

Tuesday Morning, October 20, 2015

Exhibitor Technology Spotlight

Room: Hall 1 - Session EW-TuM

Exhibitor Technology Spotlight Session

Moderator: Dennis Sollon, Kurt J. Lesker

10:20am **EW-TuM8 Ask the Experts Special EW Session, Gerardo Alejandro Brucker**, MKS Granville-Phillips Division, Longmont

The presentation will include a primer on the principles of vacuum technology including: vacuum generation, gas flow and pressure measurement along with discussion of the most interesting questions and challenges raised by the AVS audience throughout the years. Learn the differences between direct and indirect pressure measurement. Understand the advantages of thermal versus pressure based mass flow controllers. If you are new to the vacuum industry or are interested in hearing what your colleagues are doing with vacuum technology this is a great opportunity to learn some new and interesting tricks." After the spotlight presentation, be sure to visit the Ask-the-Experts booth (#439) where you will find a wide group of international experts who volunteer their time to answer vacuum process and technology questions from the conference attendees. Over the many years that the event has been hosted by the AVS, there have been many interesting questions asked by the AVS community and answered by a wide range of experts. The goal of this presentation is to bring awareness to this sponsored event and to discuss some of the most interesting questions fielded by the general AVS audience during the last few conferences.

10:40am **EW-TuM9 The Nano Probe Station for Your 2D Characterization Needs: The First Low Temperature MultiProbe SPM-NSOM System Integrated with Raman, Aaron Lewis**, Nanonics

The Nanonics CryoView MP is the ideal SPM platform for studying mechanical, optical, electrical, thermal and chemical nanoscale properties of 2D materials at low temperature. Materials such as graphene, hexagonal boron nitride (h-BN), dichalcogenides (e.g.) MoS₂, etc. The CryoView MP is uniquely suited to conduct studies in dynamics, photoconductivity, electrical conductivity, and other phenomenon of such materials. Very sensitive and stable tip-sample interaction control through the tuning fork feedback mechanism allows for high resolution SPM measurements. The open optical access allows for a variety of optical integrations including near-field, Raman, TERS and fluorescence measurements. Multiple online probes allow for a variety of measurements including MFM, EFM, SSRM, KPM, SThM, and NSOM. The CryoView MP opens up many new possibilities for exciting research in your 2D materials.

Tuesday Lunch, October 20, 2015

Exhibitor Technology Spotlight

Room: Hall 1 - Session EW-TuL

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12:40pm **EW-TuL2 The Latest Developments in Surface Analysis from Thermo Fisher Scientific**, *Tim Nunney*, Thermo Fisher Scientific, UK, *P. Mack, C. Deeks, R.G. White*, Thermo Fisher Scientific

Thermo Scientific offers a wide range of analytical techniques for materials characterisation, which include XPS, Raman, FTIR, EDS, WDS and EBSD. In this presentation we will discuss our latest developments in instrumentation and software to extend our capabilities for surface analysis.

1:00pm **EW-TuL3 EnviroESCA – The Revolution of a Method**, *Andreas Thissen, S. Bahr, T. Kampen, O. Schaff*, SPECS Surface Nano Analysis GmbH, Germany

Since many decades XPS (or ESCA) is the well-accepted standard method for non-destructive chemical analysis of solid surfaces. To fulfill this task existing ESCA tools combine reliable quantitative chemical analysis with comfortable sample handling concepts, integrated into fully automated compact designs. Over the last years it has been possible to develop XPS systems, that can work far beyond the standard conditions of high or ultrahigh vacuum. Near Ambient Pressure (NAP) XPS has become a fastly growing field in research inspiring many scientist to transfer the method to completely new fields of application. Thus, by crossing the pressure gap, new insights in complicated materials systems have become possible using either synchrotron radiation or laboratory X-ray monochromators as excitation sources under NAP conditions. Based on this experience SPECS Surface Nano Analysis GmbH has developed a revolutionary tool to realize the long existing dream in many analytical laboratories: reproducible chemical surface analysis under any environmental condition. EnviroESCA allows for different applications, like extremely fast solid surface analysis of degassing (but also non-degassing) samples, ESCA analysis of liquids or liquid-solid interfaces, chemical analysis of biological samples, materials and device analysis under working conditions (in situ/in operando studies of catalysts, electrochemical devices etc.). Discover the new capabilities of EnviroESCA, a fully automated tool in a new sophisticated and compact design with uncompromising ease-of-use, and explore completely new fields of applications for the established analysis method XPS.

