2014 4th IEEE International Workshop on Low Temperature Bonding for 3D Integration

LTB-3D 2014

http://www.3dwb.org/index.html

July 15-16 2014, Tokyo
## LTB-3D 2014

4th IEEE International Workshop on Low Temperature Bonding for 3D Integration

### July 15, Tuesday

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<tr>
<td>8:30</td>
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<td>9:00-9:20</td>
<td>Opening Remarks, T. Suga, The University of Tokyo</td>
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<td>9:20</td>
<td>Low-temperature bonding process for 3D Integration</td>
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<td>9:30</td>
<td>[Keynote] Three Dimensional Dynamic Random Access Memory; T. Kirihata, IBM</td>
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<td>10:00</td>
<td>COFFEE BRAEK</td>
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<td>10:30-11:20</td>
<td>Process Development for 3D Integration: Conductive wafer bonding for high density inter-chip interconnection; Weng Zhang, Chinese Academy of Sciences</td>
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<td>11:20-11:40</td>
<td>Low-temperature bonding process for 3D Integration</td>
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<td>11:40-12:00</td>
<td>Brick-Like Based KGDs Self-Assembly and Connection Technologies for 3DIC Integration; Yu-Cheng Fan, National Taipei University of Technology</td>
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<td>12:00-12:20</td>
<td>Copper-to-Dielectric Heterogeneous Bonding for 3D Integration, Wei Lin, IBM</td>
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<td>12:20-12:30</td>
<td>LUNCH</td>
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<td>13:00-14:00</td>
<td>3D Integration Applications for Low Temperature Direct Bond Technology; Paul Enquist, Ziptronix, Inc.</td>
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<td>14:00-14:20</td>
<td>Low Temperature Wafer Bonding for Wafer-Level 3D Integration</td>
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<td>14:20-14:40</td>
<td>[Keynote] Nanobonding - A Key Technology for Emerging Applications in Health and Environment; M. Jamal Deen, Macmaster University</td>
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<td>15:20-17:00</td>
<td>SHORT PRESENTATION</td>
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<td>15:20-15:40</td>
<td>3D Integration Process</td>
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<td>15:25-15:40</td>
<td>Mechanical Grinding of Au/SiO2 Hybrid-bonded Substrates for 3D Integrated Image Sensors; K. Hagiwara, NHK</td>
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<td>15:45-16:05</td>
<td>Cu/Dielectric Hybrid Bonding Using Surface-Activated Bonding (SAB) Technologies for 3D Integration; Ran He, The University of Tokyo</td>
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<td>16:05-16:25</td>
<td>Via-Last/Backside-Via 3D Integration Using a Visible-Light Laser Debonding Technique; T. Fukushima, Tohoku University</td>
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<td>16:30-17:00</td>
<td>Room Temperature direct bonding of Si wafers smoothed by Ne beam irradiation; Y. Kurashima, AIST</td>
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<td>16:30-17:00</td>
<td>Room temperature bonding of eutectoplated Au patterns with atomically smooth surface prepared by a replication process using a sacrificial layer; Y. Kurashima, AIST</td>
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<td>16:30-17:00</td>
<td>Room temperature bonding of eutectic Au films using low-temperature bonding and Eutectalift-Off (ELO) technique; E. Mieda, AIST</td>
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<td>17:00-17:50</td>
<td>Poster Session</td>
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<td>17:30-17:50</td>
<td>Leaving to Reception (Bus to Tokyo Bay Cruise)</td>
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### Photonic Applications of Low-temperature Bonding

- Highly Thermoresistant Temporary Bonding/Debonding System without Organic Adhesives for 3D Integration; H. Hashiguchi, Tohoku University
- Surface-Tension Driven Self-Assembly for VCSEL Chip Bonding to Achieve 3D and Hetero Integration; Y. Ito, Tohoku University
- Coupling Efficiency between Laser Diode and Optical Isolator Integrated by Photosensitive Adhesive Bonding; D. Tamura, Shibaura Institute of Technology
- Investigation of High Temperature Process for III-V/SOI Hybrid Photonic Devices with AlInAs Oxidation Current Confinement Layer; Y. Hayashi, Tokyo Institute of Technology
- InAs/GaAs Quantum Dot Lasers Metal-Stripe-Bonded onto SOI Substrate; Yuan-Hsuan Jhang, The University of Tokyo
- Light Propagation Properties of Si Waveguides after Removing III-V Layer on a III-V/SOI Wafer Fabricated by Plasma Activated Bonding; J. Suzuki, Tokyo Institute of Technology
- Epitaxial growth of GaInAsP system on wafer-bonded InP/Si substrate; J. Kishikawa, Sophia University
- Large-scale Ge-on-Insulator wafers using low-temperature bonding and Epitaxial Lift-Off (ELO) technique; E. Mieda, AIST
- Room temperature bonding of Sapphire with Sapphire or Metal Substrates in Air using Au Films; M. Ishii, Namiki Precision Jewel Co., Ltd.
- Room Temperature Bonding of Wafers in Air using Au-Ag Alloy Films; H. Kon, Tohoku University
- Room Temperature Bonding of Wafers in Air using Au-Alloy Films; H. Kon, Tohoku University
- New Material and Device Structure Improvement of Thermoelectric TiZrNiSn Thin Films by Contact Layers; W. Wunderlich, Tokai University

