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NEW AND/OR INTERESTING AT PITTCON

As is our custom, and for the hopeful interest of our readers who were not able to attend PITTCON '97, we have attempted in the following to summarize what was presented in microscopy as "new and/or interesting":

AMRAY displayed its popular model 3200 ECO Scanning Electron Microscopes. The Model 3200 ECO is a Variable Pressure or Low Vacuum SEM that allows for uncompromised examination of uncoated samples that are prone to sample charging in a conventional SEM high vacuum mode. The AMRAY Model 3200 ECO SEM also can be operated in a conventional SEM high vacuum mode. AMRAY also displayed information on their Model 3600 LEAP Field Emission SEM. The AMRAY Model 3600 LEAP boasts of a high resolution specification 4 nm at 1 kV, and 1.5 nm at 15 kV. Other features include a 2048 x 2048 frame buffer, embedded computer control of all SEM functions, and patented Schottky Field Emission. AMRAY, INC.: (617)275-1400, Fax: (617)275-0740, WWW: www.amray.com

Digital Instruments demonstrated a new module for nanoindenting, scratching and hardness/wear testing for their NanoScope® Dimension™ Series scanning probe microscopes (SPMs) for investigating the mechanical properties of thin films, such as diamond-like carbon, biological specimens, and other materials. Indentations or scratches with widths as low as 20-30 nanometers can be generated and then immediately imaged with the same tip. Unlike dedicated indenters, this *in situ* imaging eliminates the problem of relocating the new nano-scale features in order to observe the results. DI also exhibited their new Scanning Thermal Microscopy capability, as well as new developments in materials differentiation with their patented Phase Imaging technology. Digital Instruments, Inc.: (800)873-4024, Fax: (805)899-3392, WWW: www.di.com

EDAX exhibited two new products this year at PITTCON. The *EAGLE μ-Probe* is a XRF system utilizing capillary optics for micro-focus x-ray microanalysis. It also features a motorized software controlled stage, video cameras for imaging, and a large sample chamber for analyzing all types of liquids, solids and powders. *Phoenix* is the next generation of EDS systems for use with SEM's and TEM's. Designed around a WindowsNT platform, Phoenix includes as standard, digital signal processing, 32 bit software, high speed imaging and a powerful PC based workstation. Both Phoenix and Eagle utilize EDAX's Sapphire detector series, and intuitive software. EDAX INTERNATIONAL: (201)529-4880, Fax: (201)529-3156., WWW: www.edax.com

Edge Scientific Instruments showed their latest product, the True-View 3D™ Head. The True-View 3D™ Head replaces the traditional trinocular body on most microscopes, to convert the 2D image into a 3D image. A continuous, true color 3D image is seen directly through the microscope eyepieces. This is achieved by simultaneous differential viewing of the objective lens from left and right perspectives. Since the technique uses conventional objectives, magnifications from 50 x to 1000 x are possible. The method is applicable for reflected light applications as well as transmitted light and fluorescence microscopy. Edge Scientific Instruments: (310)396-9333, Fax: (310)396-9003

ETP-USA received outstanding acclaim on its presentation of the New High Performance Robinson Detector. The Ultra High Resolution BSE images on display, as well as the SEM showing of this new Series 5 detector attested to its superior performance. With over 60 % increase in signal capture and a redesigned scintillator shape allowing 5 mm working distance, the new Robinson Series 5 is unmatched. ETP-USA also announced its new INTERNET address: www.etp-usa.com. Check it out for the latest! ETP-USA: (510)449-8534, Fax: (510)449-8996, WWW: www.etp-usa.com.

HNU Systems introduced two new EDXRF analyzer models. The XR-1000T, a table-top model ideal for mobile or analytical laboratories with limited bench space *and* the XR-1000P, a portable unit designed for field or near process applications. HNU offers a choice of detectors which can operate with *either* Model XR-1000: a liquid nitrogen-cooled, high resolution, 165 eV Si(Li) detector or the *new* Peltier-cooled electronic Si(Pin) detector with 220 eV resolution. Features for both models include: easy-to-use Windows®-based XRF software for both qualitative and quantitative analysis, an automated 10 position sample tray and simultaneous analysis from sodium to uranium. HNU Systems: (617)964-6690, Fax: (617)558-0056.

