



PP2000 / PP2000T Cryo-SEM Systems

with preparation chamber attached to the SEM

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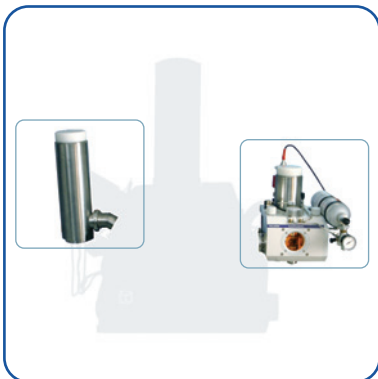
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CRYO-SEM



compact design, advanced preparation

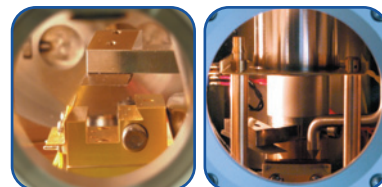
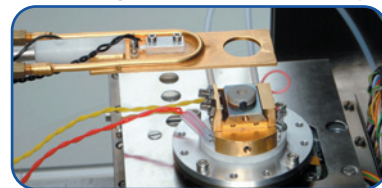
PP2000/2000T SEM cryo preparation systems



cryo preparation chamber



SEM cold stage and anticontaminator (cold-trap)



preparation chamber - excellent sample visibility

SEM cooling dewar



PP2000 and PP2000T Cryo-SEM Systems

Cryo preparation techniques for Scanning Electron Microscopy (SEM) have become essential for the observation of "wet" or beam sensitive samples. Using such techniques removes the need for conventional preparation techniques, such as critical point drying or freeze-drying, and allows observation of the sample in its "natural" hydrated state. Cryo-SEM is a very rapid technique, typically taking only a few minutes.

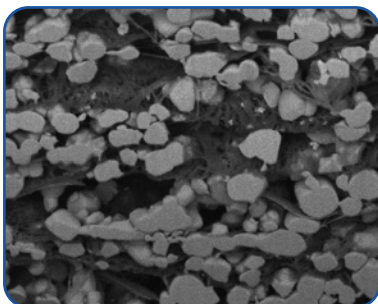
The sample is rapidly cooled and transferred under vacuum to the cold stage of the preparation chamber, which is mounted on the SEM chamber. The preparation chamber is pumped either with a rotary pump (PP2000 - recommended for standard SEMs) or by a specially designed turbomolecular pumping system (PP2000T - see below).

The PP2000 series include all the facilities for rapid sample freezing, vacuum transfer, freeze etching (to reveal greater specimen detail) and sputter coating - to allow high resolution surface imaging. Features of the PP2000 series include its unsurpassed thermal stability and highly efficient cold trapping within the SEM.

There are two models: the PP2000 is rotary pumped and primarily designed for standard (tungsten) SEM applications, the PP2000T is turbomolecular pumped and is particularly suited to FE-SEM and FIB/SEM applications.

Key Features & Benefits:

- Rapid sample preparation - typically less than 10 minutes
- Independent cooling of SEM stage and SEM cold trap - essential for high resolution imaging
- Precise control of cooling gas - optimum thermal stability
- Easy to use - rapid operator knowledge transfer
- "Cool" sputtering head - fine grain, high resolution coating
- Unique high thermal stability SEM stage - excellent stage stability
- Comprehensive cold trapping - essential for routine high resolution imaging
- Novel advanced sample handling option - easy manipulation of pre-frozen samples
- High visibility read-outs for temperature and vacuum - all important parameters can be easily seen by the operator seated at the SEM



A section of ceramic filled laminated polymer. A combination of hard and soft materials which has been prepared by cryo-FIB/SEM without damage or distortion. 2kV, secondary electron image. (For further cryo-SEM images see pages 30-31)

See: www.quorumtech.com for full technical specification and additional details.



