

## Materials Conference



D. Guerrero  
Senior Technologist  
Brewer Science, Inc., Semiconductor Business  
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### Biography

Douglas Guerrero received a PhD in Organic Chemistry from the University of Oklahoma, USA. After a post-doctoral appointment at the University of Texas - Dallas, he joined Brewer Science in 1995 and where he is a Senior Technologist in the Semiconductor Materials Business Unit. Dr. Guerrero is a Senior Member of SPIE and currently serves in the SPIE Advance Lithography and the International Symposium on DSA committees. He has over 60 publications and patents in the field of lithography. He is currently on assignment at imec in Leuven, Belgium where he is responsible for patterning process development using immersion, Directed Self-assembly and EUV lithography.

## SEMI Market Outlook - Fab Investments, Equipment and Materials Forecasts



C. Tseng  
Sr. Manager  
SEMI, Taipei, Taiwan



### Abstract

Following the record-setting pace of 2017, 2018 is forecasted to be another growth year for the semiconductor industry. Equipment spending for 2018 spending is currently expected to surpass 2017. In addition, as applications for advanced devices and advanced packages grows, the semiconductor materials market will expand as well. The presentation will provide the latest forecasts from SEMI for fab investment, capacity trend, equipment, and materials spending, including updated information specific to packaging materials.

### Biography

Clark is a senior research manager at SEMI. His major responsibility is to track and evaluate semiconductor front-end fab investment, equipment, and materials markets in the Asia Pacific region. His research also spans over LED, flat panel display and PV industries. His expertise includes in-depth analysis of the industry dynamics, as well as the fundamentals of market forecasting, competitive analysis, and strategic planning.

Prior to SEMI, Clark worked for Qimonda as the manager at Strategy and Business Development division, where he managed market & competitive intelligence function in Asia/Pacific.

Clark Tseng received a Bachelor of Business Administration and a Bachelor of Arts in International Relations from National Chengchi University in Taiwan.



I. Radu  
Director  
SOITEC, R&D, BERNIN, France



### **Biography**

Ionut Radu is Director of Advanced R&D at Soitec being responsible for research and development efforts in the field of advanced substrate technologies. Prior to being appointed to his current position, he held various technology management positions with responsibility in development of new substrate technologies for advanced electronic devices. Ionut is currently involved with industrial and academic research collaborations to support strategic developments of advanced substrate materials for semiconductor industry.

Dr. Radu obtained his B.S. in physics from University of Bucharest in 1999 and Ph.D (Dr. rer. nat.) in physics from Martin-Luther University Halle-Wittenberg in 2003. He has co-authored more than 70 papers in peer-reviewed journals, conference proceedings and reference handbooks and holds more than 40 patents in the field of semiconductor technologies. Dr. Radu is senior member of IEEE society and involved in Technical Program Committees of international conferences (ESSDERC, VLSI-TSA) and industrial forums (Semicon Europa).

## Fine Pitch Plating Resist for High Density FO-WLP



J. Serrand  
Technical packaging manager  
JSR Micro NV, R&D, Leuven, Belgium



### Abstract

Abstract— Due to large topographic gaps between the chips and mold substrate, the next generation of high density FO-WLP will require fine RDL plating resists that can achieve as low as 2um line/spaces(L/S) with a wider common depth of focus (DOF) margin. In order to meet these requirements, we developed a novel chemically amplified positive tone resist. In this study, we focused on photo acid generators (PAGs) which are one of the major components of chemically amplified resists. We found that controlling the acidity of the generated acid from PAGs after exposure was a key approach to get good profiles on Cu sputtered substrates and wider DOF margins.

Keywords—Plating resist, FO-WLP, fine RDL, photo acid generators.

### Biography

Packaging Technical Manager, Jerome joined JSR in 2002. He is located near Grenoble the French Silicon Valley from where he can give full technical support to many different key customers in Europe. Keeping close contact with the R&D department in Japan and Belgium, he manages and supports several on-going projects at different European customers.

