

RESEARCH and **Developments**

ELECTRON CRYOMICROSCOPY • SCRIBING & CLEAVING
• AUTOMATED EMBEDDING • SECTIONING • CRYO-SEM
PREPARATION • CLEM • FLUORESCENCE VIEWING...and more

DECEMBER 2015

Dear Fellow Researchers,

This past year has seen the introduction of many exciting new research tools and techniques as well as improvements to those you already depend upon. In case you missed any, we proudly present them here in one publication.

On behalf of myself and the entire team at Electron Microscopy Sciences, let me say that it is our honor and privilege to serve as the most comprehensive source of products and educational resources for all fields of microscopy and general laboratory research available.

If you would like to receive Catalog XVII or any of our separate brochures please call, write, e-mail, or fax us. Please note that our entire catalog and separate brochures may be found at our website @ www.emsdiasum.com. We look forward to hearing from you and fulfilling all of your microscopy and research needs.

Sincerely,
Stacie Kirsch

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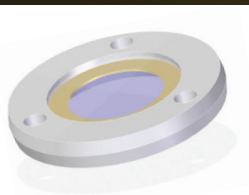
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EMS has it!

CryoCapsule®

Sample Preparation Device
for Correlative Light to
Electron Microscopy



The CryoCapsule® is a new tool in the field of High Pressure Freezing (HPF) and correlative light and electron microscopy

(CLEM). Comparable to a small petri dish, it is composed of a landmarked sapphire disc and a gold spacer ring (50µm thick) maintained together by a plastic ring^[1].

The specimens are encapsulated between the support sapphire disc (carbon landmarked) and a covering sapphire disc.

The CryoCapsule® is loaded into a specific adaptor and live cell imaging can then be done directly on the specimen prior to HPF.

Post-HPF, the specimen is processed for freeze substitution^[2] and room temperature sectioning.

CryoCapCell has also developed a set of tools to manipulate the CryoCapsule®^[2] in most scientific environments.

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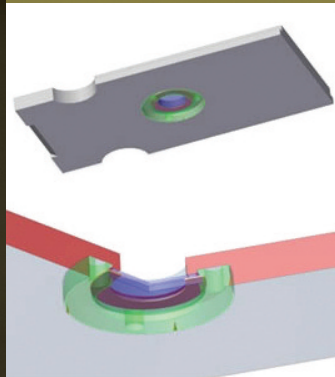
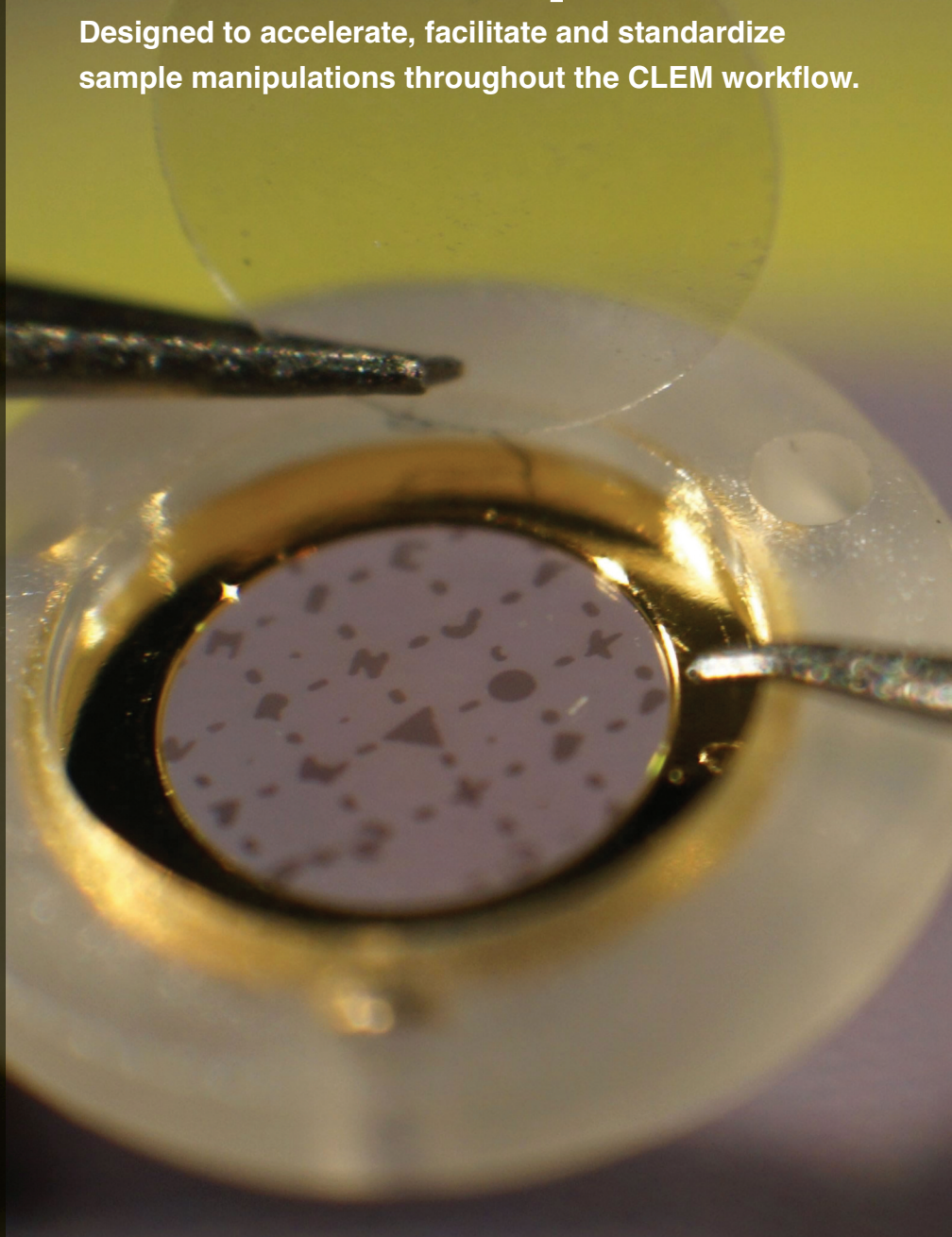
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bringing correlative light and electron microscopy forward

CryoCapsule®

Designed to accelerate, facilitate and standardize
sample manipulations throughout the CLEM workflow.



