RBD ENTERPRISES

The Service Detail

Surface Analysis Systems Newsletter — Fall 2006

Introducing the RBD IG2 Ion Source Package

RBD Enterprises' **IG2 Ion Source Package** is the ideal solution for sputter cleaning of samples prior to surface analysis experiments, including Auger depth profiling. The IG2 Ion Source Package comprises the Model 04-165 2 kV Backfill Ion Source and the Model 32-165 Ion Source Control. These units are interchangeable with the PHI® 04-161 and 04-162 ion guns and the PHI® 20-045 control, respectively.

IG2 Ion Source Package

The Model 04-165 2 kV Backfill Ion Source generates an energetic inert gas ion beam for sputter-etching solid surfaces. The source requires that an inert gas such as argon be used to achieve a static chamber pressure of 5×10^{-5} torr. Ions, which are generated by electron impact within the ion source's dual filament ionization chamber, are then focused at the target with energies of up to 2 kV. The impurity content of the ion beam is minimized by using an off-axis filament geometry. A focusing lens permits high ion current density to be obtained for a given operating pressure and source-to-sample distance. A dual tungsten filament assembly permits continued operation when the first filament opens. The filament assembly, which is easily replaced in the field, has an expected lifetime of several years under normal usage at the recommended operating conditions.

The Model 32-165 2 kV Ion Source Control provides all the necessary voltages and currents required to operate the Model 04-165 2 kV Backfill Ion Source. The beam voltage may be activated manually (locally), remotely, or with the built-in timer. Additionally, the anode (ion) and filament currents as well as the beam and focus voltages may be externally monitored to ensure accurate reproduction of sputtering conditions.

Designed with reliability, ease of use, and user maintenance in mind, the **IG2** sets a new standard for backfill ion sputtering.

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In This Issue:

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New Products

The RBD IG2 Ion Source Package

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Model 04-165 Ion Source

IG2 features include:

- Compact geometry allows the source to fit on a standard 2.75" flange
- Off-axis filament design minimizes ion beam impurities
- Adjustable focus allows for different beam diameters and current densities
- Dual filaments that are easy to replace
- Ion source can be lengthened or shortened as required
- Control is simple to operate
- Sputter timer and hour meter included as standard

Model 32-165 Ion Source Control

The **IG2 Ion Source Package** includes the following:

- 04-165 2 kV Backfill Sputter Ion Source
  RBD P/Ns: 04165PR (7" length); 04165LPR (9.25" length)
- 32-165 2 kV Sputter Ion Source Control (RBD P/N: 32165PR)
- Cables, User Manual

Options:

- X-Y Aligner (RBD P/N: IG2-EA); requires 9.25" length Ion Source (RBD P/N 04165LPR)
- Manual Leak Valve (as part of RBD P/N IG2-AGA)
- 50 cc Argon Bottle @ 275 PSI; Research Grade (as part of RBD P/N IG2-AGA)

The datasheet for the **IG2** is available here. For more information, please contact sales@rbdenter.com or call 541-330-0723, x310.

Replacement Electron Gun Controls

Ultravolt® now offers an affordable modular HV Rack series power supply that can be configured as a replacement unit for some of the more common obsolete PHI electron controls, including:

- 11-010 5 kV Electron Gun Control
- 20-320A 10 kV Electron Gun Control
- 20-610 Bertan HV supply (up to 15 kV)

For more information about how we can help you configure an Ultravolt HV Rack series power supply, please contact RBD Enterprises at 541-330-0723 x310 or sales@rbdenter.com.

Tech Tips

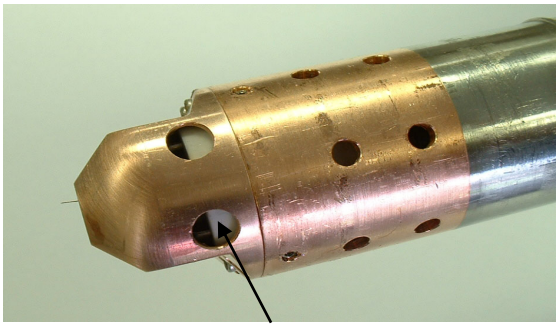
04-500 and 04-548 X-Ray Source Filament Types

Old style or new style? If your 04-500 or 04-548 X-ray Source has a white ceramic visible through the outgas holes as shown in the picture below, then you have the "new style" 622275 X-ray source filament. If you cannot see the white ceramic, then you have the "old style" X-ray source filament.

