Xi'an Jiaotong University | |
| 10:25 | | *01O-04* | Molecular direct bonding and transfer of 2D MoS2 layer over a full 200 mm silicon wafer.<br>Frank Fournel,University Grenoble Alpes, CEA-Leti | |
| 10:40-11:10 | *BREAK* | | | |
| 11:10 | *New Method for Low Temperature Bonding* | *01O-05* | **[Invite]** Bonding Potential of Atomic Diffusion Bonding of Wafers Using Oxide Films<br>Takehito Shimatsu, Tohoku University | Chairs:<br>Viorel Dragoi<br>Noriaki Toyoda |
| 11:35 | | *01O-06* | Atomic Diffusion Bonding using SiN films<br>Arina Muraoka, Canon ANELVA Corporation | |
| 11:50 | | *01O-07* | Atomic Diffusion Bonding of Wafers with PDC-SiO2 underlayers using Thin Zr Films<br>Miyuki Uomoto, Tohoku University | |
| 12:05 | | *01O-08* | Investigation of Low Temperature Cu/Cu Wafer Bonding for Hybrid Bonding Applications<br>Junsha Wang, The University of Tokyo | |
| 12:20 | | *01O-09* | Perhydropolysilazane as an Adhesion Layer for Vacuum Sealing Wafer Bonding<br>Kai Takeuchi, Tohoku University | |
| 12:35-13:40 | *LUNCH* | | | |
| 13:40 | *Hydorophilic Bonding and Fundamentals* | *01O-10* | **[Invite]** Wafer-Level InP to Si and LiNbO3 Covalent Bonding via Asymmetric Plasma Activation Strategy<br>Chenxi Wang, Harbin Institute of Technology | Chairs:<br>Serena Iacovo<br>Kai Takeuchi<br>Tadatomo Suga |
| 14:05 | | *01O-11* | New insights of junction group states modified by surface activation in interlayer dielectrics<br>Hideki Shimizu, Osaka University, | |
| 14:20 | | *01O-12* | Correlation between Pre-Bonding Surface and Bond Wave Speed<br>Ryosuke Sato, Yokohama National University | |
| 14:35 | | *01O-13* | TEOS and thermal oxide low temperature direct wafer bonding dynamics<br>Laurent Gaetan Michaud, EV Group | |
| 14:50 | | *01O-14* | **[Keynote]**Recent developments on hydrophilic and hybrid direct bonding mechanism.<br>Frank Fournel, Univeristy Grenoble Alpes, CEA-Leti | |
| 15:30 | | *01O-15* | **[Invite]** Comprehensive Wafer Bond Strength Measurement: Fundamentals to Industry Standards<br>Fumihiro Inoue, Yokohama National University | |
| 15:50-16:00 | *SHORT BREAK* | | | |
| 16:00-16:15 | *Closing Session* | | | |

| Poster Session (I) | | | |
|---|---|---|---|
| 17:00-18:00 October 30 | *Surface Activated Bonding* | *30P-01* | Room-temperature wafer bonding of p-InP and n-GaAs with p-InGaAs / n-InGaAs interface<br>Shuntaro Fujii, Chiba Institute of Technology |
| | | *30P-02* | Au flat micro-bump arrays fabricated by transfer and coining of Au thin films<br>Shintaro Goto, Tohoku University |
| | | *30P-03* | Improving distribution of bump allocation for bonding load uniformity toward 3D integration of superconducting devices<br>Mizuki Homma, Saitama University |
| | | *30P-04* | Room temperature bonding of SiO2 wafers using ALD Al2O3 ultrathin film<br>Kenji Uno, Kyushu University |
| | | *30P-05* | Structural variation during annealing at diamond/silicon heterointerfaces fabricated by surface activated bonding<br>Yutaka Ohno, Tohoku University |
| | *Low-Temperature Bonding Fundamantals* | *30P-06* | Blade Test to Characterize Bonded Interface Fabricated using Atomic Diffusion Bonding with Amorphous Si and Al Films<br>Hikaru Iemura, Tohoku University |
| | | *30P-07* | Environmental moisture absorption by Oxide-coated Si wafers and effects on post-bonding void formation and bond quality<br>Alessandro Stoppato, IMEC |
| | | *30P-08* | Evaluating Room Temperature Bonding of SiCN-SiCN films with Different Compositions<br>Yun-Hsuan Chen, National Yang Ming Chiao Tung University |
| | | *30P-09* | Investigations on low temperature aluminium thermocompression bonding using surface passivation technique<br>Kevin Diex, Fraunhofer ENAS |
