MICROSCOPY 101

We appreciate the response to this publication feature and welcome all contributions. Contributions may be sent to José A. Mascorro, our Technical Editor, at his e-mail address: jmascor@tulane.edu. José may also be reached at the Department of Structural and Cellular Biology, Tulane University Health Sciences Center, 1430 Tulane Ave., New Orleans, LA 70112 and Ph: (504) 584-2747 Fax: (504) 584-1687

Preparing Ultra-Smooth SEM Stud Surfaces

Dr. Carole Hickman, University of California, Berkeley

Occasionally the need arises to prepare an ultra-smooth surface on an SEM stud to produce a featureless substrate for high resolution SEM studies. Polishing the surface or gluing a glass cover slip to the stud surface works to some extent. An easier alternative is to use aluminum foil on the stud, prepared as follows:

- "Reynolds" aluminum foil seems smoothest and "regular" seems easiest to work with.
- Burnishing. I've tried various things and they usually end up scratching the foil. To make sure it is absolutely smooth and flat, I carefully cut a strip that is a bit wider and longer than a stub.

Place it on a clean surface; cover it with something very smooth weighing paper works well) and work over it with a finger tip to get it absolutely as flat as possible. Picking it up by the very edge with tweezers helps avoid wrinkles.

- 3. The smooth, flat piece is then transferred to a piece of double-stick scotch tape and once more pressed to the tape to get a very flat surface with no bubbles between foil and tape. This should be done on glass or a surface from which tape plus foil can then be carefully lifted.
- 4. The tape plus foil can then be applied to the stub if it still looks nice, proceed to step five. If wrinkles or bumps have appeared, pull it up and try again. (You can put the tape directly on the stub and then apply the foil - However, I have found that it works best for me to have a nicely bonded duo of smooth tape and foil first).
- 5. Using weighing paper, again, press tape plus foil gently to the stub.
- 6. Finally, use a single-edge razor blade to trim off the excess foil and tape around the edge of the stub. You can apply a couple of tiny dabs of silver paste at several edge points if you want to make absolutely certain the foil is well connected electrically to the stub. I have gotten into the habit of making the strip of foil plus tape slightly narrower than stub diameter so that there is a small crescent of stub above and below the strip, simply as a way of telling top and bottom at a glance.
- Additional note. For mounting an object with a convex (like my little larval shells) or irregular lower surface, aluminum foil can be gouged with a minuten insect pin before applying silver paste or paint to help achieve better contact and bonding.

As with everything, it just takes a bit of experimentation. . . .

... Submitted for Carole Hickman by Tina Carvalho.

42 MICROSCOPY TODAY November/December 2002

Protection from Sulfur Hexafluoride Leaks

Mick Thomas Cornell University mgt3@ccmr.cornell.edu

I recently posted a question on the microscopy listserver about how to safely protect people in a microscope room from a leak of sulfur hexafluoride (SF₆). I am grateful for the valuable advice I received from the microscopy community, and I would like to briefly summarize what I have learned.

In many microscopy situations, the volume of SF₆ in use is relatively small, but safety still needs to be taken seriously. The material safety data sheets indicate that SF₆ is non-toxic under normal operating conditions, but does pose a danger as an asphyxiant, displacing the air necessary for breathing. SF₆ is heavier than air, so that if there is a leak, it will start filling a room from the floor up.

As a result of these properties, a minimum safety requirement is an oxygen sensor(s) mounted at floor level with an alarm and an emergency venting system for the room. The collective wisdom suggests a floor-level venting system that exhausts the SF₆ directly outside the building, and is not tied into any other exhaust system, as the best method. Since SF₆ is heavier than air, removing it through a shared exhaust system can run the risk of introducing it into other rooms as it leaves the building.

Naturally, the design of any safety system must be done in consultation with your local safety officer to ensure that it meets all safety codes. Symptoms of exposure and information on the decomposition of SF_g under certain conditions are outlined in the MSDS, and are well worth reading.