## Adhesive & Encapsulation Developments for Advanced Semiconductor Packaging



R. de Wit  
EIMEA SU Head Semiconductors  
Henkel Electronic Materials NV, Semiconductor  
Assembly Materials, Westerlo, Belgium



### Abstract

Electronics market trends continue to drive innovation for higher functionality with smaller form factors and reduced power consumption. To meet these demands, the design of semiconductor devices is changing more and more from traditional wire bonded packaging to so called “advanced semiconductor packaging” based on Wafer Level, Flip Chip and 2.5D/3D Stacking technologies. Fan-In and Fan-Out Wafer Level Packaging (WLP) and Through Silicon Vias (TSV) for instance are successfully replacing proven wire bond technology today. This has a significant impact on the typical assembly materials being typically used in the Back End Of Line (BEOL) production of semiconductors. For instance, there’s often no need for die attach adhesives and traditional transfer mold compounds anymore being currently widely used in SO, QFN, QFP and BGA type of lead frame and laminate devices.

This presentation will give a high level overview of the relative new and different assembly materials being developed, qualified and used in “advanced semiconductor packaging” as such. This includes very thin “Wafer Applied Underfill Films” for 3D Stacking of thin TSV Wafers, specialized “low stress and low warpage” adhesives/underfills for Flip Chip and Interposers and low shrinkage and ultra-low warpage wafer encapsulants for Fan-In and Fan-Out devices. As the proven wire bond technology will certainly continue to be used in high reliability and automotive semiconductors and sensors, also new adhesives with higher thermal conductivity, lower temperature cure, ultra-low modulus and pre-applied “B-stage” capability will pass by ....

### Biography

Ruud de Wit is responsible for managing Henkel's Semiconductor Materials business in EIMEA. Ruud has a BSc degree in Mechanical Engineering followed by several polymer, sales and marketing courses. He's working for Henkel since 1990 in multiple positions including technical service, quality engineering and global semiconductor account and product management.

## A New Collaborative Approach to Reliability Challenges in the Automotive Industry



A. Amade  
Regional Senior Director EMEA  
Entegris, Global Sales, Dresden, Germany



### Abstract

By 2030, 50% of the car costs are expected to be SC components related. While it is an exciting source of growth for the complete supply chain, the car industry sets a great challenge for all of us: reaching the ppb level in failure rate at the component level. Material purity and contamination control could play key enabler roles. However it requires a new collaborative approach to validate expectations and identify the most adequate investments to meet the “zero defects” goal. From the list of potential material options, there is an increased value to tackle the non-visible particles that are sources of latent defects. Actually, the defectivity monitoring challenges in terms of limit of detection create a “Black Box”. The industry is here in the 3rd generation of contamination control strategy where base line and excursion control could be improved with an adequate contamination management strategy. A collaborative engagement model exists where device makers and experts in purity work together in task force mode. This is the “New Collaborative Approach”.

### Biography

Mr. Amade joined Entegris in 1995 as an Application Engineer in its Semiconductor business. In his current role as EMEA Sr. Regional Director, Mr. Amade’s primary responsibilities include growing the semiconductor business in Europe and Middle East through market strategies, and in the management of a sales, customer service and marketing team.

Mr. Amade held leadership positions at Entegris which included: gas microcontamination market management, strategical account management and regional sales management.

Mr. Amade has a degree in Chemical Engineering from ENS Chimie Lille and he is a member of Semi Electronic Materials Group for Europe.

## Digitalization and Innovation Transforms Manufacturing and Construction



P. Maris  
CEO  
Kinetics, Livermore, United States



### Abstract

We've developed some new game-changing technologies leveraging 3d computer-aided design, augmented reality, virtual reality, and sophisticated human-machine interfaces. We can discuss how these technologies are changing the way facilities and equipment are designed, built, and operated.

