SEMICON EUROPA OCT 25–27, 2016 GRENOBLE, FRANCE CONNECT

TechLounge

Organosiloxane and metal oxide materials for optical, hard mask and and dielectric applications

T. Gädda
Director
PiBond, Espoo, Finland

PiBond

Abstract
Pibond is a specialty materials company with a focus on the development, commercialization, and manufacturing of advanced siloxane and metal oxide monomers and polymers. The company specializes in the development of polymers for the Micro-electronics and Semiconductor markets.

PiBond has developed a chemistry platform (termed SAP) consisting of extremely etch resistant hard mask coating for fluorine based etch chemistries. SAP products addresses specific requirements and demand for components (e.g. sensors, 3D packaging) that global megatrends such as IoT, Industrial&Automotive sensing generate. These unique, etch resistant SAP metal-oxide based hard masks enable process simplification and lower cost of ownership, while delivering improved dimensional control and smaller feature sizes. SAP can significantly contribute to miniaturization of MEMS components and TSVs, as SAP products have been demonstrated to exhibit etch selectivity to Si up to 1:100,000 at coating thicknesses of 100nm or less. With this performance, we can eliminate the challenges currently faced with the use of >10 µm thick photoresist or many micrometers thickness of SiO2 and similar CVD materials. The thin coating contributes to minimal sidewall angle variation and profile control yielding extremely good CD control.

Other products the company markets – pattern transfer layers for lithography, optical dielectrics for ambient light sensors, and power IC passivation dielectrics – will also be outlined in brief.

PiBond’s technology platform includes materials that are in the latest semiconductor devices used for ultra-high definition and portable gadgets. PiBond is a global player that has a proven and audited track record at producing and monitoring specialty materials at PPT (parts per trillion) purity level at our Clean Room production facility in Helsinki.

Biografie
Dr Thomas M. Gädda functions as Director at PiBond. He has held various positions at VTT, Silecs and AIST, Japan. Dr. Gädda has participated in the development of siloxane and metal oxide chemistries for hard masks, dielectrics and optoelectronic materials applied in the

semiconductor industry. He holds a PhD in Chemistry from University of Southern California and an MS in Chemical Engineering from Helsinki University of Technology. He has authored ~40 patents, book chapters, scientific and technical articles.

Lift-off by AP&S - Exceptionally no magic, but close to!

S. Zuercher
Process & Application Engineer
AP&S International GmbH, Process Engineering,
Donaueschingen, Germany

Abstract
Metal lift-off processes in semiconductor industry commonly and as state-of-the-art process are done using different solvent applications as well in batch as in singlewafer equipment. By combination of powerful solvents like e.g. Acetone or NMP (n-methyl-2-pyrrolodone) and mechanical impact by high-pressure spray metal layers are lifted from patterned wafers. Used solvents often have negative characteristics which legitimate their application in the future due to chemical and equipment safety regulations or general process performance.

Looking for alternatives to critical solvents and further process optimization AP&S International GmbH provides a patent-pending lift-off process. The usage of Dimethylsulfoxide (DMSO) together with MegPie system combines an uncritical solvent with the advantage of megasonic agitation within a flexible singlewafer tool platform with capability up to 300mm wafer.

Uncritical solvent, throughput optimization, cost efficient and field proven process solution are the main benefits compared to current process technologies. No need of expensive stainless-steel tools and a wide range of hardware configuration are the possibilities in the AP&S SpinLift-off tool. These are all characteristics which show how we combine our lift-off with customer benefits.

Biografie
Stefan Zuercher studied process engineering in Furtwangen with exam as B.Sc. in 2011. Thesis Topic "Development of a pilot plant for electroless galvanic deposition of nickel on crystalline silicon".

Start working as process engineer for wet chemical batch processes (etching, cleaning, eless-plating, drying) at AP&S International GmbH in march 2011. Within 2012 start of working in R&D department for batch/singlewafer equipment and in application laboratory at AP&S Headquarter.
Becoming manager of the new AP&S Democenter in January 2015, he is working very close with customers on optimization of current processes or research of alternative process solutions within the in-house democenter. In parallel different tasks in R&D department for process and application engineering are handled.

Carriers for temporary bonding and thin wafer handling

C. Wesselkamp
Sales Manager
Plan Optik AG, Elsoff, Germany

Abstract
For thin wafer handling, support carriers are needed which should fulfil various properties such as adaption of thermal expansion coefficient, heat and chemical resistance and transparency. Glass is the best candidate for this task.

