

Exhibitor Presentations: MEMS (TechARENA)



S. Raithel
Managing Director
SEMI Europe, Berlin, Germany

Biography

Stephan Raithel successfully completed his studies of Business Administration with a German Diploma degree and a bachelor of arts with honors in 2004. Prior to his career at SEMI he was working for a professional trade show organizer and was in total responsible for 4 different products focusing on consumer goods, financial services and creative industries. In 2007 he joined SEMI in the Brussels office as Senior Manager Operations where he became a key staff in implementing SEMI Europe's strategy and enlarging SEMI's presence within Europe. In 2009 he opened a SEMI branch in Berlin, Germany, where he is acting as managing director, being at the same time responsible for the direct reports in Berlin as well as acting as a CFO for all European activities. In his role as Director of PV in Europe he is facilitating and leading the combined industry effort in writing an International Technology Roadmap for PV (ITRPV, www.itrpv.net), enforcing the dialog between leading equipment, material suppliers and PV manufacturers on a global level. He is also regularly providing industry insights to articles in known trade magazines (e.g. Photovoltaics International, pv magazine, Global Solar Technology, photovoltaic production etc.). Throughout the year he is also active as a speaker and / or moderator at leading photovoltaic events and trade shows.

Leading Techniques for the Nano-scale Etching and Deep Etching of Silicon



M. Bourke
Business Group Director
Oxford Instruments , Yatton, Bristol, United Kingdom

Abstract

As Micro Electro Mechanical Structures (MEMS) are adopted in more and more commercial and industrial applications some areas look to the nano world for developing technologies. In this paper the two leading techniques for deep etching of silicon, namely the "Bosch" process and a cryogenically cooled process will be discussed. We will update the latest results for these techniques and also look at the growing importance of nano-scale etching of silicon, which can be achieved consistently using the cryogenically cooled process. The paper will also briefly discuss atomic layer deposition (ALD) and demonstrate the role it can play in advanced micro and nano devices.

CV of presenting author

Michelle Bourke, Business Group Director, Oxford Instruments Plasma Technology

Michelle M. Bourke received a B.Sc. degree in Optoelectronics and Laser Engineering from Heriot-Watt University, Edinburgh, Scotland, U.K., in 1993. Subsequently she joined the Defence Evaluation and Research Agency (DERA), where she worked on advanced processing methods for GaAs/AlGaAs optoelectronic devices. Joining Trikon Technologies in 1997 as an etch engineer she developed technologies for $0.25\mu\text{m}$ processes for advanced silicon technologies and a variety of different compound semiconductor processes.

In 1999 she moved into Product Marketing and after 2 years transferred to Ottawa as North American Product Marketing and Sales Support Manager. Joining STS plc in 2003 as a Product Marketing Engineer, she was promoted to Product Marketing Manager in 2004 and then to Business Development Manager in 2006. In 2010 Michelle joined Oxford Instrument Plasma Technology as a Senior Product Manager, where she is now Business Group Director.

Coventor Software Platform: Speed, Accuracy & Automation in MEMS Development



C. Welham
Worldwide Applications Engineering Manager
Coventor, Paris, France

Abstract

MEMS devices are finding their way into new consumer and industrial application areas and products every day, many of which are putting unprecedented requirements for functionality and performance on MEMS developers.

Engineers have then an insatiable appetite for more speed, accuracy and automation in the design process, and those are the three key areas where Coventor is focusing by developing its MEMS Development Platform. The platform integrates a process modeling tool and MEMS design tools that allow accurate and fast MEMS+IC co-design (e.g. in Cadence Virtuoso), system verification in Mathworks/Simulink as well as manufacturing studies that would otherwise require long build and test cycles.

CV of presenting author

Chris Welham studied at Warwick University in the UK where he gained a BEng in Electronic Engineering in 1992 and a PhD in Engineering in 1996, which was focused on resonant pressure sensors. He then worked for Druck (now GE Druck) developing commercial resonant sensors and interface electronics. He moved to Coventor in 1999 as a Senior Application Engineer for Europe and now manages the Worldwide Application Engineering Group for MEMS CAD Tools from Coventor's Paris Headquarters

The Experts Behind the Mask



M. McCallion
Business Development Manager
Compugraphics International Ltd, Glenrothes, United Kingdom

Abstract

Compugraphics manufactures 3" to 32" photomasks and possess over 40 years' experience in the Semiconductor, Photonics and MEMS industries. The company is based in: Glenrothes; Scotland, Jena; Germany, Fremont California; USA and Austin Texas; USA.

"The Experts Behind the Mask" is an introduction to Compugraphics which will showcase how the company partner with their clients to understand their requirements and ensure their needs are met. The presentation looks at Compugraphics approach to manufacturing high yield photomasks and provides insight into how the organisation is able to offer customers a high level of support.

Michael McCallion, Compugraphics' Business Development Manager, will be explaining how the photomask

manufacturer has evolved from a small business in Glenrothes, Scotland, to the multinational company it is today. Michael will analyse Compugraphics' approach to customer support and define what makes Compugraphics different from the competition.

Compugraphics will be discussing how partnering with their clients has allowed the company to offer advice and help define clients' photomask requirements. The company boasts one of the highest levels of customer support in the photomask manufacturing industry. Their clients regularly rely on their expertise and Compugraphics would like to give insight into how they achieve this.

