

MRS

# BULLETIN

November 1989

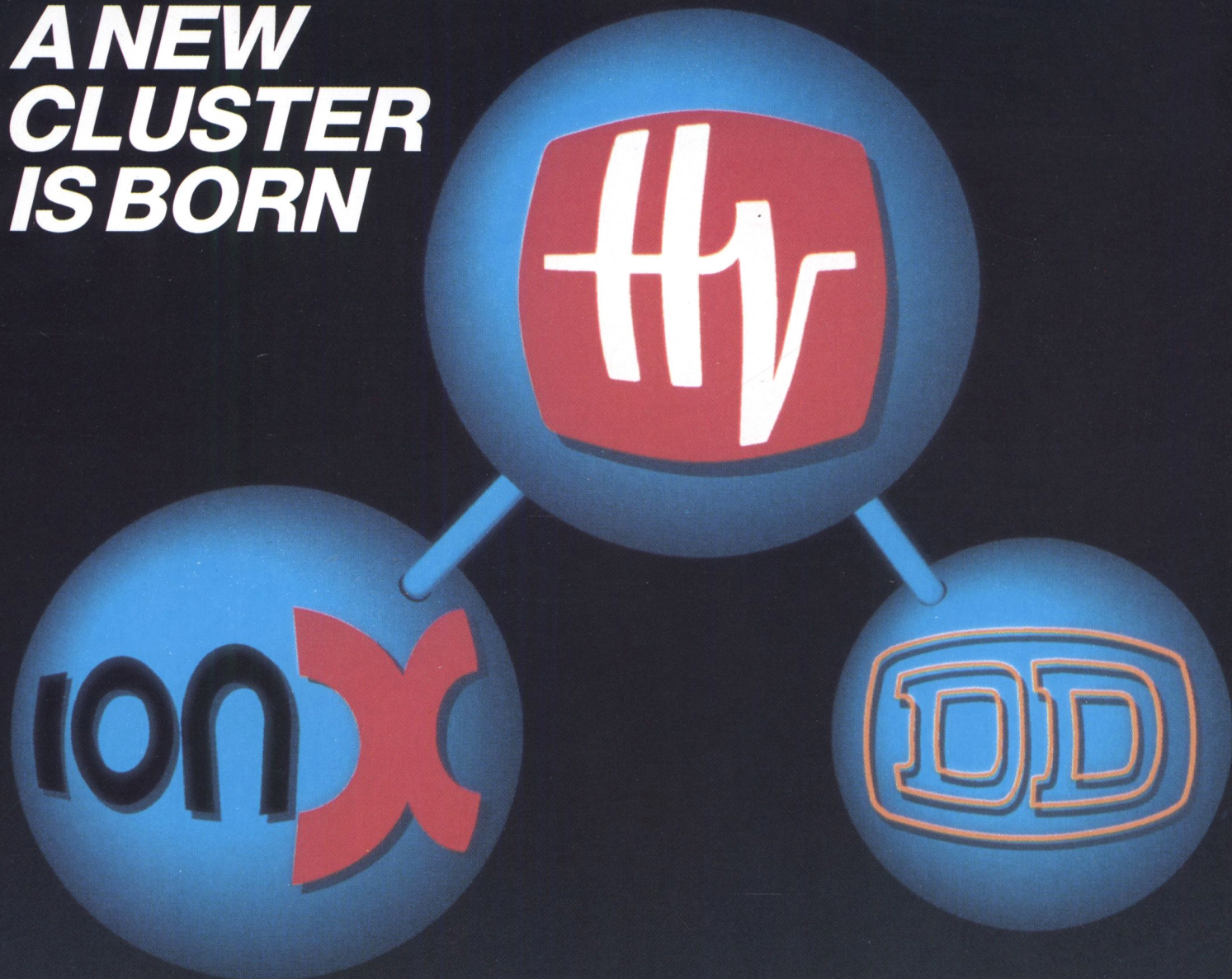
Volume XIV, Number 11

Serving the International Materials Research Community

## Refractories



# A NEW CLUSTER IS BORN



## **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.

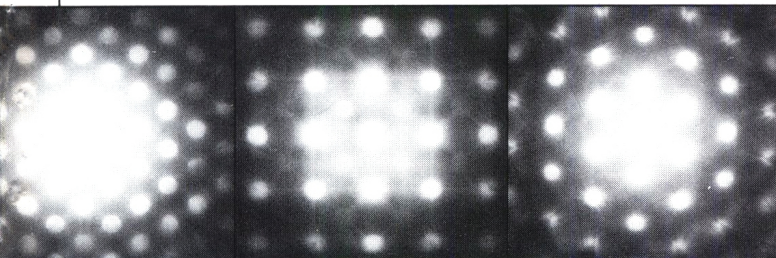
For further information on this transaction and product literature please contact HVEE in Amersfoort/NL.



**More  
Energy for Research**

**HIGH VOLTAGE ENGINEERING EUROPA B.V.**

# THE BEST WAY TO GET AN ANGLE ON CRYSTALS.



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

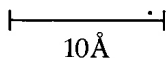
Please visit Booth No. 939-940 at the MRS Show in Boston, November 28-30, 1989.