1:20pm **EW-TuL4 Latest Developments in XPS and Related Methods from Kratos Analytical**, *Chris Blomfield, J.D.P. Counsell, S.J. Coultas, S.C. Page*, Kratos Analytical Limited, UK, *C. Moffitt*, Kratos Analytical Limited

The Axis Supra is the latest generation of XPS instrument from Kratos Analytical. In addition to offering enhanced energy resolution and sensitivity for XPS, it has a 15µm small area spectroscopy and 1µm imaging capability. The instrument is designed to offer a high level of flexibility and can be fitted with a range of complimentary surface analysis techniques such as UPS, ISS, AES, along with an additional surface science station and a range of sample treatment capabilities. In addition to offering benchmark level performance, the instrument and ESCApe data system combine to offer a high throughput platform optimised for the multiuser environment of today's surface analysis laboratory. Samples may pre-aligned and analyses predefined so that, when combined with the automated sample transfer capability, high levels of throughput can be achieved with unattended operation. Applications of high resolution imaging, multispectral imaging, gas cluster ion source and GCIS-UPS studies will be presented on a range of new materials to underline the leading capabilities of the Axis Supra.

1:40pm **EW-TuL5 What's New from Physical Electronics**, *Scott Bryan*, Physical Electronics USA

What's New from Physical Electronics

2:00pm **EW-TuL6 AFM of Thin Films for Nanomechanical, Nanoelectrical, and Electromechanical Characterization**, *Amir Moshar, A. Labuda*, Asylum Research, an Oxford Instruments Company

AFMs now offer characterization beyond just thickness, grain and domain sizes of thin films and coatings. Instrumentation advances enable hassle-free environmental experiments for studying solvent and thermal effects. Nanoelectrical, nanomechanical and electromechanical modes allow quantitative measurements of functional properties. AFMs are also faster,

easier-to-use, and allow users a wider variety of such techniques enabling more meaningful, correlative results. In this presentation, Asylum Research will discuss the latest advances in AFM instrumentation, scan modes, and give real-world examples of research being done on the Cypher™ and MFP-3D™ AFMs. We'll also introduce the science behind making quantitative measurements of electromechanical response with interferometric AFM.

Tuesday Afternoon, October 20, 2015

Exhibitor Technology Spotlight

Room: Hall 1 - Session EW-TuA

Exhibitor Technology Spotlight Session

4:00pm EW-TuA6 High Efficiency, High Capacity and Economical
“Point of Use” Gas Abatement, *D.K. Prasad*, CS CLEAN SYSTEMS,
Inc.

Air pollution regulations, employee health concerns and growing awareness of toxic agents from semiconductor, industrial and research facilities demand improvements in exhaust gas conditioning. The NOVASAFE dry scrubber reduces the hazards associated with pyrophoric, toxic and corrosive gases and vapors. NOVASAFE effluent gas scrubbers offer an extremely safe and efficient way to treat such process exhausts. The scrubber is a technologically advanced device, containing approximately 10 liters of granulate scrubbing media specific to the process chemistry, and can be used in both production and laboratory and research environments. Operating passively at room temperature, the granulate material reacts on contact with process gases and chemically converts them to non-volatile inorganic solids. NOVASAFE, with its compact form factor, can be integrated with your vacuum pump system to provide a minimal footprint solution. Effluent is abated to sub-TLV levels. The NOVASAFE requires no preventative maintenance, and is replaced and disposed of at its end of life. Granulate is available for many different chemistries, including hydrides, acid gases, metalorganics, etc. making NOVASAFE a cost-effective solution for etch, MOCVD, ALD, ion implant and many other applications.

Wednesday Morning, October 21, 2015

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10:20am **EW-WeM8 New and Ongoing Developments in Thin Film Deposition from the Kurt J. Lesker Company**, *S. Armstrong, Duane Bingaman, B. Zinn*, Kurt J. Lesker Company

This presentation will cover the latest developments in deposition sources and PVD and ALD thin film deposition systems. New advances in the field of vacuum deposition science will be outlined with a Q&A session to follow.

10:40am **EW-WeM9 H2O2 Gas: Revolutionary new molecule for ALD**, *Jeffrey Spiegelman, D. Alvarez*, RASIRC

H2O2 is well known for its superior oxidizing capabilities. Now H2O2 is available in high concentration, with or without water and even without carrier gas. H2O2 gas is ideal for next generation materials and 3D architectures that are temperature and water sensitive. Learn about two innovative products that overcome Raoult's Law and deliver stable, repeatable, high concentration H2O2 gas. The Peroxidizer delivers up to 5% H2O2 gas by volume from 30% H2O2 liquid solution. BRUTE Peroxide delivers anhydrous H2O2 gas for water sensitive processes such as ALD involving new materials and 3d architectures.

