MRS BULLETIN

October 1989

Volume XIV, Number 10

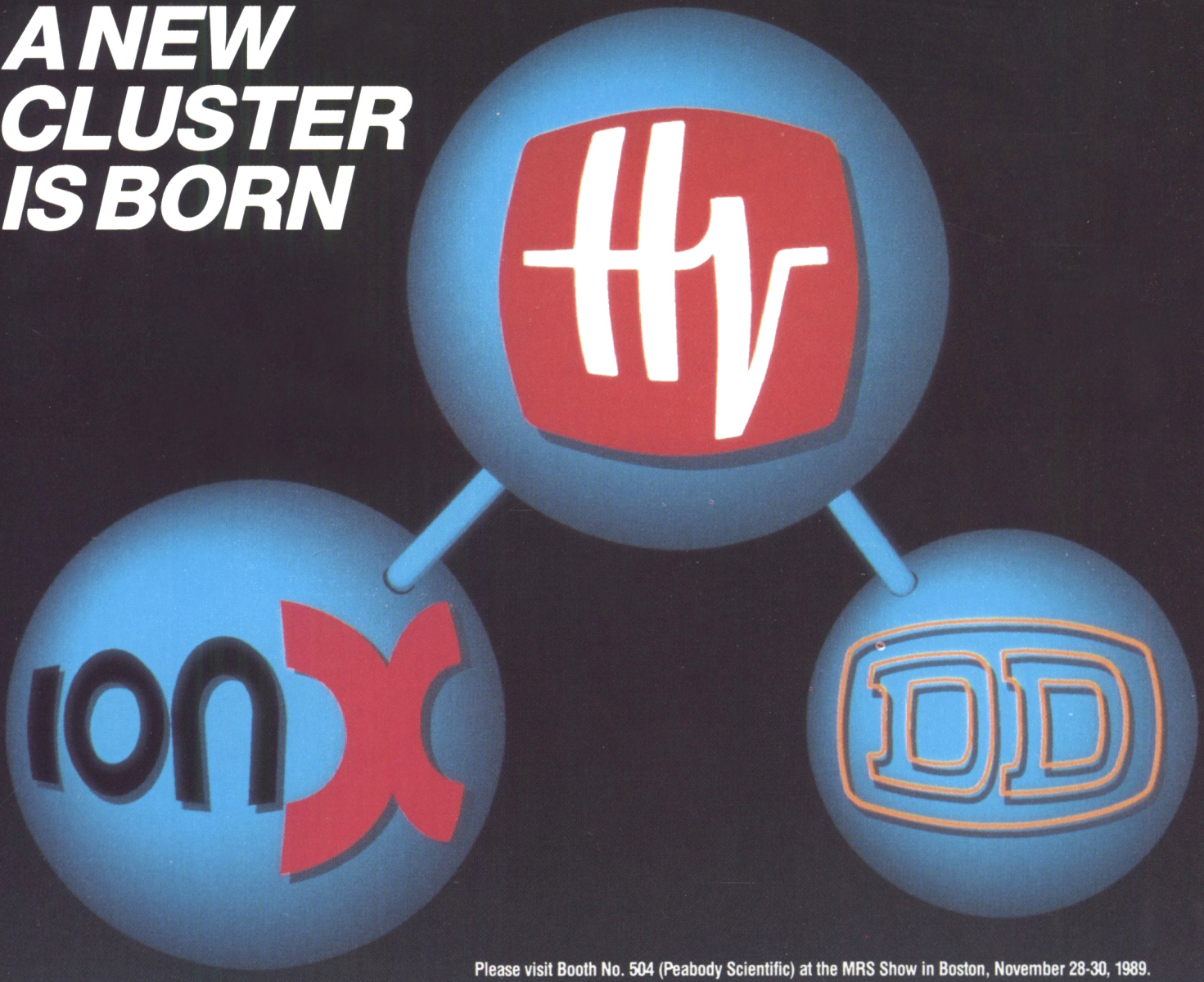
Serving the International Materials Research Community

Block Copolymers

Also: Diamond Growth
Metalorganic Deposition

https://doi.org/10.1557/S088376940006139X Published online by Cambridge University Press

A NEW CLUSTER IS BORN



Please visit Booth No. 504 (Peabody Scientific) at the MRS Show in Boston, November 28-30, 1989.