While we continue to sell the old style X-ray source filaments (RBD P/N 04-5XXOLDPR), we rebuild new-style X-ray source filaments. When it comes time to get your news-style filament rebuilt, please use the following part numbers:

- 04500FRE for the 04-500 X-ray source filament
- 04548FRE for the 04-548 X-ray source filament

Current prices for these items are available on our web site catalog.



If you can see this ceramic, you have a New Style Filament

In addition, we will soon be offering replacement new-style X-ray source filaments at a very competitive price. Keep an eye on our website for the announcement of their availability.

Gaskets: Bigger Than They Look

Did you know that the copper gaskets used on vacuum systems are usually described by the O.D. (in inches) of the flange that the gasket fits on, rather than the actual O.D. of the gasket itself? The table below lists the actual O.D. and I.D of the most commonly used gaskets referenced to the flange size.

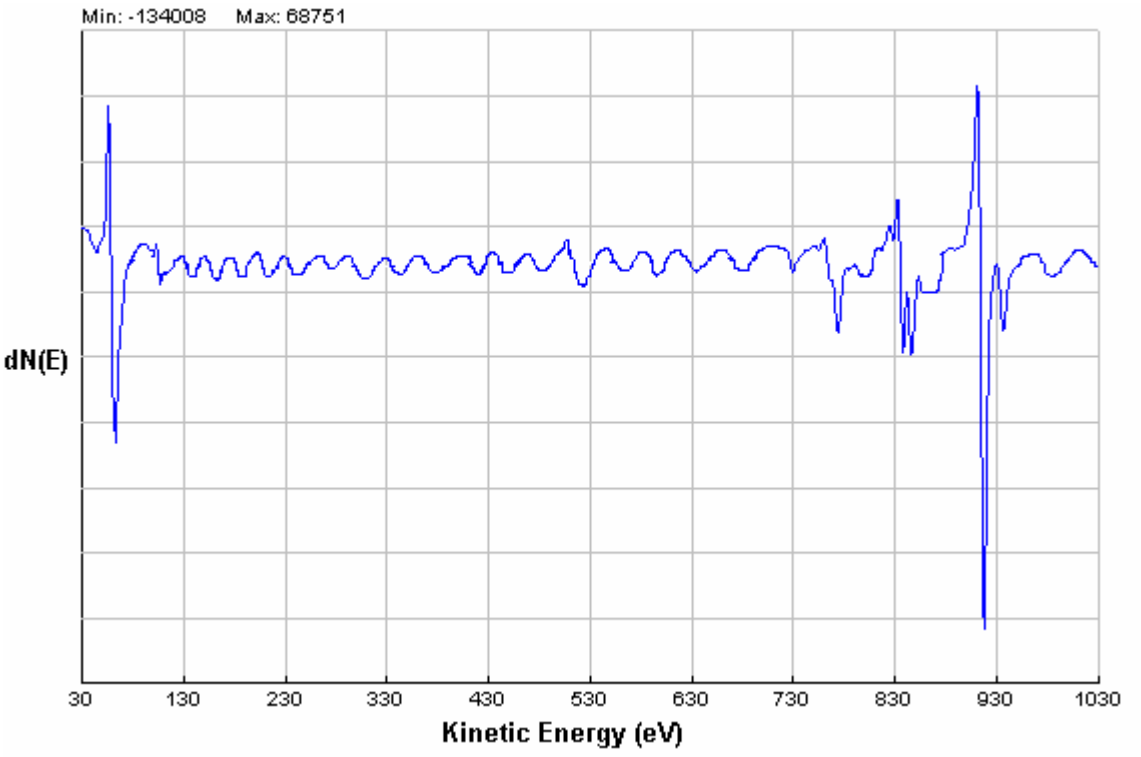
Flange Size O.D.	Gasket O.D.	Gasket I.D.
1.33	.85	.63
2.75	1.9	1.45 (large I.D.=1.52)
3.375	2.43	2.0
4.5	3.24	2.5
6	4.74	4.0
8	6.74	6.0
10	8.74	8.0

These gasket sizes and others are available directly from RBD Enterprises. Click here to get to our on-line catalog.

