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AVS 58 Topical Highlights

The [AVS 58th International Symposium and Exhibition](#) will address cutting-edge issues associated with materials, processing, and interfaces in both the research and manufacturing communities. The weeklong Symposium fosters a multidisciplinary environment that cuts across traditional boundaries between disciplines featuring:

Division/Group Programs:

- Advanced Surface Engineering
- Applied Surface Science
- Biomaterial Interfaces
- Electronic Materials & Processing
- Magnetic Interfaces & Nanostructures
- Manufacturing Science & Technology
- MEMS & NEMS
- Nanometer-Scale Science & Technology
- Plasma Science & Technology
- Surface Science
- Thin Film
- Vacuum Technology

Focus Topics:

- Antinides & Rare Earths
- Biofabrication & Novel Devices
- Electron Transport in Low-Dimensional Materials
- Ellipsometry
- Energy Frontiers
- Helium Ion Microscopy
- Graphene & Related Materials
- In Situ Spectroscopy & Microscopy
- Marine Biofouling
- Nanomanufacturing Science & Technology
- Neutron Scattering
- Transparent Conductors & Printable Electronics
- Tribology



The Wall Street Journal puts Nashville in spotlight

The nation's leading business publication said Nashville is one of seven cities "where the action is." The article focused on new industry hubs that have continued to draw entrepreneurs and investors during these tough economic times. [Read More](#)

AVS 58 Energy Storage Tutorial

Sunday, October 30, 2011

This tutorial provides an introduction to batteries, fuel cells, and capacitors, with an emphasis on batteries, especially lithium-ion batteries. The tutorial begins with a broad overview of energy storage technology, including markets and applications, and then describes opportunities and technical challenges for the technology. Following this broad overview, a more detailed description of lithium-ion battery technology is

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provided.

A complete picture of lithium-ion technology, from raw materials to cells to packs and to applications is provided. The product offering of major suppliers is surveyed along with a roadmap for next generation products. The economics of lithium-ion cells is discussed, including a cost breakdown of materials and manufacturing costs. A detailed look at the major components of lithium-ion batteries including active materials, separators and electrolytes is followed by a discussion of manufacturing methods and the principles involved in battery design. [Read More \(PDF\)](#)

AVS 58 Exhibit Days & Hours

The Exhibit comprises an extensive display of tools, equipment, services and consulting for film deposition, surface and interface measurements and analysis, materials, chemicals, supplies, vacuum production and measurement, and related instrumentation for surface, interface and film measurements, as well as professional literature and publications.

Each year, the technical symposium expands into new and exciting technical disciplines. Our Nanotechnology division has grown to record levels and our focus in emerging technologies, such as fuel cell and energy research, consistently keeps our Symposium fresh and exciting for exhibitors and attendees alike.

Tuesday	November 1	10:00 - 5:30
Wednesday	November 2	10:00 - 4:30
Thursday	November 3	10:00 - 2:00

AVS 58 Exhibitor Technology Spotlight Sessions

Tuesday, November 1

10:20 a.m.

Kurt J. Lesker - Novel Thin Film Technology
Presenter: Duane Bingaman

12:20 p.m.

Thermo Scientific: New Developments in Surface Analysis from Thermo Fisher Scientific
Presenter: Richard White

12:40 p.m.

Thermo Scientific: Characterization of Carbon nanomaterials using XPS and Raman
Presenter: Tim Nunney

1:00 p.m.

Kratos Analytical: Optimized XPS Depth Profiling of Organic Materials using Polyatomic Ion Sources
Presenter: D. Surman

1:20 p.m.

Physical Electronics: Latest Developments at PHI
Presenter: John Hammond

Wednesday, November 2

10:20 a.m.

Semicore: Using the Apple IPAD with your PVD system maintenance
Presenter: Chris Malocsay

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Future Symposia

2012

AVS 59

Tampa, Florida

October 28 - November 2

2013

AVS 60

Long Beach, California

October 27 - November 1



Gas Analysis from Low Cost RGA to Quadrupole Mass Spectrometry

12:20 p.m.

Brooks Automation: Granville Phillips Autoresonant IonTrap Mass Spectrometer
 Presenter: Steve Lass

12:40 p.m.

SAES Getters: Combining NEG and sputter ion pump technologies to meet the challenges of UHV-XHV systems.
 Presenter: Bob Garcia

1:00 p.m.

Agilent - Varian Vacuum Division
 Presenter: Steve Palmer

1:20 p.m.

Asylum Research: Smaller, Quieter, Faster AFM Imaging with Cypher
 Presenter: Keith Jone



The Cypher AFM, the World's Fastest and Highest Resolution Atomic Force Microscope

Asylum Research, the Technology Leader in Scanning Probe and Atomic Force Microscopy, will be highlighting its Cypher Atomic Force Microscope this year at AVS. Cypher is not only the most productive AFM available, it also provides the highest resolution and accuracy - and is the easiest to use.



- **High quality tapping mode imaging at 40 lines per second - 512x512 Images in Seconds!**
- **Atomic point defect resolution under ambient conditions**
- **Most accurate images and measurements**
- **Automatic laser and photodetector alignment for ease of use.**

From Cypher user Bruce Parkinson, University of Wyoming:

"The Asylum Research folks have looked at everything that limited AFM performance in the past and addressed all of them in this new design. Cypher has better resolution, less noise, less drift, is more accurate, is able to scan faster and, on top of that, is the easiest to use AFM I have ever seen--and I've seen pretty much all of them while doing AFM since the first DI AFM was introduced 20 years ago. In terms of speed and ease of use, my student timed how long it took him to be successfully imaging from the time he walked in the door--90 seconds! He accomplished in two hours what would have taken a whole day on our existing Veeco AFM."