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PP2000 / PP2000T Cryo-SEM Systems

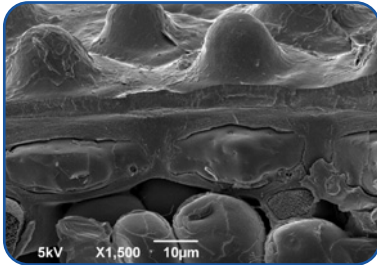
with preparation chamber attached to the SEM



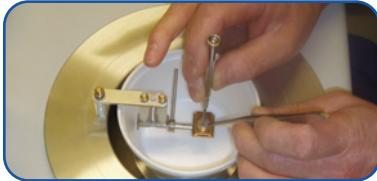
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high performance - results in minutes



Plant leaf (Euphorbia) with surface wax, normally removed using conventional sample processing. Image courtesy of University of York, Dept of Biology



Using the optional PP7465 Advance Sample Handling option allows transfer of pre-frozen specimens

Some applications

- Botanical, zoological and medical
- Food stuffs
- Resins, polymers, paints and cosmetics
- Beam sensitive materials (e.g. photographic emulsions)
- Geological (muds, slurries, oil bearing rocks etc)
- Liquids, semi-liquids and foams
- Heat sensitive semiconductor material (e.g. low k material)
- FIB/SEM (DualBeam)

Options

- Pressurised dewar for dry nitrogen gas
- Advanced sample handling system (PP7465) to allow observation of pre-frozen samples
- Wide range of sample holders (including top loading rivet & planchette holders)
- Carbon fibre evaporation head
- Stereo microscope (for preparation stage observation)
- Film Thickness Monitor package
- Large sample option - including large holders and specially adapted transfer device
- Range of targets and spares packages
- Reduced content "materials sciences" version

See: www.quorumtech.com for full technical specification and additional details.

PRODUCT SPECIFICATIONS

| | |
|--|--------------------------|
| Cryo preparation chamber with facilities for sample manipulation and processing. Consisting of: | Fitted a standard |
| Compact preparation chamber with integral sample exchange controls | Yes |
| Large viewing window, internal illumination | Yes |
| Two integral gate valves (loading and SEM) with electrical interlocks | Yes |
| Integral cooling dewar | Yes |
| Variable temperature conduction cooled sample stage (-185°C - +50°C) | Yes |
| Large low temperature anti-contaminator plates above and below cold stage | Yes |
| Micrometer fed cold fracturing knife and strong surface probe (cooled) | Yes |
| High resolution sputter coater with Au/Pd target (PP2000T comes with platinum) | Yes |
| High purity argon supply with metal fittings and regulator | PP2000T |
| Carbon fibre evaporation head and power supply | Option |
| SEM components | Fitted a standard |
| Stainless steel liquid nitrogen SEM dewar with separate gas cooling circuits for SEM stage and SEM anti-contaminator, consisting of: Nitrogen gas cooled SEM stage with thermal isolation (-192°C - +50°C) | Yes |
| Nitrogen gas cooled anti-contaminator (-192°C - +50°C). Note this is tailored to suit the specific installation | |
| Chamber light, interlock lead | Yes |
| Vacuum system | Fitted a standard |
| Turbomolecular pumping system (75L/sec) mounted on an anti-vibration trolley, connecting stainless steel bellows, high and low vacuum gauging, and vacuum controller. Requires an E5005F 50L/min. rotary pump (for "backing" the turbo pump) and an E5005G 50L/min rotary pump for operating the liquid nitrogen slusher. Anti-vibration block with solenoid controlled pump and vent valves | PP2000T only |
| Rotary pumping system with anti-vibration trolley, E500G 90L/min. rotary pump (order separately), connecting vacuum tubing, low vacuum gauging, and vacuum controller. Requires an additional E5005G 50L/min rotary pump for operating the liquid nitrogen slusher. Anti-vibration block with solenoid controlled pump and vent valves | PP2000 only |
| Other system components | Fitted a standard |
| Instrument trolley with nitrogen slushing chamber and flexible viewing light | Yes |
| Trolley mounted control unit | Yes |
| Vacuum transfer device, specimen shuttles and stubs, mounting media and comprehensive start up kit | Yes |
| Options (see "Options" above and visit www.quorumtech.com) | |

CRYO-SEM



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