Semiconductor wafers undergo a wide range of process steps. Due to progressing thickness reduction of the wafers, handling in standard semiconductor processes requires carrier substrates supporting them.

Various Thin Wafer Handling systems are already established in the semiconductor market. Depending on the used bonding and de-bonding technique, the carriers need adapted properties.

High end carriers from glass and silicon meet these requirements excellently. High temperature and chemical resistance, incredible low tolerances (down to 1 micron thickness variation), thermal expansion adjusted to the used semiconductor material are just a few examples for this. Different carrier types such as for silicon and gallium arsenide wafer handling are available.

Unique marking by QR codes for easy back tracing make them suitable for a huge number of re-use cycles. Glass carriers could be strengthened to make them virtually unbreakable. Alkaline free glass is available as well.

Blank carriers for fast laser release, perforated carriers for chemical release and carriers with recessed pockets are available for various support systems such as laser de-bonding, chemical and thermal de-bonding. Carriers are available for 2” to 300 mm wafer handling.

Biografie
Mr. Carsten Wesselkamp got a degree (Dipl.-Ing. (FH) in Industrial Engineering with a study emphasis on operating technology and production engineering.

He additionally achieved a certificate in work system and process organization by REFA (organization for work study and company organisation).

After working as assistant production manager for a multinational steel and aluminum producer he joined Plan Optik AG, one of the leading manufacturers of wafers for MEMS and carriers for semiconductor applications in 1996 as one of their sales engineers.

Nowadays Mr. Wesselkamp acts as the international sales manager of Plan Optik AG and (together with his team) manages the accounts of Plan Optik AG including technical and commercial tasks.

Atomic Layer Etching (ALE)A precision technique to enable tomorrow's technology

M. Dineen
Product Manager
Oxford Instruments Plasma Technology, Strategic and Product Management, Bristol, United Kingdom

Abstract
Atomic Layer Etching (ALE) is a plasma etch technique for delivering ultra low damage, ultra high selectivity and ultra controllable etch depth. Pushed by device performance there is an ever increasing demand for thinner layers and smaller critical dimensions. This means that the traditional methods of processing these layers are reaching their limit and new technologies are required to realise the control required. ALE is an exciting technology that provides a method to etch an atomic layer of material from the surface of a layer in a controlled manner. It enables excellent depth control and also offers exciting new possibilities for etch selectivity between different materials, truly a technique to enable tomorrow's technology.

Biografie
Dr Mark Dineen graduated from Cardiff University with a PhD on ‘Plasma etching of Gallium Nitride’ and joined Oxford Instruments in 2000. Firstly as a Process Engineer working on etching of III-V materials, and more recently as Product Manager (Optoelectronics and Discrete Devices), Mark has a wealth of experience related to Wide Band Gap device manufacturing.

Sustainable wet processing using resource and cost saving technology

T. Klaushofer
Product Manager
Siconnex, Hof bei Salzburg, Austria

Abstract
In the modern semiconductor technology resource consumption is getting more and more important.
Ecological and economical processes are a necessity in order to be competitive and to meet the environmental obligations.

For wet processes, huge possibilities are given to reduce consumption or even replace chemicals with efficient and low cost substitutes.
A cost efficient an ecological way is to utilize ozone for various processes.
As example, ozone can be used for stripping a broad bandwidth of various resists or to enhance cleaning processes.
Another big topic is to optimize processes for low DI water consumtion.

Biografie
I'm Product Manager at Siconnex. In this role I’m responsible to find and evaluate new possibilities for Siconnex as well as define specifications for our systems.
Prior to this role I was in the Project Development Department of Siconnex.
I'm holding a master’s degree in mechatronics from the University in Linz.

New Technology for Measuring 20 nm Particles in Electronic Process Chemicals

K. Dillenbeck
Product Line Manager
Particle Measuring Systems, Boulder, CO, United States

Abstract
Real time monitoring of particles as small as 20 nm in critical wafer cleaning chemicals is important for high yield of critical process technology devices. High purity chemical delivery systems are necessary to control and protect the purity of critical process fluids from the source, through distribution, to the wafer fab cleaning tools. Carefully-implemented monitoring strategies are important to ensure that the purity process chemicals is sufficiently-high to meet wet process defect-density goals. This paper provides examples and data of continuous real-time measurement of particles at 20 nm for process chemicals.