Sorvall MT-2B, MT-2 and MT-1 Ultramicrotomes, GKM Glass Knife Maker, JB-4 Microtome, each complete with accessories and warranty. Reconditioned by factory-trained representative. For prices, call Bill McGee (315) 451-1404. Microtome Service Company, Liverpool New York 13088

CrossMark

					50			8									ſ	^{1.003} He 2
² Be					ana	lytic	al				10.81 0.185	B 12.0	11 C	14.01 N 0.392 (Ti) 7	16,00 O 0.523 (V, Cr) 8	19.00 0.677 (Fe)	F :	0.16 Ne 0.845 10
Mg 12 WWW.evex.com 1.740 pt.suxwi 2 13 - 14 - 13 - 14														^{30,97} P 2.013 (2r) — 15 —	^{32.06} S 2.307 (Мо, Рь) — 16 —	34.45 2.622 	Cl ³⁶ 17 –	^{.95} Ai 957 - 18
¹⁸ Ca ¹¹ ¹¹ 20	44.95 Sc 4.090 0.395 21	^{47,90} Ti ^{4,510 (Ba)} ^{0,452 (N)} 22	50.94 V 4.952 (Ti, Cr) 0.511 (0) 23	^{52,00} Cr ^{5,414 (V)} ^{0,573 (0)} 24	54.94 Mn 5.898 (Cr) 9.637 25	55.85 Fe 6.403 (Mn) 0.705 (F) 26	^{58,93} Co 6,929 9,775 27	58.70 N 7.477 0.851 28	i ^{63,55} Cu 8.047 0.930 29	65.38 ZN 8.637 1.012 (Na) 30	69.72 (9.250 1.098	Ga 72.5 9.88 31 1.18	Ge 32	74.92 As 10.542 1.282 33	^{78.96} Se ^{11.220} 1.379 34	79,90 11.922 1.480	Br 35	53.80 Ki 12.649 1.586 3f
³² Sr 163 38 16 (Si, Ta, W)	^{88.91} Y 14.955 39 1.922	91.22 Zr 15.776 40 2.642 (P)	92.91 Nb 16.617 41 2.166	95.94 Mo 17.481 42 2.293 (S, Pb)	98 Tc 18.368 43 2.424	^{101.07} Ru 19.282 44 2.558	^{102,91} Rh 20.217 45 2.696	106.40 Pc 21.180 40 2.838	d ^{107,87} Ag 6 22,166 47 2,984	^{112,41} Cd 23,175 48 3,133 (K)	114.82 24.209 3.286	In ^{118,} 49 _{25,2} 3,44	⁵⁹ Sn 72 50	^{121.75} Sb 26.359 51 3.604	^{127,60} Te 27,471 52 3,769	126.00 28.615 3.937	1 53	131.30 Xe 29.779 54 4.109
. ³³ Ba 196 56 15 (TI)	L-	^{178,49} Hf 72 7.898 1.645	^{180,95} Та 73 8.145 1.710 (Si, Rb)	183.85 W 74 8.396 1.775 (Si, Sr)	^{186.21} Re 75 8.651 1.843	^{190.20} Os 76 8.910 1.910	^{192.22} lr <u>77</u> 9.175 1.980	195.09 Pt 78 9.441 2.050	^{196.97} Au 79 9.712 2.122	200,59 Hg 70,806 80 0.987 2,195	204.37 72,869 10.267 2,271	Ti 207. 81 74.9 10.5 2.34	² Pb 89 82 50 5 (S, Mo)	208.98 Bi 77.091 83 10.837 2.423	205 Po 79.272 84 11.129 2.501	218 81.513 11.425 2.581	At 85	²²² Rr 83.771 8f 11.725 2.662
12 18 11 14 14 16 16 16 10 10 10 10 10 10 10 10 10 10 10 10 10	Be 4 Mg 12 Ca 20 Sr 38 St. Ta, W) Ba 56 Ti) Ra	Be 4 Mg 12 Ca 44.95 Sc 4.000 0.335 21 Sr 38 14.955 39 1.922 	Be 4 Mg 12 Ca ^{44.95} Sc ^{47.90} Ti 4.516 (Br) 20 0.335 21 0.452 (M) 22 Sr ^{88.91} Y ^{91,22} Zr 38 14,855 39 15,776 40 54,776 40 2.442 (P) 72 7.898 1.445 Ra	Be 4 Mg 12 Ca 44.95 Sc 47.90 Ti 50.94 V 4.590 Ca 44.95 Sc 47.90 Ti 50.94 V 20 0.435 21 0.451 (BP) 22 0.411(0) 23 Sr 88.91 Y 91.22 Zr 92.91 Nb 14.955 39 15.778 40 16.617 41 16.617 41 12.146 2.166 1 Ti 50 St 1.455 1.710 (Si, Rb) Ba 56 L 72.89 Hf 190.05 Ta 7.898 1.455 1.710 (Si, Rb)	Be 4 Mg 12 W Ca 44.95 Sc 47.90 Ti 50.94 V 52.00 Cr 4 Mg 0.335 21 0.452 (N) 22 0.511 (n) 23 0.573 (n) 24 Sr 88.01 Y 91.22 Zr 92.91 Nb 95.94 Mo 38 14.955 39 15.776 40 16.617 41 2.233 (s, Pb) Ba 1.922 2.042 (P) 2.166 2.233 (s, Pb) 2.243 (s, Fb) Ba L .775.49 Hf 180.85 Ta 193.85 W 56 L .78.98 1.710 (sl. Rb) 1.775 (sl. Sr) 1.775 (sl. Sr)	Be 4 Mg 12 Ca 44.95 Sc 47.90 Ti 50.94 V 52.00 Cr 54.94 Mn 20 0.335 21 0.452 (N) 22 0.451 (D) 23 0.577 (D) 24 