General Ionex acquired by High Voltage Engineering Europa B.V.

In December 1987 High Voltage Engineering Europa B.V. (HVEE) acquired Dowlish Developments Ltd (DD), an accelerator tube manufacturer located in the United Kingdom.

On April 10, 1989, HVEE purchased the General Ionex Analytical Product Group from Genus Inc. based in the United States.

Through this acquisition HVEE positions itself as the largest and most diverse manufacturer of particle accelerators for the scientific and industrial research communities.

The acquired General Ionex (GI) product lines, which include the Tandetron accelerator systems and Model 4175 RBS Analyser, will be manufactured in HVEE's new, well-equipped facility in Amersfoort, The Netherlands.

World wide marketing of all products from HVEE, DD and GI will originate from HVEE Amersfoort with sales and service offices in the USA, Europe and Japan.

After addition of the newly acquired products HVEE's product lines include:

– *Ion Accelerator Systems*
- Air insulated accelerators up to 500 kV
- Single ended Van de Graaff accelerators up to 4 MV
- Tandem Tandetron accelerators up to 3 MV/TV

– *Research ion implanters*
- Beam energies 10 keV-9 MeV and higher

– *Systems for ion beam analysis*
- Systems for RBS, PIXE, PIGE, NRA, ERD, MACS and MEIS

– *Components*
- HV power supplies, electron and ion accelerator tubes, ion sources beamline components, beam monitoring equipment, UHV sample manipulators, etc.

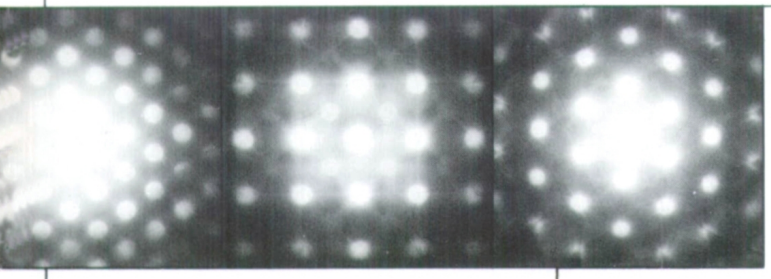
For further information on this transaction and product literature please contact HVEE in Amersfoort/NL.

More Energy for Research

HIGH VOLTAGE ENGINEERING EUROPA B.V.

P.O. Box 99, 3800 AB Amersfoort, The Netherlands. Phone: (+31) 33 - 619741. Fax: (+31) 33 - 615291. Telex: 79100 HIVEC NL
Sales Office for USA & CANADA: Peabody Scientific. P.O. Box 2009. Peabody, MA 01960. USA Phone: (508) 535-0444. Fax: (508) 535-5827

THE BEST WAY TO GET AN ANGLE ON CRYSTALS.