Tech Tips

60 Hz Noise in Auger Data

There is an easy way to determine if you have 60 Hz noise in Auger Data: Acquire a single sweep survey from 30 to 1030 eV with a time per step of 16 mS. If the noise appears as a sine wave at 16 mS per point, then it is caused by 60 Hz noise in the electron gun control, analyzer control, or electron multiplier supply.



The result shown here was caused by a defective 10,500 uF capacitor in the filament circuit of an 11-010 electron gun control

If your system is exhibiting this symptom, please contact RBD technical support for assistance. RBD technical support can be reached via e-mail at tech@rbdenter.com, or call us at 541-330-0723 x311.

Oil Drip Pans for Mechanical Pumps

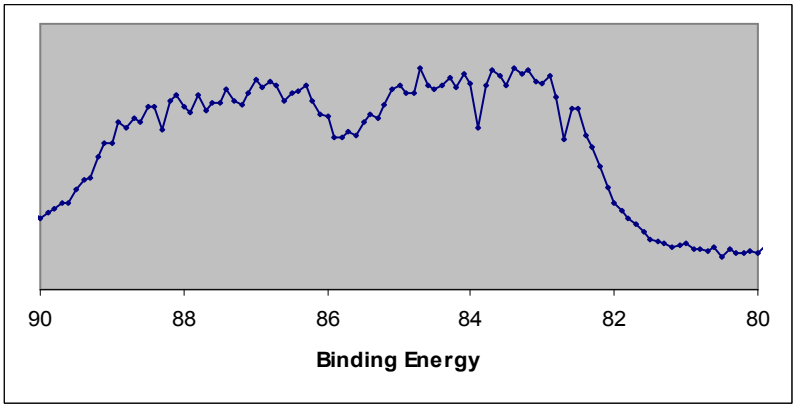
Have you ever had a hard time finding the right size pan to use as a drip pan for the mechanical pump on your system? Restaurant supply stores provide a large variety of plastic trays that work very well and can accommodate any size pump. To find a supplier near you, just Google "restaurant supply trays" or go to http://www.trayworld.com.

