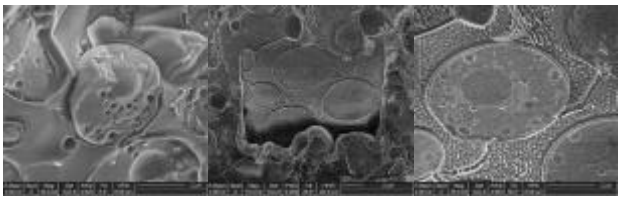
FEI COMPANY™
TOOLS FOR NANOTECH



In collaboration with

Quorum Technologies
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Invite you to come and see ...

Cryostatic sample preparation integrated with FEI's DualBeam technology.

FEI Company and Quorum Technologies have together produced the first dedicated Cryo-DualBeam solution. For the first time site-specific cross-sectional information can be directly obtained from a life science sample in its native state.

Dear SEM User

The preparation of soft or sensitive materials for microscopic analysis with SEM or optical microscopy is always a difficult process. There are many preparation techniques but all of them seem to have limitations. It doesn't matter how a sample is prepared (staining, microtoming, polymer embedding etc) there always seems to be a trade off between the information required and the artefacts introduced by the preparation process.

How can you be sure what you want to look at within the sample has not been affected by the preparation process? **Cryo-preparation** has always been one of the preferred methods of preserving sample information with the highest levels of integrity, but this technique also has its limitations. Samples need to be frozen very quickly to achieve the correct behaviour from the water contained within them, and all samples need to be fractured to expose the internal structure. Even with the best case procedures in place, the available surface is random in its location and weak points in the sample (cell walls, nuclear membranes etc) will fracture preferentially over the more uniform bulk interior which may be of more interest.

By combining Cryo capabilities with FEI's world leading **DualBeam** technology (now in its 11^{th} generation), this problem of site specific sectioning has been solved. The Ion beam (Ga+) is used as a fine cutting tool to slice through a single feature of interest, and then this freshly prepared, **artefact free Cryo-cross section** can be immediately imaged by W or FE SEM. Cross section faces of up to $100um^2$ can be produced in a few minutes for immediate imaging. All the conventional Cryo-SEM processes which are normally available are also integrated into the Cryo-DualBeam, so samples may be sublimed to enhance specific sample information and metal coated in-situ for charge reduction before imaging.

The Ion beam never comes into direct contact with the features to be imaged in the cross section face, as it remains parallel to the imaging plane at all times, so the sample surface exposed remains unaffected by the ions. The e-Beam arrives at an incident angle of 52^0 to the cross section face, allowing excellent imaging from the full area of the cross section that has been made.

This rapid site-specific cutting and imaging technique has been used extensively on **critical-point dried and polymer embedded samples** for some years and can now be directly applied to cryo-prepared samples This versatility of sample handling makes this a truly powerful front line investigative instrument.

FEI has teamed up with Quorum Technologies to offer an **integrated** solution with the Polaron Cryo-stage and Prep Station, as our tests show this solution offers the highest levels of temperature stability and ease of sample preparation and handling.

Until now Scanning Electron Cryo Microscopy has been limited by the variable success rates of fracture surfaces and the observations available from them, with the **site specific** capabilities afforded by the addition of DualBeam technology, users can now select the data they want, when they want it, and extract it from the sample directly.

FEI would like to invite you to evaluate this technology for yourself.

We will be running 2 series of workshops lasting several weeks in the Q2 timeframe. The first will be on our Quanta 3D instrument. This tool is the worlds first 3D Environmental Tungsten SEM with Cryo-stage, and we will be running this workshop from our Bristol (UK) commercial applications lab.

The second workshop period will be run at a latter date on our Nova NanoLab Field emission DualBeam tool, for those applications which require the extra imaging resolution that Field Emission SEM provides.

This invitation is to allow us to show you the techniques, and invite you to bring your own material (which you think would be appropriate to this approach) to work with us for a day or two, to investigate the applicability of this solution for your investigations.
If you are interested to take part in this evaluation by visiting our facilities in the UK, or would like to receive more information about the process as it becomes available, please complete the form below and fax/email it to the address shown. Space is limited so exact dates will be arranged with you directly nearer the time.

We look forward to working with you in the future.
With sincere regards,

Lloyd Peto
FIB and DualBeam Business Development, FEI Company

Please fax-back this page or email to indicate whether you would like to visit during the workshop period or not.

Name of Attendee	
Contact details (please include your email address as well)	
Dates when available to visit in May, June and July	

☐ Yes, I will join the workshop in May, June or July 2005

☐ Yes I would like to receive more information about this technique as it becomes available

☐ Yes I would like to join the Field Emission follow-on workshop

☐ Thank you for your invitation, however, I would not like to join the workshops or be sent any further information

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