References

1. Heiligenstein X, Heiligenstein J, Delevoye C, Hurbain I, Bardin S, Paul-Gilloteaux P, Sengmanivong L, Régnier G, Salameiro J, Antony C, Raposo G. The CryoCapsule: Simplifying Correlative Light to Electron Microscopy. Traffic [Internet] 2014 [cited 2014 May 14];15:700-16.
2. Heiligenstein X, Hurbain I, Delevoye C, Salameiro J, Antony C, Raposo G. Step by step manipulation of the CryoCapsule with HPM high pressure freezers. Methods Cell Biol [Internet] 2014 [cited 2014 Nov 27];124:259-74.

a new era in support film...

UltrAuFoil™

Holey Gold Films

Why is the foil made of gold?

Because it is a highly conductive, nonoxidizing, radiation-hard material whose surface is chemically inert and biocompatible.

Why is the TEM grid made of gold?

Using the same metal eliminates differential thermal contraction during cooling of the sample and therefore prevents changes in the geometry and tension of the support foil.

Do I need to modify the UltrAuFoil™ before use?

No, they are ready for use when delivered. They can be made more hydrophilic using standard glow discharge and plasma systems or other gold surface treatments.

EMS has it!

UltrAuFoil™

Ultrastable Gold Supports for Electron Cryomicroscopy

These newly developed ultrastable gold supports for electron cryomicroscopy will

reduce the movement of frozen specimens during imaging. This improves image contrast and quality, leading to better 3D reconstructions with less data.

During imaging at cryo-temperatures, traditional carbon supports move, particularly at the beginning of irradiation. This movement blurs images and makes it difficult to determine the structures of small and challenging molecules.

Using UltrAuFoil™, designed at MRC's Laboratory of Molecular Biology by Dr Christopher J. Russo and Dr Lori A. Passmore and produced by Quantifoil Micro Tools, specimen motion can be reduced significantly. (For details see: Ultrastable gold substrates for electron cryomicroscopy, Science, 2014, Vol. 346 no. 6215 pp. 1377-1380).

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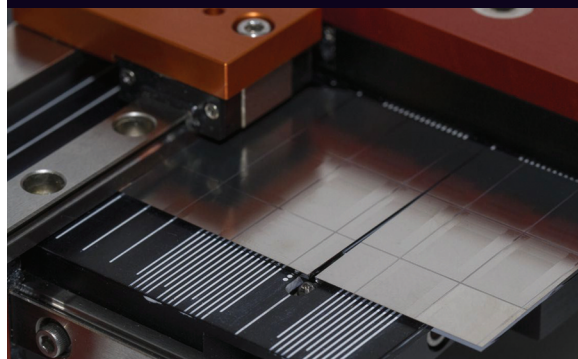
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FlipScribe™

Scribing and Cleaving Solution

FlipScribe is a compact, stable, accurate, fast and low cost scribing and cleaving solution suitable for any lab; no utilities required. It provides a more accurate method for scribing than can be achieved with hand held tools, by integrating a robust diamond scribe into a sample platform with a fence guide design. Time required to align and scribe is about a minute.

FlipScribe takes scribing to a new performance level, making clean, straight scribe lines on the back side to accurately cleave front side targets, bonded wafers and other substrates. This method eliminates contamination of sensitive front side devices during the scribing processes and is valuable for both crystalline and amorphous samples.



Semiconductor sample after scribing and cleaving

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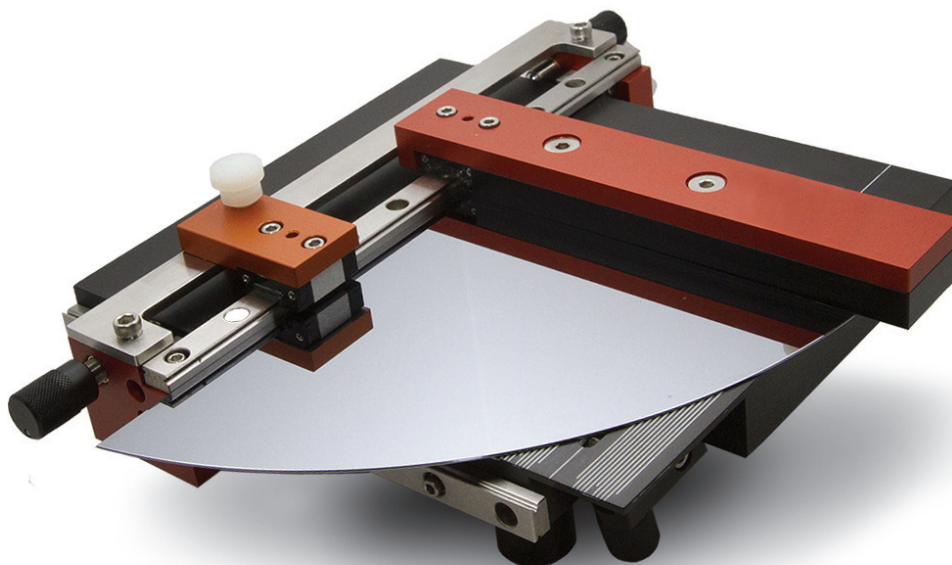
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scribing reinvented...