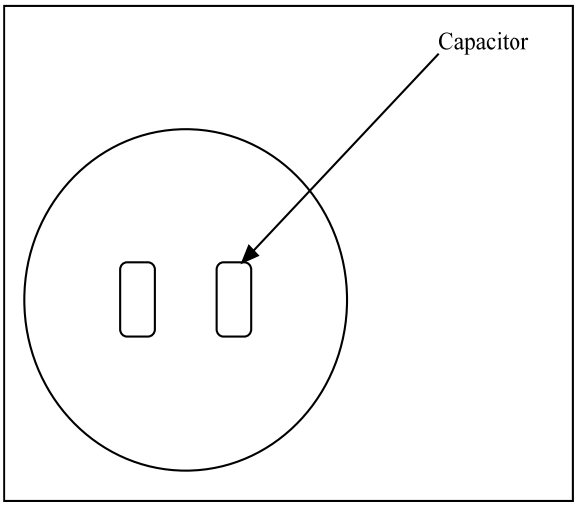
Sample Drip Pans

Tech Tips

Poor PSD Detector Resolution

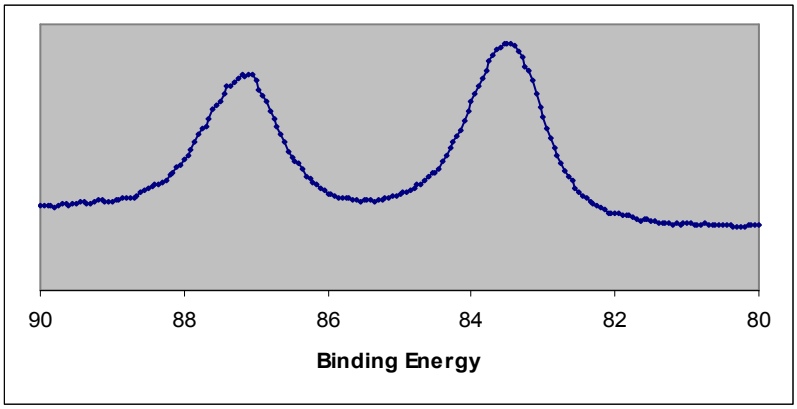
There are two capacitors in the PSD assembly that can move a little bit when the channel plates are replaced. If this happens, the Au data will look like the figure on the right. The peaks are broad and unresolved. This effect is the result of adding multiple channels together.





The capacitors are rectangular and are located on the bottom of the PSD assembly. They couple the signal from the end of the anode and feed this signal into the PSD preamp. The figure on the left shows the approximate placement of these capacitors. The two capacitors should not be touching. If they are, move them as far apart as possible in the grooves that they are mounted in.

Once the resistors are no longer touching, the Au data will look like this:



Announcements

AVS Exhibition and Give-Away in San Francisco, CA

RBD Enterprises will be exhibiting at the AVS 53rd International Symposium and Exhibition at the Moscone West Convention Center in San Francisco, CA.

The Exhibition hours are:

Tuesday, November 14	**10:00 a.m. to 5:00 p.m.**
Wednesday, November 15	**10:00 a.m. to 6:00 p.m.**
Thursday, November 16	**9:00 a.m. to 2:00 p.m.**

Our booth is located in position 1424, which can be found on the exhibition floor plan.

We are excited to announce a drawing* for a new Dell™ Inspiron 6400 Notebook with a 1.73GHz Intel® Core™ Duo processor as our give-away at this year's show. It comes with XP Professional, a 15.4" widescreen display, 1GB RAM, an 80GB hard drive, a CD/DVD burner, and built-in wireless.

So, stop by our booth to see what's going on at RBD, get your badge scanned, and give us one of your cards to enter the give-away. Then, come back to our booth at 11:30 AM on Thursday for the drawing because you need to be present to win!

*Note: This give-away is open to Symposium attendees only. Must be present to win.

PHI Model SMART-200 System Components

If you have a PHI Model SMART-200, here is a great opportunity for you to purchase some of the critical components for your system at very affordable prices. Most of these components are no longer made, and having them available could help to extend the useful lifetime of your SMART-200. Please contact us at 541-330-0723 x310 or sales@rbdenter.com for more information and prices.

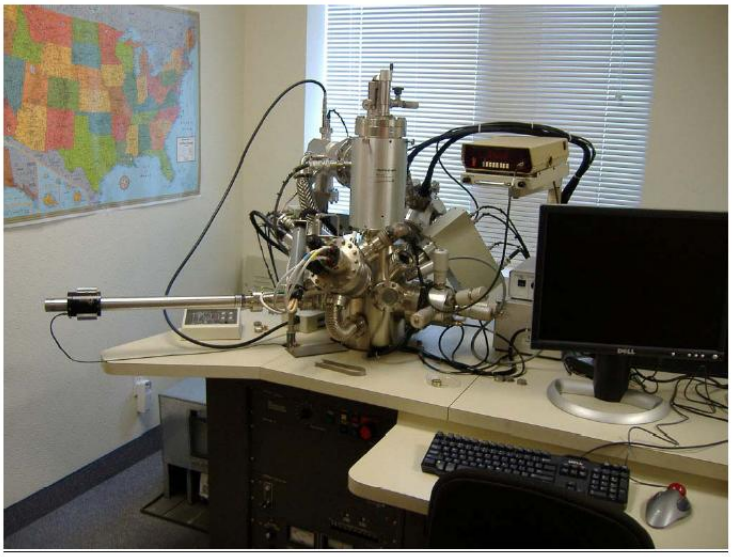
Available Smart-200 Components:

