Program NMJ 2023 (August 04, 2023)

Sunday, November 26, 2023

18:00-20:00	**Welcome Reception**

Monday, November 27, 2023

08:55-09:20	**Opening - Welcome - Introduction**
09:20-09:45	- Keynote - **4D materials for electronic skin and microrobotic systems** O.G. Schmidt Chemnitz University of Technology, Germany
09:45-10:15	**Impulse lectures from the industry**
10:15-10:45	**Coffee Break and Poster Session**
10:45-11:10	- Keynote - **The bonding process of electronic components using different energy sources and its reliability** S.-B. Jung Sungkyunkwan University, Korea
11:10-11:30	**Microstructure Analysis of Induction Sintered Ag Micro Particle Layers for Die-Attach Applications** P. Rochala[1], C. Hofmann[2], M. Kroll[1], K. Hiller[2] [1] Institute for Machine Tools and Production Processes (IWP), Professorship for Forming and Joining, Chemnitz University of Technology, Germany [2] Fraunhofer Institute for Electronic Nano Systems ENAS, Chemnitz, Germany
11:30-11:50	**Characterization of microscale mechanical property and fracture behavior of sintered Ag/semiconductor material interface** T. Matsuda, R. Seo, M. Kambara, A. Hirose Division of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University, Japan
11:50-12:10	**Thermal effect on fracture behaviour of porous sintered silver nanoparticles by phase-field method** X. Long, J. Zhu, Y. Su School of Mechanics, Civil Engineering and Architecture, Northwestern Polytechnical University Xi'an, China
12:10-13:05	**Lunch and Poster Session**
13:05-13:30	- Keynote - **Latest integrated power module and unit technology using WBG devices** Y. Takahashi Tohoku University, Japan
13:30-13:50	**Cross-Correlation of Interconnection Technologies – A Case Study of Reduced Wire Bond Quality after Ultrasonic Welding** A. Groth[1,2] and M. Hempel[1] [1] Fraunhofer IZM, Berlin, Germany [2] Technische Universität Berlin, Research Center for Microperipheric Technologies, Berlin, Germany
13:50-14:10	**Nanopaste sinter-bonding for transfer and integration of functional thin films** B. Rheingans[1], F. La Mattina[2], J. Bouaziz[1,2], C. Cancellieri[1], L. P. H. Jeurgens[1], J. Janczak-Rusch[1] [1] Laboratory for Joining Technologies and Corrosion, Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland [2] Transport at Nanoscale Interfaces Laboratory, Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland

14:10-14:30	**Microstructure-based modelling of thermal conductivity in sintered diamond-reinforced Ag composites** Y. Su[1], Y. Xu[2,3], X. Long[1], C. Chen[2] [1] Innovation Center NPU Chongqing, Northwestern Polytechnical University, China [2] The Institute of Scientific and Industrial Research, Osaka University, Japan [3] Key Laboratory of Automobile Materials (Ministry of Education), School of Materials Science and Engineering, Jilin University, China
14:30-14:50	**Joining of gold nanoparticles prepared by laser ablation with halide salt** L. Catanzaro[1], V. Scardaci[1], M. Scuderi[2], M. Condorelli[1], L. D'Urso[1], G. Compagnini[1,3] [1] Department of Chemical Sciences (University of Catania), Italy [2] CNR—Institute for Microsystems and Microelectronics, Catania, Italy [3] Istituto Nazionale Scienza e Tecnologia dei Materiali (INSTM), Catania, Italy
14:50-15:10	**Plasmonic Synthesis of Non-homogeneous AuPd Alloy for Efficient Electrocatalyst** Y. Zhao, L. Zhu, Y. Jiang Beijing University of Technology, China
15:10-15:40	**Coffee Break and Poster Session**
15:40-16:00	- Invited - **Joining Diamond with Copper in Additive Manufacturing** Y. Lu University of Nebraska-Lincoln, USA
16:00-16:20	- Invited - **High-strength bonding with low-temperature sintering copper nanoparticles** T. Yonezawa Hokkaido University, Japan
16:20-16:40	**Sub 250°C sintering of substrates to baseplates with micro scale copper sinter paste** S.K. Bhogaraju[1], D. Busse[2], A. Dahlbüdding[2], G. Elger[1] [1] Institute of Innovative Moblity (IIMo), Technische Hochschule Ingolstadt, Germany [2] Budatec GmbH, Berlin, Germany
16:40-17:00	**Enhanced Thermal Conductivity in Micro Composite Structure Joints Utilizing Porous Cu Sheets** H. Tatsumi, H. Nishikawa Joining and Welding Research Institute, Osaka University, Japan
17:00-17:20	**A comparative study of nanojoining and brazing technology for conventional and additively manufactured nickel-base superalloy** J. Awayes[1], B. Sattler[2], I. Reinkensmeier[3], S. Hausner[2], G. Wagner[2], C. Fleck[1] [1] Technische Universität Berlin Fachgebiet Werkstofftechnik; Germany [2] Chemnitz University of Technology, Group of composites and material compounds; Germany [3] Siemens Energy, Berlin, Germany
17:20-17:40	**Modified Nickel nanopastes to avoid high pressures during joining process** B. Sattler, S. Hausner, G. Wagner Chemnitz University of Technology, Group of composites and material compounds; Germany
17:40-18:00	**Ultrafast laser selective welding of sapphire and Invar alloy** J. Yang[1], Q. Jiang[1], M. Yang[1], Y.X. Zhao[1], R. Pan[2] [1] School of Materials Engineering, Shanghai University of Engineering Science, China [2] Faculty of Materials and Manufacturing, Beijing University of Technology, China
19:00-21:00	**Dinner**