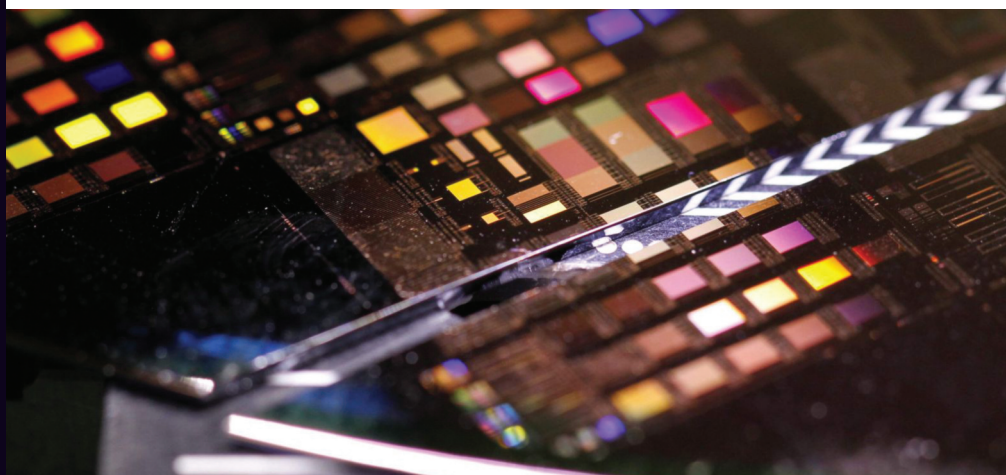
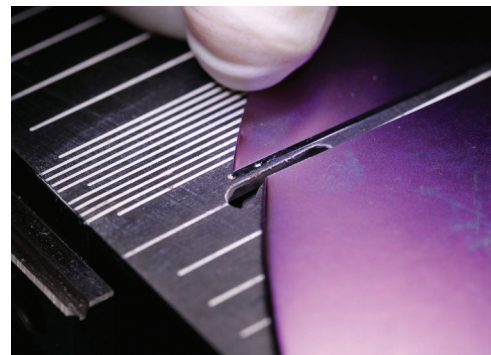
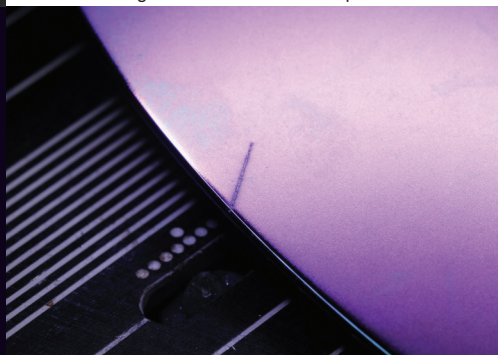
Introducing

FlipScribe™



straight-line scribe on curved part of wafer

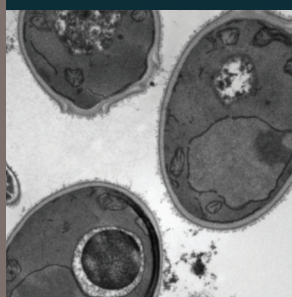
cleaved wafer



Introducing the EMS

polyIII

the solution for Evaporation-Controlled Automated Embedding and Polymerization



Yeast cells were fixed with glutaraldehyde in cacodylate buffer, washed in distilled water and postfixed with 1% KMnO₄ in distilled water

- Automates embedding
- Reduces hands-on time
- Minimizes exposure to hazardous and irritating chemicals
- Reduces solvent and resin use
- Facilitates the processing of up to 52 samples in one instrument run
- Prevents specimen loss

The EMS POLY III is an instrument for the embedding of specimens by the proper combination of pressure and temperature. Central to the instrument is a specimen chamber that is temperature controlled and which can be heated up from room temperature to 70°C. The pressure in the chamber can be reduced from ambient pressure to a controlled level with an inbuilt vacuum-pump. The instrument chamber accepts up to 52 BEEM specimen vials, and features preset programs which can be modified according to the user's preference. In the presets pressure and temperature settings have been coordinated and optimized for an efficient removal of solvent from the specimens. Bulk removal of solvent is followed by steps for the thorough removal of trace amounts.

As a practical approach the instrument can be loaded by the end of a workday and (when using acetone or propylene oxide) by the next morning the vials are ready for polymerization after the vials have been topped up with pure resin.

A lengthy and sometimes tedious manual procedure now reduced to a few simple steps.



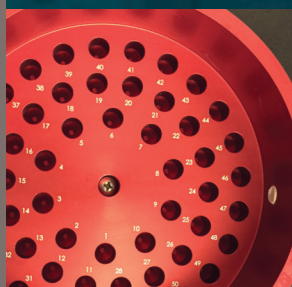
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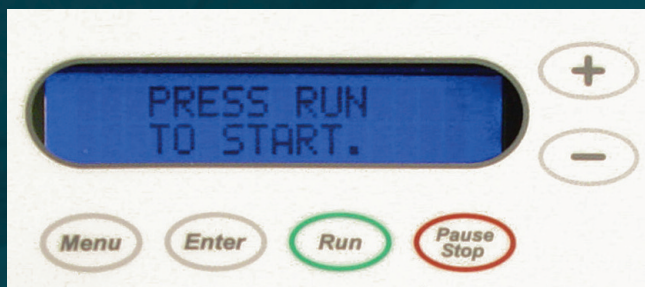
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Facilitates the processing of up to 52 samples in one instrument run.