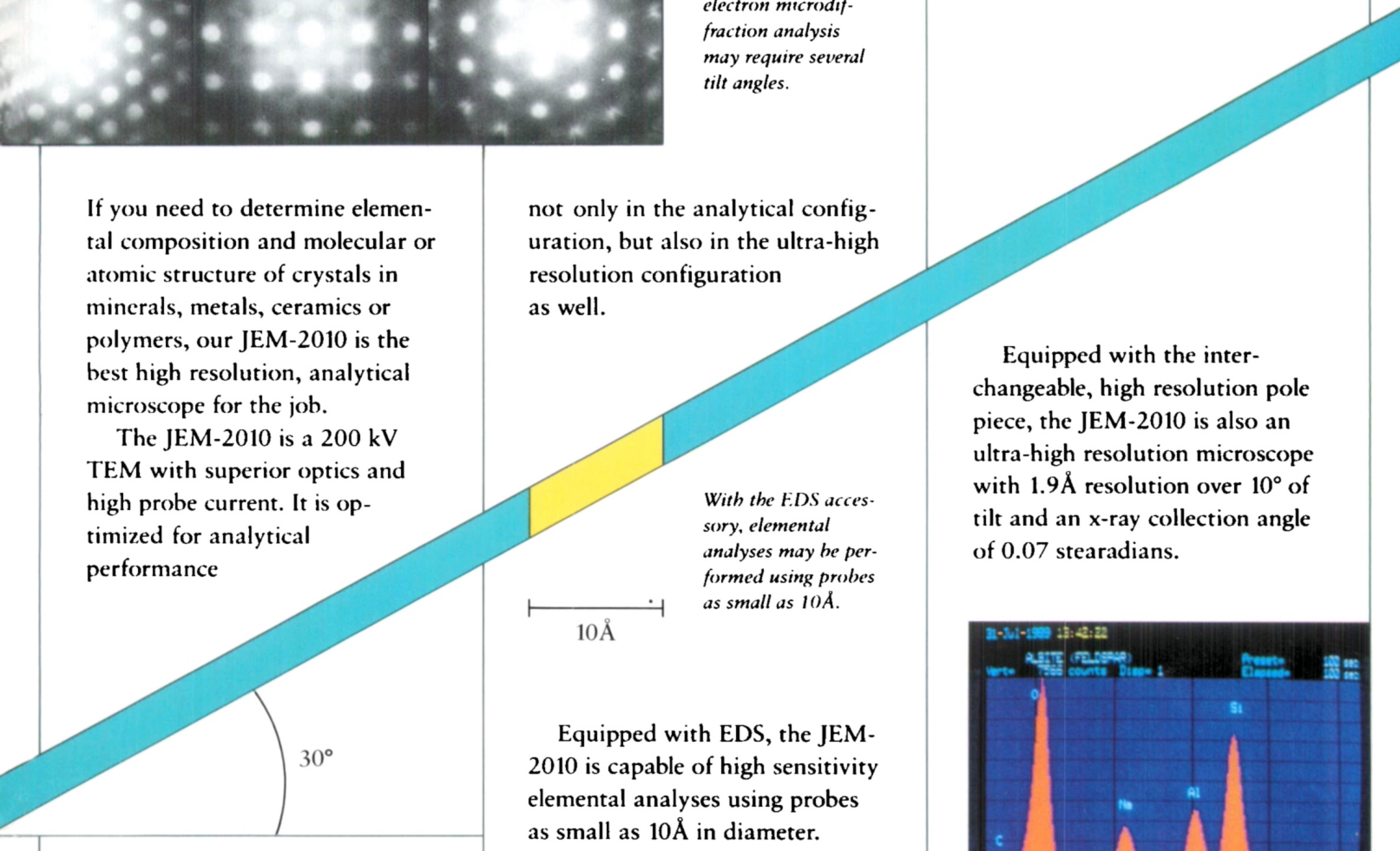


High resolution, electron microdiffraction analysis may require several tilt angles.

Please visit Booth No. 939-940 at the MRS Show in Boston, November 28-30, 1989.

If you need to determine elemental composition and molecular or atomic structure of crystals in minerals, metals, ceramics or polymers, our JEM-2010 is the best high resolution, analytical microscope for the job.

The JEM-2010 is a 200 kV TEM with superior optics and high probe current. It is optimized for analytical performance not only in the analytical configuration, but also in the ultra-high resolution configuration as well.



For purposes of analyzing obliquely oriented crystalline material in metal, mineral, ceramic or polymer matrices, the JEM-2010 offers 2.3Å resolution with a tilt angle of ± 30 degrees.

JEM-2010 Transmission Electron Microscope

With the EDS accessory, elemental analyses may be performed using probes as small as 10Å.

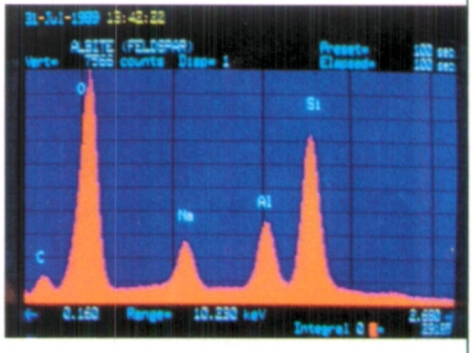
Equipped with EDS, the JEM-2010 is capable of high sensitivity elemental analyses using probes as small as 10Å in diameter.

With its analytical pole piece, it offers 2.3Å resolution over 30° of tilt and an x-ray collection angle of 0.13 stearadians. That is the best combination of analytical features of any instrument in the 200 kV class.