- Motor Control Unit
- X Stage Laser source
- Y Stage Laser source
- Laser Source Control unit
- Granville-Phillips® 307 Vacuum Gauge Control
- Leybold Haraeus Turbotronik NT340M turbo pump
- Leybold Haraeus TurboVac 340M
- Raith stage with all motors
- 200 mm sample intro
- VAT gate valve
- Pfeiffer Vacuum TCP 015 with dry pump and TPD 022 turbopump

Announcements

Addition of SSIMS Technique to RBD Analytical Lab

We are considering adding SSIMS (Static Secondary Ion Mass Spectroscopy) as a technique to our Surface Analysis Laboratory, based on demand. SSIMS is the most sensitive technique for elemental analysis, because it can detect trace impurities that are beyond the limit of AES or XPS. SSIMS is used to analyze not only the elemental composition but also the chemical structure of surfaces. Unlike Dynamic SIMS, SSIMS uses a very low ion dose that results in only the outermost surface (first ~5 Å) being analyzed. SSIMS is ideal for the characterization of organic and polymer surfaces, can detect all elements, and complements both AES and XPS analysis. For more information, please contact the lab at lab@rbdenter.com.



Shipping RMA Call Tag

When you ship something to us, we need to confirm that we received what you meant to send us. Many of you use your own company's in-house packing list, which will work perfectly. (We ask, though, that you please look at the information listed below to see what we need you to include on your packing list.) There are times, however, when you might not have your own packing list available. To address this situation, RBD has created a new form called the "RMA Call Tag."

There are two ways for you to get an RMA Call Tag from us for your shipment. In both situations we'll create one for you so that it contains your contact information and Case-related information (Case number, Sales Quote number, etc.). We would then attach it to your Case in RBD's Customer Support Portal, or fax it to you. If you are not set up yet to use our Customer Support Portal, please contact us at 541-330-0723 x310, or sales@rbdenter.com for a username and password.

Once you have received your RMA Call Tag from us, please verify your contact and shipping information. (If you find any errors, please notify RBD Enterprises so that we can correct the information in our system.) Please then provide the following information:

- The model number and description of each unit/item being sent to RBD. This includes cables, manuals, boards, miscellaneous parts.
- The unit's serial number (if available)
- The reason the item is being sent to RBD (i.e. repair, trade, exchange, loaner return, etc.)

Software Corner

Pumpkins on the porch, leaves changing color, shadows getting longer – it can only mean one thing: AVS season is here! Given how busy we all are this time of year, we'll get right down to business.

AugerScan 3.2.2 Arrives

Just in time for the holidays, RBD announces another free update to its flagship AugerScan software. The new version adds a number of features and fixes a few bugs (hey, even we make mistakes sometimes). Features include:

- Multiple levels of zoom
- Support for PHI® ion guns controlled using the EIA-485 interface
- More flexible printing options (date, time, file path and name)
- AES alignments can be differentiated during acquisition
- Neutralizer event added to automation
- Cycle, time, and depth tracing for depth profiles
- Save All prompt when closing

Discover AugerScan Automation

One of the most common comments we hear from customers regarding AugerScan is "I didn't know I could do that!". When new updates are released, people often skim over the new feature list and get right to work. One feature that we recently added to AugerScan that has often been ignored is Automation.

The Automation command, which is available from the System menu, provides a way to schedule stage, acquisition, sputtering, and neutralizer events, and then run those events unattended. The event list can be saved and loaded, and a log file keeps track of event history in case of a power outage or system failure.

Setting up events is easy. Stage events are set up by moving the stage to the desired position and clicking the Stage button. Sputtering and neutralizer events are simply turned on and off from the dialog. (The dialog containing the Automation settings and options is shown on the following page.)

Acquisition events are set up by first saving a blank acquisition, then selecting this "blank acquisition" file as the template. Saved acquisition files may be named based on sample information, date/time, customer information, and comment.

Events can be cloned, or dragged-and-dropped to change the order. The entire event schedule can be saved for reuse at a later time.

Even for simple schedules, such as pre-sputtering, using the Automation feature can save time by providing unattended system control.