0.637 (Z) 25 Sr 88.91 Y 91.22 Zr 92.91 Nb 95.94 Mo 98 Tc 38 14.955 39 15.776 40 16.617 41 17.481 42 18.366 43 55.04.W1 1.922 2.494 (P) 2.464 (P) 2.494 (P)	Be 4 A Mg De Conclytic 12 Mg 12 WWW.evex.co Ca 44.95 Sc 47.90 Ti 50.94 V 52.00 Cr 54.94 Mn 55.85 Fe 20 4.99 2.4510 (Bb) 0.452 (Ti, Cr) 6.414 (N) 2.438 (Cr) 6.433 (Mi) 0.705 (F) 26.414 (N) 6.433 (Mi) 0.705 (F) 26.414 (N) 6.437 25 6.433 (Mi) 0.705 (F) 26.414 (N) 6.437 25 6.433 (Mi) 0.705 (F) 26.414 (N) 1.4.95 (Sr) 1.5.776 4.411 (N) 24.42 (Sr) 1.9.22 2.161 1.7.481 42 1.8.966 43 1.9.22 44 2.426 (P) 2.166 2.424 (P) 2.44 2.44 2.44 2.44 2.44 2.44 2.44 2.44 2.44 2.458	Be 4 A Second Second Second Second S	$\begin{array}{c} \textbf{Be} \\ \textbf{4} \\ \textbf{Mg} \\ \textbf{12} \\ \hline \\ \textbf{Cancel yriccel} \\ \textbf{WWW.evex.com} \\ \hline \\ \textbf{Cancel yriccel} \\ \textbf{Www.evex.com} \\ \hline \\ \textbf{Ca} \\ \textbf{4.95} \\ \textbf{Sc} \\ \textbf{4.95} \\ \textbf{Sc} \\ \textbf{4.95} \\ \textbf{20} \\ \textbf{4.35} \\ \textbf{21} \\ \textbf{21} \\ \textbf{21} \\ \textbf{4.35} \\ \textbf{21} \\ \textbf{10} \\ \textbf{21} \\ \textbf{21} \\ \textbf{21} \\ \textbf{10} \\ \textbf{21} \\ \textbf{21} \\ \textbf{10} \\ \textbf{10} \\ \textbf{21} \\ 21$	Be 4 A Mg 12 Concerve con	Be 4 A A Be A A Be A A Be A A Be C State (Cr) Bes Co State (Cr) Bes Bes	Be 4 Mg Image: Constraint of the second sec	Be 4 A Image: Section of the sectin of the sectin of the section of the section of the section of t	Be 4 A Description B 12.011 C Mg 12 12 www.evex.com 1487 13 1.487 13 1.487 13 1.474 14 Ca 4.498 Sc 4.596 M 92.98 M 92.98 1.487 13 1.474 14 Ca 4.498 Sc 4.596 M 92.97 8.587 169.29 1.692 1.147 13 1.474 14 Ca 4.498 Sc 4.596 M 92.97 8.587 169.29 1.692 1.592 1.147 14 14 Ca 4.498 Sc 4.592 (K, Cr) 8.492 10.577 25 0.778 27 8.517 28 0.539 29 1.692 1.992 1.588 32 Sr 8.847 Y 91.22 Zr 92.59 1.158 32 1.588 32 1.992 4.49 2.2166 4.77 2.517 <td>$\begin{array}{c} Be \\ 4 \\ Hg \\ 12 \\ \hline \\ Ca \\ A \\ A \\ A \\ B \\ 20 \\ A \\ A \\ A \\ B \\ S \\ T \\ T$</td> <td>$\begin{array}{c} \begin{array}{c} Be \\ 4 \\ Mg \\ 12 \end{array} \\ \hline \\ Ca \\ 20 \\ 35 \\ 21 \\ ca \\ 35 \\ 20 \\ 35 \\ 21 \\ ca \\ 21 \\ ca \\ 20 \\ 35 \\ 21 \\ ca \\ 20 \\ 35 \\ 21 \\ ca \\ c$</td> <td>$\begin{array}{c} Be \\ 4 \\ Mg \\ 12 \\ \hline \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 21 \\ Ca \\ A 49 \\ A 48 \\ A 4 \\ A 48 \\ A 4$</td> <td>$\begin{array}{c} Be \\ 4 \\ Mg \\ 12 \\ \hline \\ Ca \\ A \\ A \\ A \\ B \\ Ca \\ A \\ A \\ B \\ S \\ S$</td>	$\begin{array}{c} Be \\ 4 \\ Hg \\ 12 \\ \hline \\ Ca \\ A \\ A \\ A \\ B \\ 20 \\ A \\ A \\ A \\ B \\ S \\ T \\ T$	$\begin{array}{c} \begin{array}{c} Be \\ 4 \\ Mg \\ 12 \end{array} \\ \hline \\ Ca \\ 20 \\ 35 \\ 21 \\ ca \\ 35 \\ 20 \\ 35 \\ 21 \\ ca \\ 21 \\ ca \\ 20 \\ 35 \\ 21 \\ ca \\ 20 \\ 35 \\ 21 \\ ca \\ c$	$ \begin{array}{c} Be \\ 4 \\ Mg \\ 12 \\ \hline \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 21 \\ Ca \\ A 498 \\ 20 \\ A 58 \\ 21 \\ Ca \\ A 498 \\ 21 \\ Ca \\ A 49 \\ A 48 \\ A 4 \\ A 48 \\ A 4 $	$ \begin{array}{c} Be \\ 4 \\ Mg \\ 12 \\ \hline \\ Ca \\ A \\ A \\ A \\ B \\ Ca \\ A \\ A \\ B \\ S \\ S$