CV of presenting author

Compugraphics are experts in photomask design and manufacture. The company works closely with hundreds of semiconductor, optoelectronics and MEMS companies, and universities throughout Europe and the USA.

Compugraphics manufactured their first photomask in 1970. The company now has over 40 years' experience and is based in: Glenrothes; Scotland, Jena; Germany, Fremont California; USA and Austin Texas; USA.

Compugraphics takes pride in providing clients with not only photomask solutions but also offering an excellent level of customer support. The company achieve this through partnering with our clients to understand their needs and ensure the best solution is achieved based our extensive expertise.

Compugraphics manufacture photomasks from sizes 3" to 32" and is the supplier of choice for 300mm TSVs. This includes working with company's who need help with their photomask design or helping companies which may not have the best technology get the most out of their tools. Compugraphics work with companies, who are looking to push the boundaries, however may not have the latest technology, to reach their full potential.

Multi Sensor Metrology for Control of MEMS Production



B. Marheineke
Head of Sales
FRT GmbH, Bergisch Gladbach, Germany

Abstract

In this paper we present a surface metrology system developed to fulfill the needs of MEMS industry moving from lab to production. With this system wafers, chips, PCB or any other device surfaces can be investigated and parameters such as TTV, bow or warp can be determined in fully automated routines. In addition high resolution topography, roughness or profiles for the whole surface can be analyzed. Last but not least thin film thickness can be measured. An outstanding innovation is the modular multi-sensor technology. Various optical sensors can be combined for fast and accurate measurements of different features on the same wafer. A complete vision setup is integrated to get the ability to fully automated surface inspection in production environments: utilizing a high resolution, telecentric CCD camera in combination with pattern recognition software enables the system to detect and identify reference marks and to perform Routine, repetitive measurements on predefined dies and measurement areas in full automation. To fulfill frontend needs, the metrology system can be integrated to a fully equipped EFEM with wafer handling robot, pre alignment, OCR, fan Units and FOUP or SMIF ports. Completed are these systems by a professional SECS/GEM integration. Different metrology tasks, like e.g. the fully automated measurement of topography data and film thickness data on MEMS wafers can be performed with more than 25 wafers per hour throughput. Results from fully automated measurements of various Parameters such as total thickness Variation TTV, bow, warp, roughness, film thickness, step height, pitch, profile, contour, edge structures, trenches, topography, geometry, coplanarity, critical dimensions and angles will be presented. In addition new challenges like TSV measurement, nano metrology and multi-layer thickness measurement are covered.

CV of presenting author

Bastian Marheineke graduated in Physics at RWTH Aachen and received his PhD from University of Ulm, working on MOCVD and PVD technologies for deposition of compound semiconductors. In 1998 he joined AIXTRON AG, Aachen Germany. Until end of 2013 he filled various management positions in Sales and Business Development for deposition tools for compound and organic semiconductors. In 2006 Bastian was appointed Vice President Sales, being in charge of global sales and service organisation. Beginning 2014 Bastian joined FRT GmbH, Bergisch Gladbach, Germany as Head of Sales.

Wafer Thinning Using a Versatile, State-of-the-Art Single Wafer Processor



M. Goeke
Product Manager
Dainippon Screen Deutschland GmbH, Duesseldorf, Germany

Abstract

MEMS have been early recognized for being one of the most promising technologies for the 21st century. In fact, the MEMS market is growing rapidly, mainly caused by the intensive use of MEMS sensors and microphones in consumer mobile and handheld devices.

However, also this market is suffering from continuous decline in prices and the industry is looking for ways how to lower manufacturing cost.

It is forecasted, that MEMS manufacturing will migrate from 150mm or smaller wafer sizes to 200mm in the next couple of years, which will help reducing cost per good die.

In addition, as the microelectronic packaging comprises a significant portion of overall cost per device, a lot of research is done in the field of packaging, looking for more efficient technologies like e.g. TSV interconnects.

Consequently wafer thinning will play an even more important role in MEMS manufacturing, not only to answer needs for thinner sensors or for capping sensitive device elements.

Following these market trends, Dainippon Screen decided to offer the multi- purpose single wafer processor SU-2000 for wafer thinning.

The SU-2000 belongs to Dainippon Screen's "Frontier Project" product line up, providing solutions for manufacturing "green" devices.

We will present Dainippon Screen's single wafer processor SU-2000 and the related enhancements required for wafer thinning, including thin wafer handling and chucking. In addition we will discuss to which extend spin parameters are influencing process performance and show results for stress relief Silicon etch.

Finally, an in-situ monitoring system will be presented, offering a controlled etch process by maintaining a constant etch amount by time based etch rate variation compensation.

CV of presenting author

Mark Goeke received his Master of Science in Photo Engineering from the University of Applied Science, Cologne in 1994.

After holding various positions in lithography engineering he started working with Dainippon SCREEN Mfg.Co. in 1999.

Here he moved to hold the position of the European Product Manager, responsible for technology and marketing for lithography and single wafer cleaning equipment.

In this function he is also in charge to work on the introduction of SCREEN's new 200mm single wafer cleaning tool.