Tuesday Lunch, October 30, 2012

Exhibitor Technology Spotlight
Room: West Hall - Session EW-TuL

Exhibitor Technology Spotlight
Moderator: D. Surman, Kratos Analytical Inc.

12:20pm **EW-TuL2 Complementary Nature of XPS and Raman Techniques**, ***R. Kershner***, *T. Nunney*, Thermo Fisher Scientific

The increasingly complex nature of structure-property investigations in bulk, nanostructured, and thin-film applications has demanded a renewed focus on complementary techniques for chemical and structural analysis. At the same time, the most successful experimental protocols will take advantage of minimal sample preparation, straightforward data collection, and unambiguous interpretation of results. In this talk, we present a broad overview of the rich chemical and structural information provided by both Raman and X-ray Photoelectron Spectroscopies, with an emphasis on applications that derive significant benefit from leveraging both techniques in a complementary fashion. While both XPS and Raman can be used to generate complex datasets using a variety of advanced sampling approaches, the real power lies in the user's ability to generate answers to challenging problems without the need for an in-depth understanding of the technique itself. Specific examples will be given that demonstrate how both approaches are essential to uncovering the fundamental science behind functionalization of thin graphene films, characterization of one-dimensional carbon materials, and other applications -- allowing anyone to quickly develop expertise in new and emerging fields.

12:40pm **EW-TuL3 Multi-Dimensional XPS Profiling from Thermo Fisher Scientific**, ***A. Bushell***, *R.G. White, T.S. Nunney, P. Mack, A.E. Wright*, Thermo Fisher Scientific, UK

X-ray Photoelectron Spectroscopy (XPS) provides crucial surface specific chemistry information when evaluating any surface modification, thin film coating or the composition of electronic devices. Depth information from inorganic materials can be obtained by removing material by use of Ar ion sputtering, but organic material can be adversely affected by this process. More recently, noble gas cluster ion beam sources have been developed for profiling of organic materials. The development of a combined monatomic and gas cluster ion source (MAGCIS) allows for a single depth profile experiment to have both cluster and monatomic etching stages. This is ideal for the depth profiling of devices and structures with mixed inorganic and organic layers.

When dealing with the analysis of small features, such as bond pads and tracks for electronic devices, Parallel Imaging XPS provides unmatched spatial resolution for XPS analysis. Reconstructing a spectrum from a chosen area on a spectroscopic parallel XPS image gives the analyst absolute confidence in the area from which that spectrum was obtained. The combination of retrospective spectroscopy from image stacks with a depth profiling capability within a single experiment gives the surface scientist a valuable tool for parallel multi-point depth profile analysis. Processing the large multi-dimensional data sets produced from such experiments requires a sophisticated range of statistical analysis tools, provided within the *Avantage* software.

This presentation will provide examples of data acquired from the Thermo Scientific XPS product range, demonstrating the above capabilities.

1:00pm **EW-TuL4 Organic Depth Profiling using XPS – Pro's and Con's of Different Polyatomic Species**, ***C. Blomfield***, *S. Hutton*, Kratos Analytical Ltd, UK, *D. Surman*, Kratos Analytical Inc.

XPS depth profiling of organic materials while retaining chemical information has traditionally been problematic. The advent of polyatomic ion species for sputtering has substantially changed the way depth profiling can be carried out. A variety of ion species have been developed such as C60, Coronene and Ar clusters all of which seem to have particular areas (types of materials) that they are suited to. This presentation discusses several of these ion species and what their advantages and disadvantages are and how they can be applied. Examples will be shown ranging from polymers to organic PV materials as well as some inorganic materials.

1:20pm **EW-TuL5 What's New from Physical Electronics**, ***J.F. Moulder***, Physical Electronics

The latest innovations in XPS, AES, and TOF-SIMS instrumentation from Physical Electronics will be presented.

1:40pm **EW-TuL6 KolibriSensor and Tyto: New Milestones in Scanning Probe Microscopy**, *T. Hänke, Y. Dedkov, A. Pioda, T. Kampen,* ***A. Thissen***, SPECS Surface Nano Analysis GmbH, Germany

The KolibriSensor™ from SPECS represents a new quartz sensor on the market that excels in its performance and its reliability. It is based on a symmetrical length extension resonator. The high resonance frequency of 1 MHz and the good signal-to-noise ratio allows for faster data acquisition in scanning microscopy and force spectroscopy. Oscillation amplitudes may be set below 20 pm. High stiffness prevents snap-in and the low noise floor continues to give a good frequency shift signal. The tip of the KolibriSensor™ has a separate contact, guaranteeing clean separation of the signals from the tunneling tip and from the quartz force sensor. The new Tyto scan head from SPECS is a milestone in the technology of Scanning Probe Microscopy. The modular design allows for various experimental configurations and for the usage of different sensors. A kinematic mount is used for both the sample and sensor and this feature is combined with accurate position sensors. For the first time, this enables different sensors to access identical locations on a sample and to repeat the procedure after successive sample preparation steps. This opens up opportunities for new experiments and will advance the research of surfaces at the nanometer scale. Additional features of the Tyto scan head are: Four openings for in-situ evaporation, two specular ports for simultaneous optical experiments, and large front openings and windows situated on each side of the body and at the back for broad visual inspection of the sample and sensor. Various sample receptors can be installed in the Tyto scan head, with four or twelve electronic contacts to the sample. Optional extra features include a calibrated Cernox temperature sensor located directly under the sample plate, and a small heater to control the sample temperature to within 1 mK.

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