JEOL displayed its new JSM-6340F Digital Field Emission Scanning Electron Microscope. This new microscope is a completely computer controlled near lens FE instrument capable of 2.5 nm resolution at 1 kV. Its intuitive graphical user interface and intelligent column automation allows optimum operation by even the most novice of operators. The large sample chamber can be configured with a number of additional detectors providing full analytical functionality. This instrument was truly designed with the user in mind. It has operation by mouse and/or knobs and the display CRT is a very high contrast, crisp 17 inch monitor with a high pixel resolution of 1280 x 1024 x 8 bits. The menu system is very unobtrusive and menus only stay on the screen as long as absolutely needed. JEOL USA: (508)535-5900, Fax: (508)536-2205, WWW: www.jeol.com

Kevex has introduced QUANTIFIER, our NEW detector, providing higher performance due to a new crystal/FET pairing process. The linearity, resolution and throughput have been improved, providing greater light element sensitivity. The Kevex Quantifier detector is supplemented by the NEW Digital Pulse Processor (DPP), providing enhanced performance as resolution is maintained during high throughput spectral acquisitions. The latest software automation tools are the Kevex Digital Multipoint Analysis (DMA) and Automated Image Analysis (AIA^2), have significantly enhanced the SIGMA Microanalyzer. These capabilities provide ease of use and increased throughput for a wide range of applications. Enhancements in software, coupled with the improvements in the detector, making the Sigma Microanalyzer a powerful microanalysis too. Kevex: (805)295-0019, Fax: (805)295-8714, WWW: www.kevex.com

LEO Electron Microscopy, Inc. exhibited their LEO435VP Windows controlled variable pressure SEM. This popular microscope was fully booked with demonstrations during the entire show. Customers not familiar with the variable pressure mode of operation were surprised and excited at the imaging capabilities and lack of sample preparation requirements. They were impressed with the many features included in the standard instrument package, all at very competitive prices. These items included a five-axis motorized stage, choice of solid-state or scintillor backscattered electron detector, and a secondary detector. Results were impressive, even at low acceleration voltages with crisp noise-free images produced with LEO's automatic gun bias, which varies the gun emission current with kV. LEO Electron Microscopy, Inc.: (914)747-7796, Fax: (914)681-7443, WWW: www.mwrn.com/leo

The *NEW* Leybold CONE.LINE™ Hybrid Turbomolecular Pumps are available in two versions, Models 60 and 200. Engineered for use in applications such as mass spectrometers, electron beam microscopes, and dry pump systems. These pumps utilize the TURBOVAC® field proven ceramic bearing

concept which requires no maintenance for the life of the pump. Features include high fore-vacuum tolerance of up to 10 torr, integrated power failure protection, compact footprint, and air cooling. They can be installed in any orientation, operate in ambient temperatures up to 60° C, and have an integrated data memory logging feature. Rotational speeds are programmable from 30,000 to 51,600 rpm (500 to 860 Hz). Specifications include a wide range of inlet flange sizes with pumping ranges from 60 to 205 ltr/sec. Leybold Vacuum Products, Inc.: (412)327-5700, Fax: (412)733-5960

Nicolet Instrument Corporation introduced the improved Nic-Plan microscope and powerful OMNIC Atlμs software for infrared microspectroscopy. The Nic-Plan features new autofocus for automated setup and time savings as well as automated ATF mapping capabilities for improved infrared data analysis and video image results. The Nic-Plan also features an open throat design for viewing large samples and can be combined with a Side Port Reflectance Accessory for samples too large to fit on the microscope stage. The Nic-Plan has an on-axis optical design, Redundant Aperturing™ and sample compensation with Cassegrainian Reflachromat™ optics for accurate sampling, as well as the View-Thru™ projected Aperture Masking System which permits the entire sample image to be viewed while simultaneously positioning the apertures for IR sampling. Nicolet Instrument Corporation: (608)273-5050, Fax: (608)273-5046, WWW: www.nicolet.com

NORAN Instruments announced EasyEDS, a new application for fast EDS spot acquisitions, analyses, and reports for SEM and TEM applications on the VOYAGER system. EasyEDS has a dual display for a reference image with indexed points and associated spectra. Maps and linescans are displayed in separate windows. QuickClick buttons in the main window let you automatically analyze samples with a single mouse click. A Spectrum Report feature prints formatted reports. EasyEDS is part of the latest VOYAGER software update, which also incorporates new tools for peak identification, annotation of spectra and images, and removable disks (JAZ and magneto-optical). NORAN also presented literature for its IbeX application-specific and APeX full-spectrum WD spectrometers, which complement their EDS applications. NORAN Instruments, Inc.: (608)831-6511, Fax: (608)836-7224, WWW: www.noran.com

Oxford Instruments, Microanalysis Group, showcased the XGT-2000W X-ray microscope. It combines the analytical capability of EDS and the transmitted X-ray image to give simultaneous analysis of a sample's elemental composition and internal structure. Also, demonstrated was the Link ISIS microanalysis system and Link Opal crystallography system, illustrating automated crystal orientation mapping technique. Oxford Instruments, Microanalysis Group: (508)369-9933, Fax: (508)369-8287, WWW: www.oxinst.com