A choice of 3 embedding programs in the EMS POLY III for 3 different solvents. They have been pre-programmed for general use but the user can change the programs to fit specific specimens.

Incomparable...



DiATOME diamond knives

ultra 45° • cryo • histo
ultra 35° • histo jumbo
cryo immuno • ultra sonic
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trimtool 20 • trimtool 45
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Free customer service

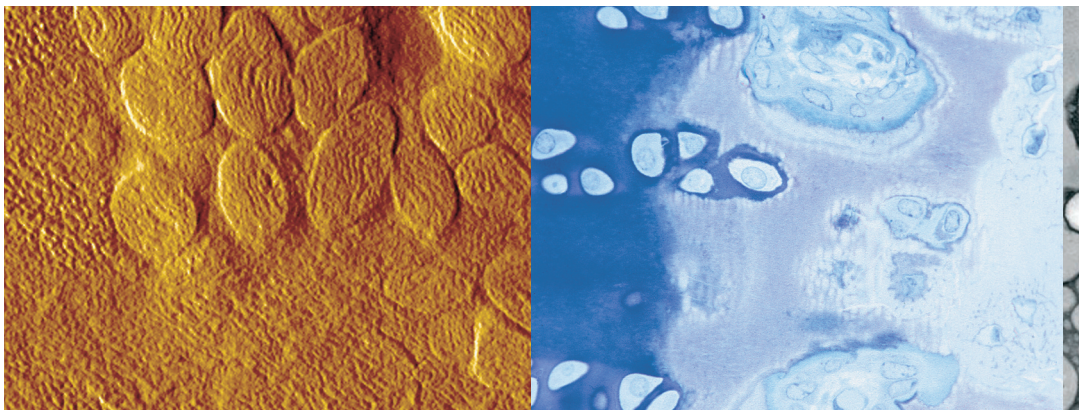
Sectioning tests with biological and material research specimens of all kinds. We send you the sections along with the surfaced sample, a report on the results obtained and a recommendation of a suitable knife. Complete discretion when working with proprietary samples.

Re-sharpening and reworking service

A re-sharpened Diatome diamond knife demonstrates the same high quality as a new knife. Even knives purchased in previous years can continue to be re-sharpened. The knives can be reworked into another type of knife for no extra charge, e.g. ultra to cryo or 45° to 35°.

Exchange service

Whenever you exchange a knife we offer you a new DiATOME knife at an advantageous price.



...and still innovating



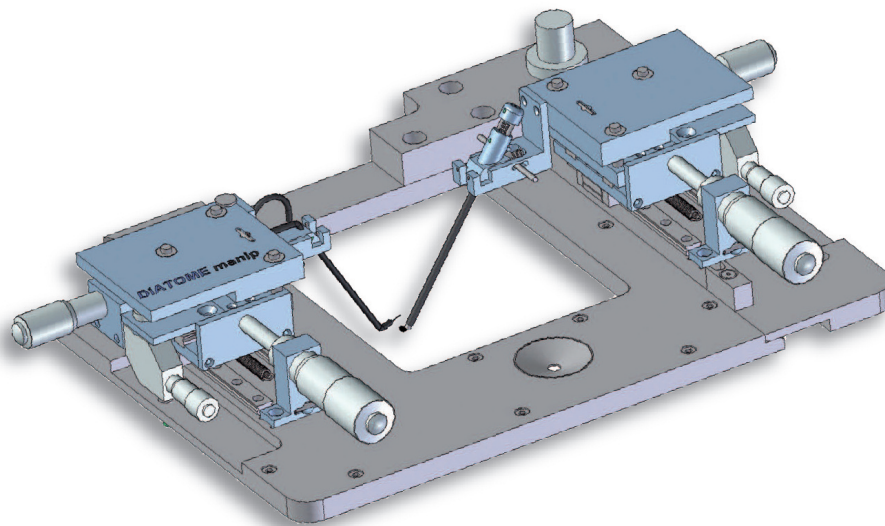
"NEW" trimtool 90

Many requests from customers doing FIB cutting of biological and technical sample blocks have motivated us to relaunch the trim 90 blade: With the trim 90 blade the surface of the blocks as well as the 90° inclined block sides may be trimmed for the following FIB processing.

Please contact us for more information.

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NEW DiATOME manip

For easy handling and mounting of section ribbons.

The mounting of the manipulator is easy. The original plate on the cryochamber is removed. The manipulator is fixed in 5 minutes.

Applications

- Frozen hydrated biological samples (CEMOVIS)
- Room temperature sectioning of water sensitive samples

Dry resin sectioning of biological samples for chemical analysis
Dry sectioning of industrial samples such as polymers