But the JEM-2010 is more than an analytical microscope.

JEOL
Serving Advanced Technology

Equipped with the interchangeable, high resolution pole piece, the JEM-2010 is also an ultra-high resolution microscope with 1.9Å resolution over 10° of tilt and an x-ray collection angle of 0.07 stearadians.



High sensitivity elemental analysis is possible with the addition of an EDS system.

Let us tell you more. Call (508) 535-5900. Or write JEOL USA, Inc., 11 Dearborn Road, Peabody, MA 01960.

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Gatan Has Redefined The TEM Anticontaminator

For many years Gatan has been working on reducing specimen contamination in the electron microscope.

With the Model 666 Parallel EELS, we can quantify contamination rates in real time and determine critical anticontaminator design parameters.

The result is the Model 651 Anticontaminator, in liquid nitrogen and liquid helium cooled versions. EEL spectra prove conclusively that even on a modern ion pumped TEM the rate of ice formation on cooled specimens (as shown by the size of the O-K edge) is reduced significantly.

The improvements will be even more dramatic on non-ion pumped and older microscopes.

Better Image Contrast: Reduced ice deposition on cooled specimens ensures good image contrast.

Rapid Response: Rapid cool down (<15mins) allows you to spend more time observing the specimen.

Long Observation Times: Cooled specimens can now be viewed for hours, not minutes.

Improved Vacuum: Improved chamber vacuum minimizes specimen erosion.

Temperature Control: An integral heater allows precise temperature control.

Low X-Ray Background: With beryllium blades (option), low background X-ray analysis is ensured.

Easier Service: Vent the microscope without having to warm the complete anticontaminator.

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6678 Owens Dr., Pleasanton, CA 94566, USA
Tel (415) 463-0200 Fax (415) 463-0204

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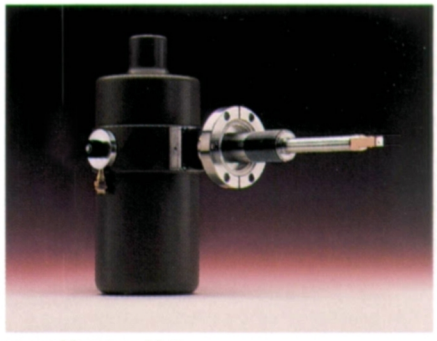
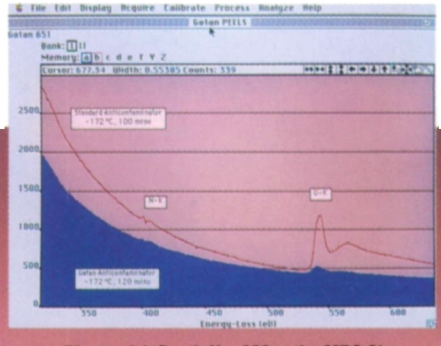


Model 651 LHe (<20 K)