Biografie
Keith Dillenbeck is Product Line Manager for Particle Measuring Systems, from Boulder, Colorado, USA. Keith has over 30 years experience in high purity process chemicals and semiconductor wafer cleaning processes, in both technology development and product management. He has a Bachelor of Science degree in Chemical Engineering.

SYSTEMA'S Xation Technology - Real-Time Analysis of Dynamic Bottlenecks

G. Luhn
Innovation Manager
SYSTEMA GmbH, Innovation Management,
Dresden, Germany

Abstract
Strong production capacity growth is a reality, especially for 200 mm fabs. This trend leads to dramatically increased requirements for production information systems. State-of-the-art applications (Business Intelligence) are typically fed via extracts out of operational systems. Such extracts are aggregated by ETL batch jobs (ETL: Extract, Transform, Load the data). It is a big challenge to enable robust and performant ETL data aggregation. Another major draw-back is, that such applications do not integrate the fab operational, engineering, and strategic layer. This reflects the need for a conceptually new approach, which
a) is capable of continuously processing information and therefore eliminates the need for complicated ETL processes;
b) is capable to handle a deep-structured information model, which enables and guarantees best informational granularity for real-time analysis (operational data), as well as for detailed root cause analysis (engineering and strategic data); and which enables from a mathematical perspective optimal algorithmic efficiency throughout those data layers;
c) is capable to support standard hw and sw infrastructure (i.e. standard db-system, messaging system, analysis services).

To overcome this strategic gap, and based on own research activities, SYSTEMA, XFAB and other partners are executing a research project. The goal is to enable the factories to continuously process real-time data for each production step, and thereby enriching the engineering and strategic data level at the same time.

As a first outcome of this research project, we present a) a real-time analysis of dynamic production bottlenecks (operational level), and b) a detailed engineering analysis of production gain potentials as caused by dynamic bottlenecks (engineering level). This analysis will show unplanned vacancies of downstream equipment, as caused by moving dynamic production bottlenecks.
SYSTEMA is developing this solution as based on its new “Xation” Technology.

Biografie
Gerhard holds a Ph.D in engineering science from the University of Erlangen-Nuremberg (Germany). He has more than 25 years of experience in semiconductor manufacturing and information science. Currently, he is leading the innovation management at SYSTEMA GmbH, Dresden. His research activities are pointing toward
a new, mathematically grounded method of Real-Time information processing, including large data volumes.
Gerhard previously worked as team leader / program manager and research fellow for Infineon/Dresden and Siemens/Munich. He also held various positions in France with Siemens / IBM joint venture in Essonnes; and ST Microelectronics in Crolles.

Turning Data into Action: The Importance of On-Tool Data Brokers for Enabling Big Data Analytics and Increasing Fab Productivity

D. Suerich
Product Evangelist
PEER Group, Inc., Kitchener, Canada

Abstract
In today's connected world, smart manufacturing initiatives make it possible for semiconductor device makers to leverage data, gain insights into their processes, and make manufacturing decisions and processing modifications that will improve fab productivity. Data collection has always been an essential part of semiconductor manufacturing and now, successful big data solutions enable intelligent analysis and allow manufacturers and suppliers to turn their collected data into action. As the cost of adding more sensors and data sources to equipment continues to become more affordable, it's important to consider how to broker high volumes of sensitive data at high speeds from disparate sources, how to consolidate the data on a single tool or across multiple tools to enable data analytics, and how to segregate IP and share information securely across business partners. Interconnecting equipment and process data provides new opportunities to fabs and OEMs to feed efficiency gains back into the manufacturing process. OEMs can analyze the data near-tool or even remotely and make equipment adjustments, ensure optimal equipment performance during production, and provide a higher standard of service to the fab through more efficient and cost-effective tool support. The fab will benefit from more efficient, autonomous manufacturing as it leverages equipment data to remove production inefficiencies, reduce costs, and improve uptime and yield. Join us in the TechLOUNGE as we explore the concept of data brokering through a secure pipe to enable a new generation of OEM and fab collaboration, central to smart manufacturing.

Biografie
Doug Suerich, Product Evangelist, PEER Group

Doug Suerich is the Product Evangelist at The PEER Group, Inc., the semiconductor industry's leading supplier of automation software. Mr. Suerich focuses on big data and remote connectivity solutions that help OEMs and fabs collaborate securely on tools (and tool data) in a production environment.