Functionality

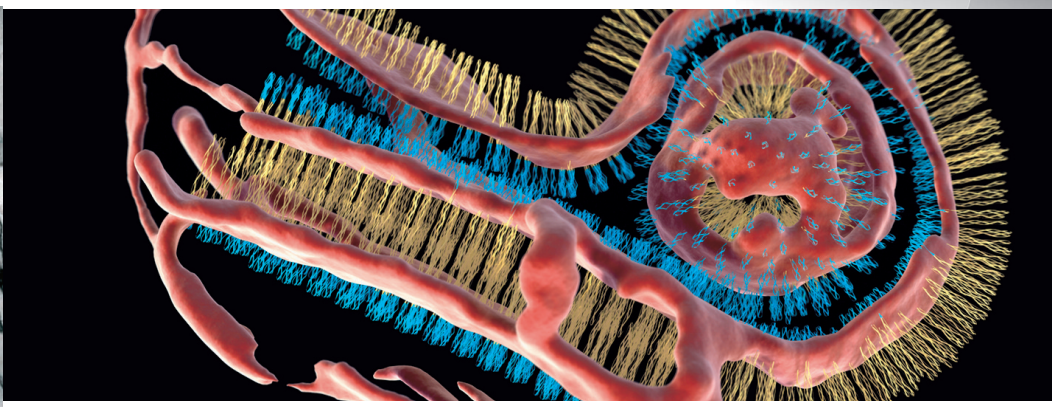
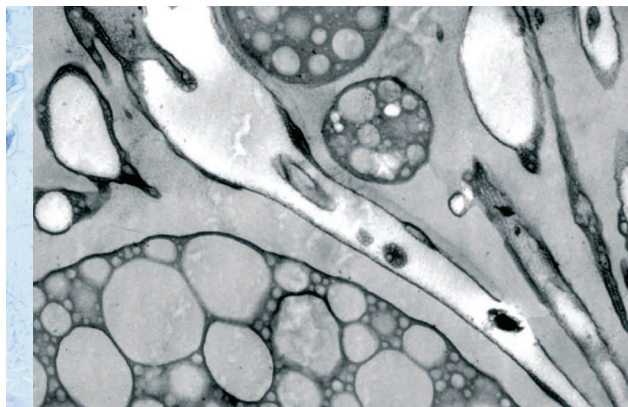
The left manipulator moves a conductive fibre on which the sections are attached by electrostatic force; the growing ribbon is guided.

The right manipulator guides the grid very precisely below the section ribbon, the sections are attached to the carbon film with electrostatic force.

Compatibility

Leica cryochambers FC6 and FC7 equipped with a Crion ionizer/charger adaption on other cryochambers upon request

A section ribbon attached to a fiber is depicted emerging from a diamond knife edge (left) beneath the ribbon the grid attached to a holder touches the section ribbon.



EMS has it!

A comprehensive selection of the finest hand-made tweezers for every research requirement, including...

EMS Tweezers

Medical Tweezers
High Precisions and Ultra Fine Tweezers
Thin and Long
Ergonomic
Flat Tip
ESD Safe
Ceramic and Ceramic Tipped
General Purpose Tweezers
Fiber and Fiber Tipped
EMS Synthetic Fiber Tweezers
Surface Mount and Optoelectric
Wafer

Dumont Tweezers:

Positive Action Standard and Biological
Medical Tweezers
Diamond Tipped
Negative-Action Standard and Biological.
Straight Positive Action Electronic Grade
Curved and Angled Positive Action,
Electronic Grade
Negative Action Style; Electronic Grade
Mini, ESD, and Wafer Handling Tweezers.
Tweezer Sets and Boxes

Rubis Tweezers:

Steel, Plastic, and Wafer Tweezers
High Tech Tweezers (Nano, Ion, Grip)
Plastic Tweezers
Accessories

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now also available
in medical grade...

EMS Tweezers

NEW EMS High End Medical Tweezers

EMS is proud to introduce this new category of tweezers. They are all handcrafted to perfect tip symmetry and balance and the surface has an electropolish finish. With high precision fine tips and dot-serrated handles for a perfect grip. All of these tweezers can be sterilized and they are all made from Inox.

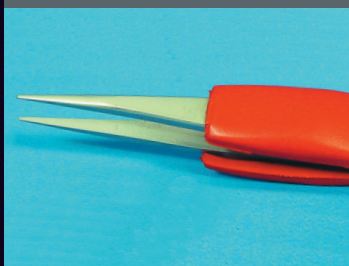


EMS is proud to provide a full selection of tweezers and forceps with all hand-crafted to a perfect tip symmetry and balance, high quality and innovative tweezers, that are well suited for many applications:

**EM Labs • General Labs • Electronic • Aerospace •
Precision Assembly • Optics • Biotech • Chemistry •
Surgery • and more**



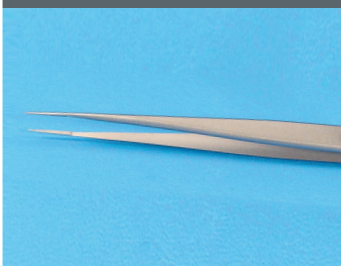
ESD SAFE
TWEEZERS



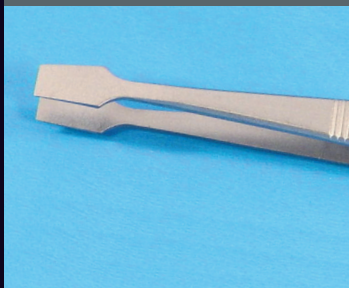
ERGONOMIC
TWEEZERS



SUPER SLIM
TWEEZERS



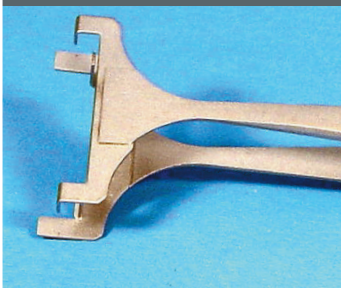
FLAT TIP
TWEEZERS



CERAMIC TIP
TWEEZERS



WAFER
TWEEZERS








available in a wide variety of materials including the patented Dumoxel and Dumostar

Dumont Tweezers

Electron Microscopy Sciences offers a complete range of tweezers to meet your needs. The Dumont Tweezers are known all over the world for their high quality, durability and detailed engineering. The tweezers are available in sizes from 90 to 180 mm and in a range of designs to suit your application and preferences. Curved and angled tweezers will enable you to hold the tweezers at 90° or parallel to the job or in restricted spaces. Waffle tweezers are ideal for holding many objects. Negative action tweezers allow the grasping of an object without finger pressure.