Wednesday Lunch, October 21, 2015

Exhibitor Technology Spotlight

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12:40pm EW-WeL2 Wet Cell II for Analysis at the Liquid Vacuum Interface, *Junhang Luo*, SPI Supplies

The liquid interfaces are very active and important for environmental, biological, and industrial processes. However, most surface analysis instrument are vacuum based and the rapid liquid evaporation makes in-situ analyzing liquid surface extreme challenge. Wet Cell II offers a simple solution for scientists and researchers to directly analysis of liquids at the molecular level in a vacuum environment with minor cost. As a lab-on-a-chip device, Wet Cell II can be straightforwardly adaptable to many different analytical platforms, including scanning electron microscopy (SEM) and time-of-flight secondary ion mass spectrometry (TOF-SIMS). Wet Cell II requires little or no sample preparation and only consumes a few drops of liquid. Typical applications include microbiology, liquid surface chemistry, drug delivery & reaction, and energy storage, etc.

1:00pm EW-WeL3 Relative Permeation Performance of O-ring Seals Using DuPont Test Methodology, *Mark Heller*, DuPont™ Kalrez®

As Large Scale Integration (LSI) Devices become more advanced, feature sizes are continuing to get smaller and the associated film thicknesses deposited are reaching atomic levels. As a result, the outgassing and permeation characteristics of elastomeric seal materials used in high temperature and high vacuum processes are important factors that can influence film uniformity, quality and consistency. DuPont Performance Polymers (DPP) has developed a practical test methodology for comparing relative permeability characteristics of O-ring seals under high vacuum conditions using a Quadrupole Mass Analyzer (QMA) and Ionization Vacuum Gauges. The method will be discussed and a sampling of data generated for various O-ring materials / compositions will be reviewed.

1:20pm EW-WeL4 Advances in Bellows Electroforming, *Berl Stein*, NiCoForm

Improved mechanical properties of NiCoForm's nickel-based alloy, NiColoy®, broaden the appeal of electroformed bellows. Newer manufacturing techniques shorten lead times and reduce cost of custom, as well as standard bellows. Proprietary electrojoining, corrosion protection and multi-ply technologies deliver industry-leading performance in net-shape electroformed, ready-to-use components.

1:40pm EW-WeL5 PREVAC's Solutions for Helium Temperature Sample Manipulation and Related Sample Transferring Systems, *Adam Dziwoki*, PREVAC sp. z o.o., Poland

The wide range of temperatures is the key point for number of analytical techniques. We are able to cool down and stabilise the temperature of the sample in 5-6 axes manipulators below 10K. Our latest upgrade in helium manipulator is the possibility of the sample heating and extension of the tilt range implemented without any impact on continuous rotation. If you need a solution for fast and reliable transfer between several chambers in UHV conditions we invite you to check in person a manual or motorised solutions for Radial Distribution Chamber. Thanks to it the spectroscopy, deposition and microscopy chambers with all auxiliary chambers can be connected together.

2:00pm EW-WeL6 Variations on Vacuum Baking for MEMS Processing, *William Moffatt*, *K. Sautter*, Yield Engineering Systems, Inc.

Yield Engineering Systems' latest series of ovens are essential tools for Semiconductor, MEMS and Wafer-level packaging (WLP) processes. The full presentation will explain the technical process involved for each tool in the YES-VertaSeries: The YES-VertaCure automated, high temperature cure series of ovens helps achieve total environmental control to increase yields and extend device performance.

Applications

- Polyimide cure
- BCB cure
- Low temp polymers cure
- Copper anneal

The YES-VertaCoat automated, silane vapor deposition system is designed for today's most advanced MEMS and semiconductor process applications. Whether it's precise surface modification to reduce stiction for MEMS devices or a thin copper diffusion barrier layer in an advanced semiconductor device, the capability to use a large number of different organosilanes provides the ability for precise surface modification.

Applications

- Wafer dehydration
- Surface tension modification
- Copper diffusion barrier

The YES-VertaVac series of automated high vacuum ovens ensures moisture and hydrogen removal using high vacuum (10⁻⁵) and high temperature (up to 450°C). Our patented nitrogen purge precedes process ramp and creates a successful procedure for improved MEMS lifetime and performance.

Applications:

- Wafer dehydration
- Getter activation
- Metal annealing

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4:00pm EW-WeA6 Title Innovative Raman imaging, *Tim Prusnick*, RENISHAW, INC.

Renishaw's inVia is the world leader in confocal Raman spectroscopy. The inVia offers a wide range of imaging techniques that allow the user to choose the optimal solution for a particular sample type. Renishaw has partnered with other instrument vendors to combine atomic force microscopy (AFM) and scanning electron microscopy (SEM) to provide Raman analysis from the same point on the sample. The SEM Structural and Chemical Analyzer (SEM-SCA) combines both SEM and Raman techniques into one system, so that users can take full advantage of the high spatial resolution, large depth of field and high contrast afforded by the SEM, and the chemical information revealed by Raman. The Atomic Force Microscope (AFM) combine AFM and Raman to allow users to simultaneously acquire data from the same point on the sample without having to move it. This ensures that your data are consistent, even if your sample is changing with time.

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