### Biography

Peter Maris, Kinetics Systems, Inc.  
CEO

An accomplished business leader with over 19 years' experience in the high-technology industry, Peter heads the global business operations for Kinetic Systems, Inc. Peter left a successful 10-year career in the commercial banking industry to join Kinetics in January 2000, first working in Malaysia for its Asian operations. He continued his leadership path shortly thereafter taking over as president for Europe/ME and Asia, before assuming the role of president and CEO in 2010. He is accredited for consolidating Kinetics' international operations and establishing its Saudi Arabian business units. His strategy to drive the business into a process-driven company has transformed Kinetics into "The Process People" it is today, positioning the company as a global leader in total process solutions. Peter's fluency in four languages and strong finance background gives him an edge in working with people and finding common sense solutions in an engineering-driven industry. Under his leadership, the company has continued to deliver double-digit profitable growth over the last few years. Peter holds a BS in economics.



J. W. Bartha  
Professor  
TU Dresden, EEIT - IHM, Dresden, Germany



### Biography

Prof. Dr. Johann W. Bartha received a Diploma and PhD. degree in solid state physics at the University of Hannover, Germany. He was two years Post Doc at the IBM T. J. Watson Research Center Yorktown Heights, N. Y. where he investigated Metal Polyimide interfaces for applications in multi layer ceramic packaging. 1985 he joined the IBM German Manufacturing Technology Center (GMTC) at Sindelfingen Germany as staff member and became responsible for plasma based technologies in semiconductor processing as a senior staff member. 1994 he accepted a C3 professorship at the University of Applied Sciences at Münster, Germany where he established a laboratory for micro manufacturing. 1999 he accepted a C4 professorship as head of the chair for Semiconductor Technology at the Technische Universität Dresden (TUD). Since March 2003 he is director of the Institute of Semiconductor- and Microsystems Technologies at TUD and established a strong collaboration between the Dresden University and the local semiconductor Industry. The research focus at his chair is BEOL processing, 3D integration including electrical and optical TSVs as well as Silicon thin film PV. The search for ultrathin conformal Cu barriers as required in damascene technology initiated the interest in

ALD. In the meantime, the materials studied include high-k dielectrics, moisture barriers, metals, nitrides and graphene. Specific focus is on in-situ and in-vacuo analysis of the nucleation and growth within the ALD processes.

## Wide Band Gap Semiconductor Materials - Status and Challenges



J. Friedrich  
Department Head  
Fraunhofer IISB, Materials, Erlangen, Germany



### Abstract

Wide band gap (WBG) semiconductors (SiC, Ga<sub>2</sub>O<sub>3</sub>, GaN, AlN, diamond) have certain outstanding physical properties which make these materials so attractive for power electronic, optoelectronic and rf applications. However, the growth of bulk crystals with large diameters and with high quality and yield and the manufacturing of substrates from these crystals are much more complicated in comparison to the very mature materials Si and GaAs.

In the presentation the difficulties in growing bulk and epitaxial WBG semiconductors will be introduced and technical solutions will be shown which have been developed to overcome the existing obstacles. Special focus is put on SiC, GaN and AlN. The status of these materials is compared in terms of available crystal size, totally produced wafer area and typical crystal defects.

An outlook will be given to the next scientific and technological steps which must be solved in order to accelerate the commercialization of the materials further.

### Biography

Dr.-Ing. Jochen Friedrich studied Materials Science at the Friedrich-Alexander University of Erlangen-Nuremberg (FAU), Germany. After receiving his Dr.-Ing. degree from the FAU in 1996 he joined the Fraunhofer Institute of Integrated Systems and Device Technology (IISB). Since 2004 he is head of the Department Materials at IISB which was formerly named Crystal Growth. Together with his colleagues Dr. Jochen Friedrich received several awards: "Wissenschaftspreis des Stifterverbandes für die Deutsche Wissenschaft 2003", Award of the „Gesellschaft für Mikroelektronik, Mikro- und Feinwerktechnik (GMM) des VDI/VDE“ 2005, Best Lecture Award of the International Workshop on Crystal Growth Technology 2008, Microelectronics Innovation Award 2009, and EMRS-Symposium W Best Poster Award 2016. He was also president of the German Crystal Growth Association (DGKK) from 2012 to 2016. His department is doing applied research for its industrial partners on bulk growth and epitaxy of semiconductor materials (Si, Ge, GaAs, InP, SiC, GaN, AlN).