HOOKED TIP TWEEZERS	NEGATIVE-ACTION TWEEZERS	GENEVA PATTERN TWEEZERS	COMPONENT HANDLING	OBLIQUE TIP TWEEZERS
				

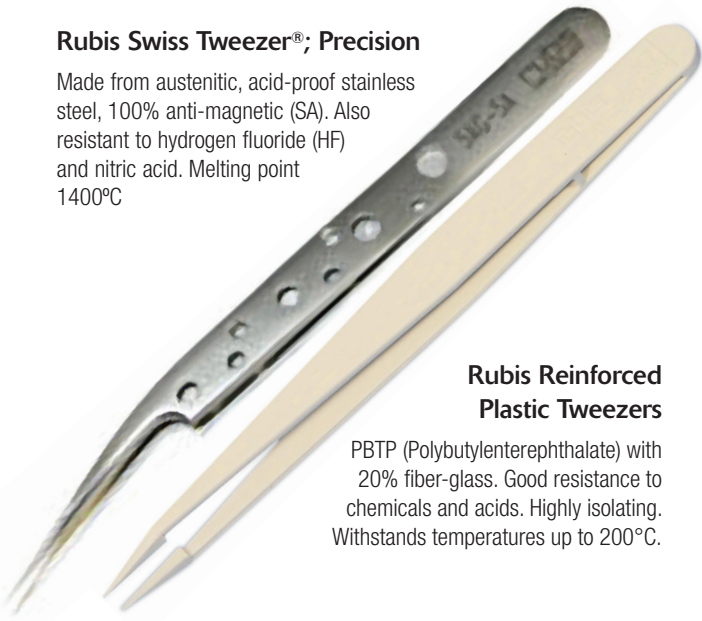
a clear focus on cutting-edge laboratory instruments

Rubis Tweezers

Evolution is what the Rubis development engineers call it when they harmonize ultra-modern technology and traditional Swiss precision engineering in their ground-breaking precision instruments. Continuous innovation in recent years has enabled the premium label//brand to ready its classic tweezers to meet new and exacting demands. With three new developments at once, the experts from South Switzerland are back on the pioneering track: exclusive high-tech surfaces offer substantial added utility and clear customer benefits.

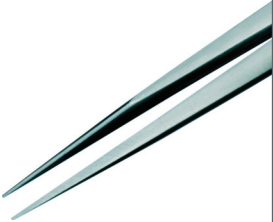




Rubis Swiss Tweezer®; Precision

Made from austenitic, acid-proof stainless steel, 100% anti-magnetic (SA). Also resistant to hydrogen fluoride (HF) and nitric acid. Melting point 1400°C



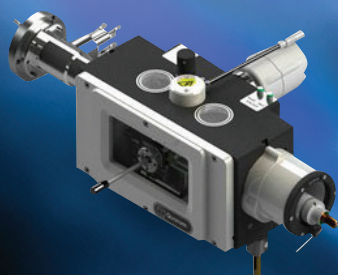
Rubis Reinforced Plastic Tweezers

PBTP (Polybutylenterephthalate) with 20% fiber-glass. Good resistance to chemicals and acids. Highly isolating. Withstands temperatures up to 200°C.

AXAL TWEEZERS	DURAX TWEEZERS	NANO TWEEZERS	ION TWEEZERS	GRIP TWEEZERS
				

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CRYO-SEM Preparation



The PP3010T is a highly automated, easy-to-use, column-mounted, gas-cooled cryo preparation system suitable for most makes and models of SEM, FE-SEM and FIB/SEM. The PP3010T has all the facilities needed to rapidly freeze, process and transfer specimens.

Now, building on the success of the PP3010T cryo-SEM/FIB/SEM preparation system, we are pleased to announce three new related products for ambient and cryo temperature transfer...

NOW AVAILABLE: NEW Specimen Transfer Systems

PP3004 QuickLok

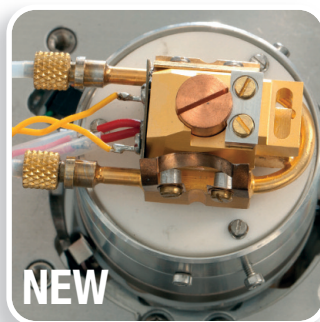
Ambient temperature airlock for SEM, FIB/SEM, beamline and vacuum platforms



- Rapid specimen exchange
- Vacuum and inert gas transfer
- Field-retrofittable to most systems
- Upgrade path to CoolLok
- Custom designed holders available
- 3 year warranty