Suerich has over 20 years of experience leading software teams for a variety of industries including semiconductor, manufacturing, and transportation. Most recently, he was involved in architecting PEER Group's remote connectivity solution, Remicus™, and he was a champion in promoting the use of cloud computing and latest-generation web technologies to serve global users.

Prior to joining PEER Group, Mr. Suerich was a software development manager, automation engineer, information systems specialist, and consultant. He has extensive experience designing and integrating robust automation software solutions.

Suerich holds a Bachelor of Science with Honours in System Design Engineering and an option in Management Science from the University of Waterloo.

Smart Manufacturing meets Industry 4.0 at AIS

F. Geissler
Director Sales
AIS Automation, Dresden, Germany

Abstract
Optimization of efficiency, higher quality products, improve productivity are main goals of smart manufacturing. Big data, cloud services and full integration are aspects of smart manufacturing. AIS provides solutions for smart manufacturing by involving the ideas German initiative I4.0.

Biografie
Frank Geissler studied electrical engineering in Dresden (Germany) and graduated in 2004 with focus on equipment automation. He started his professional career in the semiconductor industry joining Brooks Automation (Germany) in 2004. After working for one year in Jena he served as Production and Outsourcing Manager from 2005-2006 in Tainan (Taiwan). In 2009 he joined AIS Automation in Dresden (Germany). Also in 2009 he finished his MBA from HHL in Leipzig (Germany). As Director Sales he is leading the sales and marketing department.

AIS Automation is a leading provider of factory and equipment control solutions in the semiconductor, LED and photovoltaic industry. AIS MES solutions are the backbone of solar Fabs around the world, while providing latest technologies like Advanced Process Control (APC). Equipment control solutions from AIS incl. SEMI compliant interfaces are used in hundreds of batch, inline and cluster tools.

Title: Total Production Integration – the Industry 4.0 Approach

H. Mayer
COO
znt Zentren für Neue Technologien GmbH, COO,
Burghausen, Germany

Abstract
Shop Floor Integration is an essential precondition for implementing the concepts of Industry 4.0. While in Semiconductor Front End Fabs the integration is widely implemented based on Semi Standards, the backend and facility management areas are subject to further integration efforts. Especially in the Backend area we often face proprietary communication protocols and none Semi-Standard Interface that cause high integration efforts.

The talk shall point out, which concepts and standardization activities are going on in the Industry 4.0 community and which approaches may also be useful for the Semiconductor Industry to close gaps in some areas of shop Floor integration.

The first part highlights the position of shop floor integration in terms of the Reference Architecture Model Industry 4.0 (RAMI4.0) that has been updated in April 2015 by the Platform Industry 4.0. In the next part ongoing integration standardization activities are presented, followed by an outlook, how the results of the activities may be used in the Semiconductor Industry. The last part shows a solutions architecture that can implement those integration concepts.

Biografie
Hans Mayer (Ing.) COO

Hans Mayer has 28 years of experience in IT Systems for automation.

After 6 years at Siemens AG in Munich in software development for cell phones, he joined znt. With znt he implemented many automation projects as software developer and project manager for different industries with a main focus on Semiconductor and Solar Industry, Medical Device and Electronic Industry and Automotive Suppliers.

Fabmatics – About the new specialist for material handling automation

B. Stegemann
Sales Director
Fabmatics GmbH, Dresden, Germany

Abstract
Since September 1, 2016, the merged companies HAP Handhabungs-, Automatisierungs- und Präzisionstechnik GmbH Dresden and Roth & Rau - Ortner GmbH have been operating under the new name Fabmatics GmbH. The company is an experienced specialist for the automation of material flows and handling processes in semiconductor manufacturing plants and other high-tech production environments. Both predecessor companies have been implementing automation projects with great success for more than 20 years. One of the focal points of Fabmatics is retrofitting 200mm factories with automation solutions in order to make these fabs fit for the future. Currently, there are some two-hundred 200mm factories world-wide. In light of rising global cost pressure, a majority of semiconductor manufacturers is expected to modernise their factories and to automate processes significantly as a result.
The presentation will show best practice automation projects, focused on material handling and production logistic applications, even at positions where automation previously seemed impossible. Learn how a smart integration and combination of automated systems for cassette transportation and storage, lot identification & localization as well as carrier and wafer handling can retrofit older 200 mm fabs in order to increase their competitiveness. Older does not mean obsolete!