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Software Corner

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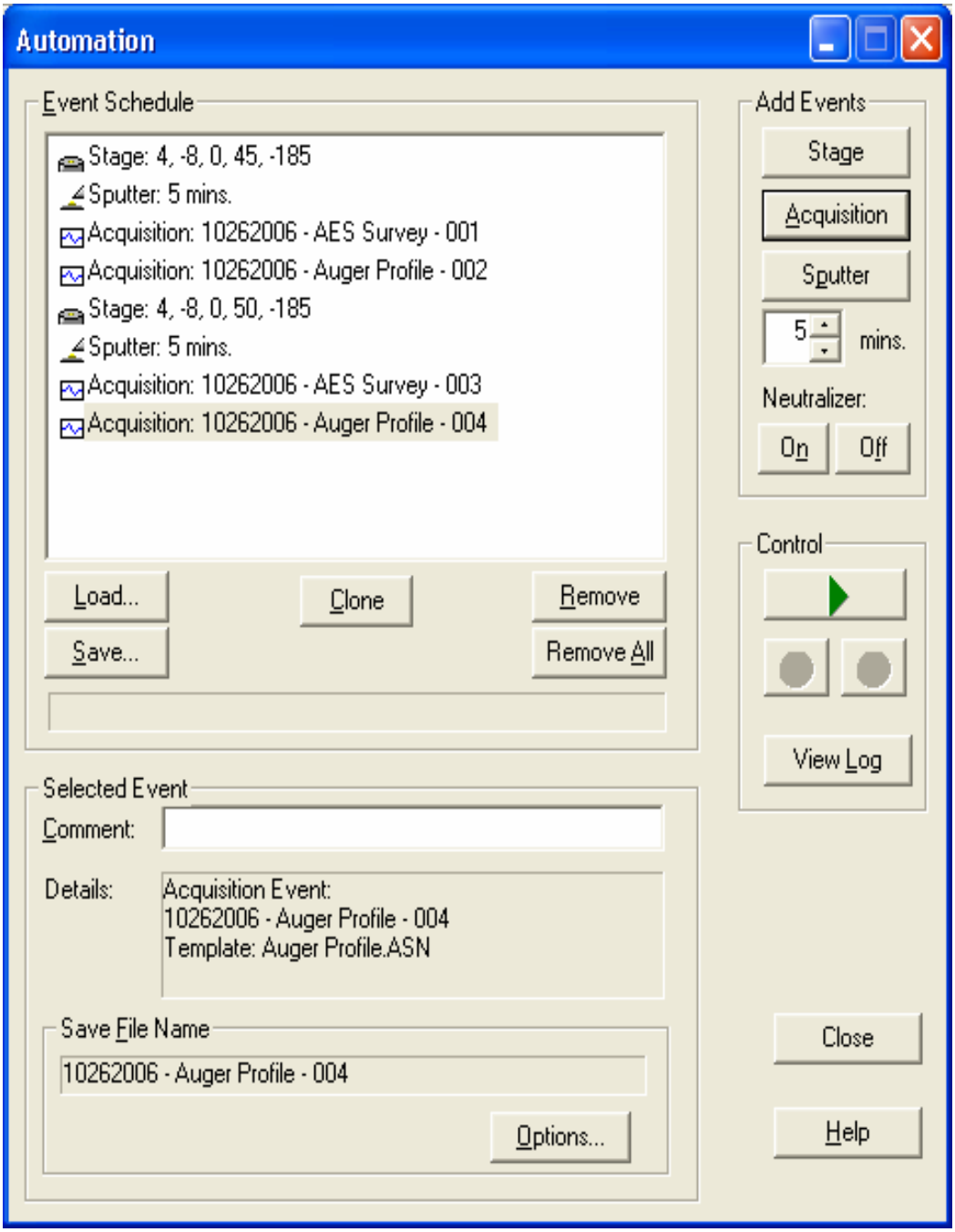

Automation Dialog in AugerScan

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Software Corner

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Up-and-Coming

AugerScan Features "In the Queue"

As AugerScan becomes the standard for many systems, numerous customer requests are for more specialized features. We try and balance our development by placing a priority on features that will impact the greatest number of customers, as well as those that are urgently needed for any one customer. Because of this, some features can take a long time to implement.