PP3005 SEMCool

Non-airlock cryo cooling for SEM, FIB/SEM, beamline and vacuum platforms



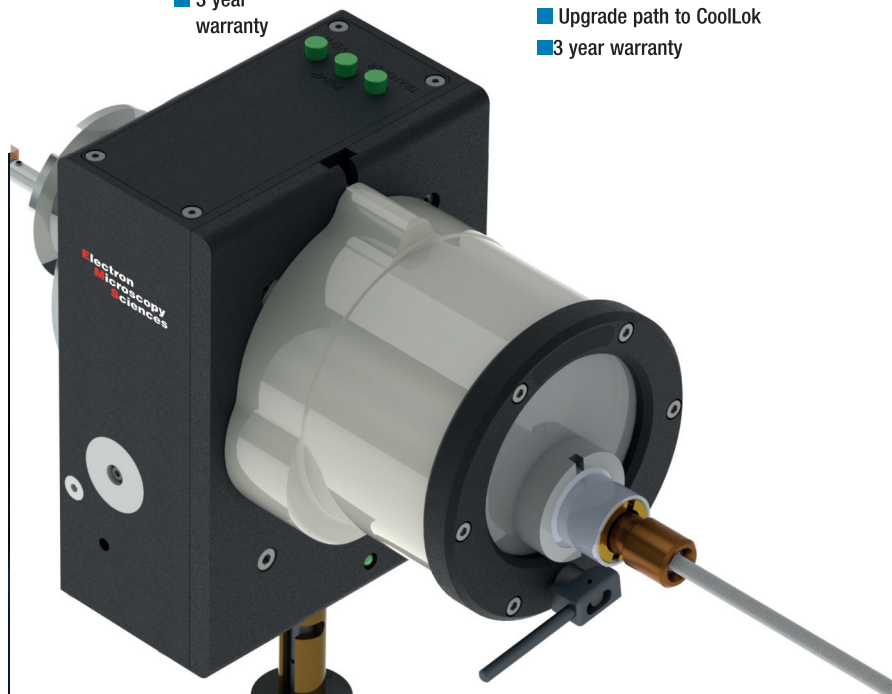
- Temperature range down to -190°C , with stability better than 0.5°C
- Off-column cooling with all-day runtime between fills
- Independent cooling of cold stage and cold trap
- Upgrade path to CoolLok
- 3 year warranty

PP3006 CoolLok

Cryo transfer systems for SEM, FIB/SEM, beamline and vacuum platforms



- Rapid specimen exchange
- Temperature range down to -190°C with stability better than 0.5°C
- Off-column cooling with all-day runtime between fills
- Independent cooling of cold stage and cold trap
- Vacuum or inert gas transfer
- Rapid specimen freezing option
- 3 year warranty

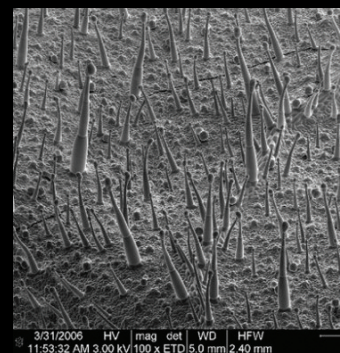
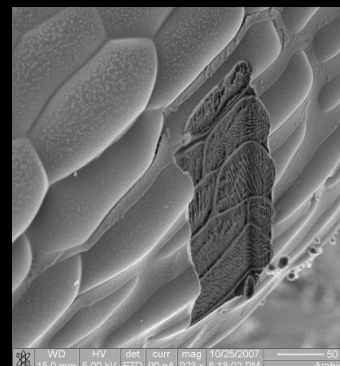


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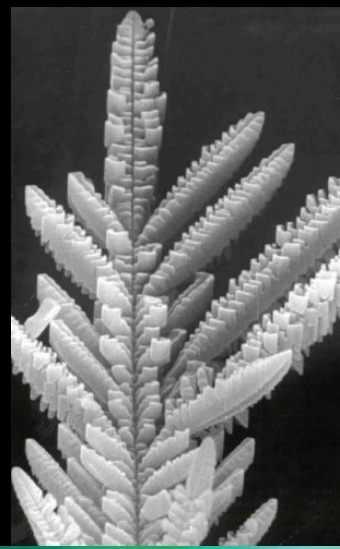
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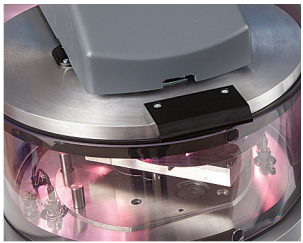
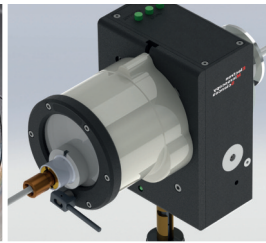
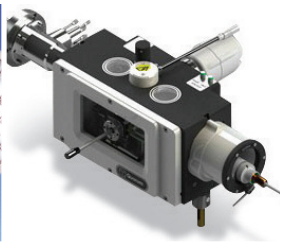
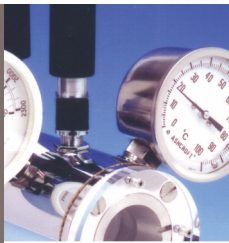


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Stop by and see what it's all about.





get well equipped...

EMS is committed to providing the highest quality vacuum equipment with competitive pricing, prompt delivery and outstanding customer service.

Our extensive line of High-End Vacuum Equipment and Accessories includes...

Cooling Stages

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SEM/TEM Carbon Coaters

Vacuum Evaporators (Large Chamber)