Tuesday, November 28, 2023

08:55-09:20	- Keynote - **Femtosecond laser processing in photonics -scribing, welding and 3D nano-structuring** P. Herman University of Toronto, Canada
09:20-09:40	- Invited - **Cu@Ag nanoparticles: synthesis, characterization, sintering mechanism and applications for power and flexible printed electronics** H. Ji Harbin Institute of Technology (Shenzhen), China
09:40-10:00	**Femtosecond laser induced nanofusion and nanoalloying of high-entropy alloy nanoparticles** A. Hu[1], D. Fieser[1], J. Whitlow[2], P.K. Liaw[2] [1] Department of Mechanical, Aerospace and Biomedical Engineering, University of Tennessee Knoxville, USA [2] Department of Materials Science and Engineering, University of Tennessee Knoxville, USA
10:00-10:20	**Broadening the scope of sintering: silver and copper/ silver mixed pastes for substrate and die-attach on challenging surfaces such as Cu, Ni and Al-finishes** B. Rabay Nano-Join GmbH, Berlin, Germany
10:20-10:40	**A novel strategy for nano-alloys preparation for power electronics packaging** Q. Jia[1], B. Zhou[1], H. Hu[1], Y. Wang[1], F. Guo[1], G. Zou[2] [1] Faculty of Materials and Manufacturing, Beijing University of Technology, China [2] Department of Mechanical Engineering, State Key Laboratory of Tribology, Tsinghua University, China
10:40-11:10	**Coffee Break and Poster Session**
11:10-11:30	- Invited - **Heterogeneous Direct Bonding: From Microelectronics to Biomedical Implantation** C. Wang Harbin Institute of Technology, China
11:30-11:50	**Microwelding of NiTi to stainless steel** K. Zhang, A. Shamsolhodaei, P. Peng, N. Zhou Centre for Advanced Materials Joining (CAMJ), University of Waterloo, Canada
11:50-12:10	**Micro welding of glasses with USP-lasers – process models, results and applications** D. Nodop, M. Kahle ifw Jena - Günter Köhler Institute for Joining Technology and Materials Testing, Jena, Germany
12:10-12:30	**Laser Irradiation of Porcine Skeletal Muscle Tissue** K. Zhang[1,2], Y. Zhou[1,2], M. Mayer[1,2] [1] Dept. of Mechanical and Mechatronics Engineering, University of Waterloo, Canada [2] Centre for Advanced Materials Joining, University of Waterloo, Canada
12:30-13:30	**Lunch and Poster Session**
13:30-13:50	- Invited - **Direct laser writing of composite structures: process and application** P. Peng University of Waterloo, Canada