The good news is that our new development and bug-tracking system is integrated with our customer support portal, so we are able to track requests by customer while keeping an eye on the "big picture." Since implementing the system, we've logged over 130 requests for features and bug fixes (some by our own employees) across our various software applications. (If you are unfamiliar with our bug-tracking system and want to get set up on it, please call as at 541-330-0723 x 310 to learn more about it.)

Here are a few of the features that are in store for AugerScan in the future:

- Ability to load multiple element tables
- Ability to shift limits (as opposed to data) for selected or all regions of a multiplex or depth profile
- Save to temp file during acquisition for recovery
- Depth profile legend
- Copy/Paste for annotations
- Vertical annotations
- Separate line style options for printing
- Option to load previous settings for multiplexes and depth profiles

670 and 680 System PC Upgrades Under Development

In the last few years we have had a lot of requests to develop a PC upgrade for the PHI 670 and 680 systems. Recently, we purchased a 670 system that we will use to help test the upgrade and ensure proper control of the system. Initially, we will focus on the 670 systems because they do not have the specimen stage control issues that 680 systems do, and so will be much easier to develop.

We plan to have the 670 upgrades ready for production by mid-to-late 2007. If you have a 670 system that you are still using and would like to operate it on the latest Windows operating system (Vista), please contact us for more information. We would also like to hear your suggestions for improvements in functionality over and above simply duplicating the original features.

Resources

NIST Database for Simulation of Electron Spectra for Surface Analysis (SESSA) (Standard Reference Database 100)

Version 1.0 of this database has been designed to facilitate quantitative interpretation of AES and XPS spectra and to improve the accuracy of quantitation in routine analysis. SESSA contains physical data needed to perform quantitative interpretation of an electron spectrum for a specimen of given composition. Retrieval of relevant data is performed by a small expert system [1-3] that queries the comprehensive databases. A simulation module provides an estimate of peak intensities as well as the energy and angular distributions of the emitted electron flux.

SESSA can be used for two main applications. First, data are provided for many parameters needed in quantitative AES and XPS (differential inverse inelastic mean free paths, total inelastic mean free paths, differential elastic-scattering cross sections, total elastic-scattering cross sections, transport cross sections, photoionization cross sections, photoionization asymmetry parameters, electron-impact ionization cross sections, photoelectron lineshapes, Auger-electron lineshapes, fluorescence yields, and Auger-electron backscattering factors). Second, Auger-electron and photoelectron spectra can be simulated for layered samples. The simulated spectra, for layer compositions and thicknesses specified by the user, can be compared with measured spectra. The layer compositions and thicknesses can then be adjusted to find maximum consistency between simulated and measured spectra. The design of the software allows the user to enter the required information in a reasonably simple way. The modular structure of the user interface closely matches that of the usual control units on a real instrument. In other words, any user who is familiar with a typical electron spectrometer can perform a retrieval/simulation operation with the SESSA software in a few minutes for a specimen with a given composition. Additional information on SESSA and some examples of SESSA applications are given at http://www.iap.tuwien.ac.at/%7Ewerner/sessa.html.

System requirements: PC with Windows operating system, CD-ROM drive, and a hard disc space of approximately 180 MB. The minimum amount of RAM needed to run SESSA is about 15 MB, but 30 MB or more is needed for simulations. SESSA is also available for Macintosh OS X and Linux operating systems, but these versions have not been as extensively tested as the Windows version.

Price: $1390 for a single copy (an order form is available on the NIST web site below). SESSA can be obtained for a free 15-day trial period at http://www.iap.tuwien.ac.at/~werner/asessa_demo.html.

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1. W. Smekal, W. S. M. Werner, and C. J. Powell, Surf Interface Anal. 37, 1059 (2005).
2. W. S. M. Werner, Surf Interface Anal. 31, 141 (2001).
3. W. S. M. Werner, in *Surface Analysis by Auger and X-ray Photoelectron Spectroscopy,* D. Briggs and J. T. Grant, eds. (IMPublications, Chichester, 2003), p. 235.