| | *Power Device Applicaitons* | *30P-10* | 20-mm-square GaN/diamond bonding without vacuum process<br>Takashi Matsumae, National Institute of Advanced Industrial Science and Technology (AIST) |
| | | *30P-11* | Functional GaN Heterogeneous Integrated Substrate Based on Wafer Bonding and Smart-cut Technology<br>Jiaxin Ding, National Key Laboratory of Materials for Integrated Circuits, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences |
| | | *30P-12* | Ohmic contact formation on N-polar n-GaN surfaces exposed by wafer bonding and back surface process<br>Satoki Toka, Osaka Metropolitan University |
| | | *30P-13* | Fabrication and Characterization of GaN HEMT with Nitride Buffer/Diamond Junctions<br>Yosei Sunamoto, Osaka Metropolitan University |
| | | *30P-14* | Polishing Polycrystalline Diamond for Direct Bonding using Ar/O2-mixed Gas Cluster Ion Beam<br>Ce Feng, SABers Co. Ltd |
| | | *30P-15* | Low Temperature Bonding of Diamond Heat Spreaders for Advanced Thermal Management<br>Matthias Danner, EV Group |

| Poster Session (II) | | | |
|---|---|---|---|
| 14:50-15:50 October 31 | *Surface Activated Bonding* | *31P-01* | 100 GHz thin-film LNOI/Si optical modulator fabricated by room temperature wafer bonding<br>Seigo Murakami, Kyushu University |
| | | *31P-02* | Improvement of the effective thermal conductivity in DFC-PowerChip for highly intense laser gain media<br>Yoichi Sato, RIKEN SPring-8 Center |
| | | *31P-03* | Nb-In direct bonding at room temperature using surface activated bonding<br>Shoei Ishiyama, Saitama University |
| | | *31P-04* | Electrical characteristics of thick-metal-film interconnects on silicon oxide films by directly bonding Al foils<br>Saki Murotani, Osaka Metropolitan University |
| | | *31P-05* | Loading Pressure Effects on the Bonded Interface Structure in Atomic Diffusion Bonding Using Thick Au Films<br>Kosuke Noguchi, Tohoku University |
| | | *31P-06* | Effect of Ar-fast atom beam irradiaon on n-Ga2O3/n-Si electrical conductance<br>Takashi Matsumae, National Institute of Advanced Industrial Science and Technology (AIST) |
| | *Metal and Hybrid Bonding* | *31P-07* | Surface modification of Cu films by gas cluster ion beams using organic acid vapor for wafer bonding<br>Noriaki Toyoda, University of Hyogo |
| | | *31P-08* | Optimization of plating parameters for nanocrystalline copper for realizing low temperature Cu-Cu bonding<br>Ankush Kumar, National Yang Ming Chiao Tung University |
| | *Hydrophilic Bonding and Fundamental* | *31P-09* | Hydroxide and fluoride catalyzed bonding interface closure for low temperature wafer bonding<br>Paul Noel, CEA-Leti |
| | | *31P-10* | Crystal orientation dependence of low-temperature bonding using germanium and diamond substrates<br>Yuki Minowa, Tokyo University of Science |
| | | *31P-11* | Low Temperature LiTaO3-to-Si Wafer Bonding<br>Dominic Richter, Fraunhofer ENAS |
| | | *31P-12* | Influence of Annealing-induced Edge Voids in Wafer-to-Wafer (W2W) Direct Bonding<br>Sodai Ebiko, Yokohama National University |
| | | *31P-13* | A systematic approach for tuning plasma-specific process results in plasma-activated low-temperature wafer-to-wafer bonding<br>David Doppelbauer, EV Group |
| | *Power Device Applications* | *31P-14* | Heat dissipation characteristics of GaN on polycrystalline diamond HEMTs<br>Chiharu Moriyama, Osaka Metropolitan University |
| | | *31P-15* | Fabrication of GaN-on-Diamond HEMT Structures using PCD on a Back Plate for Low Cost and High Heat Dissipation<br>Hazuki Tomiyama, Osaka Metropolitan University |
| | | *31P-16* | SiC/Si heterojunction formed by direct wafer bonding and its characterization<br>Chengguo Li, JFS Laboratory |
| | *New Process for 3D Integration* | *31P-17* | Patterning over the vertical sidewall for wiring front and backside electrodes on the device chip<br>Yuki Ito, Toyota Technological Institute |