Park Scientific Instruments introduced the BioProbe SPM. Designed for life sciences research, BioProbe combines the convenience and capabilities of optical microscopes with the power and ultra-high resolution of Scanning Probe Microscopy (SPM). BioProbe is the first SPM available which provides full optical viewing with simultaneous SPM operation. The user can utilize all of their advanced optical capabilities including phase contrast, DIC/Nomarski, epi-fluorescence, polarization while collecting, viewing or analyzing SPM images. ProScan software running under the Windows 95 operating system provides for simple and powerful operation. The unit mounts easily on the most popular brands of inverted microscopes. Easy sample access allows the use of micromanipulators, patch clamps and other accessories. Park Scientific Instruments: (408)747-1600, Fax: (408)747-1601, WWW:www.park.com

PGT introduced IMIX-PC, the latest in their line of X-ray microanalysis systems. The Pentium based system will be offered with all of the award winning analytical tools available on PGT's SUN based IMIX-PTS. Using the latest dual processor technology, the extensive X-ray and computer aided microscopy capabilities are merged with the familiar environment of Windows 95. The Windows NT operating system lets one easily move between PGT X-ray Analysis, Image Analysis, and the most popular word processing, spreadsheet and data base software on the PC. Princeton Gamma-Tech: (609)924-7310, Fax: (609)924-1729, WWW: www.pgt.com

Philips Electron Optics showed, for the first time, the new XL30 ESEM Scanning Electron Microscope. The XL30 ESEM uses the unique patented ESEM technology for true secondary electron imaging at water vapor pressures of 10 torr or higher. The instrument now comes with Tungsten and LaB6 guns which compliment the existing field emission gun. The new system bring ESEM operation to wider range of market applications. ESEM provides high magnification SE images of water containing samples while extending secondary imaging well into the 10 Torr vacuum range (while hydrated samples can be stable). By preventing dehydration, the instrument observes wet samples in their natural environment. It also reduces or eliminates the need for sample preparation: samples need not be coated, for example. The SEM can be used for studying a wide variety of low Z, non-conductive samples found in materials science and chemistry. It can also image out gassing and porous materials. The instrument gives noise-free SE images, even from materials containing elements with low atomic mass (low Z), as there is no charging of uncoated, non-conductive specimens. Philips Electron Optics: (201)529-3800, Fax: (201)529-5084, WWW: www.peo.philips.com

RJ Lee Instruments Ltd. exhibited the Model PSM-75VP (TorrSEM) version of their PERSONAL SEM®. With the variable pressure capability many types of samples can be analyzed without coating or other tedious preparation. The user-friendly design has simplified controlling the TorrSEM through the use of a graphical user interface for complete vacuum, image and accessories control. Switching between high vacuum and high pressure operation is accomplished by clicking an icon. The specially designed multi-quadrant backscatter detector, which includes graphical illumination control, facilitates enhanced imaging in the high pressure mode. The TorrSEM package includes the Model PSM-75 PERSONAL SEM, solid state backscatter electron detector with multi-quadrant controller, variable pressure operation package for variable pressure up to 1 torr, and online diagnostics package for remote evaluation of system performance by customer support engineers. RJ Lee Instruments Ltd., (412)744-0100, Fax: (412)744-0506

SPI Supplies formally introduced for the first time the newest version of the highly successful SPI Microporous Specimen Capsules®, a pore size of 30 μm. Used world wide for critical point drying and certain other high volume specimen processing protocols, this newest pore size will be attractive to those researchers working with small groups of cells or other particles similarly sized, since use of the capsules enables one to have confidence that there will be a complete absence of cross-specimen contamination. Other available pores sizes are 78 μm and also 120-200 μm. SPI Supplies, Inc.: (610)436-5400, Fax: (610)436-5755, WWW: www.2spi.com

The Opti-SEM 300 introduced by Topcon Technologies combines an Optical Targeting Microscope with a tungsten SEM. The Opti-SEM 300 also uses a standard Windows™ Graphical Users Interface and has digital image averaging as a standard feature. The visual image produced by the Optical Targeting Microscope is displayed on the computer monitor and allows the user to locate the region of interest quickly and easily. Colors as well as geographic references can be used to center the area of interest under the SEM beam for imaging or EDS analysis. The Opti-SEM 300LV (Low Vacuum) model is also available for viewing samples in their natural state. Topcon Technologies: (201)261-5410, Fax: (201)262-1504, WWW: www.topcon.com/tti~1.htm