13:50-14:10	**Laser spiral spot welding of Al and Cu foils: process, microstructure and properties** W. Du, R. Xiao, T. Huang High-Power and Ultrafast Laser Manufacturing Lab, Faculty of Materials and Manufacturing, Beijing University of Technology, China
14:10-14:30	**Plasmonic-assisted heterogeneous integration of oxide-semiconductor interconnects under ultrafast laser irradiation** L. Lin, Y. Hu, Z. Li School of Materials Science and Engineering, Shanghai Jiaotong University, China
14:30-14:50	**Tuning Wettability of Graphene Oxide by Laser Induced Reduction in Liquids** V. Scardaci[1], G. D'arrigo[2], G. Condorelli[1], G. Compagnini[1] [1] Department of Chemistry, University of Catania, Catania, Italy [2] CNR—Institute for Microsystems and Microelectronics, Catania, Italy
14:50-15:10	**High-Performance Mid-IR to Deep-UV van der Waals Photodetectors with Tunable Response** D. Shen[1 2], N. Zhou[3], A.W. Tsen[2] [1] School of Mechanical Engineering, Shanghai Jiao Tong University, China [2] Institute for Quantum Computing, University of Waterloo, Canada [3] Centre for Advanced Materials Joining and Department of Mechanical and Mechatronics Engineering, University of Waterloo, Canada
15:10-15:40	**Coffee Break and Poster Session**
15:40-16:00	- Invited - **Sintering behavior of nano porous film for device integration including power electronics, chiplet and flexible electronics** L. Liu, G. Zou, W. Wang, B. Feng, Q. Jia, H. Bai Department of Mechanical Engineering, State Key Laboratory of Tribology, Tsinghua University, Beijing, China
16:00-16:20	**Thermal fatigue damage mechanism of nano-foam sintered layer in the SiC device during thermal reliability testing** H. Zhang, C. Yin, Z. Peng, W. Guo School of Mechanical Engineering and Automation, Beihang University, Beijing, China
16:20-16:40	**Alloy-type lithium anode prepared by connecting nanosized alloy-type material with conductive material** T. Huang High-Power and Ultrafast Laser Manufacturing Lab, Faculty of Materials and Manufacturing, Beijing University of Technology, Beijing, China
16:40-17:00	**Transition metal chalcogenide cathode for printed flexible zinc ion batteries** S. Wang, X. Wang, J. Feng, Y. Tian State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin, China
17:00-17:20	**Fabrication of Noble Metal Nanowire Flexible Electrodes by Electrodeposition Interconnection and its Application in Electrochromic Devices** H. Zhang, Y. Tian State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin, China
17:20-17:40	**Additive fabrication and adhesion enhancement of conformal interconnections on Al substrates with arbitrary 3D structures** Y. Li[1], J. Li[1], P. Du[1], W. Li[1], H. Guo[2], X. Yu[3], P. Zhang[1] [1]School of Materials Science and Engineering, Harbin Institute of Technology at Weihai, China [2]Shenzhou Information Technology Research Institute at Weihai, China [3]Shandong Kaer Electric Co., Ltd., Weihai, China
19:00-21:00	**Dinner at Auerbachs Keller**

