

Wednesday Lunch, November 12, 2014

Exhibitor Technology Spotlight

Room: Hall ABC - Session EW-WeL

Exhibitor Technology Spotlight Session

Moderator: Chris Moffitt, Kratos Analytical Limited, UK

12:40pm **EW-WeL2 An Auger Electron Analyzer System for *In Situ* Growth Monitoring**, *W.Laws Calley III, P.G. Staib*, Staib Instruments, Inc.

The Auger Probe is a specially designed electron analyzer engineered for in situ growth monitoring [1]. To avoid shadowing a growing surface, the Probe is designed to operate at extended working distances (tested between 50mm to 82mm) with a tapered, small diameter tip. The Probe can utilize a grazing incidence RHEED gun or a near normal incidence electron gun. Figure 1 shows a typical Probe configuration in an MBE system.

AES is a surface sensitive technique capable of detecting nearly all elements. The Probe has detected low-Z elements like Li, figure 2, as well as high-Z elements like Dy [2], figure 3, during real time deposition of the respective element.

The Probe has been implemented in a wide variety of growths environments, from more traditional MBE III-V growths, to III-Nitrides and Oxides, figure 4, as-well-as metal alloy growths.

The Probe has proven reliable in all the tested growth environments, including systems with Li, O, Cl, Ga, As, and Sb. It has not failed in any tested growth environment after hundred of hours of exposure during growth. It has not been shown to interfere with any growth process that it has been operated.

The Probe is easy to operate, requiring simplified alignment when compared to traditional AES. Coupled with automated data acquisition software, it is easy to implement in real time growth monitoring.

The Probe has been used to detect and identify several contaminants in growth environments including, C, O, and Cl. It has also been used to monitor the oxide removal from substrates prior to growth.

The Probe has been used to monitor the growing surfaces in all of the previously mentioned growth environments. This real time monitoring of growing films allows the user to construct an AES growth profile of the grown film.

The Probe provides real time N(E) auger spectra enabling quantification of the Auger data. This allows the user to track the elemental concentration throughout the growth.

The Probe has been used in a wide variety of growths environments. The Probe has not failed in any of the environments in which it has been installed. The Probe can detect elements as light as Li to heavy elements through the Lanthanide system. In addition to AES, the analyzer provides REELS spectra of the distribution of characteristic energy losses [3]. Due to its robust and unique design, the Probe can be used in a variety of growth environments to provide real time elemental analysis during growth.

[1] P. G. Staib, *J. Vac. Sci. Technol. B* 29, (2011).

[2] W. Laws Calley, et al., *J. Vac. Sci. Technol. B* 31, (2013).

[3] P. G. Staib, at this conference. Abstract #5115

1:00pm **EW-WeL3 Safe and Efficient - Dry Bed Exhaust Gas Abatement of Toxic Gases I**, *Sam Yee*, CS Clean Systems Inc.

The NOVAPURE® series offers a safe, efficient and reliable solution for treatment of hazardous process gases and by-products.

This unique system uses chemisorptive granulate technology to treat process gases in a negative pressure environment ensuring only inbound flows. Continuous gas monitoring assures total point-of-use gas treatment below TLV levels. In the event of a power outage, the NOVAPURE system will continue to treat the inflows.

The built-in 90% depletion feature provides warning of breakthrough when the granulate is 90% consumed. The remaining capacity allows the current process to run-to-finish and time to schedule a shutdown for canister replacement.

Chemisorptive technology provides irreversible reactions with process gases and their byproducts, forming non-volatile solids. The spent canister can be easily and safely disposed of or incinerated. Air pollution regulations, employee health concerns, and growing awareness of toxic agents from semiconductor processes demand increased improvements in exhaust gas conditioning.

The NOVAPURE® Dry Scrubber reduces the hazards associated with flammable, toxic or corrosive gases and vapors.

NOVAPURE® effluent gas scrubbers offer an extremely safe and efficient way to treat toxic and corrosive gases resulting from hazard processes. This scrubber is a technologically advanced dry chemical scrubber containing approximately 32 or 37 gallons of scrubbing media. The scrubber is suitable for use in production and general laboratory environments. Operating passively at ambient temperature, chemical resins in the canister react on contact with process gases and by-products, converting them to non-volatile inorganic solids.

Applications include: Ion Implant, Etch, ALD, CVD, III-V, and MOCVD. Flow limit is 240slpm. The unit is equipped with built in bypass, end point detector.

1:20pm **EW-WeL4 The Workstation For Your 2D Characterization Needs - The First Low Temperature MultiProbe SPM-NSOM System Integrated with Raman**, *David Lewis*, Nanonics Imaging Ltd.

The Nanonics CryoView MP is the ideal SPM platform for studying mechanical, optical, and electrical 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 probes allows for a variety of electrical measurements including MFM, EFM, KPM and thermal measurements. The CryoView MP opens up many new possibilities for exciting research in your 2D materials.

1:40pm **EW-WeL5 Trends and Solutions of Control Electronics for Surface Analysis and Science**, *Jacek Latkowski*, PREVAC sp. z o. o.

Any electronics, magnetic and electrostatic field distortions give rise to unwanted effects, especially in sensitive electron microscopy measurement techniques such as XPS and UPS. The electronics utilised in these techniques require special consideration in order to minimise the influence of such distortions. We will describe, based on practical experience, how important these considerations are.

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