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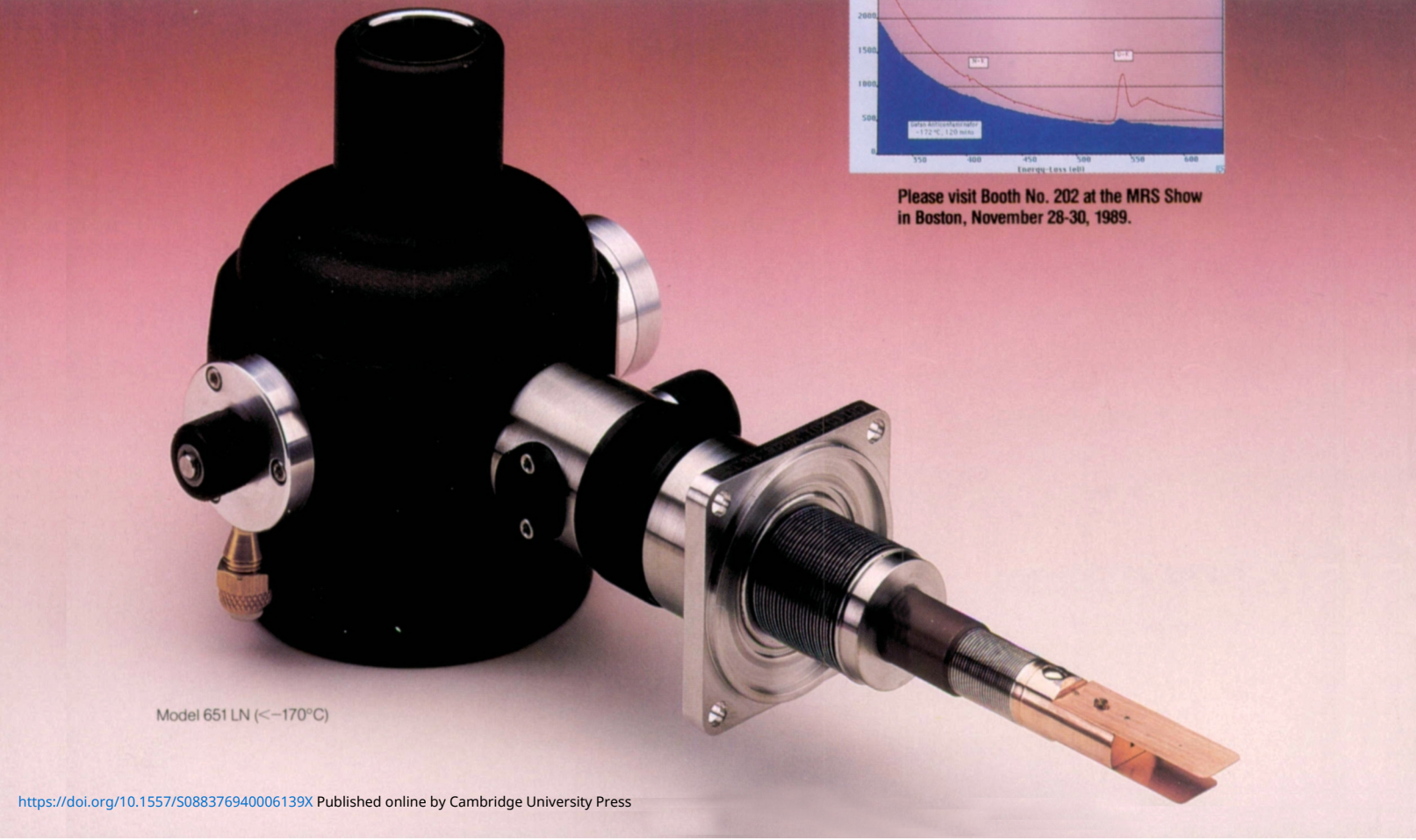

Model 651 LN (<−170°C)

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FEATURE

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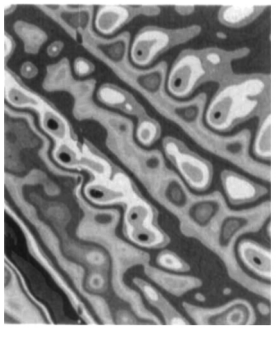


ON THE COVER: Optical interference micrograph of a thin film of a polystyrene/polymethylmethacrylate symmetric, diblock copolymer heated to 170°C for 72 hours and cooled to room temperature. The individual colors correspond to different optical path lengths in the film and, hence, different thicknesses. It can be seen that the film thickness is quantized, i.e., the thickness changes are discrete, which results from the orientation of the lamellar morphology of the copolymer parallel to the surface of the underlying silicon substrate. For more about this topic, see "Behavior of Block Copolymers in Thin Films" by T.P. Russell et al. on p. 33.