Wednesday, November 29, 2023

08:55-09:20	- Keynote - **Heterogenous Integration - Thermal and Mechanical Challenges** M. Kuball University of Bristol, United Kingdom
09:20-09:40	- Invited - **Integrating Low Dimensional Materials for Quantum Technology and Sensing** M. Calame EMPA, Switzerland
09:40-10:00	**Intra/interlayer Atomic Diffusion Behavior of Al/Ni Reactive Multilayer Nanofoils Excited by Electrical/Thermal/Mechanical Multi-fields** L. Cheng, Z. Yansong Shanghai Key Laboratory of Digital Manufacture for Thin-Walled Structure, Shanghai Jiao Tong University, China
10:00-10:20	**Atomistic Modeling of Nano-Multilayers for Nano-/Micro-Joining Applications** V. Turlo Empa – Swiss Federal Laboratories for Materials Science and Technology, Switzerland
10:20-10:40	**Contribution of molecular dynamics to the study of metallic nanometric multilayers** O. Politano[1], Y. Li[1], V. Turlo[2], F. Baras[1] [1] Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303, CNRS-Université de Bourgogne, France [2] Laboratory for Advanced Materials Processing, Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland
10:40-11:00	**Microstructural evolution of Cu-Nb nanomultilayer on Si substrate upon annealing** J. Yeom, G. Lorenzin, C. Cancellieri, L.P.H. Jeurgens, J. Janczak-Rusch Empa, Swiss Federal Laboratories for Materials Science and Technology, Laboratory for Joining Technologies and Corrosion, Switzerland
11:00-11:20	**Coffee Break and Poster Session**
11:20-11:40	- Invited - **New Materials for Joining Microelectronic Components** Y. Joseph TU Bergakademie Freiberg, Germany
11:40-12:00	**Ag directional outflow in Ag/AlN nano-multilayers** C. Cancellieri[1], A.V. Druhzinin[2], L.P.H. Jeurgens[1], B.B. Straumal[2], J. Janczak-Rusch[1] [1]Empa, Swiss Federal Laboratories for Materials Science and Technology, Laboratory for Joining Technologies and Corrosion, Switzerland [2]Osipyan Institute of Solid State Physics, Russian Academy of Sciences, Russian Federation
12:00-12:20	**Controlled directional Cu outflow in Cu/W nanomultilayers for joining technologies** G. Lorenzin, B. Rheingans, J. Janczak-Rusch, L.P.H. Jeurgens, C. Cancellieri Empa, Swiss Federal Laboratories for Materials Science and Technology, Laboratory for Joining Technologies and Corrosion, Switzerland
12:20-12:40	**Reactive joining for temperature sensitive strain sensors** J. Böttcher[1], A. Schumacher[2], P. Meyer[2], G. Dietrich[1], E. Pflug[1], S. Knappmann[2], A. Dehé[2,3] [1] Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS Dresden, Germany [2] Hahn-Schickard-Gesellschaft für angewandte Forschung e.V., Villingen-Schwenningen, Germany [3] Albert-Ludwigs-Universität Freiburg, IMTEK, Georg H. Endress Professur für Smart Systems Integration, Germany
12:40-13:00	**Interfacial melting and low-temperature reactive bonding in sequential Sn and Bi layers for hybrid flip chip joining in flexible electronics** Sri Harini Rajendran, Seong Min Seo, and Jae Pil Jung Department of Materials Science and Engineering, University of Seoul, Rep. of Korea

13:00-13:20	**Hybrid material joining with Al/Ni multilayers directly sputtered on thermoplast substrates** M. Glaser[1], E. Vardo[2], S. Matthes[2], J. Hildebrand[1], P. Schaaf[2], J.P. Bergmann[1] [1] Department Production Technology Group, TU Ilmenau, Germany [2] Department Materials for Electrical Engineering, TU Ilmenau, Germany
13:20-14:00	**Lunch and Poster Session**
14:00-14:20	- Invited - Thermo-mechanical characterisation and reliability of advanced system integration technologies B. Wunderle Chemnitz University of Technology, Germany
14:20-14:40	**Low Temperature In-bearing Solders for Microelectronic Applications** C.R. Kao, F. L. Chang, Y. S. Lin, and Y. J. Fang Department of Materials Sci and Engineering, National Taiwan University, Taipei, Taiwan
14:40-15:00	**Site-Selective Solder Deposition on Multi-Segment Nanowires as a New Approach for Nanowire Joining and Interconnection** E. Fratto[1], J. Wang[1], Z. Yang[1], H. Sun[2], Z. Gu[1] [1] Department of Chemical Engineering, University of Massachusetts Lowell, U.S. [2] Department of Mechanical and Industrial Engineering, Northeastern University, Boston, U.S.
15:00-15:20	**Transient Liquid Phase Infiltration Bonding of Copper for Die-attach** S. Fukumoto, S. Kuroiwa, R. Miyajima, Y. Masuda, M. Matsushima Graduate School of Engineering, Osaka University, Japan
15:20-15:40	**Elimination of Kirkendall Voids in Sn/Annealed-twinned Cu Joints** S. Chen, X. Tian, N. Zhao School of Materials Science and Engineering, Dalian University of Technology, China
15:40-16:00	**Effect of Reducing Agent on Bridge Formation and Thermal Conductivity of Metal Bridged Electrically Conductive Adhesive** M. Matsushima, T. Senda, K. Taniyama, S. Fukumoto Graduate School of Engineering, Osaka University, Japan