Biografie
Born in 1969, Burkhard Stegemann studied Physical Technics at the FH Aachen and completed his final year at Coventry University. In 1996 he joined Carl Zeiss in Jena in the department of microscopic wafer inspection. After two years in R&D/ application, he changed to product and project management. As part of the acquisition of the Zeiss business field “optical wafer inspection” by HSEB Dresden GmbH in 2004, Burkhard Stegemann joined HSEB. His responsibilities were sales and service. Since May 2014 Burkhard Stegemann is sales director of HAP GmbH Dresden and due to the merger of HAP and Roth & Rau - Ortner, since September 2016 sales director of Fabmatics GmbH.

Optical gas & pressure sensing for process control of vacuum based industrial processes

S. Stanley
Technical Sales & Marketing Manager
Gencoa Ltd, Liverpool, United Kingdom

Abstract
Some form of monitoring of the vacuum environment is essential for the efficient operation of any vacuum processes. This can be achieved through a variety of sensors; from simple total pressure sensors, to highly sensitive quadrupole mass spectrometers. In particular, residual gas analysis (RGA) can be performed with quadrupole mass spectrometers. Residual Gas Analysis allows for detection and identification of individual species within the vacuum. This can result higher process yields through faster troubleshooting, scrappage reduction through contamination detection, more efficient use of pumping time, or a more controlled vacuum environment.

The limiting factor for Quadrupole RGAs is the pressure range over which they can operate. Above 1x10-4 mbar damage will occur to the sensor's filament – restricting its use above this pressure. An alternative residual gas monitoring sensor that operates directly at pressures above 1x10-4 has been built around plasma emission monitoring. A small "remote" plasma can be generated inside a sensor that is part of the main vacuum. Consequently, species that are present within the vacuum will become excited in the sensor's plasma, emitting light at certain wavelengths, which can then be used to identify the emitting species. Advances in miniature spectrometers in combination with advanced spectrum identification software has resulted in a robust, lower-cost, multi-purpose vacuum sensor.

Presented are a number of examples of its use in monitoring a variety of vacuum conditions such as contaminant detection, water vapour outgassing, etching process monitoring, pump down analysis and reactive deposition control.

Biografie
Steven Stanley is the recently appointed Technical Sales and Marketing Manager at Genoca Ltd with a PhD in Surface Physics and Degree in Engineering Physics from Loughorough University. Steven has previously held Process Development and Project Scientist roles at the European Space Tribology Lab, Qioptiq, Power Vision and Applied Multilayers involving a wide range of coating applications from VIS - FIR optical coatings to solid lubrication coatings and deposition technologies including E-Beam, Magnetron Sputtering, Evaporation, PECVD and ALD.

N2O: Global Warming or Acid Rain?

M. Czerniak
Environmental Solutions Business development Manager, Edwards
Edwards, Semiconductor, Clevedon, United Kingdom

Abstract
Nitrous oxide has many uses in the manufacture of semiconductor chips. However, it is also one of the gases that are responsible for climate change. Simple combustion of this gas is possible, but readily results in the formation of mono-nitrogen oxides (NOx) which are harmful to humans and contribute to acid rain. These issues will be discussed, together with abatement solutions that avoid excessive NOx creation by careful tailoring of the combustion chemistry.

Biografie
Mike Czerniak: Environmental Solutions Business development Manager
Starting his professional career with Philips, initially in their UK R+D labs & subsequently in the fab in Nijmegen, Holland, Mike has worked in the semiconductor business since gaining his PhD in 1982. He had subsequent marketing roles at UK-based OEMs Cambridge Instruments, VSW and VG Semicon before joining Edwards 19 years ago. He has held various technical and marketing roles before starting his current role 2 years ago.

How Semiconductors Firms Can Address their Documentation Challenges Using the IXIASOFT DITA CMS

N. Kerzreho
Technical Account Manager for Europe
IXIASOFT, Sales & Marketing, Montréal, Canada

Abstract
The intellectual property contained within semiconductor documentation is high-value and often expensive to create and maintain. If your engineers are spending too much time searching for and updating content and your end-users cannot find the accurate content on your information portals, then IXIASOFT can help. You'll be able to create, reuse and deliver content to your customers and partners through portals and traditional channels while also reducing costs.