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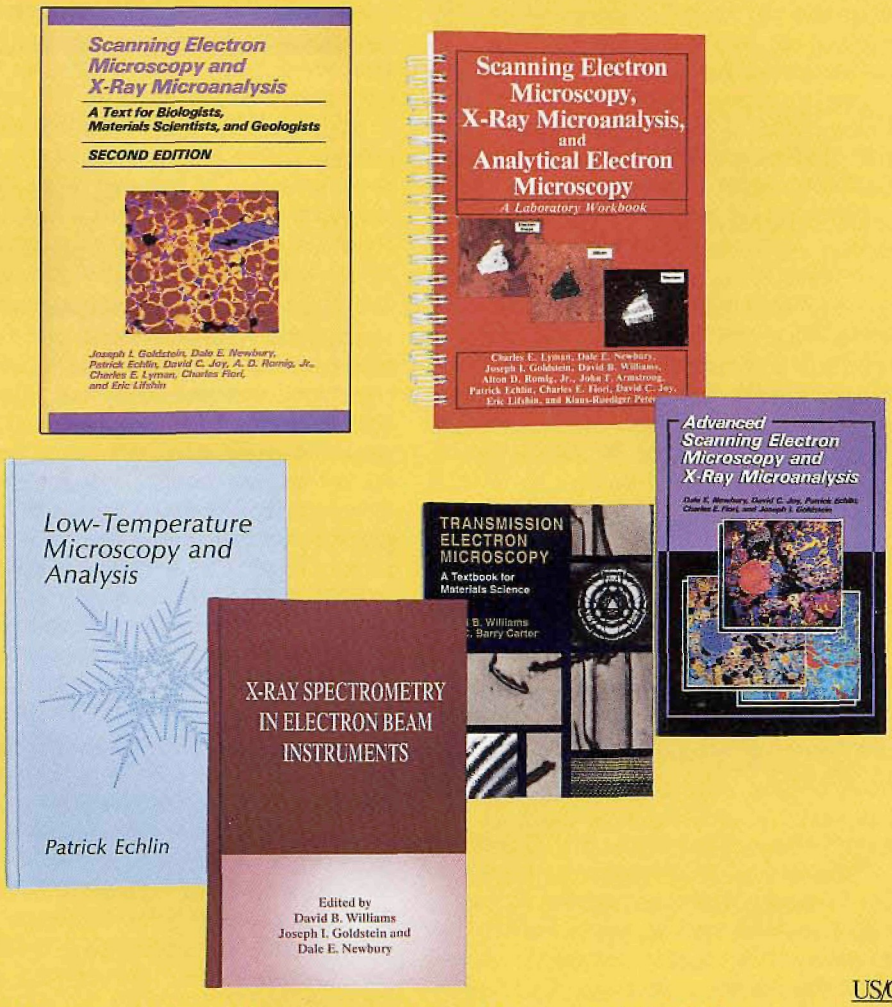

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J. I. Goldstein et al., *Scanning Electron Microscopy and X-ray Microanalysis*, 2nd Edition	$59.50
C. E. Lyman et al., *SEM, X-ray Microanalysis, and AEM: A Laboratory Workbook*	$39.50
D. E. Newbury, et al., *Advanced Scanning Electron Microscopy and X-ray Microanalysis*	$55.00
D. B. Williams, et al., eds., *X-ray Spectrometry in Electron Beam Instruments*	$89.50
P. Echlin, *Low-Temperature Microscopy and Analysis*	$120.00
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Scanning Electron Microscopy and X-ray Microanalysis

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1

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Instrumentation: 10 electron beam instruments with EDS, WDS, and digital imaging systems.

Textbooks Provided: Both texts were written by the course lecturers:
Scanning Electron Microscopy and X-ray Microanalysis, Plenum Press, 1992
SEM, X-ray Microanalysis, and AEM: A Laboratory Workbook, Plenum Press, 1990

Advanced Scanning Electron Microscopy

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2

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3

Advanced topics include: ZAF and $\phi(\rho z)$ calculations using personal computers • WDS and EDS detectors • quantitative analysis of thin particles and rough specimens • light element analysis • trace element analysis • strategies for applying microanalysis techniques • specimen preparation

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4

Advanced topics include: STEM optics • beam-specimen interactions • Z contrast • x-ray microanalysis • electron energy-loss spectrometry • quantitative compositional imaging • convergent beam electron diffraction • symmetry determination • microcomputer calculations • thin specimen preparation • digital imaging (**New textbook provided:** *Transmission Electron Microscopy: A Textbook for Materials Science*, by D. B. Williams and C. B. Carter)

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5

Atomic force microscopy • scanning tunneling microscopy • scanning tunneling spectroscopy • feedback control • tip fabrication • tip-sample interactions • scan calibrations • in-situ imaging • UHV imaging • imaging in air and liquids • image processing • near-field optical probes • metrology • lateral force microscopy • electrochemical STM/AFM • other emerging scanned probe techniques

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