



MicroTech 22 Conference – Next Generation of Electronics and People

26th April 2022 – Held at Rutherford Appleton Laboratory, Harwell Campus

The IMAPS-UK organised MicroTech 22 Conference on Next Generation of Electronics and People explored the current semiconductor market, reviewed many aspects of packaging developments for ICs, RF devices and power electronics packaging and included wider consideration of skills and training of people within the electronics industry.



The Conference Chair, Carolyn Short (KLA Corporation) welcomed participants to the event with an introduction to IMAPS-UK and a short video advertising the EMPC 2023 Conference and Exhibition to be held near Cambridge in the UK on 11-14 September 2023. The chair then introduced the Keynote Speaker, John West of Yole Developpement.

Session 1: Market Trends and Developments for Carbon Reduction

Keynote Presentation – Transforming with the Fast-Changing Semiconductor Supply Chain – John West, Yole Developpement

The keynote presentation from John West of Yole Developpement explored the Semiconductor Super Cycle with a clear manufacturing technology roadmap to 1nm and the acceleration of adoption of digital technology by several years by the Covid-19 pandemic, with strong growth predicted over a wide range of sectors. However, geopolitical forces are changing the semiconductor market which are exposing supply chain risks, with leading edge chip manufacture concentrated in South Korea and Taiwan. The majority of intellectual property belongs to US, EU and Japanese suppliers, but wafer fab equipment is moving to South East Asia, although there is a desire towards establishing localised chip supply by changing government strategies. For the UK, there are several success stories in specific areas of design and equipment supply, which can be built on in these turbulent times. In answer to a question about access to Government and private venture support, John reported that the finance sector is listening to the requirements of the electronics sector.

E-Planes to Replace High Speed Rail? – Paul Riley, Belsa Power Electronics

Paul Riley of Belsa Power Electronics introduced the subject of whether e-planes can replace high speed rail and presented an argument that the development of battery powered aircraft with small numbers of seats (<20) could be economically viable for point to point travel compared to the existing train infrastructure. He then explained that a segmented approach to power converters could save a considerable amount of weight through the reduction in cooling systems.

Questions were raised on the safety implications of failure of converters within the series of modules and Paul said that this was being examined in the development work being undertaken.

Session 2: Materials and Processes

High Power Density Amplifiers using Advanced Die Attach Techniques – Manoj Balakrishnan, Filtronic

Manoj Balakrishnan of Filtronic presented a study to optimise the die attach process for a GaAs MMIC using a Ag filled epoxy material with an copper interposer to an aluminium heatsink to overcome issues with thermal expansion mismatch. Promising results had been achieved and extensive temperature cycling tests are underway.

Development of IGBT Power Modules with Advanced Interconnect Technology – Xiang Li, Dynex Semiconductor

Xiang Li of Dynex Semiconductor described a programme to eliminate weak points and enhance reliability of IGBT modules through advanced interconnection technologies including copper sintering, copper clip die top systems and transient liquid phase soldering with copper-tin. The work had shown promising results in improving performance and reliability.

Hybrid Bonding – Leading the Way for More than Moore Packaging – Jonathan Abdilla, BESI

Jonathan Abdilla of BESI explained the principles behind the process of hybrid bonding for hydrophilic silicon used for wafer bonding, covering cleaning, plasma activation and annealing at elevated temperatures. The need for cleanliness and elimination of any particles in the bond area were emphasised.

Latest Technologies for Laser Dicing, Blade Dicing of SiC and new Ultra-Thin Grinding – Brian Raeburn, DISCO HI-TEC Europe Ltd

Brian Raeburn of DISCO HI-TEC Europe gave an overview of various processes for preparing semiconductor materials including ablation and stealth dicing, wafer slicing, thinning and polishing and the wafer processing services available at DISCO Grinding Services.

Session 3: IMAPS-UK AGM – reported separately

Session 4: Research and Development

Photoimageable Pastes – The Latest Innovations in Fineline Thick Film Technology – Steve Muckett, Mozaik Technology (on behalf of Fraunhofer IKTS)

Steve Muckett of Mozaik Technology presented on behalf of the Fraunhofer IKTS demonstrating the latest capabilities for the deposition of fine line thick film conductors for RF applications, with the enhancement in performance being achieved through the photoimageable process to increase resolution to produce lines of 20 micron track and gap.

Rapid Formation of Intermetallic Joints using Cu-Sn Nanocomposite Interlayers – Han Jiang, Loughborough University

Han Jiang of Loughborough University reported on the investigation into the development of a nanocomposite copper-tin structure which could reduce the time taken to create a fine-grained intermetallic structure in transient liquid phase soldering.

Bonding Larger Area Detector Arrays – Andreas Schneider, STFC

Andreas Schneider of STFC presented an update on the high precision flip chip processes and equipment at used for the manufacture of complex large area detectors. The extension of the assembly processes using indium bump bonding for wafers and individual was described.

Session 4: Skills and Training

An Initiative to Develop Learning Skills in Microelectronics Manufacturing – Andy Longford, Panda Europe

Andy Longford of Panda Europe outlined a project to develop training content for power electronics packaging, which has been supported by Driving the Electric Revolution – Building Talent for the Future programme. An open access introduction video was played and details of the course framework were explained.

Addressing the Power Electronics, Machines and Drives Skills Gaps in the UK – Mark Urbanowski, UKRI

Mark Urbanowski of UKRI presented remotely due to Covid and described the scope of activities that the Driving the Electric Revolution are undertaking to address the skills gap in power electronics, machines and drives. The main four pillars were explained; needs analysis, outreach and engagement, education and training and delivery mechanism through a Skills Hub.

Meet the Exhibitors



The following organisations exhibited at the MicroTech 2022 Conference:

[Accelonix](#) – Specialist equipment sales and support for Microelectronics, Battery and PCB Assembly

[Alter Technology](#) - Leading provider of microelectronics and opto-electronics services in engineering, procurement, assembly and test

[Carl Zeiss](#)— Materials Characterisation and Failure Analysis Equipment

[Custom Interconnect Ltd](#) — Electronics Manufacturing, Advanced Technologies, Design Services, Power Electronics for BEVs/PHEVs, Box Build and Rapid Prototypes

[DISCO HI-TEC EUROPE](#) — Semiconductor Dicing and Grinding Solutions

[Filtronic](#)—Enabling the Future of RF, microwave and mmWave

Gen3—Specialist British manufacturer and distributor of test and measurement equipment

Inseto (UK) Ltd—Manufacturing Equipment, Assembly Materials and Adhesives

KLA Corp (SPTS Division)—Advanced Wafer Processing Solutions

Pyramid Engineering Services—Design and Manufacture of Equipment for Controlled Atmosphere Package Encapsulation

For further information on forthcoming events, please visit IMAPS-UK (www.imaps.org.uk)