With the IXIASOFT DITA CMS, our Semiconductor customers can:
• Rapidly deliver accurate information on-time – even with short product cycles
• Reduce the amount of time required to update information
• Deliver tailored content that is consistent and accurate
• Make your information easier for your users to find
• Increase brand consistency
• Translate content for a global marketplace, while reducing translation costs

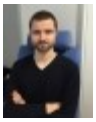
The IXIASOFT DITA CMS provides organizations with a solution to manage their entire DITA technical documentation process. As part of this offering, DITA CMS provides various tools that are tailored to different types of users that participate in the process, including technical writers, engineers, chip designers and other members of your engineering teams.

Want to hear why Qualcomm, Ericsson, ARM, Altera and others are now using the IXIASOFT DITA CMS? Meet us at Booth 352.

Founded in 1998, IXIASOFT is a trusted global leader in the XML content management software industry. Its signature product, the DITA CMS, is an award winning, end-to-end component content management solution (CCMS) deployed by industry leaders. From authoring to reviewing, localizing and publishing, DITA CMS provides all the tools required for large, global organizations to support their entire information development process. IXIASOFT solutions are accessed by thousands of users worldwide in hi-tech, heavy machinery, semiconductor, and medical device manufacturing industries.
For more info and use cases, please visit ixiasoft.com.

Biografie
Nolwenn Kerzreho is the Technical Account Manager for Europe at IXIASOFT and has more than a decade years of experience in the technical communication industry, from information development, to knowledge management, localization and delivery. Nolwenn holds a Master's degree in Technical Communication, Translation, Terminology and Project Management from the University of Rennes (France).
Based in France, Nolwenn has international experience in the chemical, Telecom, language, and software industries.

Hard Materials Deep Etching: Novel Solutions For MEMS



A. UVAROV
R&D Manager
CORIAL, BERNIN, France

Abstract
Introduction of new materials – glass, quartz, sapphire – for MEMS and micromachining applications demands development of novel technologies for their processing.

One of the bottlenecks becomes creation of deep structures with high aspect ratio using conventional DRIE approaches.

This presentation will outline CORIAL latest hardware and process advancements regarding ICP-DRIE of hard materials, as well as will demonstrate capabilities of PECVD systems to deposit thick (up to 100 µm) SiN films that are considered to be promising candidates as masks for DRIE.

Biografie
Andrei Uvarov is an R&D manager at CORIAL, France. His responsibility covers development of both hardware and process.

Andrei Uvarov joined the CORIAL team in 2015. Previously, he worked in the field of plasma based processes and hardware development in Russia and Japan. Andrei holds a PhD in CVD of PTFE films from Saint-Petersburg State Polytechnical University.

Bridging Semiconductor Test from the Lab to Production

H. NOXON
Semiconductor Account Manager
National Instruments, Austin, United States

Abstract
National Instruments welcomes you to Semicon Europa 2016. From IC characterization to wafer sort and final test, or for streamlining characterization to production - come learn about why NI's platform based Smarter Test Systems approach puts you, the engineer ultimately in charge of solving the test challenges of today and tomorrow – join us at booth #650. If you are working on issues that transcend across design to test disciplines under higher device complexity and time to market pressure, we would like to invite you to NI's Design to Test presentation on Tuesday October 25th from 3:00 to 5:00 pm (Room "Le Bans").

Biografie
Heath Noxon is a business development manager for National Instruments that has worked with semiconductor test applications for the past 8 years in both the lab and in manufacturing. Heath has a bachelor's degree in chemical engineering from the University of Colorado at Boulder.

Automated wafer-level testing of high voltage devices and structures

M. Cejer
Marketing Director
Keithiley Instruments / Tektronix, Cleveland,
United States

Abstract
As demand increases for semiconductor devices with breakdown voltages greater than 1kV and leakage currents under 1nA, yield optimization becomes a more critical issue for the fab. To ensure adequate yield at these higher production volumes, Engineers have considered adding new workflow steps such as process control monitoring (PCM) and die sort for identifying process failures at the wafer level, thus improving overall profitability and time-to-market.

However, due to the complexities typically associated with wafer-level testing over 1000V — such as instrumentation setup, cabling, probing, automation, and safety — high voltage wafer-level testing has not been widely adopted.

The new Keithley S540 Power Semiconductor Test System addresses these issues and reduces overall test time by enabling fully automatic, sub-nA parametric measurements up to 3kV in a single probe touch-down.

In addition, the S540 eliminates the time needed to manually change the test setup when moving from low voltage (< 200V) to high voltage (>200V) wafer-level tests by automatically switching across a maximum of 48 pins.