Critical Point Dryers

Freeze Dryers

RF Plasma Etchers/Plasma Reactors

Cryo-SEM Preparation Systems

NEW: Specimen Transfer Systems

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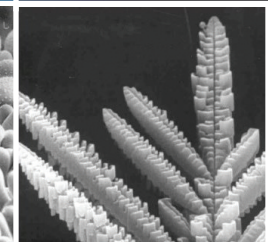
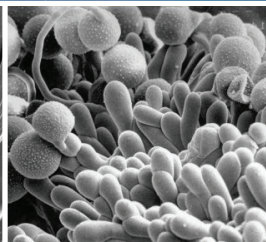
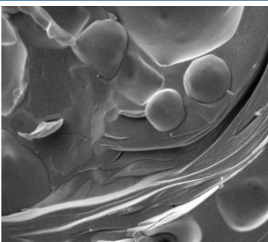
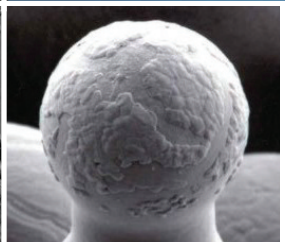
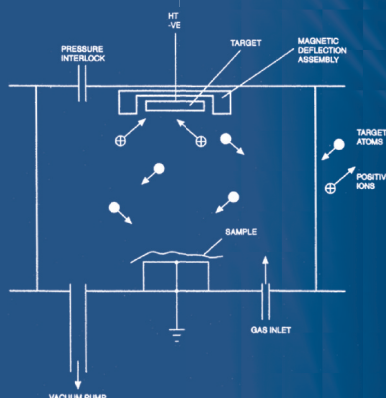
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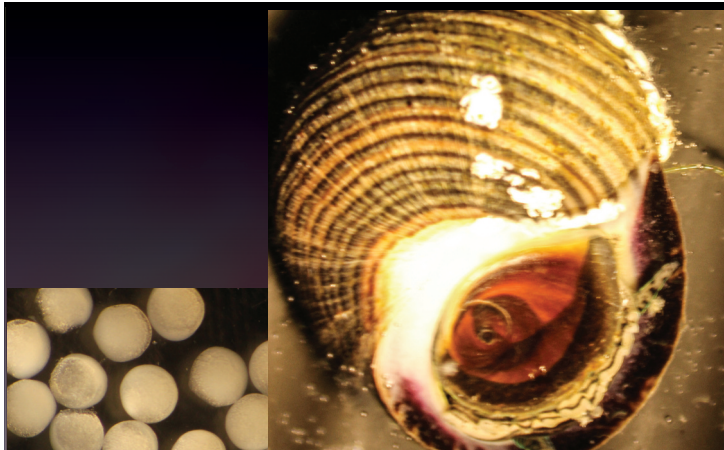
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more than just products...

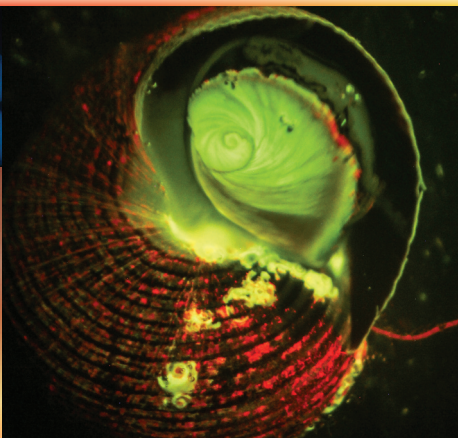
Both our Full Line Catalog and our website are loaded with supplemental information for electron microscope specimen preparation equipment, including articles and video reviewing electron microscope preparation techniques, such as...

- Sputter Coating Techniques and Applications
- Silver as a Removable Coating for Scanning Electron Microscopy
- Carbon Coating Techniques and Applications
- Plasma Etching and Ashing Techniques and Applications
- A summary of the Critical Point Drying Method
- Freeze Drying Principles
- Cryo-SEM — the Advantages



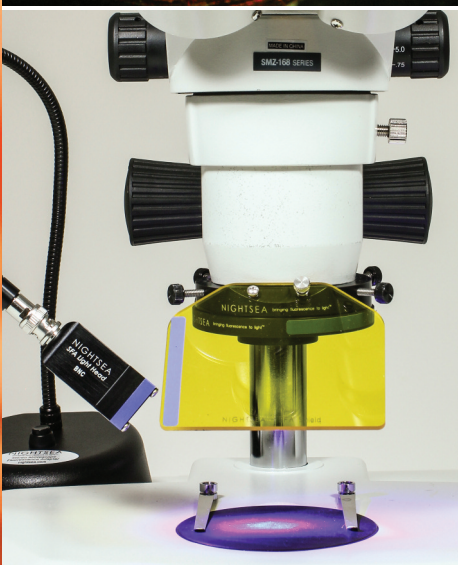


Microscopy
+ **Fluorescence**



= **NIGHTSEA**
Fluorescence Viewing Systems

Fluorescence
isn't just for
research
microscopes
anymore...



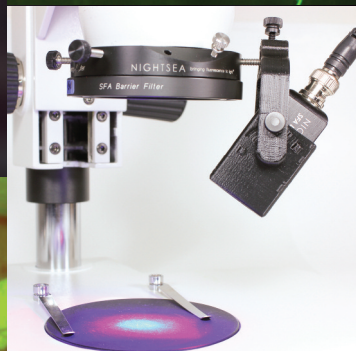
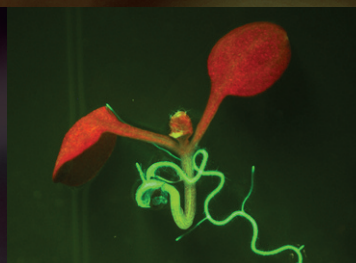
NIGHTSEA™
Stereo Microscope Fluorescence Adapter

Adapt your existing lab stereo microscopes for fluorescence

The NIGHTSEA™ Stereo Microscope Fluorescence Adapter adapts just about any stereo microscope (dissecting microscope) for fluorescence with no modification to the microscope itself. The modular design lets you easily switch between several different excitation/emission combinations to work with a variety of fluorescent proteins and other fluorophores. There are now five different excitation/emission combinations available, plus white light.

Applications

- Quick screening of your fluorescent genotypes — *Drosophila*, zebrafish, *C. elegans*,...
- Genotype sorting
- Fluorescence-aided dissection, injection, or micromanipulation
- Freeing up your research-grade fluorescence microscopes for more demanding work
- New faculty start-up budgets
- Bringing fluorescence into teaching laboratories



NEW
**Light Head Hangers
and Cables**

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MORE INFORMATION...**

EMS has it!

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P.O. Box 550 • 1560 Industry Rd.
Hatfield, Pa 19440
Tel: (215) 412-8400
Fax: (215) 412-8450
email: sgkcck@aol.com
or stacie@ems-secure.com
www.emsdiasum.com