### 3D Integration Process

- High thermoresistance temporary bonding/debonding system without organic adhesives for 3D integration; H. Hashiguchi, Tohoku University
- Surface tension driven self-assembly for VCSEL chip bonding to achieve 3D and heterointegration; Y. Ito, Tohoku University
- Coupling efficiency between laser diode and optical isolator integrated by photosensitive adhesive bonding; D. Tamura, Shibaura Institute of Technology
- Investigation of high temperature process for III-V/SOI hybrid photonic devices with AlInAs oxidation current confinement layer; Y. Hayashi, Tokyo Institute of Technology
- InAs/GaAs quantum dot lasers metal-stripe-bonded onto SOI substrate; Yuan-Hsuan Jhang, The University of Tokyo
- Light propagation properties of Si waveguides after removing III-V layer on a III-V/SOI wafer fabricated by plasma activated bonding; J. Suzuki, Tokyo Institute of Technology
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- Room temperature bonding of Wafers in Air using Au-Alloy Films; H. Kon, Tohoku University
- New Material and Device Structure Improvement of Thermoelectric TiZrNiSn Thin Films by Contact Layers; W. Wunderlich, Tokai University
## July 16, Wednesday

### Layer Transfer
- **8:30-8:50**
  - Micromechanical View of Heterointegration by Wafer Bonding and Layer Splitting: H. Baumgart, Old Dominion University.

### MEMS Applications
- **9:00-9:20**
  - Integration of III-V Materials and Si-CMOS through Double Layer Transfer Process: Kwang Hong Lee, Singapore-MIT Alliance for Research and Technology (SMART).

### Microwave Wire Bonding and Package Technology
- **10:10-10:30**
  - Thermal activation of Au/Ti by interdiffusion for getter film integration in wafer-level vacuum packaging: A. Bosseboeuf, Université Paris Sud

### MEMS Applications
- **10:45-12:30**
  - Fabrication of Miniaturized Polarization Sensors Using Flip-Chip Bonding With Atmospheric-Pressure Plasma Activation: S. Ikeda, The University of Tokyo
  - Thermocouples Fabricated on Microfluidic Trench Sidewall Capped with Film: M. Shibata, Toyota Technological Institute
  - Surface Activated Bonding Method Applied in MEMS Pressure Sensor with TSV structures: Zilan Wu, Tsinghua University
  - Wafer-Level Packaging for Harsh Environment Application: C. Jia, Carinthian Tech Research AG.

### Low-temperature Metal Bonding Processes
- **10:45-12:30**
  - Cu/Cu Direct Bonding by Metal Salt Generation Bonding Technique with Organic Acid and Its Persistence of Reformed Layer: S. Koyama, Gunma University
  - Microstructural change of Ag nanoporous bonding joint and interdiffusion of Cu/Ag during thermal aging: Min-Su Kim, Osaka University
  - The effect of Cu particle additions on the microstructure and melting point of Sn-Si solder for die attachment: O. Mokhtari, Osaka University
  - Room-temperature vacuum packaging using ultrasonic bonding with Cu compliant rim: R. Takigawa, Kyushu University
  - In-Situ Observation of Ultrasonic Bonding Using High Speed Camera: Y. Shuto, Kyushu University
  - Nanoporous Gold as a Versatile Bonding Intermediate: Y.-C. Lin, Tohoku University
  - Low temperature and low pressure bump bonding realized by single-micrometer Ag-nanoparticle bumps: Weixin Fu, Waseda University

### COFFEE BREAK

### LOW-TEMPERATURE METAL BONDING PROCESSES
- **10:45-12:30**
  - Low-temperature Metal Bonding Processes
  - Surface Activated Bonding: Electronic Properties
  - Surface Activated Bonding: Power Applications

### LUNCH: Poster Session

### POSTER SESSION

### Solar Cells
- **14:00-15:40**
  - Solar Cells [Keynote] Wafer Bonding Technologies for Photovoltaic and Other Energy Applications: M. S. Goorsky, University of California, Los Angeles
  - Reliability of Bonding Technologies for Power Electronics Modules: C. Bailey, University of Greenwich

### Low-temperature Metal Bonding Processes
- **14:45-16:00**
  - Low-temperature Metal Bonding Processes

### COFFEE BREAK

### LOW-TEMPERATURE METAL BONDING PROCESSES
- **16:20-17:40**
  - Low-temperature Metal Bonding Processes
  - Solid Liquid Inter-Diffusion Bonding at Low Temperature: J. Froemel, Fraunhofer ENAS
  - Direct Bonding for Dissimilar Metals Assisted by Carbonylic Acid Vapor: Shang-Kun Huang, National Chung Hsing University

### Awards
- **18:00**
  - Closing Remarks
Sponsor
The IEEE Components, Packaging, and Manufacturing Technology Society
IEEE CPMT Society Japan Chapter Chair

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Japan Institute of Electronics Packaging (JIEP)
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Acknowledgement

I would like to express my sincere gratitude to all speakers, chair persons, sponsors, committee members and all participants for their contribution to the success of the workshop.

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