Come learn how the Keithley S540 can help improve overall yield by performing fully automated wafer-level tests, including high voltage breakdown, capacitance, and low voltage measurements, in a single probe touch-down.

Biografie
Mark Cejer is responsible for Keithley's Parametric Test System business. During his 25 year tenure at Keithley, he has held a variety of Marketing and Sales roles, and has led the development and launch of many Keithley products, including SourceMeter SMU Instruments, DMMs, and more.

EVA100 Analog/Mixed IC Test Solution

S. Doellinger
Product Manager
Advantest, Business Development, Munich, Germany

Abstract
The Internet of Things (IoT) is currently one of the most exciting and often debated topics worldwide. The discussions range from socio-political aspects, product ideas and future visions to technical requirements. Thus IoT is not only important for 5G mobile radio specifications, but also has a significant influence on the semiconductor industry that provides basic technology for IoT with its new and innovative products.

Even if IoT possibilities are still quite daring, the first basic requirements already arise for the required semiconductor components. They must interact with users' environment, e.g., measure and regulate states, as well as communicate with ones' infrastructure. Semiconductor components must, for example, provide data obtained from a cloud and receive control commands. The design of the new IoT semiconductor components is already distinguishing from these functions. What is meant is the integration of a very high and ever increasing proportion of analog components with an intelligent digital core for control.

With the EVA100 E model (engineering model), Advantest offers the ideal test solution for the development and verification of IoT devices. The EVA100 P model (production model) extends the test solution right up to production. The EVA100 "All-in-One" concept integrates various instruments into a compact single test head. The test head is modular and can be equipped with different modules depending on the test requirements. The offered modules include power supply, 4-quadrant DC signal measuring unit, pattern generator, logic analyzer, AWG signal generator, digitizer and oscilloscope. Neither the operation of the measuring system nor the definition of test sequences require programming knowledge. Intuitive user interfaces allow quick familiarization as well as quick and easy creation of the tests.

Biografie
Stefan Doellinger joined Advantest in 1996 as an Engineering Specialist in system and application engineering, software development and factory integration. He's also held roles as a software engineer for Advantest's memory test system development in Gunma R&D centre in Japan, a program manager for system application engineering, project manager in R&D for T2000 module development and currently as a business development manager. He received his diploma in physics from the Friedrich-Alexander-Universität Erlangen-Nürnberg.

microDICE - Laser System for Semiconductor Industry

H.-U. Zühlke
Market Development Manager Semiconductor
3D-Micromac AG, Chemnitz, Germany

Abstract
TLS-Dicing™ is a laser based cleaving method to separate brittle materials. TLS (Thermal Laser Separation) uses thermal induced mechanical stress. A combination of heating (by laser) and cooling (by a very small amount of DI water spray) induces mechanical stress pattern into the wafer. This mechanical stress field guides a well-defined crack through the brittle material. The cleave needs for initiation a small local defect, called I-Scribe. This scribe can also be used, to extend the range of applicable products, e.g. by removing metal from the street [1].

TLS-Dicing™ shows manifold advantages in comparison to mechanical sawing and ablative laser processes: The cleaving speed is up to 300 mm/s (mechanical sawing speed for SiC is 7 mm/s). The material is not affected by chipping - consecutively no particles are generated. The process causes no negative residual thermal impact or stress pattern on the device. In opposite to stealth dicing TLS separates the material completely in one pass over the whole vertical thickness. Even thin backside metal is separated at the same time without any delamination. TLS requires no limiting design rules and can also be applied with metal in the street by using a preparing laser step.
These benefits make TLS the perfect dicing method for SiC-based products [2]. Hence the focus for process development was first on SiC.

The presentation will give an introduction in TLS-dicing™ in general, followed by a case study for the dicing costs of a given SiC-wafer. It will be concluded with an introduction of the new generation of the dicing tool microDICE™.

[1] H.-U. Zuehlke, “Thermal laser separation for wafer dicing,” in Solid State Technology, 2009.
[2] K. O. e. A. Dohnke, “Comparison of different novel chip separation methods for 4H-SiC (Infineon Technologies AG),” in ECSCRM, Grenoble, 2014.

Biografie
Hans-Ulrich Zuehlke studied instrument engineering at Friedrich Schiller University Jena. In 1998 he received his PhD from the university. Afterwards he worked at JENOPTIK, last ten years in the field of laser applications for the semiconductor industry. In 2014 Hans-Ulrich Zuehlke started as Market Development Manager Semiconductor at 3D-Micromac.

