EMS MICROSCOPY ACADEMY
MATERIALS ULTRAMICROTOMY WORKSHOP

Examples of the endless possibilities when doing materials microtomy

High Impact Polystyrene. Claudia Maymofer, TU Graz

GaAs-AlGaAs nanowires grown epitaxially on Si Substrate. Resin embedded and sectioned with a ultra 35 Degree diamond knife; HAADF-STEM. Hanne Kauko, Dept of Physics Trondheim

Polycarbonate modified with rubber. Jens Sicking, Bayer Technology Services, Leverkusen

Polypropylene with montmorillate clay nanoparticles. Sectioning with the DiATOME Ultrasonic Knife.
Sectioning Brittle Samples

Zeolite USY30 Crystal morphology STEM Analysis. The Mesopores (2-50 nm) (left) and the Crystalline micropores (0.7 nm) (right) are clearly visualized. Tom Wilhammar, Sara Bals EMAT, Antwerp

Sectioning Metals

Cerium inclusions in a zinc coating. Philippe Steyer and Emile Calvie INSA, Lyon

EDS spectra showing the cerium peak.
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Three days of hands-on training for technicians, researchers, and students who want to apply a faster and cleaner preparation method that provides samples with uniform thickness, no embedded contamination, and is cheaper than a FIB.

**Details**

Tuesday - Thursday  
April 3 - 5, 2018  
8:00 a.m. - 4:30 p.m.  
Hatfield, Pennsylvania, USA

**Facility**

**The EMS Microscopy Academy**

Located in Hatfield, Pennsylvania, the Academy provides electron microscopy classes, workshops and training sessions for all fields of microscopy, including materials science and biological science.

**Faculty**

**Helmut Gnaegi**, Diatome Ltd., Switzerland  
Helmut’s background is in engineering and is one of the founders of Diatome, the leading supplier of diamond knives and related accessories, such as ionizers and manipulators, etc. He is also one of the leading instructors for ultramicrotomy courses (Biological and Materials) around the world.

**Michael Kostrna** was the program director of the Electron Microscopy Technician program at Madison Area Technical College and has more than 35 years in EM technical education and research experience. He has been training EM students for 30 years and has developed curricula and lab exercises for TEM, SEM, OLM, lab safety, introductory and advanced biological EM, EM, maintenance, and x-Ray microanalysis. He has worked with companies such as SC Johnson Polymer, Dow Chemicals, Io Genetics, Virent Technologies, ABS Global, NanoOnocology, and Microscopy Innovations, and in the process gained insight to the various applications of EM.

**Al Coritz** has been working in the Electron Microscopy field for 39 years, beginning at the Yale School of Medicine and ending up on the commercial side with several key EM companies. His specialty is Cryo-techniques and Thin Film Technology: i.e. Freeze Fracture/Rotary Shadowing, High Pressure Freezing, and more. He is currently with Electron Microscopy Sciences where he has been the Technical Director for over 20 years.
Scope of class

Introduce individuals to the unique application of ultramicrotomy to materials, which provides several advantages over other common techniques, such as ion milling, FIB, and tripod polishing for TEM analysis. The thin (≤ 30 nm) sectioning of metals, embedded powders, and polymers is a technique that provides samples with a uniform thickness, retention of elemental distribution, lack of ion implantation contamination, and proves to be much faster than other preparation methods such as ion milling, tripod polishing and FIB milling.

Format

Lecture demonstration and hands-on practice as well as round table discussion. Participants may bring their own samples to work on during lab time.

Main Curriculum

Sample discussion/evaluation to determine method of support.
Embedment in Epofix or Cyanoacrylate glue if necessary
Trimming using razor blades, diamond trim blades or the TXP for precision trimming
Sectioning of brittle materials and brittle water sensitive materials at room temperature
Sectioning polymers at room temperature using ultrasonic knife
Cryo trimming and sectioning softer polymers
OsO4 and RuO4 staining of sectioned polymers

Instruments Available

<table>
<thead>
<tr>
<th>Leica UC7</th>
<th>Leica TXP</th>
<th>Diatome Ultrasonic</th>
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<tr>
<td>Boeckler Autotome</td>
<td>DM4</td>
<td>Diatome Diamond Knives</td>
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Schedule

Tuesday, April 3, 2018

8:00-8:30  Introduction of staff and participants
8:30-10:00  Introduction to room temperature microtomy and ultramicrotome instrument
10:00-10:30  Break
10:30-11:30  Introduction to cryo temperature ultramicrotomy (Polymers)
11:30-12:30  Leica TXP and other trimming methods
12:30-1:00  Provided lunch
1:00-2:00  Demo embeddment/trimming
2:00-4:00  Individual embeddment and trimming, (Demo RT sectioning)?
6:30 p.m.  Host Dinner
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Wednesday, April 4, 2018

8:00-8:30 Debrief on previous day’s activities
8:30-10:00 Demo room temperature sectioning and checking under OLM
10:00-10:30 Break
10:30-12:00 Finish individual trimming, begin sectioning
12:00-12:30 Provided lunch
12:30-4:30 Individual RT microtomy

Thursday, April 5, 2018

8:00-8:30 Roundtable discussion of previous days activities
8:30-9:30 Demonstration of cryo temperature microtomy
9:30-12:30 Individual cryo and RT ultramicrotomy
12:30-1:00 Provided lunch
1:00-1:30 Staining of polymers
1:30-4:30 Individual activities

Lodging

Participants are responsible for making their own hotel reservations. The following hotel has been designated as the host hotel:

Homewood Suites
1200 Pennbrook Parkway
Lansdale, PA 19446
Phone: 215-362-6400

The special rates are $119.00 per night (plus tax) which includes a hot breakfast and a light dinner in the evening.

Please make your reservations and mention you are participating in the EMS Workshop.
GROUP CODE: EMS WORKSHOP

Everyone should plan to arrive the evening of April 2nd.

Enrollment Note

Registration will be limited to a maximum of 15 participants. EMS/DiATOME will provide samples to those who prefer not to bring their own.

Registration Fee $995.00 Includes

A workshop syllabus, all supplies, reagents and solutions, lunches, coffee, tea, and dinner on the opening evening of the workshop.
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PRINTABLE REGISTRATION FORM

________________________________________________________ M / F
Name / Title

_____________________________________________________
Institution

_____________________________________________________
Department

_____________________________________________________
Mailing address

_____________________________________________________
City / Zip

_____________________________________________________
Country

_____________________________________________________
Telephone / Fax

_____________________________________________________
E-Mail

Will you bring your own specimens? Yes / No (See note on prior page)
What samples are you bringing and most interested in?

_____________________________________________________

All registrations must include payment.
Rate $995.00 per person ______________
Number of participants ______________
Total $ ______________
Pay by check: make payable to EMS and reference “Materials Workshop Apr18”.
Pay by credit card: Credit Card Type__________________________
Credit Card Number ________________________________
Exp Date __________________
3 Digit Code ______________

Signature / Date

Return your registration to:
Stacie Kirsch
1560 Industry Road
Hatfield, PA 19440 USA
Phone: 215-412-8402
E-Mail: sgkcck@aol.com or Fax: 215-412-8452

TO REGISTER ONLINE, CLICK HERE.