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.

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

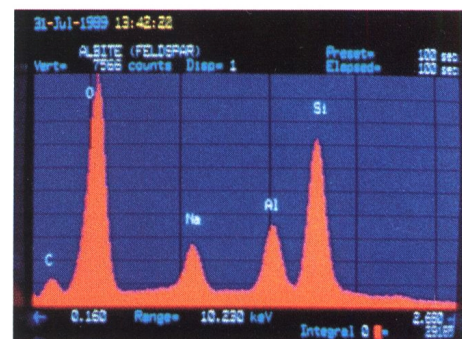


Equipped with the interchangeable, high resolution pole piece, the JEM-2010 is also an ultra-high resolution microscope with 1.9Å resolution over 10° of tilt and an x-ray collection angle of 0.07 steradians.

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

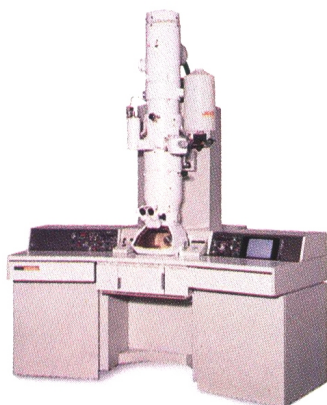
With its analytical pole piece, it offers 2.3Å resolution over 30° of tilt and an x-ray collection angle of 0.13 steradians. That is the best combination of analytical features of any instrument in the 200 kV class.

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



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

*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



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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.

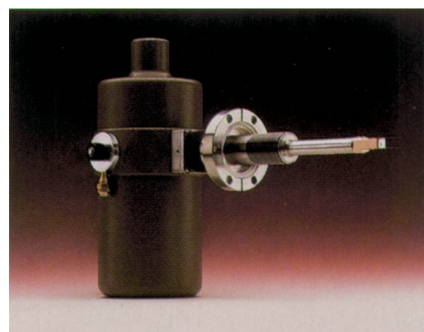


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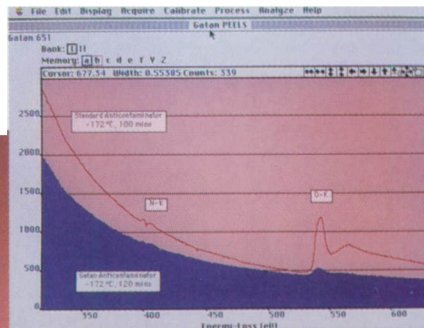
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Model 651 LN (<-170°C)

# MRS BULLETIN

November 1989

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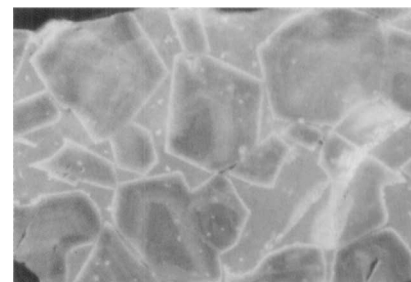
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**ON THE COVER:** Cathodoluminescence micrograph shows the microstructure of a ceramic build-up formed in a channel induction furnace. The build-up consists of growth-zoned spinel ( $MgAl_2Al_2O_7$ ) crystals (green) in a melilite ( $Ca_2Al_2SiO_7$ ) matrix (blue). The specimen was viewed with a Technosyn cold cathode luminescence device, model 8200 Mk II, mounted on a Nikon Labophot-Pol microscope. The cathodoluminescence micrograph was taken by M. Karakus with a Nikon FX-35WA automatic camera using Kodak 800/1600 Ektachrome film exposed for 10 seconds and developed at 800 ASA. The specimen was placed in a helium vacuum and excited with an electron beam 2 mm across and with a beam voltage of 12-20 kV and a beam current of 1 mA. For more about this topic, see "Cathodoluminescence Microscopy: A Valuable Technique for Studying Ceramics" by R.D. Hagni and M. Karakus on p. 54.

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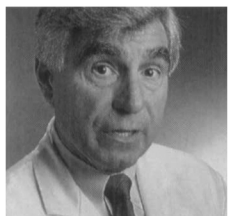
The Materials Research Society (MRS) is a nonprofit scientific association founded in 1973 to promote interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes more than 9,000 scientists from industrial, government, and university research 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 University Chapters.

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

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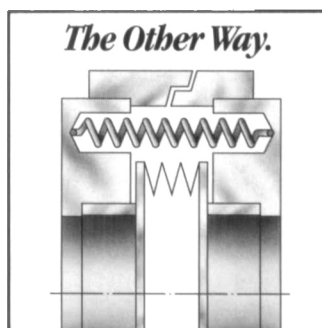
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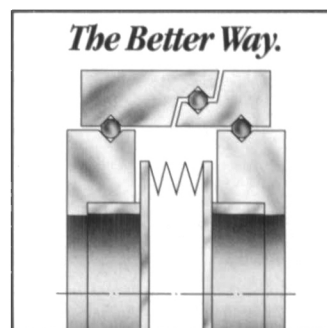
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