Sales and Service Sensors - Digital Imaging - Instrumentation

L	139.91 33.441 4.650 0.833	La 57	140.12 34.717 4.839 0.882	Ce 58	140.91 36,031 5.033 0.929	Pr 59	144.24 37.358 5.229 0.978	Nd 60	145 38.725 5.432 1.032	Pm 61	150.40 40.118 5.835 1.085	Sm 62	151.98 41.534 5.845 1.137	Eu 63	157.25 42.992 6.058 1.190	Gd 64	158.93 44.476 6.272 1.245	Tb 65	162.50 45.997 6.494 1.299	Dy 66	164.93 47.534 6.719 1.353	Ho 67	167.26 Er 49.100 68 6.947 1.400	^{168.93} Tm 50.730 69 7.179 1.486	173.04 Yb 52.362 70 7.414 1.523	174.97 Lu 54.078 71 7.654 1.581
A	227.03 88.495 12.650 2.911	Ac 89	232.04 93.382 12.967 2.896	Th 90	231.04 95.886 13.288 3.083	Pa 91	238.03 98.434 13.612 3.171	U 92	237.05 100.800 13.941 3.260	Np 93	244 103.320 14.275 3.348	Pu 94	243 105.970 14.615 3.437	Am 95	247 14.961 	Cm 96	247 	Bk 97	251 15.561	Cf 98	252 16.018 	Es 99	Fm 100	Md 101	No 102	Lr 103







Evex Analytical 857 State Road Princeton, NJ 08540 609-252-9192 (T)



https://doi.org/10.1017/S1551929500058533 Published online by Cambridge University Press