MRS BULLETIN

Materials Research Society • 9800 McKnight Road • Pittsburgh, PA 15237

ABOUT THE MATERIALS RESEARCH SOCIETY

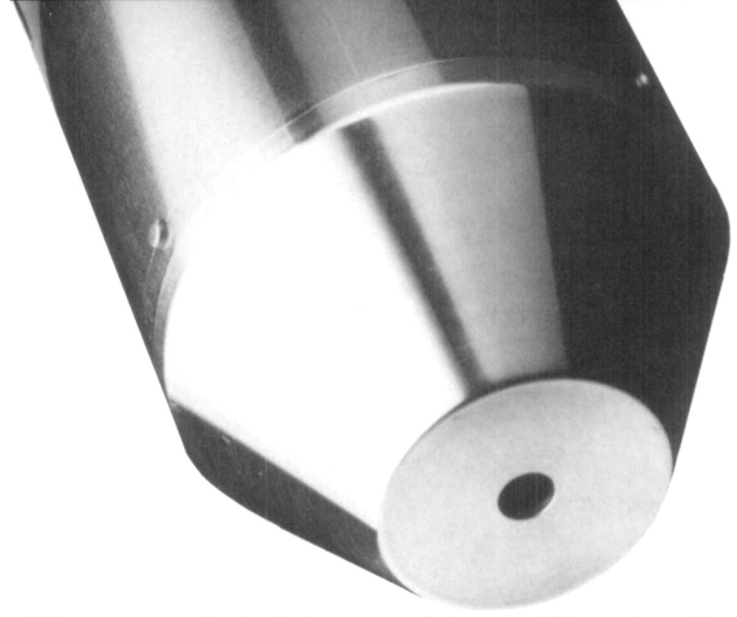
The Materials Research Society (MRS) is a nonprofit scientific association founded in 1973 to promote interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes more than 8,700 scientists from industrial, government, and university research laboratories in the United States and more than 25 countries.

The Society's interdisciplinary approach to the exchange of technical information is qualitatively different from that provided by single-discipline professional societies because it promotes technical exchange across the various fields of science affecting materials development. MRS sponsors two major international annual meetings encompassing approximately 30 topical symposia, as well as numerous single-topic scientific meetings each year. It recognizes professional and technical excellence, conducts short courses, and fosters technical exchange in various local geographic regions through Section activities and Student Chapters on university campuses.

MRS is an Affiliated Society of the American Institute of Physics and participates in the international arena of materials research through associations with professional organizations such as European MRS.

MRS publishes symposia proceedings, the *MRS BULLETIN, Journal of Materials Research*, and other current scientific developments.

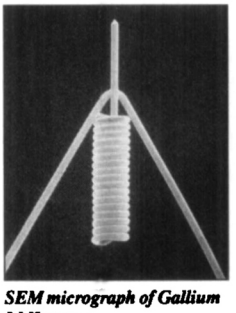
For further information on the Society's activities, contact MRS Headquarters, 9800 McKnight Road, Suite 327, Pittsburgh, Pennsylvania 15237; telephone (412) 367-3003; facsimile (412) 367-4373.



We've Made It Easier To Focus Your Energies On A Nano Scale.

Focused Ion Beam Columns

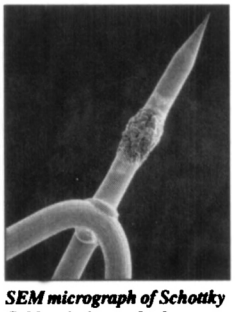
Choose a single-lens 25KeV gun that delivers spot diameters down to 100nm. Or a two-lens gun that puts up to 3 A/cm² on a spot as small as 25nm. Our high-stability liquid metal ion sources are simply the best in the business.



SEM micrograph of Gallium LMI source.

FEI Focused Ion Beam Columns are designed for use in Time-of-Flight SIMS, Auger Depth Profiling, Quantum Structure Fabrication, SIMS Imaging, Micro Cross-Sectioning, Integrated Circuit Repair, and Area- Selective Material Deposition, among others.

Focused Electron Beam Columns



SEM micrograph of Schottky field emission cathode.

Choose a single-lens 25KeV gun that delivers spot diameters down to 50nm. Or a two-lens gun that puts up to 3000 A/cm² on a spot as small as 15nm. Schottky cathodes provide improved field emission with excellent current stability and high brightness.

FEI Focused Electron Beam Columns are designed for use in Scanning Auger Microscopy, In Situ SEM, Electron Beam Lithography, E-beam Induced Deposition and RHEED, among others.

FEI focusing columns install easily on virtually any vacuum system. Standard flange mounts are 4½-inch or 6-inch Conflat type. Beam diameter is relatively insensitive to working distance, providing easier access to your specimen without sacrificing beam performance, even on very crowded vacuum systems. For more information, call or write today. You'll find FEI's 18 years of research and successful applications of field emission technology make it easier than ever to focus your energies.

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Please visit Booth No. 207 at the MRS Show in Boston, November 28-30, 1989.

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