Plasma-based process solutions for Packaging

T. Lazerand
Director of Business Development
Plasma-Therm, St Petersburg, FL, United States

Abstract
The convergence of SoC and SiP (more More and more than Moore) is becoming both a focus and a challenge not only for device designers but to packaging specialists.
At the manufacturing level, this convergence generates a bridge between the Front End and Backend environments and makes transitioning some Front End processing solutions into Back End attractive. Although Front End processing equipment using plasma technology is very mature, it is not always easy to directly transfer it into packaging facilities. Reluctance in the Back End environment to avoid unfamiliar technology and one they might consider relatively too expensive, limits acceptance. Concerns regarding thermal budget, plasma interactions and new potential sources of contamination, are slowing down the adoption of technologies which can bring extreme gains even when well-proven as accepted as enabling and productive technologies in both fab and packaging environments. This describes the current dilemma for equipment vendors introducing existing plasma-based equipment into advanced packaging.

Plasma-Therm, along with Disco, offer a complete suite of solutions for wafer singulation. In addition to the fundamental singulation step using saws, lasers, and plasma, a comprehensive process flow and integration addresses optimum wafer preparation, street clearing, and post dicing cleaning.

This presentation reviews the pros and cons of various singulation methods and provides an overview of technology and market drivers pulling device manufacturers to adopt plasma dicing.
Process integration flows that show pre-plasma etch wafer preparation and post-plasma etching cleaning will be shown along with results for final die quality.

Biografie
Thierry Lazerand
Director Business Development, Plasma-Therm

Thierry Lazerand experience spans over 30 years with lead roles in front end device manufacturing, technical marketing and business development responsibilities for device manufacturers and equipment vendors in Europe and USA. He received his Master in Material Sciences and MBA from universities in France.
His current role at Plasma-Therm is to drive strategic marketing along with product marketing, and business development in served and new markets.

Reducing TSV integration cost using F.A.S.T. deposition solution

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Abstract
As one of the key enabler of 3D integration, Through Silicon Via (TSV) has been widely studied but not largely adopted by advanced packaging industry. The main factor that has limited its adoption is the higher overall integration cost when compared to standard packaging solution. Based on PECVD and PVD deposition system, TSV key films, i.e. isolation, barrier and Cu seed layer, are the cost lever. Those deposition methods are not able to answer actual TSV needs: thick and conformal layers obtained at a throughput in line with production constraints. They have forced engineers to compensate with other TSV fabrication steps while degrading fabrication cost: longer etch process step to limit scalloping effect; increased CMP process time to remove the thick top Cu layer from PVD.
Alternative solutions are already being studied and evaluated. Based on electroless processes or ALD deposition method, they successfully overcome the conformal issue introduced by PECVD and PVD actual reactors. But they also introduce new chemistries and low throughput processes that do not improve the TSV integration cost issue.
Originally developed by Altatech, the alternative Fast Atomic Sequential Technology (F.A.S.T.), a unique combination of optimized CVD reactor with ALD pulsing capability, has been extensively evaluated to answer the thick and conformal layer request of TSV integration scheme:
- Based on well-known precursor molecules and standard reactor architecture, actual Isolation, Copper barrier and Cu Seed materials can be layered in TSV with aspect ratio up to 20:1;
- Conformity closed to 100% in 10:1 and up to 20:1 is obtained while offering deposition rate higher than 100nm/min.
Those 3 deposited layer based on the alternative F.A.S.T. technology have been computed in the whole TSV integration cost and compared to standard PECVD/PVD solution and other alternatives. A fabrication cost comparison between the different deposition solutions will be presented during the talk.

Biografie
Julien VITIELLO (PhD) is now C.E.O. of KOBUS, since 2016, a leading equipment supplier of thin film deposition solution when Thick and Conformal matters.

Previously, he worked for Altatech Semiconductor. He joined this company in 2007 as Process Manager. Since 2011, he has held the position of Director of the Deposition Product Line. He was responsible for the R&D as well as the development of the new Deposition applications.
Julien began his career at Philips Semiconductor in 2003 where he held several positions in the front end and back end R&D department.
Julien studied Material Engineering at INSA Lyon and earned his doctoral degree in Integrated Electronics from the INSA Lyon in 2006.