For more information, please visit

www.asylumresearch.com

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Three compact quadrupole mass spectrometers are available from ULVAC - the low cost Qulee BGM, Qulee CGM for high pressure and the Qulee HGM for the highest sensitivity. All models feature simplicity of design and operation. Integrated display and control electronics eliminates the need for a PC to operate these units. One-touch control displays the partial pressure readout in Torr, mbar, or Pascal of He, H₂O, N₂, O₂, O₂/N₂ ratio and user selected gas. Qulee has built-in set points with serial I/O remote control, RS232C and 485 outputs and easy-to-use software.

Qulee BGM: At prices starting under \$4,400 the Ulvac Qulee BGM is your answer to low cost leak detection, RGA and process gas monitoring in mass ranges of 1-100 or 1-200 amu. The minimum detectable partial pressure is 1×10^{-14} Torr and optional differential pumping is available.

Qulee CGM: With a maximum operating pressure of 15 mTorr, Qulee CGM is able to achieve high measurement accuracy and resolution at up to 7.5 mTorr without the need for differential pumping. It features a user selectable channel from mass ranges of 1-50 amu and a minimum detectable partial pressure of 1×10^{-12} Torr. These features enable Qulee CGM to be used for leak detection, RGA and process gas monitoring in PVD systems.

Qulee HGM: Delivering the highest sensitivity, Qulee HGM offers a minimum detectable partial pressure of 10-15 Torr in mass ranges of 1-200 amu. The maximum bake-out temperature is 482°F while connected to the controller and 572°F when disconnected. Qulee HGM meets the needs of gas analysis in R&D and vacuum system process monitoring.

For more information, please contact ULVAC Technologies, Inc., 978-686-7550, sales@ulvac.com, www.ulvac.com.

Edge Welded Bellows Technology

Simply stated, BellowsTech, LLC edge welded bellows are manufactured by welding stamped, metal diaphragms into a long, flexible assembly. Strips of metal in sheet form are hydraulically stamped into the shape of the diaphragm. The pressure, stroke length, spring rate and temperature help to determine the thickness and material required to meet the applications' demands. The shape of the ripples and inside and outside edges of the diaphragm are crucial to the performance of the bellows assembly. The ripples need consistency between diaphragms to survive high cycles and create accurate spring rates. The inside and outside diameters will be welded later in the process; with properly stamped edges, welds are leak-tight.



Once stamped, diaphragms are inspected for quality and cleaned. The cleaning preparation varies between manufacturers, but the main focus is to ensure that the material is free of any grease or dirt to ensure the welds are strong and leak-tight. The diaphragms need special handling after the process as well to ensure that the natural oils of skin do not come into contact with the diaphragms. The diaphragms are positioned back-to-back (male to female) to pair the inside diameter holes. Once the inside diameters come into contact with each other, they are welded together. Depending on the manufacturer and material, welding can be accomplished through plasma, laser, arc, or electron beam welding equipment. Vision systems can aid the accuracy and consistency of welds. This process is continued in order to make the proper number of convolutions. The convolutions give the bellows assembly the flexibility and performance characteristics.

Once the inside diameter welds are completed, the convolutions can be prepared for outside diameter welding. Depending on the welding equipment, copper rings can be inserted between the convolutions in order to ensure that the heat from the welds does not distort or change material properties in the adjacent material. End plates or flanges can be welded to the end of each side of the bellows assembly per customer requirements. Once completely assembled, edge welded bellows are helium leak tested to ensure the assembly is completely sealed. The industry standard leak rate is 1×10^{-9} for stainless steel material, but lower leak rates are required for certain applications.

For more information, please Contact BellowsTech today with your metal bellows requirements at <http://www.bellowstech.com/edge-welded-bellows/>

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Aluminum Valves with Conflat Flanges from 2.75 to 14 inch

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Aluminum CF flanges from 2.75 to 14 inch OD mate directly to S. S. Conflats® (also CF on one side and ISO on the other). The bolt circle, number of holes, threads, flange diameter, etc. are the same as stainless steel flanges, and mate directly to stainless steel flanges using aluminum gaskets. Our standard bonnet seal is Viton but metal seals are available. Match Cryo & Turbo pump flanges; throttle or Open/Close positioners. Leak rate less than 10-10 scc/s. Vacuum Research has been building high vacuum valves for almost 50 years and has earned a reputation for world class product quality and customer service. If you are not satisfied with our valve just send it back. In under 5 minutes you can replace every moving part in a Vacuum Research Bonnet Style valve with no special tools or training. The valve port stays in your system to support the pump and vacuum lines.



For more information, please contact Vacuum Research Corp., 2419 Smallman Street, Pittsburgh, PA USA, 800-426-9340, Fax 412-261-7220, vrc@vacuumresearch.com, <http://www.vacuumresearch.com>.

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New polyatomic ion source enables sputter depth profiling on polymeric materials using large polyatomic ions (such as C₂₄H₁₂) rather than conventional monatomic ions. These larger ions have an advantage for polymers and other organic materials



where a layer of a few nm may be removed without leaving damaged material on the sputtered sample. XPS depth profiling of polymer materials is now possible and is expected to have a similar impact as depth profiling on inorganic materials. Organic photovoltaic, OLED technologies and drug release polymers will also benefit from this improved capability. The polyatomic ion source has up to 20kV beam energy, mass filtering for ion selection and is available across the Axis Ultra and Axis Nova product ranges."

For more information, please visit www.kratos.com

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